Final Report

# Laboratory and Bench-Scale Testing for Rare Earth Elements


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# EXECUTIVE SUMMARY

The U.S. Department of Energy has recently identified a list of critical elements that are needed to ensure the ability to provide a sustainable source of clean energy of which several are rare earth elements. The supply of these rare earth elements is a significant national concern given that the source is mainly from the international market. An evaluation of data from a U.S. Geological Survey study has recently revealed that coal and coal byproducts may be a significant source for rare earth elements, especially the heavy rare earth elements needed for the renewable energy market. As such, a study had been conducted to evaluate the potential to concentrate rare earth elements (REEs) that exist in coal and coal byproducts using existing physical cleaning methods and technologies.

The investigation involved the collection of six coal and coal byproduct samples from locations that were identified as having material with potentially elevated REE contents. The samples were crushed, screened and split to obtain 6 x 0.6 mm (1/4-inch x 28 mesh) and 0.6 x 0.15 mm (28 x 100 mesh) particle size fractions which were subjected to washability analysis and used to assess the REE pre-concentration potential using six different separation technologies including table concentration, enhanced gravity concentration, wet high intensity magnetic separation and electrostatic separation. The potential of concentrating the REEs in the material finer than 0.15 mm (-100 mesh) was assessed using froth flotation and agglomeration. An additional task was to evaluate the REE concentration that occurs in 20 coal preparation plants that operate in the northern and central Appalachian coalfields.

A mineralogical study was conducted on selected samples from the pre-concentration studies involving the use of SEM-EDS and ToF-SIMS. A portion of the samples were prepared using a low temperature ashing unit to remove the carbon while maintaining the structure of the mineral matter. The mineralogical findings are: 1) the REEs exist as a mineral dispersed within coal in the form of monazite, xenotime and bastnaesite as well as an element substitute in clay and 2) the RE mineral particle size is in the range of 1 – 10 micrometers and smaller.

The potential for pre-concentrating REEs using density-based separators was found to be minimal which can be explained by the ultrafine grain sizes of the RE minerals. Washability data obtained from the 0.6 x 0.15 mm size fraction of the coarse refuse collected from a plant treating Fire Clay seam coal indicates the potential to upgrade the total REEs from 321 ppm to 406 ppm on a whole sample basis which is a modest enrichment of 126%. It is noted that the REE content of the ash-producing mineral matter increased substantially as the specific gravity was reduced. For example, the REE content in the ash material produced from the Fire Clay coarse refuse increased from 455 ppm in the feed to 1485 ppm in the 1.6 SG float fraction which is an increase of 326%. A similar trend was realized from each sample evaluated in the study including those from the 20 coal preparation plants. Based on this finding, bottom ash material was collected from a utility that uses Fire Clay seam coal as fuel. The total REE was around 800 ppm for the

bottom ash material and the washability data suggested equal distribution across all specific gravity fractions.

Froth flotation was found to be the only method of the six evaluated that could be exploited to pre-concentrate REEs. For thickener underflow material collected at a processing plant cleaning Eagle seam coal, the total REE content was increased from 172 ppm (whole coal basis) in the feed to 367 ppm in the flotation concentrate, which is an increase of 213%, using a common collector for rare earth mineral flotation. It should be noted that this performance is not an optimum result given that only five tests were performed on the Eagle seam thickener underflow. Similar REE enrichment was realized from the flotation of the other coal sources with the exception of fly ash material.

A RE mineral release and concentration study was conducted on a sample collected from the middlings stream of an operating preparation plant treating the Fire Clay seam coal. The selection of this material was based on the ability to isolate the mineral matter dispersed within the coal seam from the out-of-seam mineral matter. Crushing the material to a particle size smaller than 6 mm (1/4-inch) and conducting a float-sink test using a 1.5 SG medium resulted in a near 200% increase in the REE content in the sink fraction. The 1.5 SG float material was ground to a mean particle size of 10 micrometers and subjected to froth flotation using fuel oil as the collector. The REE content increased from 118 ppm in the feed to 565 ppm in the tailings of the flotation process. This finding indicates that the finely dispersed, high REE mineral matter can be liberated and concentrated. Further processing of the flotation tailings using appropriate chemistry should improve overall REE concentration performance.

A survey of 20 coal preparation plants from which samples were segregated by particle size and density resulted in 771 samples that were analyzed for total REEs. A mass balance completed on 15 of the 20 plants revealed that nearly 10,000 tons of total REEs exist in the feed to the 15 plants annually. The REE content of the clean coal products ranged from 23 to 84 ppm whereas the content in the reject stream was significantly higher with a range from 118 to 266 ppm. The heavy REEs are concentrated in the plant clean coal products where the heavy-to-light REE ratio is around 0.4.

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# 1.0 INTRODUCTION

There has been a growing concern that the U.S. is losing its leadership in manufacturing – not just in low-tech products due to low wages abroad – but also in the production of high-value products. With the global energy demand expected to increase over 50% by 2035 and concerns over greenhouse gas emissions associated with the continued use of fossil fuels, the U.S. Department of Energy (DOE) is developing viable renewable energy resources which will hopefully kick-off a new industrial revolution and help the U.S. maintain global leadership in manufacturing for generations to come. Much of the renewable energy technologies, such as photovoltaic films, wind turbines, electric and hybrid vehicles, and phosphors, require materials that are not readily available in the U.S. Thus, continued availability of those materials is critical for meeting the DOE's objectives in renewable energy.

The 2011 DOE Critical Materials Strategy Report has identified 15 materials (chemical elements) that are essential for the development of clean energy technologies, of which 8 are rare earth elements (REEs). The DOE report also identified 5 REEs, i.e., dysprosium (Dy), neodymium (Nd), terbium (Tb), yttrium (Y) and europium (Eu), to be most critical and have the highest risks for supply shortages and interruptions. These elements are used not only for renewable energy technologies, but also for cellphones, flat TV screens, medical imaging, defense applications, and many others. Such market demand intensifies the need for the development of a stable, reliable, and domestic supply chain.

Recent studies sponsored by the U.S. Department of Energy (DOE) suggest that coal seams contain REEs at concentration levels that may be economic to extract, recover and refine into marketable products. To investigate this potential resource, researchers at Virginia Tech and the University of Kentucky have undertaken an experimental program to determine the

concentration of REEs in various coal product streams including clean coal products, coal refuse products, and coal byproducts (i.e., fly ash). The work effort includes:

- Exploratory work to determine REE concentrations in various size classes and float-sink fractions from five sources of coal-related material (three fine and coarse refuse streams, one waste coal stream, and one fly ash stream);

- Laboratory and bench-scale separation tests to determine whether existing types of conventional solid-solid separation processes can be used to further concentrate REEs in the five sources of feed material,

- Preliminary characterization tests using spectroscopic methods such as Energy Dispersive X-Ray Spectroscopy (SEM-EDS) to evaluate the potential nature of the associations between REEs and the organic and inorganic constituents contained in coal and coal byproducts, and

- Detailed evaluations of size fractions and gravity classes generated from the clean coal and refuse streams from a typical fleet of industrial coal processing facilities operating in the central Appalachian coalfields.

# 2.0 EXPERIMENTAL

## 2.1 Waste Coal and Byproduct Samples

### *2.1.1 Sample Collection*

Samples used in the initial assessment of REE concentrations were jointly obtained from six different sites by personnel from Virginia Tech and the University of Kentucky. The sites included: i) Three active coal production facilities, ii) a waste coal site (Pennsylvania waste coal supplied by LTI), iii) a power station utilizing Fire Clay seam coal and iv) pit cleanings from an active Texas surface mine. As shown in Figure 1(a), the sampling at two active Kentucky coal preparation plants involved taking incremental samples of coarse coal refuse (plus 100 mesh) and fine coal refuse (minus 100 mesh) every 20 minutes during a three hour period.

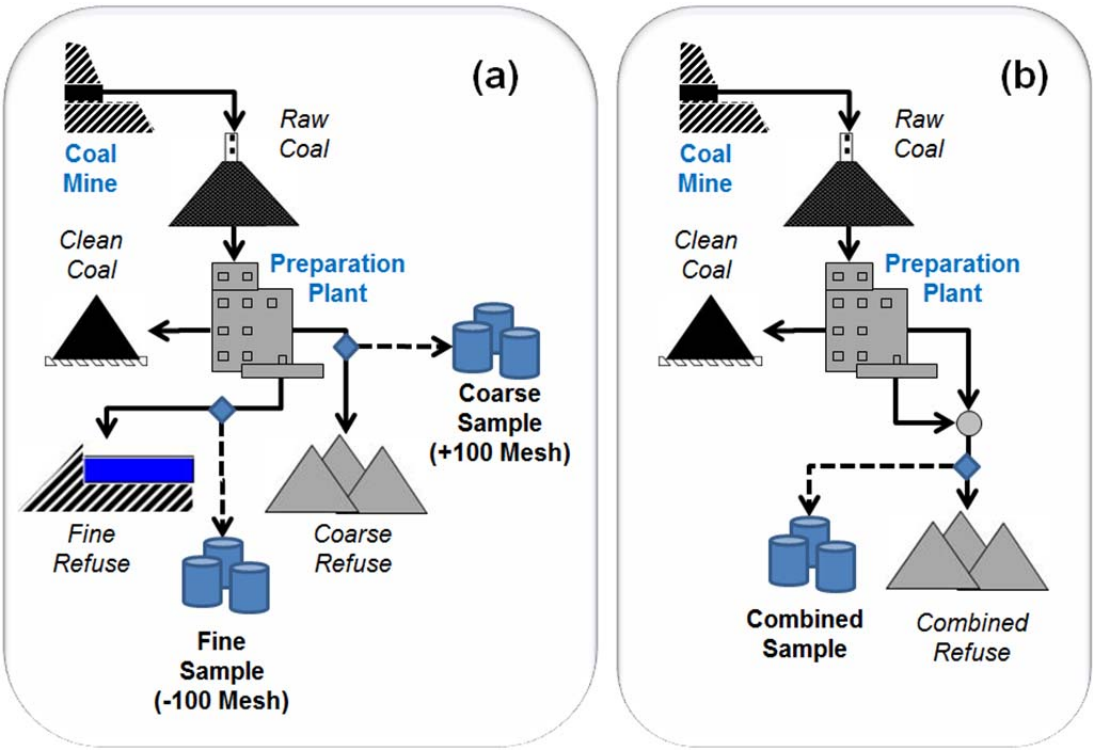



*Figure 1. Sampling locations for the three coal production sites. (a) plants with separate coarse and fine waste streams and (b) plants with a combined coarse and fine waste stream.*

Approximately 1 ton of each sample was collected using sequential sampling techniques to ensure that a reasonably representative lot of material was collected of each stream. The sources of the feed coal at the two plants were the Fire Clay/Hazard No. 4 (UK001) and Fire Clay Rider/Hazard No. 4a (UK003) seam coals. As shown in Figure 1(b), the sample collected at one West Virginia production facility treating Eagle seam coal (UK002) was a combined refuse sample since the plant configuration did not allow separate samples of coarse and fine refuse to be collected. Approximately 2 tons of this material were taken so that it could be separated into coarse (plus 100 mesh) and fine (minus 100 mesh) fractions after transport to the university laboratories. A Pittsburgh coal fines sample (UK005) was provided by LTI, so specific information regarding how the sample was collected is not known. Approximately one ton each of bottom ash and fly ash (UK004) were collected from a power station that utilized Fire Clay seam coal over its long history of producing electricity. Four drums of pit cleanings (UK006) from an active Texas surface operation extracting coal from the Jackson Group lignite formation was collected by mine personnel and shipped to the University of Kentucky.

### *2.1.2 Sample Crushing/Screening*

Each of the three sets of coal refuse samples and Texas pit cleanings were placed into new barrels lined with plastic liners. The barrels were then transported to the university laboratories for crushing and screening into smaller size fractions. Figure 2 shows the experimental procedure used to crush and size the UK 001 and UK 003coarse (plus 100 mesh) refuse samples and the UK 006 Texas sample. The procedure used to treat the UK 002 combined refuse sample was identical except that a rotary washer and screen combination had to be used to re-slurry and size the sample into plus 100 mesh and minus 100 mesh fractions before further

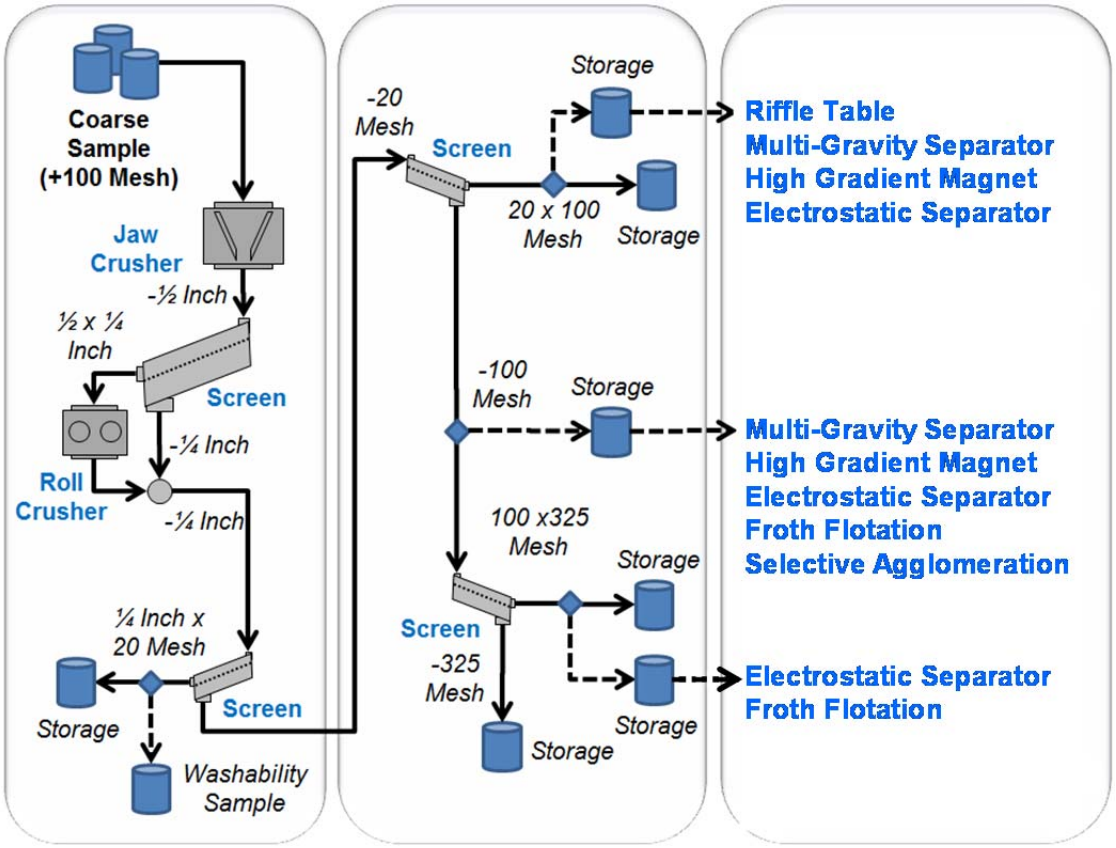



*Figure 2. Procedure used to crush, size and process coarse refuse from the Kentucky coal processing sites and the Texas pit cleaning sample.*

crushing and sizing (see Figure 3). For reference, photographs of the various test equipment are provided in Appendix 5.1.

In each case, the damp sample was placed in a thin layer on a concrete pad and allowed to air dry to constant weight. The sample was then passed through a jaw crusher set to a close-side clearance of ½ inch. The nominal minus ½ inch material was then screened using a pilot-scale vibratory screen to obtain a ½ x ¼ inch oversize product and a minus ¼ inch undersize product. The ½ x ¼ inch oversize was then passed through a roll crusher set to a close-side clearance of ¼ inch. The nominal minus ¼ inch material from the roll crusher and vibrating screen was combined fed to a Sweco-type rotary screen equipped with a 20 mesh sieve panel.

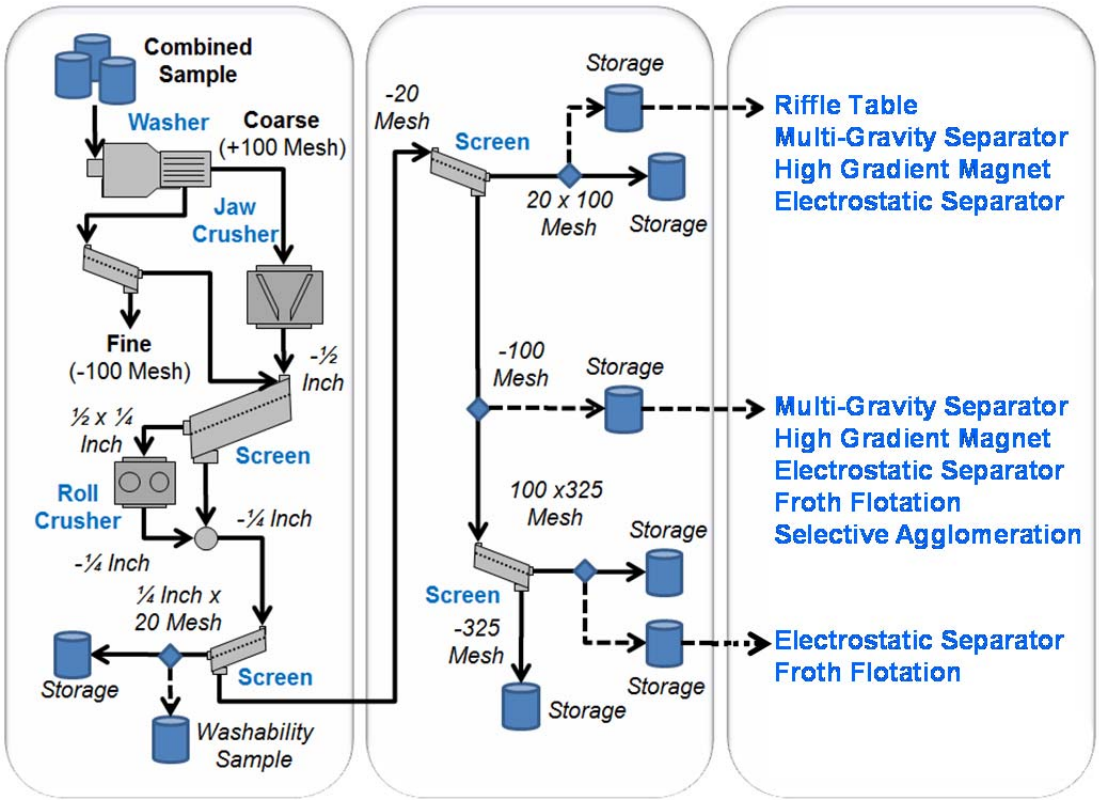



*Figure 3. Procedure used to crush, size and process coarse refuse from the West Virginia production site extracting coal from the Eagle seam (Note: Addition upfront reslurry/sizing steps required to deal with combined refuse).*

One representative sample of approximately 200 lbs of the oversize (¼ inch x 20 mesh) product from the rotary screen was collected, placed into a sealed barrel, and shipped to a commercial laboratory for float-sink testing. A second representative sample of approximately 500 lbs of the oversize (¼ inch x 20 mesh) product was collected, placed into a sealed barrel, and shipped to Kentucky for density separation testing.

For all three plant refuse samples (UK 001, UK 002 and UK 003), the minus 20 mesh fraction from the rotary screen was further sized at 100 mesh using a second rotary screen. Representative splits of the coarse (20 x 100 mesh) and fine (minus 100 mesh) fractions were collected for use in separation tests (riffle table, multi-gravity density separation, high-gradient magnetic separation, froth flotation, electrostatic separation, and selective agglomeration

separation). An additional sizing step was also undertaken to prepare a narrower size fraction of 100 x 325 mesh material for electrostatic separation. This additional sizing step was believed to be necessary since the minus 100 mesh fines did not respond well to electrostatic separation (i.e., the 325 mesh ultrafines caused drum coating issues and created severe dusting/plugging problems).

The Pittsburgh fines sample (UK 005) did not require crushing. The sample was screened and processed in the same manner as shown in Figure 2.

The bottom ash and fly ash material (UK 004) collected at a utility were processed in the University of Kentucky laboratories in a manner very similar to Figure 2. The bottom ash material was screened and crushed to achieve ¼-inch x 28 mesh and 28 x 100 mesh particle size fractions. Samples of both particle size fractions were submitted to a commercial laboratory for float- sink analysis. Separation tests involving riffle tabling, multi-gravity separation and high-gradient magnetic separation were performed on the 28 x 100 mesh particle size fraction. The fly ash sample was treated using froth flotation, selective agglomeration, electrostatics, and high-gradient magnetic separation.

### *2.1.3 Characterization by Density Fractionation and Flotation*

The 200 lb representative sample of the -1/4-inch material of each source was sent to SGS Laboratories to be screened at 28 mesh and 100 mesh. The +28 mesh and 28 x 100 mesh particle size fractions were subjected to washability analyses using medium specific gravity values of 1.6, 1.8, 2.0, 2.1, 2.2, 2.3 and 2.4. The 2.4 sink material was returned to the University of Kentucky where additional separations were conducted using medium gravities of 2.68 and 2.90. In the case of the Pittsburgh coal fines, it was recognized by visual observations that the

majority of the sample had a specific gravity less than 1.6. As such, a medium specific gravity of 1.4 was added to the SGS procedure. Proximate and REE content analyses were performed on the material collected from each density fraction.

The -100 mesh material was returned to the University of Kentucky where a flotation release analysis was performed to determine the ultimate flotation performance and the potential for REE concentration. Approximately 400 grams of solids was slurried with tap water in a 4 liter cell (i.e 10% solids) which was mounted on a Denver Model D5 batch flotation machine and agitated at 1200 rpm in the absence of air. As shown in Figure 4, the standard release test requires two phases in which the first phase removes all of the pure hydrophilic material from the floatable material. In stage1, two drops of diesel were added to the slurry and conditioned for 5 minutes followed by the addition of 1 drop of frother (MIBC) and conditioning for another 30

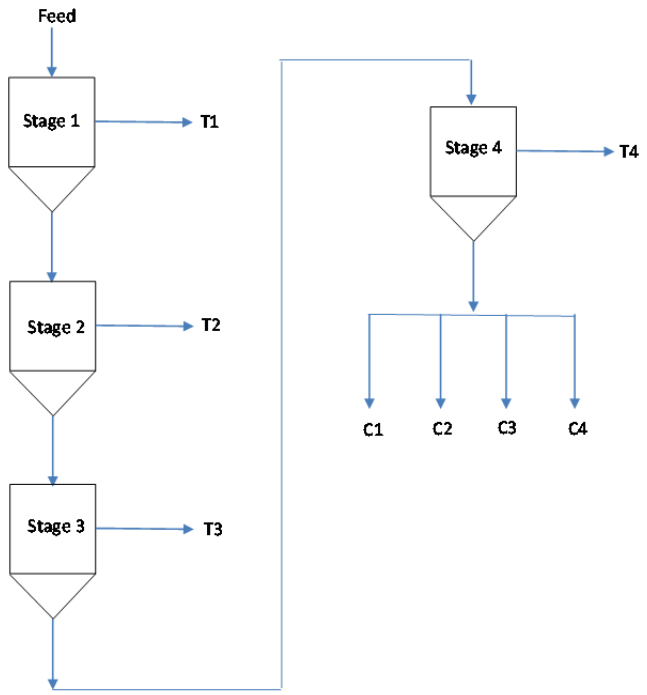



*Figure 4. Flow diagram representing the procedural steps of the standard release analysis procedure.*

seconds. The airflow rate was adjusted to 4.5liters/min and flotation started. The flotation process continued until no particles continued to float. Afterward, the flotation concentrate was added back to the flotation cell and the process repeated. The tailings from the first stage was placed in a container and identified as Tailings 1. The process was repeated three times to ensure that all hydraulically entrainable material was removed.

After the completion of Phase 1, the concentrate was added back to the flotation cell and tap water added to a total volume of 4 liters. Phase 2 was initiated without the addition of collector or frother in an effort to collect the most pure floatable materials. The concentrate was collected until flotation slowed and then the concentrate was set aside and labeled as C1. Afterwards, the flotation conditions were slightly enriched by an increase in frother and rotor rotation speed. Flotation continued until the concentrate rate slowed. The concentrate was labeled as C2. Conditions were again enriched and the process repeated two additional times to create C3 and C4 concentrates.

After the Standard Release Analysis procedure was completed, each of the resulting flotation products and tailing samples were filtered, dried, weighed and assayed for ash content and REE concentration.

The Standard Release Analysis procedure used for fly ash was essentially the same as was used for coal preparation effluents, however a different frother and collector were used. This decision was made based on over 2 decades of experience using this technique for fly ash flotation. While MIBC and fuel oil can certainly be used for fly ash, the quantities required can be excessive and problematic because of the differences in hydrophobic properties of coal and

fly ash carbon. Although the amount of carbon in fly ash is quite small compared to preparation plant effluents (3 to 10% vs. 30 to 60 %), fly ash carbon contains only marginal hydrophobic properties. Fly ash carbon is typically comprised of a mixture of isotropic coke, anisotropic coke and smaller amounts of unburned inertinite. As isotropic and anisotropic coke are both products of incomplete combustion, these particles are highly oxidized and have a highly developed surface area generated by devolatilization. If fuel oil is used as a collector for fly ash carbon, fuel oil droplets are absorbed into the pore structure of the carbon particles during conditioning and provide little surface hydrophobicity. Rather than using fuel oil, the collector used to float fly ash carbon was a mixture of 90% #2 fuel oil and 10% oil soluble petroleum sulfonate. The petroleum sulfonate emulsifies the fuel oil into small droplets that provide numerous advantages in flotation as described in US Patent No. 5,456,363. In addition to a collector, it is necessary to use a frother in flotation. The frother used was a water soluble polypropylene glycol (Percol F948), which provides a more persistent froth than MIBC. A more persistent froth is advantageous because there is very little hydrophobic material present and the hydrophobic particles stabilize the froth phase during flotation.

The only other difference between the release analysis for fly ash and that for preparation plant effluents was in the ashing procedure. Fly ash flotation products were ashed at 750$^{O}$C for 4 hours and the weight loss is reported as Loss on Ignition (LOI). LOI is commonly used as a surrogate for carbon analysis for Class F fly ashes derived from the combustion of bituminous and higher rank coals.

### *2.1.4 Laboratory and Bench-Scale Separation Tests*

Several series of laboratory and bench-scale separation tests were conducted to quantify the potential of enriching rare earth elements using existing physical separation processes.

(Please note that advanced separation processes that are currently under development and that could have potential for these applications were not considered or tested at this time. These advanced processes are not currently commercially available and require additional research and development (R&D) or demonstration and deployment (D&D) before being considered viable in the industrial sector). Six types of laboratory and bench-scale equipment were used to determine whether existing solid-solid separation processes could be used to further concentrate minerals rich in REEs. The six processes included:

- Conventional vibrating table concentration;
- Froth Flotation;
- High-gradient magnetic concentration;
- Multi-gravity separation (centrifugal enhanced gravity separator);
- Electrostatic separation (high tension corona separator);
- Selective agglomeration separation (oil agglomeration separator).

Brief descriptions of each of the technologies and the test procedures utilized during testing are provided in the following paragraphs. REE concentration for the coarse fraction was evaluated using a riffle table. The Multi-Gravity Separator (MGS) was used to treat 20x100 mesh and minus 100 mesh material from the coarse refuse stream and -100 mesh material from the fine refuse stream. The Electrostatic Separator (ESS) was used to treat the 20x100 mesh and 100x325 mesh material from the coarse refuse stream and 100x325 mesh material from the fine refuse stream. A batch-type, wet high intensity magnetic separator was used on the same size fractions as the electrostatic tests. The Selective Agglomeration (SOA) process and froth flotation was used to evaluate the separation potential of -100 mesh solids in the coarse and fine refuse streams.

a) Riffle Table Concentration

Riffle table tests were conducted on all the representative 28x100 mesh coarse refuse samples and bottom ash samples. The main objective was to collect multiple splits of each sample across the table with an emphasis on making a high density cut. There were a total of five splits collected across the table for each sample starting with fine clean coal on the right to dense coarse material on the extreme left. Each split was then oven dried, ashed at 500 °C and analyzed for REE concentration along with moisture and ash analysis.

The feed material was continuously fed on to the table using a vibratory feeder and high flow rate of water was used for evenly distributing the feed sample. Product collection started once a steady distribution of the feed across the table was achieved. The experimental set-up is provided in Figure 5. Following each table test, the raw feed and all product fractions were analyzed for ash percentages. A split of both raw feed and each product fraction was then analyzed for rare earth elements using ICP-OES.

b) Multi-Gravity Centrifugal Separation

The Multi-Gravity Separator (MGS) was developed by Richard Mozley Limited, U.K., for the selective separation of fine particles based on differences in density. The operating principle of MGS is similar to that of a conventional shaking table. However, by placing the table surface inside a rotating drum, it is possible to achieve many times the normal gravitational pull on the particles as they move across the table in a film of water flowing along the internal surface of the drum. The centrifugal field allows finer particles to be selectively separated than would be possible using conventional flowing-film separators.

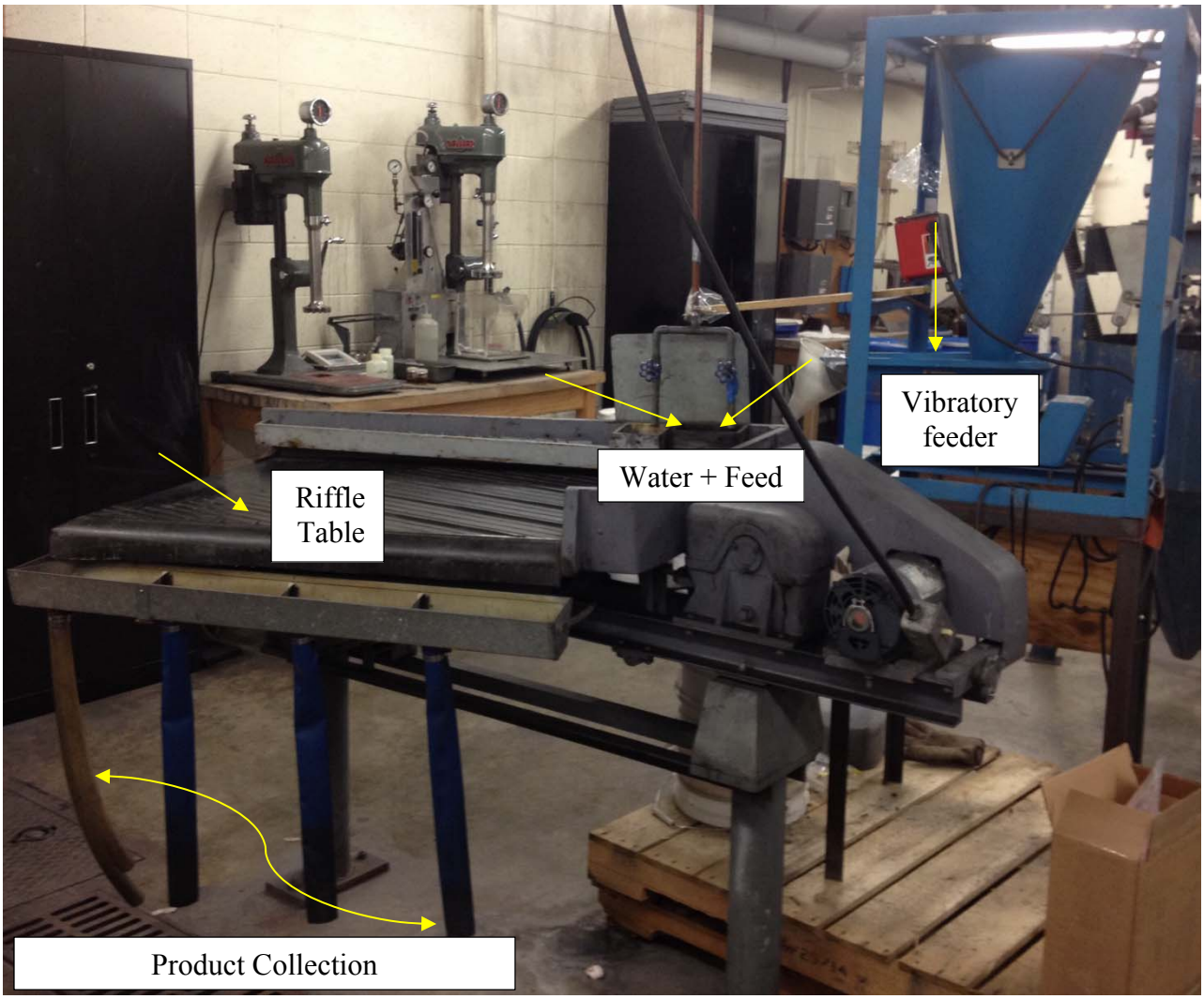



*Figure 5. Experimental set-up for Riffle Table Tests.*

Successful applications of the MGS technology include the concentration of cassiterite, chromite, wolframite, graphite, mixed sulfides and gold. For these applications, MGS can treat particles in the range of 1-1000 mm with high separation efficiencies. The lower particle size limit is much smaller than can be achieved with any other commercially-viable gravity separation process. For example, shaking tables are generally effective over a particle size range of 200-1,200 mm. Tests suggest that the MGS may be useful for processing fine coals down to 5

mm in diameter. A photograph of the MGS unit used in the current test program is shown in Figure 6.

*Figure 6. Multi-Gravity Separator (MGS).*

During testing, the operating parameters adjusted for the MGS included feed rate, drum speed, water rate and feed solids content. After setting these parameters at a "visually optimal" level (i.e., 276 RPM, 6 cycles/sec oscillation, 10 mm amplitude, 6 degree slope), the MGS was allowed to operate for a time sufficient to reach steady-state conditions. After this period of time, representative samples of the feed, clean-coal and reject streams were collected using standard sampling techniques, dried and subjected to ash and REE analyses. The centrifugal field was then increased by raising the rotation speed from 276 to 282 RPM and a second sample was collected using standard sampling techniques, dried and subjected to ash and REE analyses.

c) Electrostatic Separation

Electrostatic (high-tension) separators are used to separate conducting from non-conducting solids. In this process, particles are charged by a corona discharge prior to being dropped onto a rotating metallic drum. Upon colliding with the drum, conducting particles lose their charge and are removed via centripetal acceleration. Non-conducting particles remain on the drum surface and eventually drop off or are removed using a brush. High-tension separators are preferred for feeds containing coarse conductors and fine non-conductors. Typically, the feed particles must be very dry and have a narrow size distribution in the range of 28 to 150 mesh. Industrial plants use multiple stages of scavenging/cleaning to improve the separation efficiency.

A bench-scale electrostatic separator equipped with twin corona electrodes was used in the current test work. A photograph of the electrostatic separator unit used in the current test program is shown in Figure 7. In each test, approximately 2 kg gm of dry feed material was introduced into a hopper and heated to ensure that it is completely dry. Then, the hopper door was opened and the feed was allowed to flow in a thin layer onto a rotating wheel. An electrode was used to shower the feed material with electrons. For materials that are conductors, the electrons easily pass through the material and the material is thrown from the wheel by centrifugal force. For non-conductors, a charge builds up on the surface of the minerals causing them to be pinned to the wheel until they are brushed off. Splitters on the product chutes were used to control the amount of conductor, middling, and non-conductor products produced. The rotational speed of the wheel, the feed rate, and the applied potential were "visually optimized" to provide a conduct, non-conductor and a middling products. The products were collected and subjected to ash and REE analyses.

*Figure 7. Electrostatic Separator (ESS).*

d) Wet High Intensity Magnetic Separation (WHIMS)

Magnetic separation tests were performed using a batch-type wet high intensity magnetic separator (WHIMS) on all 28 x 100 mesh and -100 mesh samples of UK 001 coarse refuse, UK 002 coarse refuse and UK 003 coarse refuse. Additional tests were also performed on bottom ash

and fly ash samples UK 004 from a power plant completing a total set of eight feed materials for these tests. A flow chart describing the process is shown in Figure 8.

A total of five product fractions were obtained comprising of a non-magnetic material, (T1), strongly magnetic (T2), moderately magnetic (T3), REE concentrate (C) and weakly magnetic (T4). Approximately one kilogram of the feed material was blended with five liters of water and fed to the magnetic separation unit at a feed rate of 2 l/min. For the bottom ash feedstock, approximately 400 grams of feedstock was used at a lower feed rate of 0.5 l/min as the separation was not efficient at higher feed rates. The process consisted of four stages wherein, the feed was first subjected to a magnetic field strength of 1.5 Tesla (T) to remove the

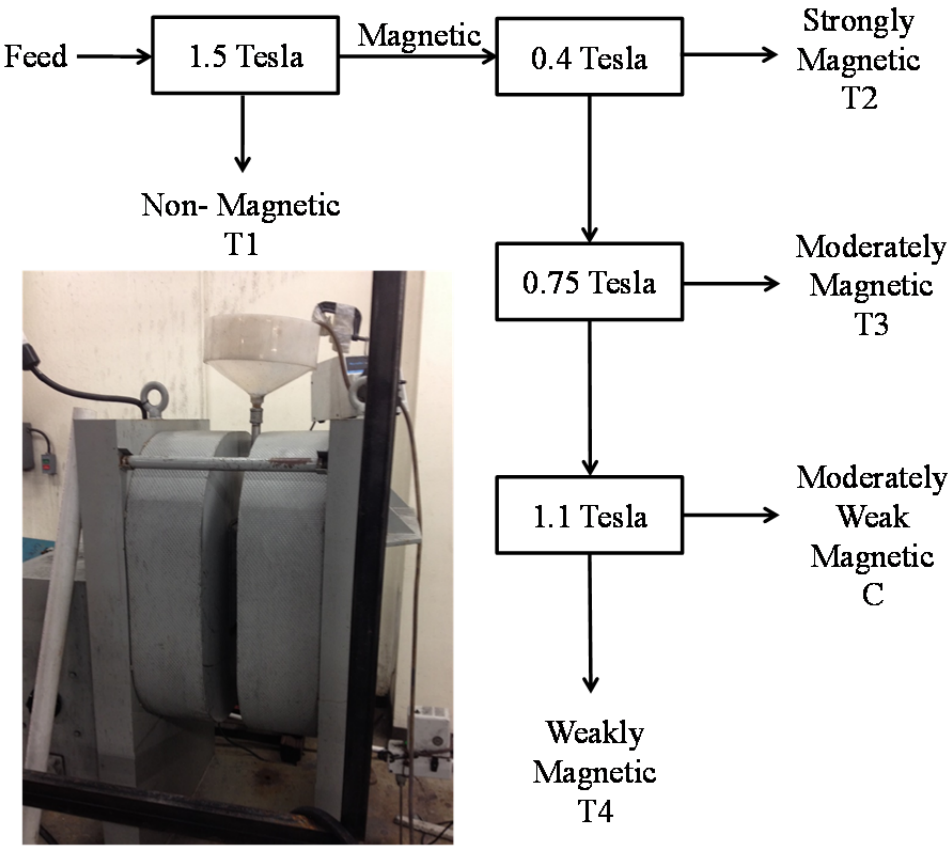



*Figure 8. Photograph of the laboratory WHIMS unit and flow chart describing the magnetic separation test program conducted on each sample.*

non-magnetic material (T1). The magnetic material from the first stage was passed through a 0.4 Tesla magnetic field to remove the strongest magnetic particles (T2). The field strength was increased in subsequent stages to recovery the weaker magnetic particles in three different increments with the magnetic stream collected using the 1.1 Tesla field strength considered the concentrate (C).

e) Selective Agglomeration Separation

Selective (oil) agglomeration is surface-based separation process used to separate fine particles. In this process, one or more "light" hydrocarbon oils such as diesel fuel or kerosene are added to an aqueous slurry containing hydrophobic and hydrophilic solids. The oil selectively coats and agglomerates the hydrophobic solids, which can then be separated by simple screening of the larger hydrophobic agglomerates away from hydrophobic solids dispersed in water.

A photograph of the selective oil agglomeration laboratory unit is shown in Figure 9. A three step procedure was used to determine the separation potential of each source of feed material. In the first step, a high-speed kitchen blender was used to contact oil with fine particles contained in each sample. The agitated slurry was then passed across a fine sieve (100 mesh) to remove naturally hydrophobic fine particles. A reagent known as a collector was then added to the aqueous phase to increase the hydrophobicity of one or more selected minerals such as monazite which

*Figure 9. Selective Oil Agglomeration (SOA).*

are potentially rich in REEs. After adding a second dose of oil to the mixture, the slurry was again agitated in the kitchen blender to agglomerate the minerals made hydrophobic by the addition of the collector. The larger agglomerates were then separated from the hydrophilic minerals dispersed in water by passing the slurry mixture across a 100 mesh sieve. Representative samples of the coal agglomerates, mineral agglomerates and dispersed minerals were collected, filtered, dried and then subjected to ash and REE analyses.

f) Froth Flotation Process

For the thickener underflow and -100 mesh material produced when crushing the coarse refuse, flotation was used to explore the ability to concentrate REEs. The experiments were conducted using a 2-liter laboratory Denver flotation cell shown in Figure 10 and a rotational speed of 1200 rpm. The solids concentration was adjusted to 10% by weight and conditioned for 5 minutes with the appropriate collector and frother.

*Figure 10. Laboratory Denver froth flotation unit.*

For all samples, the carbon material was first removed in primary and secondary flotation stages as shown in Figure 11 using diesel oil and MIBC as collector and frother, respectively. For the first stage (R.C.1), a sufficient amount of collector and frother were added to recover as much carbon as possible from the slurry. In stage 2 (R.C.2), nearly the same amount of collector and frother as R.C.1 was added to remove carbon thoroughly. To reduce the entrapment of refuse mineral in the concentrate, the combined concentrate of stage R.C.1 and R.C.2 was refloated without any

collector. A small amount of frother was added to ensure complete recovery of the carbon material.

The tailings of R.C.2 and R.C.3 were combined together and introduced to the REE flotation separation (F.S.) stage. At this stage, a one-liter flotation cell was used and the flotation speed was maintained at 900 rpm. During the conditioning stage, a high solid concentration was used (around 20% by weight) to improve the conditioning performance. Before adding the collector, the slurry pH was adjusted to a value of around 9.50 using NaOH. Different collectors (sodium oleate, oleic acid, Talon 9400) were used as collector, and frother (MIBC) was added as needed for bubble generation. The slurry was conditioned with the collector for 5 minutes. After

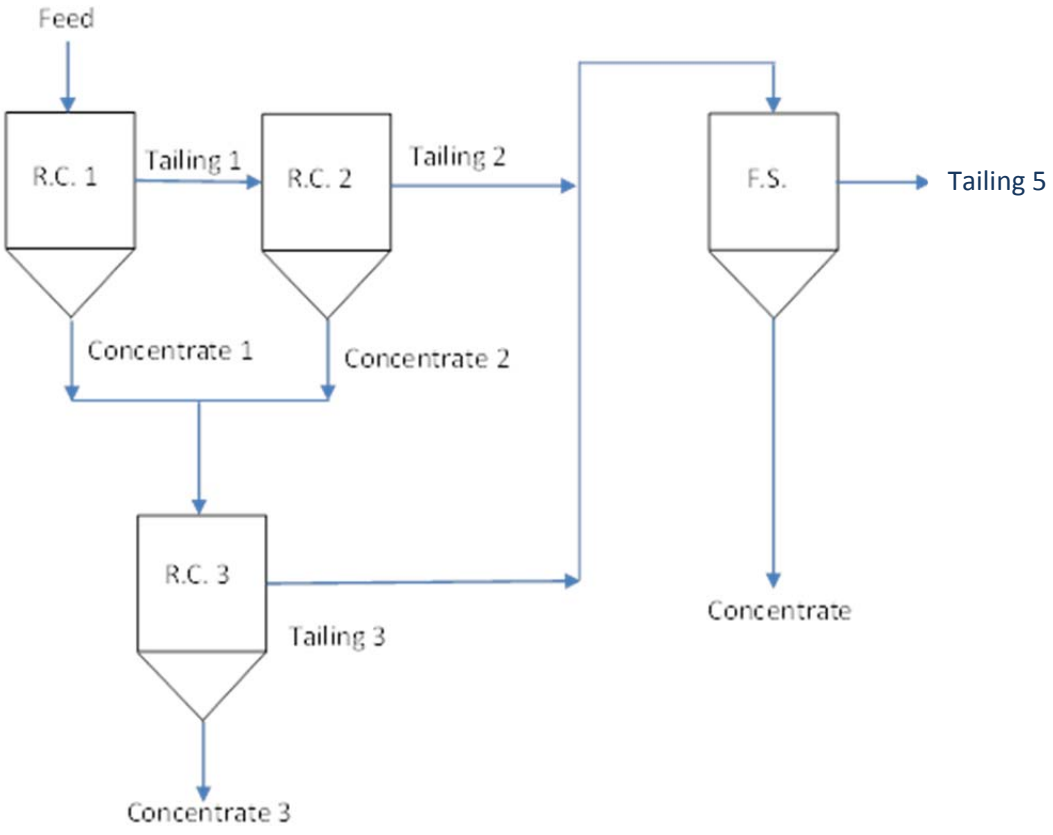



*Figure 11. Flow sheet of flotation separation test (R.C. represents a carbon removal step and F.S. refers to a REE concentration step).*

conditioning, water was added to adjust the solid concentration to 10% by weight. Flotation time was held constant at 5 minutes.

## 2.2 Coal Preparation Plant Samples

A preliminary field survey was undertaken to determine the distributions of rare earth elements present in the clean coal, coarse refuse and fine refuse products generated by a representative group of coal preparation plants operating in the eastern U.S. coalfields. To this end, representative samples of these products were collected and analyzed for 20 different industrial coal preparation plants. The products were dried, split into particle size classes, and subjected to float sink (washability) testing. The size and density classes examined in the work were selected to best reflect with the individual particle size ranges and density separation points appropriate for each processing facility. This report (i) provides a detailed overview of the experimental test data collected under this effort and (ii) discusses some of the general trends in associations between rare earth elements and the products generated by coal processing faciilities operating in the the eastern U.S. coalfields.

### *2.2.1 Plant Sampling*

Three composite samples were representatively taken from each coal processing facility. As illustrated in Figure 12, the composite samples were taken as (i) fine coal refuse, (ii) coarse coal refuse, and (iii) clean coal product. Standard ASTM sampling procedures were used to collect, subdivide, transport and store the collected samples. A total of 20 different coal processing facilities were sampled under this portion of the testing program. For corporate confidentiality reasons, the names of the processing facilities have been excluded from this

report and instead each plant has been identified using an identification number between 1 and 20. Plants located in southwestern West Virginia include plants 1, 5-6, 8-11 and 20. Plants located in central/northern West Virginia include plants 2, 4 and 7. Plants located in western Pennsylvania include plants 12-15. Plants located in Virginia include plants 16-19. Plant 3 was located in eastern Kentucky. Although samples were collected and analyzed for all 20 plant sites, mass balances could only be completed for 15 plants due to problems in establishing tonnage rates as a result of physical limitations associated with plant circuitry. Therefore, many of the values plotted in this document represent the full set of 20 plants, while others requiring mass balance data represent only 15 plant facilities.

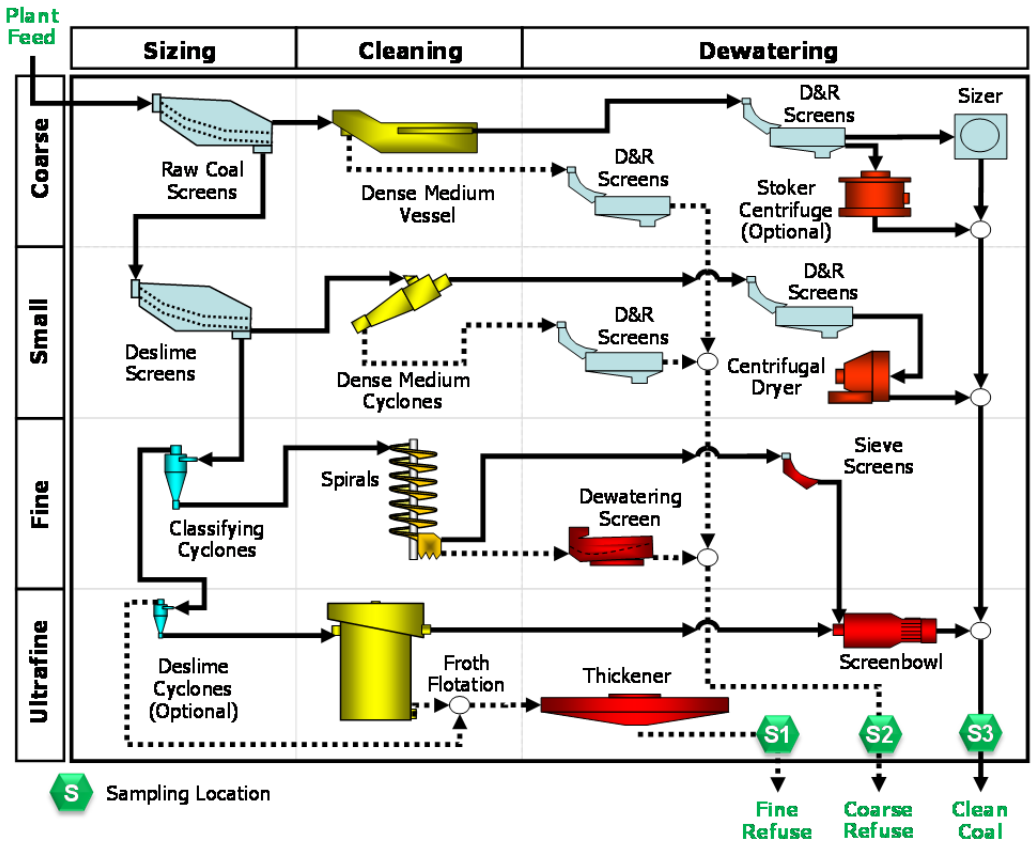



*Figure 12. Sampling points in a typical flow sheet.*

### *2.2.2 Particle Size and Density Partitioning*

Each of the three composite samples collected from the coal processing plants were subdivided into three or more particle size fractions, as appropriate to describe the circuitry in each facility. Each size fraction greater than 100 mesh (0.15 mm) was then subjected to float-sink (washability) analysis using mixtures of dense organic liquids. Unless otherwise noted, the float-sink procedure was used to generate (i) a low-ash "float" product, (ii) a medium-ash "middlings" product, and (iii) a high-ash "reject" product. The specific gravity (SG) values used during the float-sink analysis were adjusted as appropriate to reflect the target cutpoint gravities (SG) for each plant. This selection normally involved 3 or 4 float-sink gravities in the ranges of 1.5 to 1.8 SG.

### *2.2.3 Sample Analysis*

All of the individual samples generated from the size-by-size float-sink analysis were subjected to ash and rare earth element (REE) analyses. The data from the partitioning work generated a total of 771 individual samples for REE analysis. The results of these analyses are fully summarized in Appendix 5.6. It should be noted that some middlings classes were found to have insufficient weight for REE analyses. In such cases, the low-weight samples were recombined with either the clean coal or reject products prior to analysis, depending on the ash contents of the fractions.

## 2.3 REE Analyses

The washability (float-sink) samples were analyzed for REE content by a commercial laboratory with the exception of the Texas lignite samples. The commercial laboratory used ICP-MS for the REE analyses.

For all other samples, the REE content was analyzed at the University of Kentucky. The specific elements analyzed as part of this effort were as follows:

- Cerium or Ce (58)
- Dysprosium or Dy (66)
- Erbium or Er (68)
- Europium or Eu (63)
- Gadolinium or Gd (64)
- Holmium or Ho (67)
- Lanthanum or La (57)
- Lutetium or Lu (71)
- Neodymium or Nd (60)
- Praseodymium or Pr (59)
- Scandium or Sc (21)
- Samarium or Sm (62)
- Terbium or Tb (65)
- Thulium or Tm (69)
- Yttrium or Y (39)
- Ytterbium or Yb (70).

The sample preparation procedure followed the ASTM D6357 method for ashing and digestion of the coal and refuse samples with modifications made to the digestion to allow for use of the digestion block apparatus. An ICP-OES instrument was utilized for the determination of REE concentration in the resultant solution.

The ICP-OES unit was calibrated using four standards made at the following concentrations: 0 ppm, 0.2 ppm, 1.0 ppm and 10.0 ppm. The calibration was verified by two independent sourced check standards at the frequency of not less than every 20 samples:

i. Check 1 @ 2.5 ppm (from individual 1000ppm stds - CPI);

ii. Check 2 @ 1.0 ppm (from multi element 100 ppm std – VHG Labs).

The recovery of these check standards was +/- 10% RSD.

One duplicate sample was chosen at random and ran through the entire process to verify repeatability at the frequency of not less than one every 40 samples. A total of 54 duplicates were analyzed during the program. The average difference in the total REEs + Y content between the duplicate samples was 15 ppm with a standard deviation of 16 ppm.

One or more standard reference materials was digested and analyzed alongside unknown samples and compared against best known values in each batch of samples. These included SRMs from the USGS, NIST, SARM and other round robin proficiency testing programs. Comparisons of REE analyses data from the ICP-OES with a standard sample conducted as part of the quality control method used in this study is provided in Table 1.

The REE content results are reported on an ash basis and on a 'whole coal' or 'whole sample' basis. The ash-based REE contents were obtained directly from the ICP analysis. The 'whole coal' or 'whole sample' REE values were calculated utilizing the ash content of each sample. The expression used to convert the ash-based REE to whole coal or sample REE is:

$$REE_{whole\ coal\ or\ whole\ sample} = \left(REE_{ash-based}\frac{weight\ parts\ REE}{total\ ash\ weight}\right)\left(\frac{Ash\ \%}{100}\frac{total\ ash\ weight}{total\ sample\ weight}\right).$$

*Table 1. Comparison of REE analysis data obtained from the ICP-OEC unit used in this study with the REE data provided for a standard sample.*

| Date | Parameter | Rare Earth Element | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Y | Ce | Dy | Er | La | Nd | Pr | Sc |
| 9/29/2014 | Calibrated Value (ppm) | 89 | 190 | 17 | 8.7 | 94 | 85 | 23 | 41 |
| | ICP Analysis 1 (ppm) | 80.41 | 163.6 | 15.6 | 7.21 | 83.89591 | 81.87 | 28.05 | 42.60 |
| | Analysis 1 REE Recovery (%) | 90.3% | 86.1% | 91.8% | 82.9% | 89.25% | 96.31% | 122.0% | 103.9% |
| | ICP Analysis 2 (ppm) | 80.52 | 162.4 | 15.7 | 7.24 | 83.25045 | 81.04 | 28.01 | 42.29 |
| | Analysis 2 REE Recovery (%) | 90.5% | 85.5% | 92.6% | 83.2% | 88.56% | 95.34% | 121.8% | 103.2% |
| 9/30/2014 | Calibrated Value (ppm) | 89 | 190 | 17 | 8.7 | 94 | 85 | 23 | 41 |
| | ICP Analysis 1 (ppm) | 72.37 | 163.9 | 15.3 | 7.53 | 84.7 | 81.29 | 44.30 | 42.85 |
| | Analysis 1 REE Recovery (%) | 70.9% | 86.3% | 89.8% | 86.6% | 90.12% | 95.64% | 192.6% | 104.5% |
| | ICP Analysis 2 (ppm) | 79.1% | 163.1 | 15.0 | 7.71 | 84.5 | 80.63 | 43.63 | 42.69 |
| | Analysis 2 REE Recovery (%) | 79.7% | 85.9% | 88.5% | 88.6% | 89.9% | 94.86% | 189.7% | 104.1% |
| 10/1/2014 | Calibrated Value (ppm) | 89 | 190 | 17 | 8.7 | 94 | 85 | 23 | 41 |
| | ICP Analysis 1 (ppm) | 78.69 | 162.4 | 15.8 | 7.46 | 83.5 | 83.77 | 45.90 | 42.68 |
| | Analysis 1 REE Recovery (%) | 88.4% | 85.5% | 93.1% | 85.7% | 88.85% | 98.55% | 199.6% | 104.1% |
| | ICP Analysis 2 (ppm) | 78.2 | 161.1 | 15.6 | 7.39 | 83.1 | 82.95 | 45.54 | 42.38 |
| | Analysis 2 REE Recovery (%) | 87.9% | 84.8% | 92.0% | 85.0% | 88.4% | 97.58% | 198.0% | 103.4% |
| 10/2/2014 | Calibrated Value (ppm) | 89 | 190 | 17 | 8.7 | 94 | 85 | 23 | 41 |
| | ICP Analysis 1 (ppm) | 79.62 | 161.3 | 16.0 | 7.70 | 84.2 | 84.64 | 46.27 | 42.99 |
| | Analysis 1 REE Recovery (%) | 89.5% | 84.9% | 94.1% | 88.5% | 89.53% | 99.57% | 201.2% | 104.9% |
| | ICP Analysis 2 (ppm) | 79.4 | 160.7 | 16.0 | 7.57 | 83.9 | 84.53 | 46.03 | 42.81 |
| | Analysis 2 REE Recovery (%) | 89.2% | 84.6% | 93.9% | 87.0% | 89.2% | 99.45% | 200.1% | 104.4% |
| 10/27/2014 | Calibrated Value (ppm) | 89 | 190 | 17 | 8.7 | 94 | 85 | 23 | 41 |
| | ICP Analysis 1 (ppm) | 79.28 | 169.3 | 16.2 | 7.61 | 86.7 | 86.97 | 44.99 | 42.44 |
| | Analysis 1 REE Recovery (%) | 89.1% | 89.1% | 95.6% | 87.5% | 92.25% | 102.32% | 195.6% | 103.5% |
| | ICP Analysis 2 (ppm) | 79.5 | 169.7 | 16.3 | 7.62 | 87.0 | 87.74 | 45.26 | 42.30 |
| | Analysis 2 REE Recovery (%) | 89.3% | 89.3% | 96.2% | 87.6% | 92.6% | 103.22% | 196.8% | 103.2% |

## 2.4 Sample Characterization Studies

One of the important tasks to be undertaken in this project was the characterization of selected samples using advanced spectroscopic tools such as SEM-EDS analysis. Data from this type of analysis can provide mineral association and liberation information that is critical to the identification and design of separation processes suitable for concentrating REEs. Due to the high cost, equipment and labor requirements for this type of work, only samples found to have potential for REE separations (i.e., rich in REEs) were subjected to characterization.

### *2.4.1 Equipment*

Scanning Electron Microscope (SEM) with Energy Dispersive X-Ray Spectroscopy (EDS): The SEM-EDS uses a focused high energy electron beam directed onto a sample to generate extremely high magnification (up to 20,000X) images with a resolution up to 2 nm. The high energy electron beam also produces secondary electrons, back-scattered electrons (BSE), and characteristic x-rays. In the present work, an SEM-EDS equipped in FEI Quanta 600 FEG (FEI, USA) was used to obtain the images of RE minerals and determine the elements in the minerals.

Time-of-Flight-Secondary Ion Mass Spectrometry (ToF-SIMS): Time-of-flight secondary ion mass spectrometry (ToF-SIMS) uses a pulsed primary ion beam to desorb and ionize species from a sample surface. The resulting secondary ions are accelerated into a mass spectrometer, where they are mass analyzed by measuring their time-of-flight from the sample surface to the detector. There are three different modes of analysis: 1) mass spectra to determine the elemental and molecular species on a surface; 2) images to visualize the distribution of individual species on the surface; and 3) depth profiles of different chemical species. ToF-SIMS provides mass

spectroscopy for characterization of chemical composition, imaging for determining species distribution, and depth profiles.

### *2.4.2. Samples*

For SEM-EDS analysis, a powdered sample was sprinkled on a sticky carbon tape, so that the particles are evenly distributed as a mono-layer. The sample was then coated with carbon or Au/Pd with thicknesses of approximately 5 nm. This was necessary to create a conductive surface for electrons.

Some samples were analyzed by ToF-SIMS. For these analyses, a powdered sample was mounted in an epoxy, and the resulting briquette was polished. The polished sample surface was sputtered with a 14-nA $Bi^+$ beam to remove organic species. All of the images were obtained at 0.2 pA current for high-lateral resolution. The analysis was carried out using i) the high current bunching mode to obtain high mass resolution spectra to identify and detect REEs and ii) the Burst Alignment mode to achieve high lateral resolution.

<u>Mineral Matter in Coal and Coal Byproducts</u>: Five different coal and coal byproduct samples were received. These included:

a) mineral matter isolated from a clean coal sample obtained at a Kentucky coal preparation plant treating Fire Clay seam coal where the UK 001 sample was collected;
b) mineral matter isolated from the raw coal feed to the coal preparation plant treating Fire Clay seam coal where the UK 001 sample was collected;,

c) fly ash produced from a utility using clean coal that originated from the Fire Clay coal seam;

d) bottom ash produced from a utility using clean coal that originated from the Fire Clay coal seam;

e) mineral matter isolated from the middlings stream at a coal preparation plant treating Fire Clay seam coal;

f) samples identified as 'a',' b' and 'c' that were obtained by micronizing Fire Clay seam coal samples and subsequently floating the coal away from mineral matter repeatedly to produce a nearly pure coal.

Mineral Matter Obtained by Low-Temperature Ashing: When a coal is burned at high temperature, the mineral matter in coal is fused to become glass spheres and loses its inherent mineral identity. One way to isolate the mineral matter in coal without changing its identity would be to 'burn' a coal sample in a low-temperature plasma oven, which is referred to as low-temperature ashing. We received five different samples of mineral matter isolated in this manner. These included those from the following samples:

a) Fire Clay clean coal;

b) Fire Clay 1.6 SG float in the coarse reject Fire Clay sample (UK 001),

c) Run-of-mine (ROM) Fireclay coal;

d) Fly ash produced from the Fire Clay seam coal; and

e) Fire Clay seam coal obtained from feed to a Kentucky utility plant.

# 3.0 RESULTS AND DISCUSSION

## 3.1 Washability and Release Analyses

### *3.1.1 Washability Analyses*

Previous published data indicated that the rare earth minerals were associated with the mineral matter within the coal and pre-concentration could be achieved by density separations. As such, representative samples were collected from the coarse and fine reject streams at three coal processing plants. It is noted that all three coal sources originated from underground mining operations that extract a significant amount of out-of-seam material. The impact is that the out-of seam material could dilute the mineral matter in the coal having an affinity with the rare earth elements (REE) and thus limit the ability to concentrate the REEs by density-based separators.

The coarse material was crushed to a particle size finer than 6 mm (-1/4-inch) followed by screening to obtain two separate particle size fractions, i.e., 6 x 0.6 mm (1/4-inch x 28 mesh) and 0.6 x 0.15 mm (28 x 100 mesh). Representative samples of the two particle size fractions were subjected to float-sink analysis from which the material in each density fraction was weighed and analyzed for rare earth element concentration. All the washability data with rare earth analysis results are provided in Appendix 5.3A.

The results obtained from the analysis of the three coarse reject samples shown listed in Table 2 and plotted in Figure 13 indicate that the majority of the weight exists in the specific gravity fractions between 2.4 and 2.68. The total REE contents on a whole coal basis were found to be relative close between the three sources with the highest concentration of around 320 ppm in the Fire Clay coal (UK 001) while the contents in the Eagle (UK 002) and Fire Clay Rider (UK 003) were slightly lower. The overall concentration behavior of the rare earth elements (REE) was consistent between the coarse and finer particle size fractions for all three coal

*Table 2. Density-by-density weight, ash and REE content distributions in the three coarse reject samples collected from operation coal preparation plants; Fire Clay seam (UK001), Eagle seam (UK002) and Fire Clay Rider (UK003).*

| Sample | Specific Gravity | | +28 Mesh Incremental Analysis | | | | | 28 x 100 Mesh Incremental Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sink | Float | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) |
| Fire Clay Seam Coarse Reject (UK 001) | Float | 1.60 | 1.50 | 22.50 | 2091 | 471 | 2.17 | 6.20 | 15.43 | 1485 | 229 | 4.42 |
| | 1.60 | 1.80 | 1.90 | 44.39 | 933 | 414 | 2.41 | 2.50 | 44.39 | 865 | 384 | 2.99 |
| | 1.80 | 2.00 | 2.40 | 57.84 | 647 | 374 | 2.76 | 2.30 | 56.99 | 679 | 387 | 2.77 |
| | 2.00 | 2.10 | 1.70 | 68.13 | 587 | 400 | 2.09 | 2.10 | 66.33 | 612 | 406 | 2.66 |
| | 2.10 | 2.20 | 2.10 | 74.86 | 529 | 396 | 2.55 | 2.70 | 74.44 | 538 | 401 | 3.37 |
| | 2.20 | 2.30 | 4.00 | 80.21 | 452 | 362 | 4.44 | 3.30 | 79.98 | 470 | 376 | 3.86 |
| | 2.30 | 2.40 | 15.40 | 85.92 | 326 | 280 | 13.24 | 19.70 | 87.53 | 369 | 323 | 19.81 |
| | 2.40 | 2.68 | 60.78 | 93.00 | 353 | 328 | 61.20 | 56.75 | 92.22 | 351 | 324 | 57.20 |
| | 2.68 | 2.90 | 9.44 | 90.83 | 335 | 304 | 8.81 | 2.79 | 91.16 | 300 | 273 | 2.38 |
| | 2.90 | Sink | 0.78 | 83.77 | 162 | 136 | 0.32 | 1.66 | 77.42 | 137 | 106 | 0.55 |
| | Total | | 100.00 | 87.49 | 401 | 326 | 100.00 | 100.00 | 82.83 | 455 | 321 | 100.00 |
| | | | | | | | | | | | | |
| Eagle Seam Coarse Reject (UK 002) | Float | 1.60 | 0.70 | 17.94 | 560 | 100 | 0.25 | 10.80 | 9.82 | 587 | 58 | 2.47 |
| | 1.60 | 1.80 | 0.70 | 46.66 | 420 | 196 | 0.49 | 1.70 | 44.16 | 385 | 170 | 1.14 |
| | 1.80 | 2.00 | 0.90 | 57.98 | 403 | 234 | 0.76 | 1.70 | 55.91 | 377 | 211 | 1.42 |
| | 2.00 | 2.10 | 1.00 | 67.33 | 383 | 258 | 0.93 | 1.80 | 65.93 | 375 | 247 | 1.76 |
| | 2.10 | 2.20 | 1.00 | 73.76 | 364 | 269 | 0.97 | 1.50 | 75.01 | 362 | 271 | 1.61 |
| | 2.20 | 2.30 | 1.30 | 78.74 | 366 | 288 | 1.35 | 1.80 | 81.91 | 351 | 288 | 2.05 |
| | 2.30 | 2.40 | 1.70 | 82.45 | 368 | 304 | 1.86 | 16.80 | 93.20 | 313 | 292 | 19.43 |
| | 2.40 | 2.68 | 73.84 | 94.52 | 303 | 287 | 76.19 | 56.14 | 94.34 | 303 | 286 | 63.65 |
| | 2.68 | 2.90 | 14.54 | 93.77 | 319 | 299 | 15.67 | 4.80 | 93.14 | 308 | 286 | 5.45 |
| | 2.90 | Sink | 4.32 | 77.17 | 128 | 99 | 1.53 | 2.95 | 75.50 | 115 | 86 | 1.01 |
| | Total | | 100.00 | 91.57 | 305 | 278 | 100.00 | 100.00 | 81.87 | 336 | 252 | 100.00 |
| | | | | | | | | | | | | |
| Fire Clay Rider Seam Coarse Reject (UK 003) | Float | 1.60 | 3.20 | 24.18 | 480 | 116 | 1.20 | 5.70 | 15.46 | 595 | 92 | 1.89 |
| | 1.60 | 1.80 | 3.30 | 43.47 | 405 | 176 | 1.88 | 2.90 | 41.37 | 413 | 171 | 1.78 |
| | 1.80 | 2.00 | 2.60 | 59.09 | 390 | 231 | 1.94 | 2.70 | 55.99 | 387 | 217 | 2.11 |
| | 2.00 | 2.10 | 2.60 | 70.36 | 364 | 256 | 2.15 | 2.80 | 64.79 | 383 | 248 | 2.50 |
| | 2.10 | 2.20 | 3.10 | 75.44 | 350 | 264 | 2.64 | 2.30 | 72.10 | 370 | 267 | 2.21 |
| | 2.20 | 2.30 | 2.50 | 79.48 | 342 | 272 | 2.20 | 2.50 | 77.99 | 362 | 283 | 2.54 |
| | 2.30 | 2.40 | 2.10 | 82.80 | 340 | 282 | 1.91 | 7.30 | 86.59 | 342 | 296 | 7.78 |
| | 2.40 | Sink | 80.60 | 92.40 | 357 | 330 | 86.07 | 73.80 | 92.15 | 324 | 298 | 79.20 |
| | Total | | 100.00 | 86.11 | 363 | 309 | 100.00 | 100.00 | 83.34 | 348 | 278 | 100.00 |

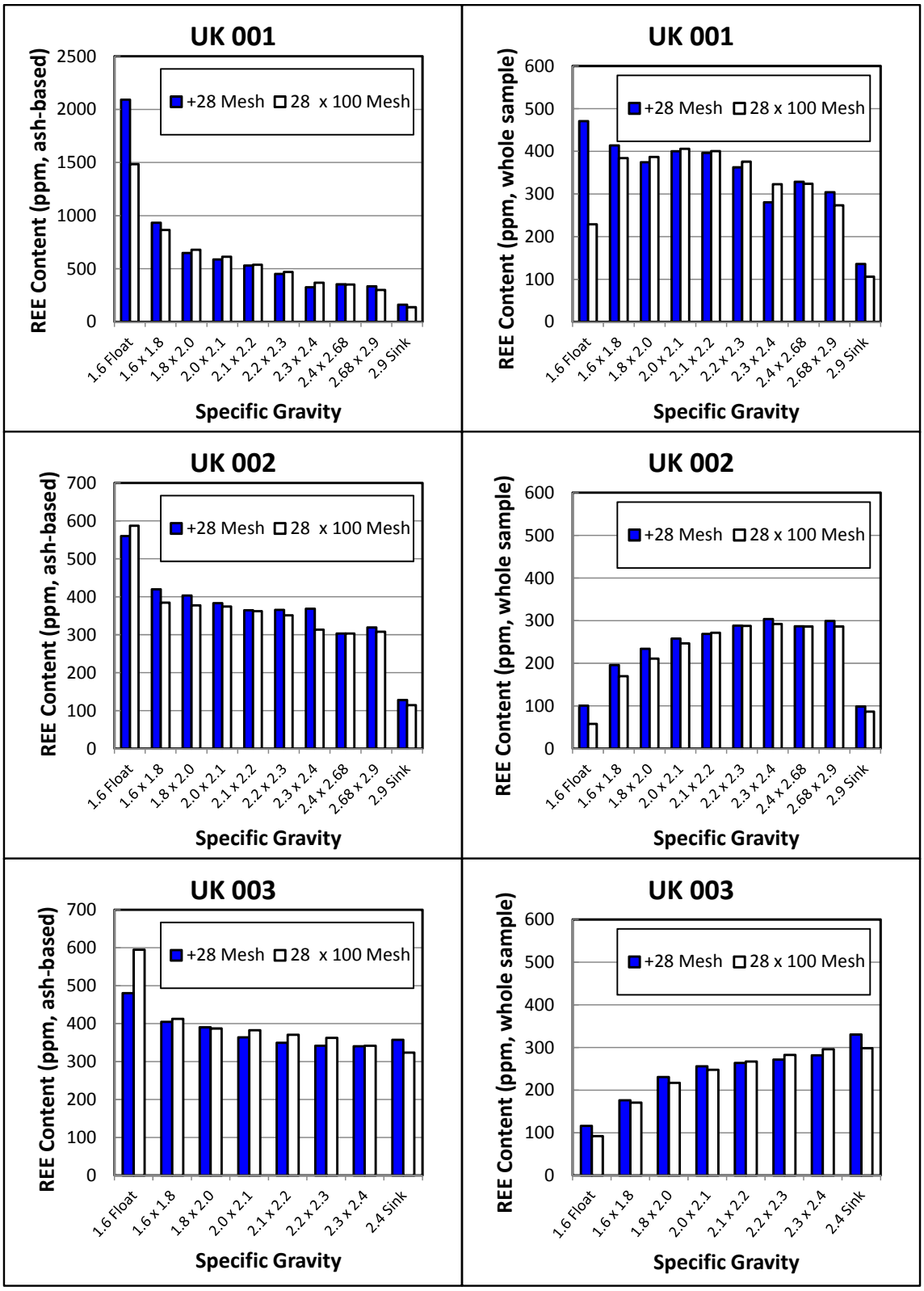



*Figure 13. REE concentrations on an ash basis and whole sample basis by particle specific gravity in the coarse reject samples collected at three coal preparation plants; Fire Clay seam (UK001), Eagle seam (UK002) and Fire Clay Rider (UK003).*

sources indicating no benefit from particle size reduction to improve the REE concentration as a result of potential REE mineral liberation for particle sizes larger than 0.15 mm.

The coarse reject material from the Fire Clay seam coal has characteristics that are distinctively different from the other two samples. The first difference is that the REE content on a whole coal basis increases by as much as 133% in the specific gravity fractions below 2.3 SG (Figure 13). For the other two coarse reject samples, the REEs concentrate in the denser gravity fractions above 2.3 SG and the level of concentration is significantly lower. One explanation is the larger amount of out-of-seam dilution in the Fire Clay source although the comparative amount is unknown.

Samples of the 2.9 SG sink fraction were obtained and analyzed from the Fire Clay (UK 001) and Eagle (UK 002) seam coarse reject samples. As shown in Table 2 and Figure 13, the REE contents in the 2.9 SG sink material are significantly lower (30% - 35% of the feed REEs on a whole coal basis) than the overall REE content of the sample and thus removal of the fraction would concentrate the REEs in the 2.9 SG float. The impact is dependent on the weight percentage in the 2.9 SG sink fraction which tends to be relatively low.

Another clear distinction for the Fire Clay coarse reject is the magnitude of the REE concentration on an ash-basis that occurs in the lower specific gravity fractions. As supported by the data in this report, the REE content on an ash-basis for most coal seam sources increases with a decrease in specific gravity which implies strong affinity with the finely dispersed mineral matter remaining in the coal and/or an affinity with the organic matter. Organic matter affinity has been previously reported and especially found in low rank coals. As such, combustion at a utility provides a natural REE concentration process. The REE content expressed on an ash basis

increased by over 300% in the 1.60 SG Float fraction for the Fire Clay coarse reject whereas the concentration obtained for the other two coarse reject sources was around 180%.

Based on the relatively high REE concentrations on an ash-basis, bottom ash and fly ash samples were collected from an electric power unit that utilizes clean coal from the Fire Clay seam. The washability results obtained for the bottom ash material (UK004) indicate REE concentrations on a whole sample basis of 793 ppm (Table 3). The bottom ash particles are well distributed by weight across a broad range of specific gravity values. Likewise, the REE contents do not significantly change from low to high specific gravity fractions (Figure 14). These findings clearly indicate that REE concentration by exploiting density differences is prohibitively difficult. The slight increase in REE content in Figure 14 on a whole sample basis with an increase in specific gravity is due to the dilution effect of coal in the lower gravity fractions.

A Pittsburgh fines samples provided by LTI was found to contain 93% by weight 1.4 SG float material having an ash content of 5% ash. The total REE content was 36 ppm on a whole coal basis and 534 ppm on an ash basis (Table 3). The majority of the REE was in the 1.4 SG Float fraction where the REE was concentrated to a level of 549 ppm on an ash-basis but only 27 ppm on a whole coal basis. Similar to the three coarse reject samples, the REE content on an ash-basis increased with a decrease in particle specific gravity indicating strong affinity with the finely dispersed mineral matter and/or the organic matrix. On a whole coal basis, significant upgrading of REEs occurs from low to high particle specific gravity. From a feed containing 35 ppm on a whole coal basis, the content of the 2.40SG Sink material is 272 ppm which is a 755% improvement (Table 3 and Figure 14).

A Texas lignite pit cleanings sample (UK006) was found to contain a very low amount of REEs (122 ppm on a whole coal basis) and a very low opportunity to concentrate by gravity.

*Table 3. Density-by-density weight, ash and REE content distributions in boiler bottom ash (UK004), Pittsburgh coal fines (UK005) and Texas lignite pit cleanings (UK006).*

| Sample | Specific Gravity | | +28 Mesh Incremental Analysis | | | | | 28 x 100 Mesh Incremental Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sink | Float | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) |
| Fire Clay Utility Bottom Ash (UK 004) | Float | 1.60 | 9.50 | 100.00 | 790 | 790 | 9.45 | 2.50 | 94.20 | 734 | 692 | 2.19 |
| | 1.60 | 1.80 | 13.70 | 100.00 | 811 | 811 | 14.01 | 3.10 | 95.78 | 758 | 726 | 2.85 |
| | 1.80 | 2.00 | 20.50 | 100.00 | 809 | 809 | 20.89 | 10.40 | 96.61 | 794 | 767 | 10.11 |
| | 2.00 | 2.10 | 14.20 | 100.00 | 802 | 802 | 14.35 | 13.10 | 99.47 | 809 | 805 | 13.36 |
| | 2.10 | 2.20 | 9.50 | 100.00 | 814 | 814 | 9.74 | 19.00 | 99.96 | 797 | 797 | 19.18 |
| | 2.20 | 2.30 | 7.10 | 100.00 | 791 | 791 | 7.07 | 21.40 | 100.00 | 820 | 820 | 22.23 |
| | 2.30 | 2.40 | 6.00 | 100.00 | 758 | 758 | 5.74 | 17.90 | 100.00 | 794 | 794 | 17.99 |
| | 2.40 | Sink | 19.50 | 100.00 | 763 | 763 | 18.74 | 12.60 | 100.00 | 758 | 758 | 12.09 |
| | Total | | 100.00 | 100.00 | 793 | 793 | 100.00 | 100.00 | 99.29 | 795 | 789 | 100.00 |
| | | | | | | | | | | | | |
| Pittsburgh Coal Fines (UK 005) | Float | 1.40 | 93.20 | 4.98 | 549 | 27 | 71.44 | 90.30 | 4.88 | 598 | 29 | 70.66 |
| | 1.40 | 1.60 | 2.60 | 25.00 | 352 | 88 | 6.41 | 4.90 | 20.68 | 341 | 71 | 9.27 |
| | 1.60 | 1.80 | 1.30 | 44.84 | 325 | 146 | 5.31 | 1.90 | 30.45 | 302 | 92 | 4.69 |
| | 1.80 | 2.00 | 1.40 | 57.48 | 312 | 179 | 7.04 | 0.90 | 42.07 | 292 | 123 | 2.97 |
| | 2.00 | 2.10 | 0.60 | 66.14 | 308 | 204 | 3.42 | 0.40 | 54.52 | 305 | 166 | 1.78 |
| | 2.10 | 2.20 | 0.20 | 70.93 | 310 | 220 | 1.24 | 0.20 | 61.35 | 319 | 195 | 1.05 |
| | 2.20 | 2.30 | 0.20 | 77.55 | 322 | 250 | 1.40 | 0.20 | 68.52 | 316 | 217 | 1.16 |
| | 2.30 | 2.40 | 0.20 | 83.11 | 319 | 265 | 1.49 | 0.30 | 75.11 | 310 | 233 | 1.87 |
| | 2.40 | Sink | 0.30 | 89.38 | 300 | 268 | 2.25 | 0.90 | 85.95 | 316 | 272 | 6.55 |
| | Total | | 100.00 | 7.81 | 534 | 36 | 100.00 | 100.00 | 7.85 | 572 | 35 | 100.00 |
| | | | | | | | | | | | | |
| Texas Lignite Pit Cleanings (UK 006) | Float | 1.60 | 20.50 | 39.02 | 315 | 123 | 24.56 | 30.41 | 29.60 | 498 | 147 | 36.61 |
| | 1.60 | 1.80 | 17.93 | 63.09 | 166 | 105 | 18.25 | 13.00 | 57.47 | 168 | 97 | 10.28 |
| | 1.80 | 2.00 | 24.85 | 77.40 | 114 | 88 | 21.41 | 18.90 | 73.21 | 132 | 96 | 14.87 |
| | 2.00 | 2.10 | 12.38 | 84.98 | 126 | 107 | 12.89 | 6.87 | 80.70 | 128 | 103 | 5.79 |
| | 2.10 | 2.20 | 10.85 | 85.20 | 118 | 100 | 10.60 | 9.50 | 84.83 | 155 | 131 | 10.18 |
| | 2.20 | 2.30 | 7.34 | 87.94 | 117 | 103 | 7.37 | 7.65 | 87.15 | 200 | 174 | 10.88 |
| | 2.30 | 2.40 | 4.87 | 88.68 | 87 | 77 | 3.65 | 7.36 | 88.74 | 125 | 111 | 6.68 |
| | 2.40 | 2.68 | 1.17 | 86.22 | 115 | 99 | 1.13 | 6.03 | 87.29 | 103 | 90 | 4.42 |
| | 2.68 | 2.90 | 0.08 | 70.33 | 188 | 132 | 0.10 | 0.18 | 73.87 | 172 | 127 | 0.19 |
| | 2.90 | Sink | 0.03 | 69.89 | 224 | 157 | 0.05 | 0.10 | 68.63 | 203 | 139 | 0.11 |
| | Total | | 100.00 | 70.17 | 165 | 103 | 100.00 | 100.00 | 62.58 | 253 | 122 | 100.00 |

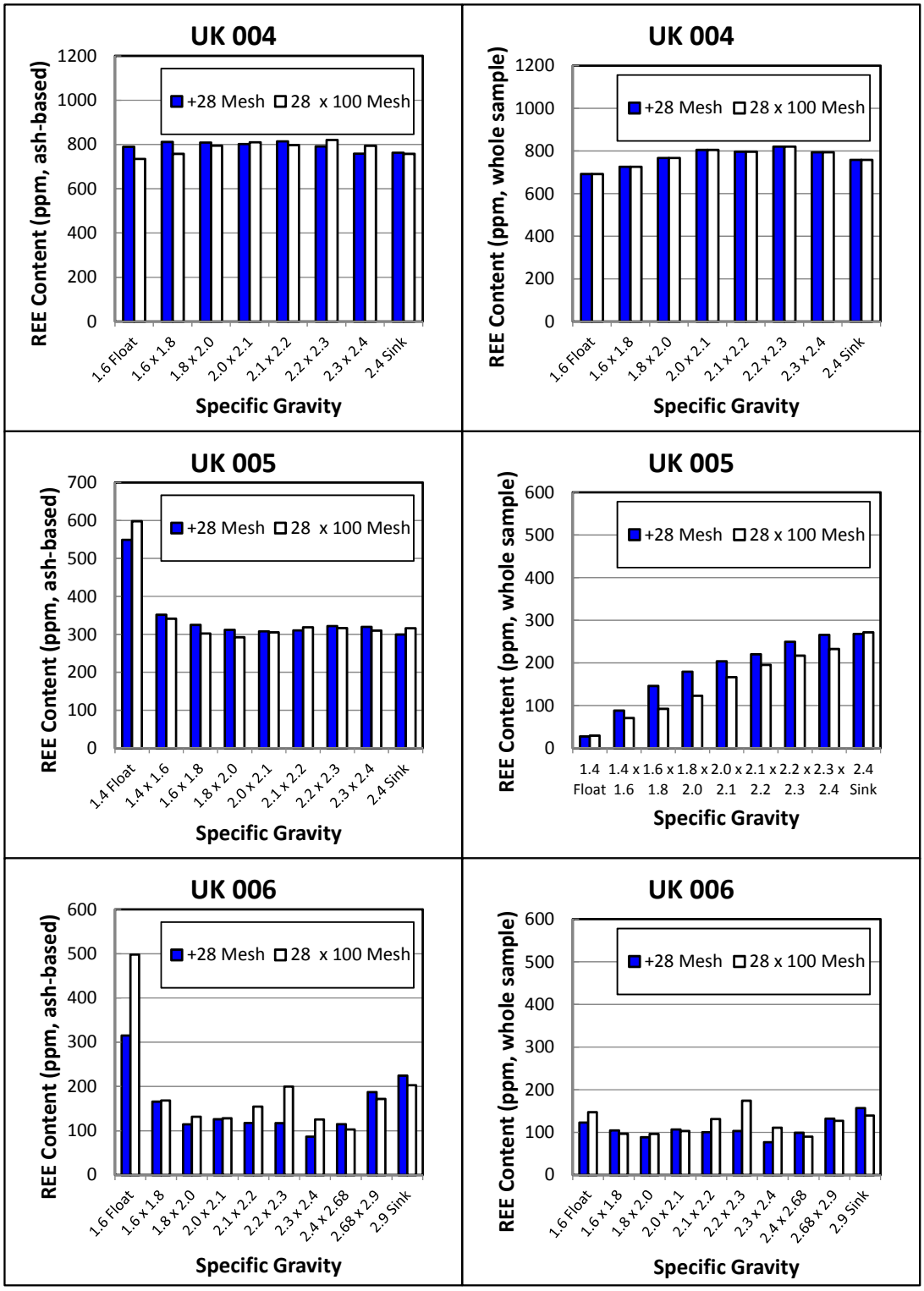



*Figure 14. REE concentrations on an ash basis and whole sample basis by particle specific gravity in boiler bottom ash (UK004), Pittsburgh coal fines (UK005) and Texas lignite pit cleanings (UK006).*

### *3.1.2 Release Analyses*

The primary focus of the release analyses was to assess the REE concentration realized when segregating the particles in each sample according to their degrees of floatability (or, more directly, their degrees of hydrophobicity). Direct flotation of the RE minerals or affiliated minerals was performed as part of a separate task that is discussed in another section of this report. As such, the release process in this study involved the flotation of naturally hydrophobic material with the assistance of fuel oil as the collector. The release analysis objectives and the results obtained from the process are analogous to those obtained from washability analyses. The performance represents the maximum recovery achievable by a flotation process over a range of product grade values.

The results were very similar to those reported from the washability studies for the plant waste materials. As shown in Table 4, the maximum amount of REEs reports in the initial flotation tailings. However, the REE concentration in the tailings very nearly equals the overall feed content. The total REE content in the ash material obtained after coal combustion was significantly higher in the concentrate fractions that produced the lowest overall ash contents for all samples. In particular, the -100 mesh sample from the Fire Clay coal seam produced a flotation concentrate containing 6.71% ash and, after combustion, the REE content in the ash material was 1034 ppm compared to 312 ppm in the ash generated from the combustion of the feed to the flotation process which represents a 313% enrichment. Similar enrichment trends were realized for the Fire Clay thickener underflow and all other sources as shown in Figure 15. These findings provide further evidence of a linkage between the RE minerals and elements with the organic material through association with the finely dispersed mineral matter and/or the affiliation between the REEs and the organic components directly.

*Table 4. Flotation release analysis results obtained from the treatment of the -100 mesh fraction of the three crushed coarse plant reject samples and thickener underflow samples collected at two preparation plants.*

| Sample | -100 Mesh Crushed Sample | | | | | | Thickener Underflow | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Product | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) | Product | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole coal) | REE Distrib (%) |
| Fire Clay Seam Reject (UK 001) | C1 | 20.49 | 6.71 | 1034 | 69 | 7.75 | C1 | 5.18 | 29.82 | 654 | 195 | 4.28 |
| | C2 | 8.75 | 21.31 | 676 | 144 | 6.87 | C2 | 3.55 | 49.42 | 545 | 269 | 4.04 |
| | C3 | 9.13 | 37.93 | 367 | 139 | 6.93 | T4 | 8.25 | 73.25 | 426 | 312 | 10.90 |
| | C4 | 8.37 | 47.26 | 342 | 161 | 7.36 | T3 | 2.68 | 91.13 | 197 | 179 | 2.04 |
| | T4 | 1.19 | 73.36 | 337 | 247 | 1.60 | T2 | 12.15 | 92.31 | 145 | 134 | 6.89 |
| | T3 | 2.12 | 84.97 | 307 | 261 | 3.01 | T1 | 68.20 | 92.68 | 268 | 249 | 71.84 |
| | T2 | 5.80 | 88.17 | 278 | 245 | 7.75 | | | | | | |
| | T1 | 44.16 | 91.56 | 266 | 244 | 58.72 | | | | | | |
| | Total | 100.00 | 58.87 | 312 | 183 | 100.00 | Total | 100.00 | 58.87 | 274 | 236 | 100.00 |
| | | | | | | | | | | | | |
| Eagle Seam Coarse Reject (UK 002) | C1 | 7.70 | 22.94 | 444 | 102 | 4.60 | C1 | 6.64 | 22.36 | 293 | 66 | 2.46 |
| | C2 | 1.07 | 38.63 | 448 | 173 | 1.09 | C2 | 6.12 | 78.33 | 373 | 293 | 10.11 |
| | T4 | 2.54 | 72.94 | 417 | 304 | 4.52 | T3 | 4.81 | 88.44 | 284 | 251 | 6.81 |
| | T3 | 2.88 | 89.61 | 178 | 159 | 2.69 | T2 | 3.80 | 92.79 | 271 | 251 | 5.40 |
| | T2 | 9.00 | 93.35 | 153 | 143 | 7.55 | T1 | 78.64 | 95.20 | 178 | 169 | 75.23 |
| | T1 | 76.80 | 94.79 | 187 | 177 | 79.55 | | | | | | |
| | Total | 100.00 | 87.82 | 194 | 171 | 100.00 | Total | 100.00 | 88.92 | 199 | 177 | 100.00 |
| | | | | | | | | | | | | |
| Fire Clay Rider Seam Coarse Reject (UK 003) | C1 | 5.62 | 36.60 | 354 | 130 | 3.23 | | | | | | |
| | C2 | 13.02 | 68.92 | 337 | 232 | 13.38 | | | | | | |
| | C3 | 7.59 | 83.35 | 257 | 214 | 7.20 | | | | | | |
| | T4 | 4.68 | 92.63 | 275 | 255 | 5.27 | | | | | | |
| | T3 | 8.50 | 93.25 | 255 | 238 | 8.97 | | | | | | |
| | T2 | 2.87 | 93.74 | 238 | 223 | 2.83 | | | | | | |
| | T1 | 57.73 | 95.58 | 242 | 231 | 59.13 | | | | | | |
| | Total | 100.00 | 87.48 | 258 | 226 | 100.00 | Total | | | | | |

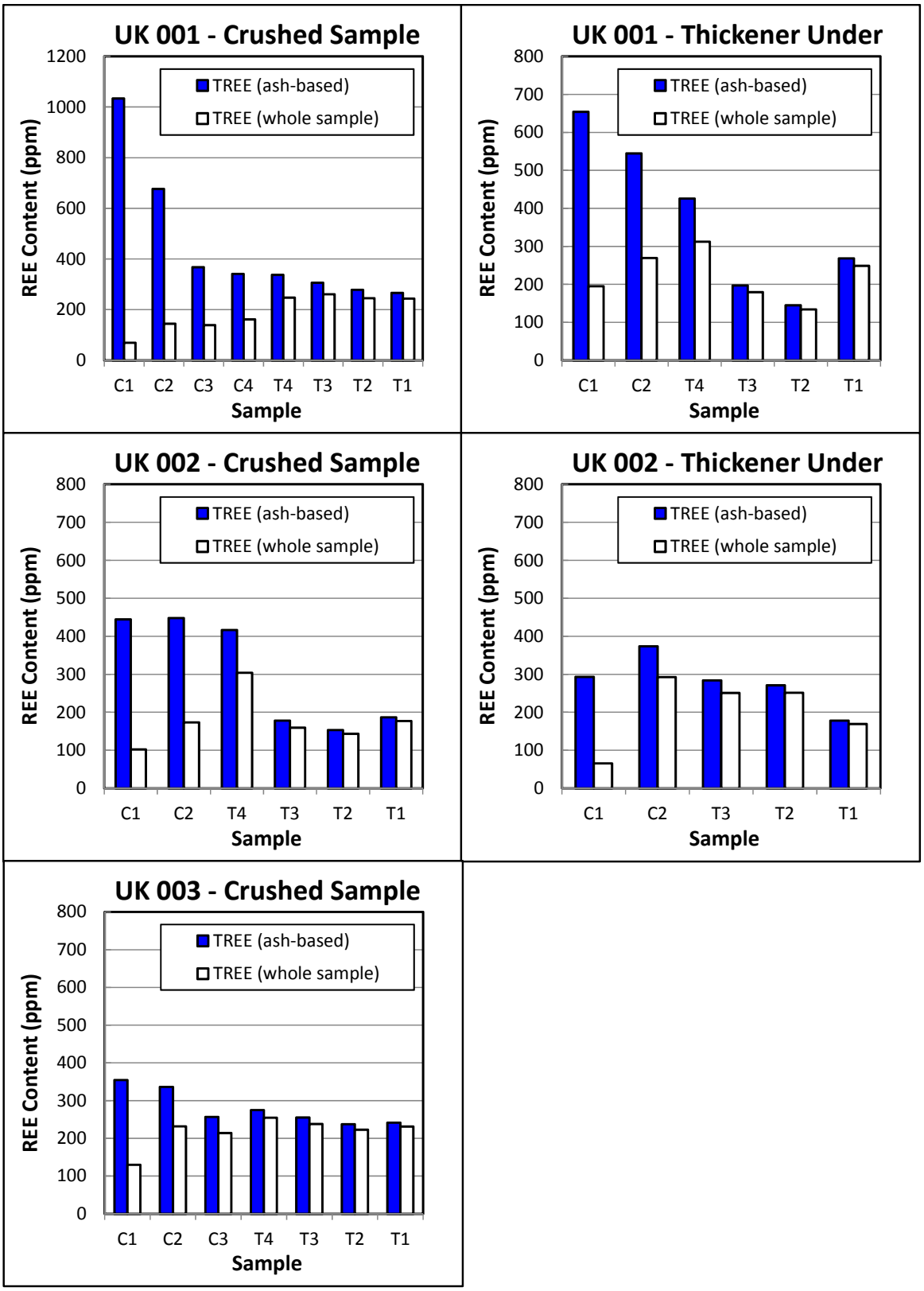



*Figure 15. Concentration of REEs achieved during flotation release analysis of the -100 fraction produced from crushing the coarse reject collected from three operating preparation plants (UK001, UK002 and UK003) and the thickener underflow of two plants (UK001 and UK002).*

A release analysis was conducted on the fly ash material generated at an electric power station utilizing Fire Clay seam coal as a fuel source. The total ash content of the sample was 94.06% (5.94% LOI) and the REE content was 613 ppm on a whole sample basis. Based on the results shown in Table 5, Froth flotation produced a concentrate representing 8.18% of the total feed weight and containing 40.59% ash. By removing the carbon for the fly ash through flotation, the REE content was improved slightly to 640 ppm for the remaining 91.82% of the material. Interestingly, the ash produced from combusting the high carbon flotation concentrates contained higher REE levels of around 900 ppm. Figure 16 shows the lack of REE concentration achieved on a whole sample basis with maximum REE levels only slightly greater than the feed.

*Table 5. Release analysis results obtained from the treatment of Pittsburgh coal fines and fly ash material generated at a utility using Fire Clay Coal.*

| Sample | Product | Weight (%) | Ash (%) | Total REE (ash-basis) | Total REE (whole sample) | REE Distrib (%) |
|---|---|---|---|---|---|---|
| Fire Clay Fly Ash (UK 004) | C1 | 2.22 | 35.16 | 907 | 319 | 1.15 |
| | C2 | 3.84 | 42.47 | 597 | 254 | 1.59 |
| | C3 | 2.12 | 42.85 | 920 | 394 | 1.37 |
| | C4 | 4.30 | 91.35 | 713 | 652 | 4.57 |
| | T4 | 2.72 | 94.82 | 715 | 678 | 3.01 |
| | T3 | 4.80 | 98.48 | 642 | 632 | 4.95 |
| | T2 | 7.34 | 98.57 | 703 | 693 | 8.30 |
| | T1 | 72.66 | 99.47 | 636 | 633 | 75.05 |
| | **Total** | 100.00 | 94.06 | 651 | 613 | 100.00 |
| | | | | | | |
| Pittsburgh Fines (UK 005) | C1 | 1.63 | 7.28 | 451 | 33 | 0.44 |
| | C2 | 4.23 | 7.99 | 444 | 35 | 1.23 |
| | C3 | 4.51 | 9.55 | 455 | 43 | 1.61 |
| | C4 | 5.27 | 15.24 | 362 | 55 | 2.39 |
| | C5 | 4.94 | 15.49 | 416 | 64 | 2.61 |
| | C6 | 7.55 | 20.35 | 336 | 68 | 4.24 |
| | C7 | 16.25 | 27.78 | 311 | 86 | 11.51 |
| | T4 | 7.81 | 34.49 | 286 | 99 | 6.30 |
| | T3 | 5.67 | 68.76 | 200 | 137 | 6.39 |
| | T2 | 11.22 | 71.79 | 209 | 150 | 13.78 |
| | T1 | 30.91 | 81.43 | 240 | 196 | 49.52 |
| | **Total** | 100.00 | 48.33 | 253 | 122 | 100.00 |

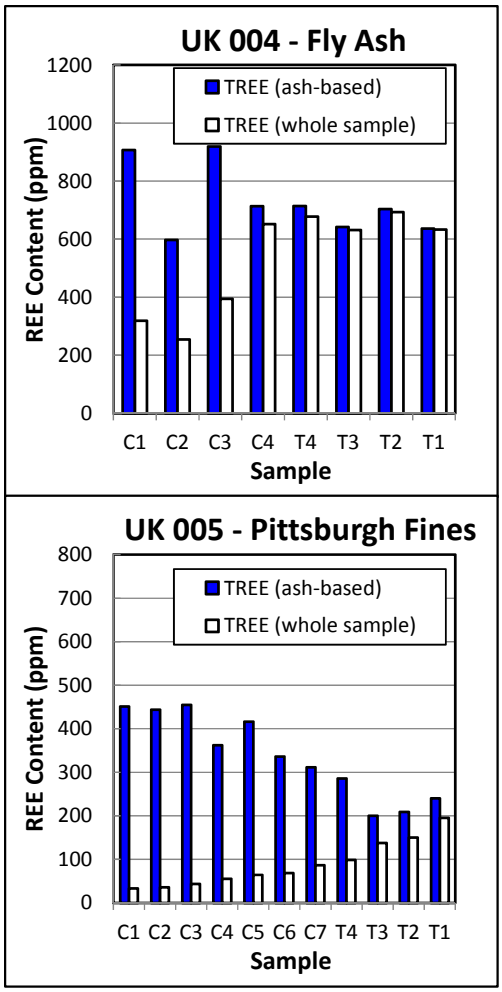



*Figure 16. REE concentrations obtained by flotation release analyses conducted on fly ash material (UK004) produced by a utility using Fire Clay coal as a fuel and on Pittsburgh coal fines (UK005).*

Table 5 and Figure 16 also provide the flotation release analysis results obtained from the treatment of the -100 mesh particle size fraction in the Pittsburgh coal fines (UK005). The total REE content in the sample was relatively low at 122 ppm whereas the ash content was a relatively high 48.33%. The majority of the REEs reported in the initial tailings material which has a total REE content of 196 ppm and an ash content of 81.43%. The concentration in the tailings material on a whole sample basis is shown in Figure 16 and equates to a 161% increase in REE. As with the other samples, the largest concentration occurred from the combustion of the flotation products. The REE in the ash products of the flotation concentrate reached a value

of 455 ppm which represents a 179% increase in REE content compared to the content in the ash generated from the combustion of the feed material.

Several attempts were made to achieve a flotation response for the Texas lignite pit cleanings sample. It is well known that lignite coal has very weak surface hydrophocity and thus is difficult to float. The attempts to use froth flotation for the processing of the Texas lignite sample was unsuccessful.

All the flotation release test data with rare earth analyses results are provided in Appendix 5.3B.

## 3.2. Separation Test Results

### *3.2.1 Riffle Table*

The ability to concentrate RE minerals in the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction in each sample source by a density separator was evaluated using a laboratory riffle table concentrator. Samples were collected along the edge of the table which was divided into five sections resulting in an equal number of samples collected during each test. The samples were weighed and analyzed for ash and REE contents. From the whole sample REE results, a concentration ratio (*CR*) was calculated as a percentage using the following expression:

$$CR = 100 * \frac{REE_i}{REE_f} \ ,$$

where $REE_i$ is the total rare earth content in the *i*th product and $REE_f$ is the rare earth content in the feed.

As shown in Table 6, the riffle table treated provided effective segregation of ash-based material with the content varying by over 20 absolute percentage points for all samples with the exception of the bottom ash. Despite the effectiveness in varying ash content among the product

*Table 6. Riffle table concentration performance results from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of each sample source.*

| Sample | Product | Incremental Analysis (dry basis) | | | | |
|---|---|---|---|---|---|---|
| | | Weight (%) | Ash Content (%) | Total REE (ash-basis) (ppm) | Total REE (whole coal) (ppm) | REE Distribution (%) |
| Fire Clay Seam Coarse Reject (UK 001) | P1 | 29.85 | 60.74 | 331 | 223 | 11.66 |
| | P2 | 17.85 | 62.09 | 396 | 250 | 4.28 |
| | P3 | 28.98 | 68.06 | 295 | 248 | 51.64 |
| | P4 | 14.36 | 76.32 | 206 | 185 | 15.61 |
| | P5 | 8.95 | 83.56 | 279 | 252 | 16.80 |
| | Feed | 100.00 | 67.38 | 280 | 233 | 100.00 |
| Eagle Seam Coarse Reject (UK 002) | P1 | 17.67 | 59.29 | 261 | 155 | 13.95 |
| | P2 | 4.48 | 59.65 | 263 | 157 | 3.59 |
| | P3 | 40.54 | 89.79 | 228 | 204 | 42.30 |
| | P4 | 22.51 | 93.35 | 224 | 209 | 24.07 |
| | P5 | 14.80 | 91.40 | 233 | 213 | 16.09 |
| | Feed | 100.00 | 84.09 | 233 | 196 | 100.00 |
| Fire Clay Rider Seam Coarse Reject (UK 003) | P1 | 16.85 | 66.57 | 265 | 177 | 13.63 |
| | P2 | 4.81 | 65.90 | 275 | 181 | 3.99 |
| | P3 | 43.24 | 86.55 | 266 | 230 | 45.61 |
| | P4 | 23.05 | 91.50 | 256 | 234 | 24.75 |
| | P5 | 12.05 | 90.37 | 241 | 218 | 12.02 |
| | Feed | 100.00 | 83.79 | 261 | 218 | 100.00 |
| Fire Clay Bottom Ash (UK 004) | P1 | 7.90 | 100.00 | 716 | 716 | 8.38 |
| | P2 | 2.44 | 100.00 | 717 | 717 | 2.58 |
| | P3 | 35.17 | 100.00 | 690 | 690 | 35.93 |
| | P4 | 12.75 | 100.00 | 718 | 718 | 13.55 |
| | P5 | 41.74 | 100.00 | 640 | 640 | 39.56 |
| | Feed | 100.00 | 100.00 | 676 | 676 | 100.00 |
| Pittsburgh Coal Fines (UK 005) | P1 | 10.30 | 6.23 | 575 | 36 | 9.71 |
| | P2 | 33.18 | 6.10 | 465 | 28 | 24.79 |
| | P3 | 50.09 | 7.50 | 483 | 36 | 47.79 |
| | P4 | 3.72 | 17.40 | 272 | 47 | 4.63 |
| | P5 | 2.72 | 69.95 | 261 | 183 | 13.09 |
| | Feed | 100.00 | 8.97 | 423 | 38 | 100.00 |
| Texas Pit Cleanings (UK 006) | P1 | 29.85 | 60.74 | 290 | 176 | 37.54 |
| | P2 | 17.85 | 62.09 | 293 | 182 | 23.16 |
| | P3 | 28.98 | 68.06 | 145 | 99 | 20.43 |
| | P4 | 14.36 | 76.32 | 182 | 139 | 14.23 |
| | P5 | 8.95 | 83.56 | 87 | 73 | 4.64 |
| | Feed | 100.00 | 67.38 | 208 | 140 | 100.00 |

streams, the concentration of REEs was relatively minimal among all samples (Figure 17). However, the total REE content in the ash material generated from the combustion of the six samples was improved. The increase in REE content on an ash basis was 141% for the Fire Clay coarse reject and the Texas pit cleaning while the rise was by 136% for the Pittsburgh coal fines. The detailed results are provided in Appendix 5.3C.

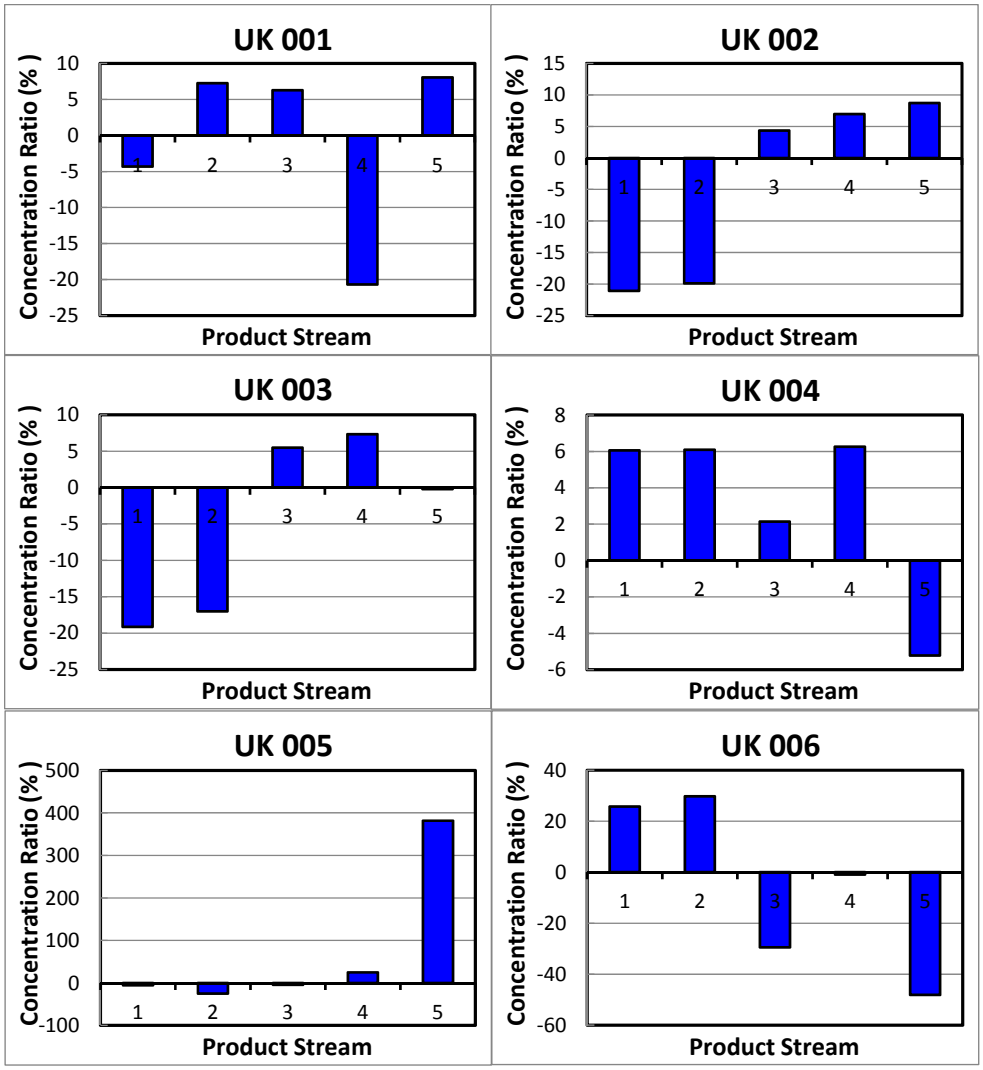



*Figure 17. REE concentration achieved using a riffle table to treat the 6 x 0.15 mm (28 x 100 mesh) particle size fraction in each of the sample sources; concentration ratio was based on the whole sample REE values.*

### 3.2.2 *Wet High Intensity Magnetic Separation*

The separation data generated from the experiments using a wet high intensity magnetic separator (WHIMS) are provided in Tables 7 and 8 and Figures 18 and 19. The entire data set for the treatment of the six samples is provided in Appendix 5.3D. As shown in Tables 7 and 8, the amount of magnetic material was relatively low with a range from 0.3% for the Texas lignite pit cleanings to a high of 12.87% in the bottom ash sample. The highest magnetics content among the preparation plant coal reject samples was 7.27% in the Eagle seam reject material.

The REE contents were generally higher for the magnetic material which was a low percentage of the total feed mass and the concentration was more effective with the -100 mesh size fraction as compared to the 28 x 100 mesh fraction. For the -100 mesh size fraction in the Pittsburgh coal fines, the strongest magnetic material contained the highest concentration of total REEs at 445 ppm on a whole sample basis (Table 8). The content increase was 645%. However, the fraction only represents 0.17% of the total feed. In most samples, the weakest magnetic fraction in the magnetic portion of the total sample also contained an elevated amount of REEs.

An interesting observation is that the lowest REE contents in the majority of the samples and particle size fractions are associated in the fraction recovered using a magnetic field strength of 0.7 Tesla. The exceptions are the Fire Clay seam coarse reject and the bottom ash. The lower REE values correspond with a significant drop in ash content for the Pittsburgh fines and the Texas lignite samples. For the Eagle and Fire Clay Rider samples, the ash content remained relatively unchanged. This finding is likely due to the mineralogy of the material which was not investigated as part of the project.

Magnetic separation was ineffective in concentrating the REEs in both the bottom ash and fly ash material despite the fairly large amount of magnetic material in both samples.

*Table 7. REE concentration test results obtained using a laboratory wet high intensity magnetic separator for the 0.6 x 0.15 mm (28 x 100 mesh) and -0.15 mm (-100 mesh) particle size fractions in the crushed coal refuse samples.*

| Sample | Product | Incremental Analysis (dry basis) | | | | |
|---|---|---|---|---|---|---|
| | | Weight (%) | Ash Content (%) | Total REE (ash-basis) (ppm) | Total REE (whole coal) (ppm) | REE Distribution (%) |
| 28 x 100 Mesh Fire Clay Seam Coarse Reject (UK 001) | NM | 94.82 | 83.30 | 257 | 214 | 93.85 |
| | M1 | 0.79 | 83.53 | 270 | 226 | 0.82 |
| | M2 | 0.76 | 86.15 | 297 | 256 | 0.90 |
| | M3 | 3.04 | 84.79 | 312 | 265 | 3.72 |
| | M4 | 0.59 | 87.76 | 296 | 260 | 0.71 |
| | Total | 100.00 | 83.40 | 260 | 216 | 100.00 |
| -100 Mesh Fire Clay Seam Coarse Reject (UK 001) | NM | 97.52 | 85.21 | 293 | 250 | 97.37 |
| | M1 | 0.63 | 81.68 | 307 | 251 | 0.63 |
| | M2 | 0.44 | 85.51 | 317 | 271 | 0.48 |
| | M3 | 1.10 | 85.98 | 309 | 266 | 1.17 |
| | M4 | 0.31 | 86.45 | 333 | 288 | 0.36 |
| | Total | 100.00 | 85.20 | 293 | 250 | 100.00 |
| 28 x 100 Mesh Eagle Seam Coarse Reject (UK 002) | NM | 92.73 | 83.39 | 207 | 173 | 91.34 |
| | M1 | 1.57 | 80.74 | 270 | 218 | 1.95 |
| | M2 | 1.14 | 84.82 | 267 | 226 | 1.47 |
| | M3 | 3.46 | 87.83 | 225 | 198 | 3.90 |
| | M4 | 1.10 | 87.48 | 245 | 214 | 1.34 |
| | Total | 100.00 | 83.56 | 210 | 175 | 100.00 |
| -100 Mesh Eagle Seam Coarse Reject (UK 002) | NM | 97.30 | 88.34 | 210 | 185 | 95.96 |
| | M1 | 0.60 | 81.37 | 339 | 276 | 0.88 |
| | M2 | 0.52 | 85.48 | 344 | 294 | 0.81 |
| | M3 | 1.18 | 89.89 | 295 | 265 | 1.66 |
| | M4 | 0.40 | 88.22 | 364 | 322 | 0.68 |
| | Total | 100.00 | 88.30 | 213 | 188 | 100.00 |
| 28 x 100 Mesh Fire Clay Rider Seam Coarse Reject (UK 003) | NM | 95.70 | 83.70 | 264 | 221 | 95.75 |
| | M1 | 0.49 | 86.56 | 290 | 251 | 0.56 |
| | M2 | 0.83 | 88.25 | 266 | 235 | 0.88 |
| | M3 | 2.45 | 86.56 | 234 | 203 | 2.25 |
| | M4 | 0.53 | 89.37 | 259 | 232 | 0.56 |
| | Total | 100.00 | 83.85 | 263 | 220 | 100.00 |
| -100 Mesh Fire Clay Rider Seam Coarse Reject (UK 003) | NM | 98.31 | 87.56 | 263 | 230 | 97.99 |
| | M1 | 0.30 | 88.04 | 366 | 322 | 0.42 |
| | M2 | 0.26 | 89.02 | 343 | 306 | 0.34 |
| | M3 | 0.91 | 88.37 | 260 | 230 | 0.91 |
| | M4 | 0.22 | 89.90 | 393 | 354 | 0.34 |
| | Total | 100.00 | 87.58 | 264 | 231 | 100.00 |

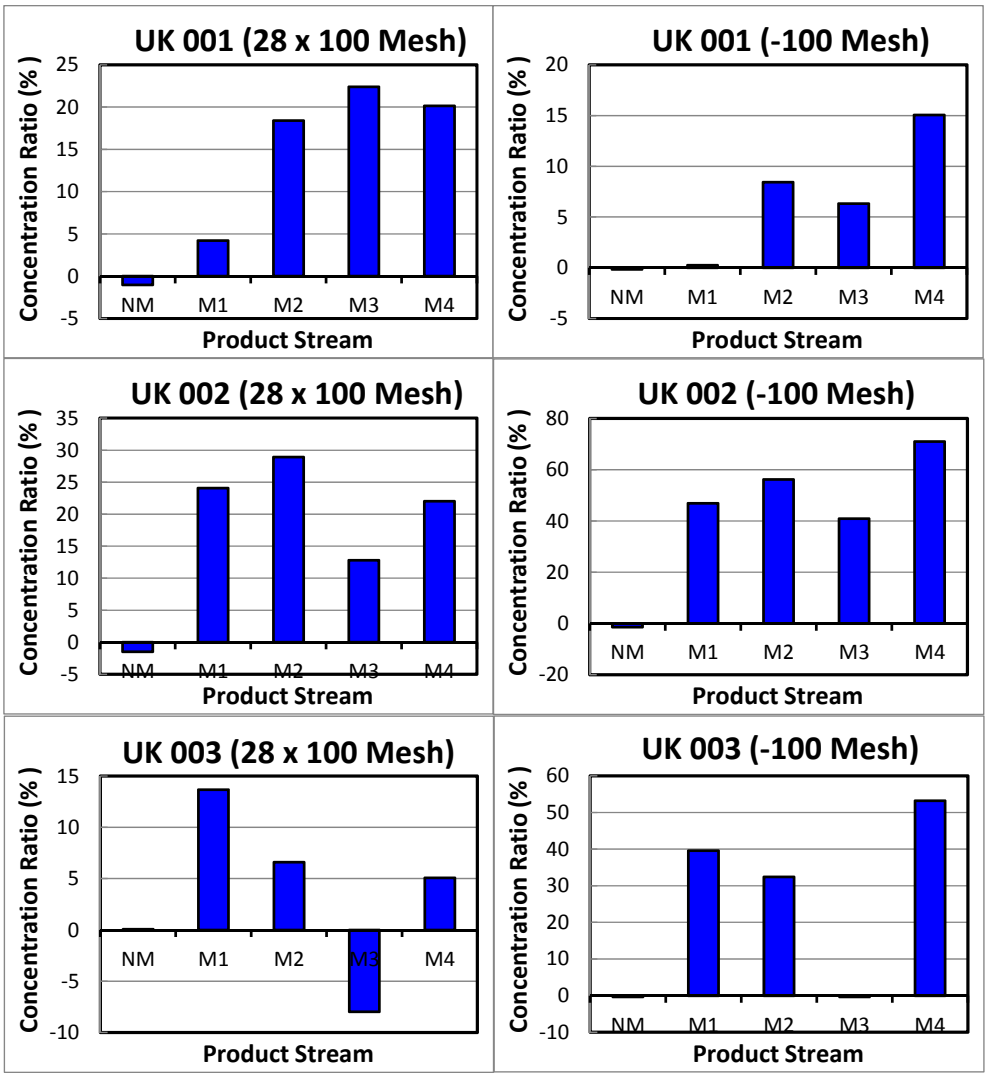



*Figure 18. REE concentration achieved from the treatment of the 0.6 x 0.15 mm (28 x 100 mesh) and -0.15 mm (-100 mesh) particle size fractions in the crushed coarse refuse samples.*

*Table 8. Test results from the treatment of the 0.6 x 0.15 mm (28 x 100 mesh) and -0.15 mm (-100 mesh) particle size fractions in the crushed coal refuse samples using a laboratory wet high intensity magnetic separator.*

| Sample | Product | Incremental Analysis (dry basis) | | | | |
|---|---|---|---|---|---|---|
| | | Weight (%) | Ash Content (%) | Total REE (ash-basis) (ppm) | Total REE (whole coal) (ppm) | REE Distribution (%) |
| Fire Clay Fly Ash (UK 004) | NM | 89.91 | 100.00 | 635 | 635 | 90.78 |
| | M1 | 6.11 | 100.00 | 524 | 524 | 5.09 |
| | M2 | 0.99 | 100.00 | 616 | 616 | 0.97 |
| | M3 | 2.29 | 100.00 | 665 | 665 | 2.42 |
| | M4 | 0.70 | 100.00 | 666 | 666 | 0.74 |
| | Total | 100.00 | 100.00 | 629 | 629 | 100.00 |
| Fire Clay Bottom Ash (UK 004) | NM | 87.13 | 100.00 | 717 | 717 | 87.09 |
| | M1 | 5.03 | 100.00 | 702 | 702 | 4.92 |
| | M2 | 2.85 | 100.00 | 729 | 729 | 2.90 |
| | M3 | 3.73 | 100.00 | 739 | 739 | 3.84 |
| | M4 | 1.26 | 100.00 | 709 | 709 | 1.25 |
| | Feed | 100.00 | 100.00 | 717 | 717 | 100.00 |
| 28 x 100 Mesh Pittsburgh Coal Fines (UK 005) | NM | 99.66 | 47.54 | 501 | 238 | 99.52 |
| | M1 | 0.08 | 96.39 | 464 | 447 | 0.16 |
| | M2 | 0.06 | 92.06 | 460 | 423 | 0.10 |
| | M3 | 0.15 | 50.74 | 393 | 199 | 0.12 |
| | M4 | 0.05 | 95.73 | 479 | 458 | 0.09 |
| | Total | 100.00 | 47.64 | 501 | 239 | 100.00 |
| -100 Mesh Pittsburgh Coal Fines (UK 005) | NM | 99.47 | 47.54 | 142 | 68 | 97.40 |
| | M1 | 0.17 | 96.39 | 462 | 445 | 1.11 |
| | M2 | 0.12 | 92.06 | 419 | 386 | 0.65 |
| | M3 | 0.17 | 50.74 | 377 | 191 | 0.46 |
| | M4 | 0.07 | 95.73 | 372 | 356 | 0.37 |
| | Total | 100.00 | 47.72 | 145 | 69 | 100.00 |
| 28 x 100 Mesh Texas Pit Cleanings (UK 006) | NM | 99.66 | 66.41 | 210 | 139 | 99.44 |
| | M1 | 0.17 | 89.05 | 275 | 244 | 0.30 |
| | M2 | 0.03 | 86.73 | 284 | 246 | 0.06 |
| | M3 | 0.07 | 65.24 | 239 | 156 | 0.08 |
| | M4 | 0.07 | 95.32 | 273 | 261 | 0.13 |
| | Total | 100.00 | 66.47 | 210 | 140 | 100.00 |
| -100 Mesh Texas Pit Cleanings (UK 006) | NM | 99.70 | 66.94 | 225 | 151 | 99.45 |
| | M1 | 0.05 | 79.80 | 424 | 339 | 0.11 |
| | M2 | 0.05 | 79.42 | 385 | 306 | 0.10 |
| | M3 | 0.16 | 74.11 | 280 | 208 | 0.22 |
| | M4 | 0.05 | 89.30 | 431 | 385 | 0.13 |
| | Total | 100.00 | 66.97 | 225 | 151 | 100.00 |

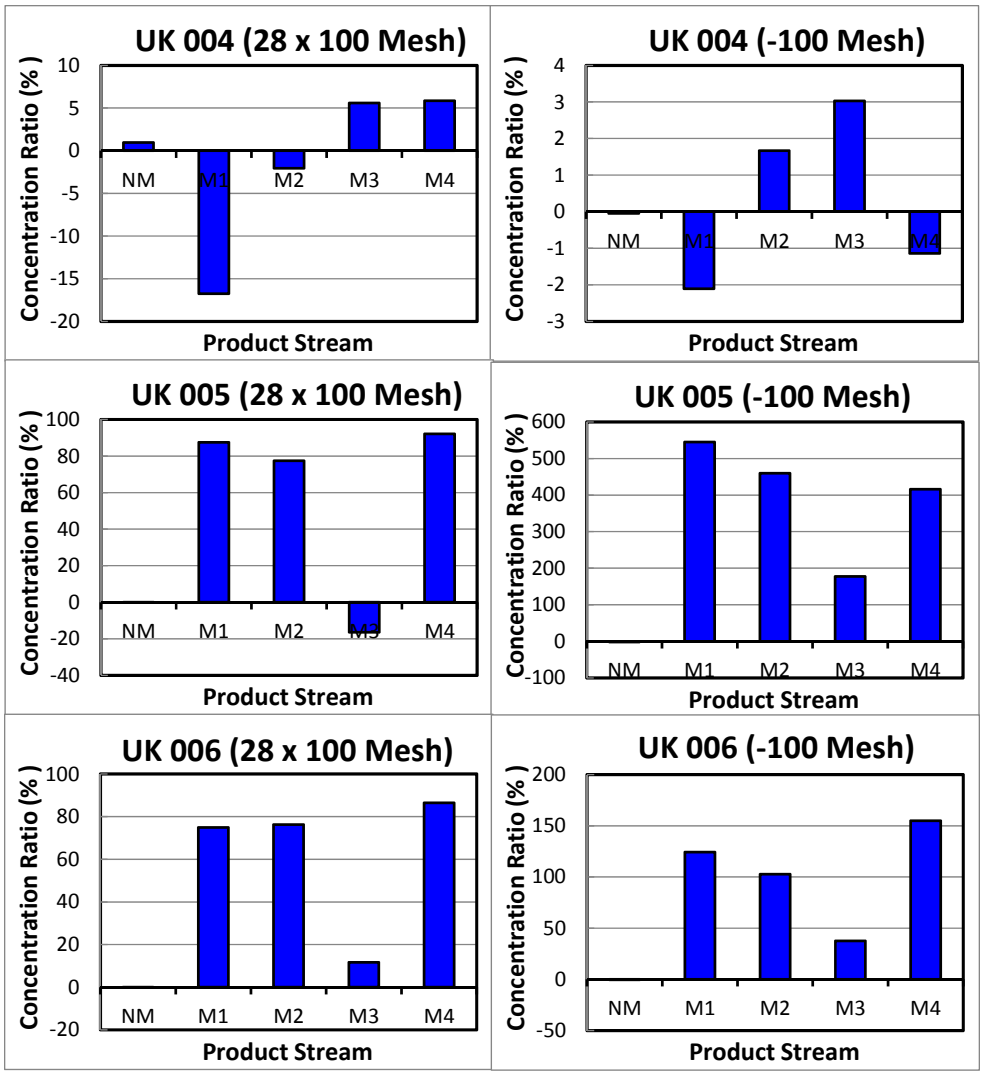



*Figure 19. REE concentrations realized from the treatment of Fire Clay seam fly ash material (UK004), Pittsburgh coal fines (UK005) and Texas lignite pit cleanings (UK006) using a wet high intensity magnetic separator.*

### *3.2.3 Froth Flotation*

Preliminary tests were performed to evaluate the potential of concentrating the RE minerals and/or the affiliated minerals using froth flotation. The tests involved an initial flotation stage to remove all of the carbonaceous material. The tailings material from the first stage was treated with a collector that was reported to be effective for RE minerals which also required slurry pH adjustment to maximize the effectiveness of the collector. The overflow float product was considered to be the REE concentrate. The tests were performed on the thickener underflow material collected from the three preparation plants and the fly ash sample. The operating conditions and the analytical results are provided in Appendix 5.4A. It should be noted that the results are not optimum and a significant amount of research is needed to identify reagent schemes and conditions needed to maximize REE concentration.

The test conditions for each of the eight tests conducted on the Fire Clay thickener underflow are provided in Table 9. The test results listed in Table 10 indicated that the best performance was achieved in test No. 5 which involved the use of oleic acid at a concentration of 2.5 kg/ton. The REE content was increased from 257 ppm in the feed to 386 ppm in the product on a whole sample basis which equates to 150% enrichment. The enrichment was obtained even with a decrease in ash content which tends to suppress the REE content due to the dilution effect of the carbonaceous material. As such, the oleic acid was effective in the selective flotation of the RE minerals as further indicated by the concentration ratio values in Figure 20.

A comparison of the performances achieved with the fourth sample reveals that the maximum REE concentration was achieved when treating the Eagle seam thickener underflow as shown by a comparison of the concentration ratios in Figure 20. The test conditions used when

*Table 9. Collector type and flotation test conditions used for the Fire Clay seam thickener underflow.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Thickener Underflow (UK 001) | Talon 9400 | 1 | 9.53 | 1C | 1T |
| | | 1.5 | 9.49 | 2C | 2T |
| | | 2.5 | 9.24 | 3C | 3T |
| | Oleic Acid | 1 | 9.36 | 4C | 4T |
| | | 2.5 | 9.51 | 5C | 5T |
| | Sodium Oleate | 0.5 | 9.01 | 6C | 6T |
| | | 1 | 9.13 | 7C | 7T |
| | | 2.5 | 9.19 | 8C | 8T |

*Table 10. REE concentration results using froth flotation to treat Fire Clay seam thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | Total REE (ash basis) | Total REE (whole sample) | REE Distribution | Concentration Ratio (%) |
|---|---|---|---|---|---|---|---|
| Fire Clay Thickener Underflow (UK 001) | 1C | 9.22 | 88.67 | 329 | 292 | 10.66 | 15.61 |
| | 1T | 90.78 | 91.30 | 272 | 248 | 89.34 | -1.59 |
| | | | | | | | |
| | 2C | 26.54 | 87.03 | 314 | 273 | 29.58 | 11.46 |
| | 2T | 73.46 | 92.94 | 253 | 235 | 70.42 | -4.14 |
| | | | | | | | |
| | 3C | 25.28 | 85.78 | 327 | 281 | 29.04 | 14.88 |
| | 3T | 74.72 | 92.94 | 250 | 232 | 70.96 | -5.04 |
| | | | | | | | |
| | 4C | 8.55 | 81.57 | 348 | 284 | 9.90 | 15.83 |
| | 4T | 91.45 | 91.94 | 263 | 241 | 90.10 | -1.48 |
| | | | | | | | |
| | 5C | 15.41 | 81.47 | 473 | 386 | 23.13 | 50.10 |
| | 5T | 84.59 | 92.85 | 251 | 233 | 76.87 | -9.13 |
| | | | | | | | |
| | 6C | 4.87 | 87.13 | 337 | 294 | 6.05 | 24.32 |
| | 6T | 95.13 | 91.35 | 255 | 233 | 93.95 | -1.25 |
| | | | | | | | |
| | 7C | 11.10 | 87.11 | 340 | 296 | 13.41 | 20.84 |
| | 7T | 88.90 | 91.63 | 261 | 239 | 86.59 | -2.60 |
| | | | | | | | |
| | 8C | 28.10 | 88.97 | 305 | 271 | 31.78 | 13.10 |
| | 8T | 71.90 | 91.78 | 248 | 228 | 68.22 | -5.12 |

treating the Eagle seam material are provided in Table 11 and the results are listed in Table 12. Similar to the findings obtained from the treatment of the Fire material, oleic acid provided the optimum selectivity for REE concentration when treating Eagle seam thickener underflow. In test No. 4, the REE content was increased from 172 ppm to 367 ppm on a whole sample basis, which equates to a REE content increase of 213% with minimal difference in the ash content between the product and tailings material. With a mass yield to the product of 14.6%, the REE recovery was 38.4%.

Oleic acid was also found to provide a similar REE concentration performance from the treatment of the Fire Clay Rider thickener underflow. The test conditions are provided in Table 13 and the results in 14. A collector dosage of 2 kg/ton provided an increase in REE content from 240 ppm to 377 ppm on a whole sample basis while recovering 14.1% of the REEs that reported in the feed. It is clear that REE recovery and concentration improvement is needed. However, the preliminary results from the treatment of the three thickener underflow samples clearly indicate potential for selective REE concentration using flotation.

The test conditions and results obtained from the nine tests conducting on the fly ash sample are provided in Tables 15 and 16, respectively. As clearly shown in Figure 20, froth flotation was ineffective in concentrating the REEs which is likely due to the complex nature of the REE distribution throughout the glassy matrix comprising the fly ash material.

*Table 11. Collector type and flotation test conditions used for the Eagle seam thickener underflow.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Eagle Seam Thickener Underflow (UK 002) | Talon 9400 | 1 | 9.3 | 1C | 1T |
| | | 2 | 9.69 | 2C | 2T |
| | | 5 | 9.48 | 3C | 3T |
| | Oleic Acid | 2 | 9.63 | 4C | 4T |
| | | 5 | 9.39 | 5C | 5T |

*Table 12. REE concentration results using froth flotation to treat Eagle seam thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | REE (ppm, ash basis) | REE (ppm, whole sample) | REE Distribution (%) | Concentration Ratio (%) |
|---|---|---|---|---|---|---|---|
| Eagle Seam Thickener Underflow (UK 002) | 1C | 25.71 | 93.49 | 286 | 268 | 29.97 | 16.57 |
| | 1T | 74.29 | 95.29 | 227 | 217 | 70.03 | -5.73 |
| | | | | | | | |
| | 2C | 33.77 | 93.82 | 291 | 273 | 51.34 | 52.02 |
| | 2T | 66.23 | 95.33 | 139 | 132 | 48.66 | -26.53 |
| | | | | | | | |
| | 3C | 56.06 | 94.37 | 247 | 234 | 73.47 | 31.06 |
| | 3T | 43.94 | 95.09 | 113 | 108 | 26.53 | -39.63 |
| | | | | | | | |
| | 4C | 14.55 | 92.56 | 396 | 367 | 31.00 | 113.09 |
| | 4T | 85.45 | 95.29 | 146 | 139 | 69.00 | -19.26 |
| | | | | | | | |
| | 5C | 26.05 | 92.92 | 371 | 344 | 48.82 | 87.43 |
| | 5T | 73.95 | 95.24 | 133 | 127 | 51.18 | -30.80 |

*Table 13. Collector type and flotation test conditions used for the Fire Clay Rider seam thickener underflow.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Rider Seam Thickener Underflow (UK 003) | Talon 9400 | 1 | 9.3 | 1C | 1T |
| | | 2 | 9.69 | 2C | 2T |
| | | 5 | 9.48 | 3C | 3T |
| | Oleic Acid | 2 | 9.63 | 4C | 4T |
| | | 5 | 9.39 | 5C | 5T |

*Table 14. REE concentration results using froth flotation to treat Fire Clay Rider seam thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | TREE (ppm, ash basis) | TREE (ppm, coal basis) | REE Distribution (%) | Concentration Ratio (%) |
|---|---|---|---|---|---|---|---|
| Fire Clay Rider Seam Thickener Underflow (UK 003) | 1C | 22.31 | 93.17 | 317 | 295 | 26.77 | 20.01 |
| | 1T | 77.69 | 95.32 | 243 | 232 | 73.23 | -5.75 |
| | | | | | | | |
| | 2C | 25.62 | 93.13 | 348 | 324 | 35.10 | 37.02 |
| | 2T | 74.38 | 95.52 | 216 | 206 | 64.90 | -12.75 |
| | | | | | | | |
| | 3C | 49.66 | 94.15 | 310 | 292 | 64.23 | 29.32 |
| | 3T | 50.34 | 95.35 | 168 | 160 | 35.77 | -28.93 |
| | | | | | | | |
| | 4C | 8.48 | 92.84 | 406 | 377 | 13.31 | 56.94 |
| | 4T | 91.52 | 95.02 | 239 | 227 | 86.69 | -5.28 |
| | | | | | | | |
| | 5C | 17.79 | 91.33 | 340 | 311 | 26.04 | 46.42 |
| | 5T | 82.21 | 95.27 | 200 | 191 | 73.96 | -10.04 |

*Table 15. Collector type and flotation test conditions used for the fly ash sample.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Fly Ash (UK 004) | Oleic Acid | 5 | 10.5 | 1C | 1T |
| | | 2 | 10.5 | 2C | 2T |
| | | 1 | 10.5 | 3C | 3T |
| | Sodium Oleate | 5 | 10.5 | 4C | 4T |
| | | 2 | 10.5 | 5C | 5T |
| | | 1 | 10.5 | 6C | 6T |
| | Talon9400 | 5 | 10.5 | 7C | 7T |
| | | 2 | 10.5 | 8C | 8T |
| | | 1 | 10.5 | 9C | 9T |

*Table 16. REE concentration results using froth flotation to treat the fly ash material.*

| Sample | Product | Weight (%) | Ash (%) | Total REE (ash basis) | Total REE (whole sample) | Concentration Ratio (%) | REE Weight Distribution (%) |
|---|---|---|---|---|---|---|---|
| Fire Clay Fly Ash (UK 004) | 1C | 29.40 | 97.66 | 606 | 592 | 11.88 | 32.89 |
| | 1T | 70.60 | 97.68 | 515 | 503 | -4.94 | 67.11 |
| | | | | | | | |
| | 2C | 20.47 | 98.25 | 649 | 638 | 14.65 | 24.39 |
| | 2T | 79.53 | 97.25 | 551 | 535 | -3.77 | 75.61 |
| | | | | | | | |
| | 3C | 20.99 | 97.54 | 583 | 569 | 4.27 | 21.89 |
| | 3T | 79.01 | 98.46 | 548 | 539 | -1.14 | 78.11 |
| | | | | | | | |
| | 4C | 13.85 | 97.16 | 535 | 525 | -6.43 | 12.96 |
| | 4T | 86.15 | 98.24 | 578 | 567 | 1.03 | 87.04 |
| | | | | | | | |
| | 5C | 5.10 | 97.53 | 470 | 458 | -10.21 | 4.58 |
| | 5T | 94.90 | 97.92 | 524 | 513 | 0.55 | 95.42 |
| | | | | | | | |
| | 6C | 10.16 | 98.27 | 620 | 609 | 14.50 | 11.64 |
| | 6T | 89.84 | 98.31 | 532 | 523 | -1.64 | 88.36 |
| | | | | | | | |
| | 7C | 5.39 | 96.77 | 416 | 403 | -23.40 | 4.13 |
| | 7T | 94.61 | 98.12 | 543 | 533 | 1.33 | 95.87 |
| | | | | | | | |
| | 8C | 9.37 | 97.98 | 575 | 563 | 2.71 | 9.62 |
| | 8T | 90.63 | 98.02 | 558 | 547 | -0.28 | 90.38 |
| | | | | | | | |
| | 9C | 11.44 | 98.02 | 619 | 607 | 19.71 | 13.70 |
| | 9T | 88.56 | 98.29 | 503 | 494 | -2.55 | 86.30 |

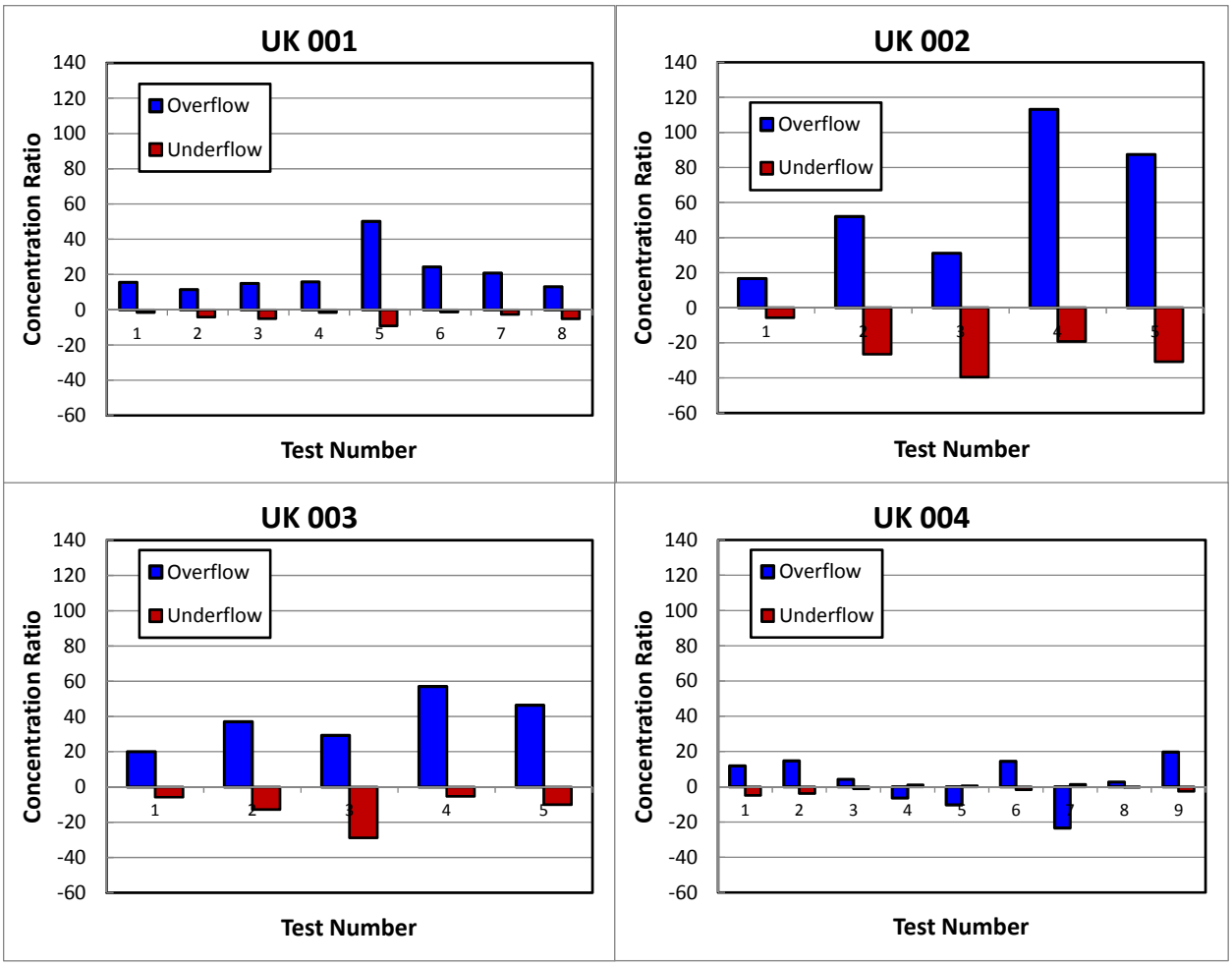



*Figure 20. Test results obtained from flotation tests using rare earth mineral collectors when treating the thickener underflow material from three coal preparation plants (UK001, UK002 and UK003) and the utility fly ash (UK004); concentration ratio is percent.*

### *3.2.4 Multi-Gravity, Electrostatic and Agglomeration*

a) Eagle Seam Coarse Refuse (20x100 Mesh)

Table 17 shows the separation results obtained using the MGS and ESS for the 20 x 100 mesh split of the coarse refuse from the Eagle seam coal. Two test runs were completed using the MGS unit, while one test was conducted using the ESS unit. To better visualize the test data, the percentage change in ash, total REEs, heavy REEs and light REEs were plotted in Figure 21. The data indicates that the MGS was capable of increasing the concentration of REEs in the high ash (high SG) product, which suggests that some high density minerals rich in REEs were likely

concentrated in the high SG product and depleted from the low SG product. However, the magnitude of the change was relatively small, typically less than a 20% increase/decrease. The ESS process had very little impact on the ash content of the products, but surprisingly had a large impact on the LREE concentration. However, this impact was not observed in other ESS tests, which suggests that there may have been a problem with the REE analyses for this particular feed.

*Table 17. Separation results for 20x100 mesh coarse refuse (Eagle Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS 1 | | | | | | | | | |
| Low SG | 60.14 | 61.56 | 158.49 | 24.07 | 119.51 | -13.84 | -17.84 | -16.23 | -19.63 |
| High SG | 39.86 | 86.37 | 229.92 | 33.75 | 180.07 | 20.88 | 19.18 | 17.45 | 21.10 |
| Feed | 100.00 | 71.45 | 192.91 | 28.73 | 148.69 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS 2 | | | | | | | | | |
| Low SG | 74.65 | 64.94 | 239.83 | 35.14 | 184.97 | -9.11 | 2.19 | 3.16 | 1.49 |
| High SG | 25.35 | 90.62 | 223.81 | 31.79 | 176.51 | 26.83 | -4.63 | -6.67 | -3.15 |
| Feed | 100.00 | 71.45 | 234.68 | 34.06 | 182.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS 1 | | | | | | | | | |
| Thrown | 8.10 | 85.27 | 183.07 | 26.89 | 140.11 | 3.40 | -6.77 | -9.14 | -6.90 |
| Middling | 62.52 | 86.49 | 169.28 | 24.97 | 129.05 | 4.88 | -13.80 | -15.61 | -14.25 |
| Pinned | 29.38 | 73.14 | 268.80 | 42.08 | 207.77 | -11.32 | 36.89 | 42.22 | 38.06 |
| Feed | 100.00 | 82.47 | 196.37 | 29.59 | 150.49 | 0.00 | 0.00 | 0.00 | 0.00 |

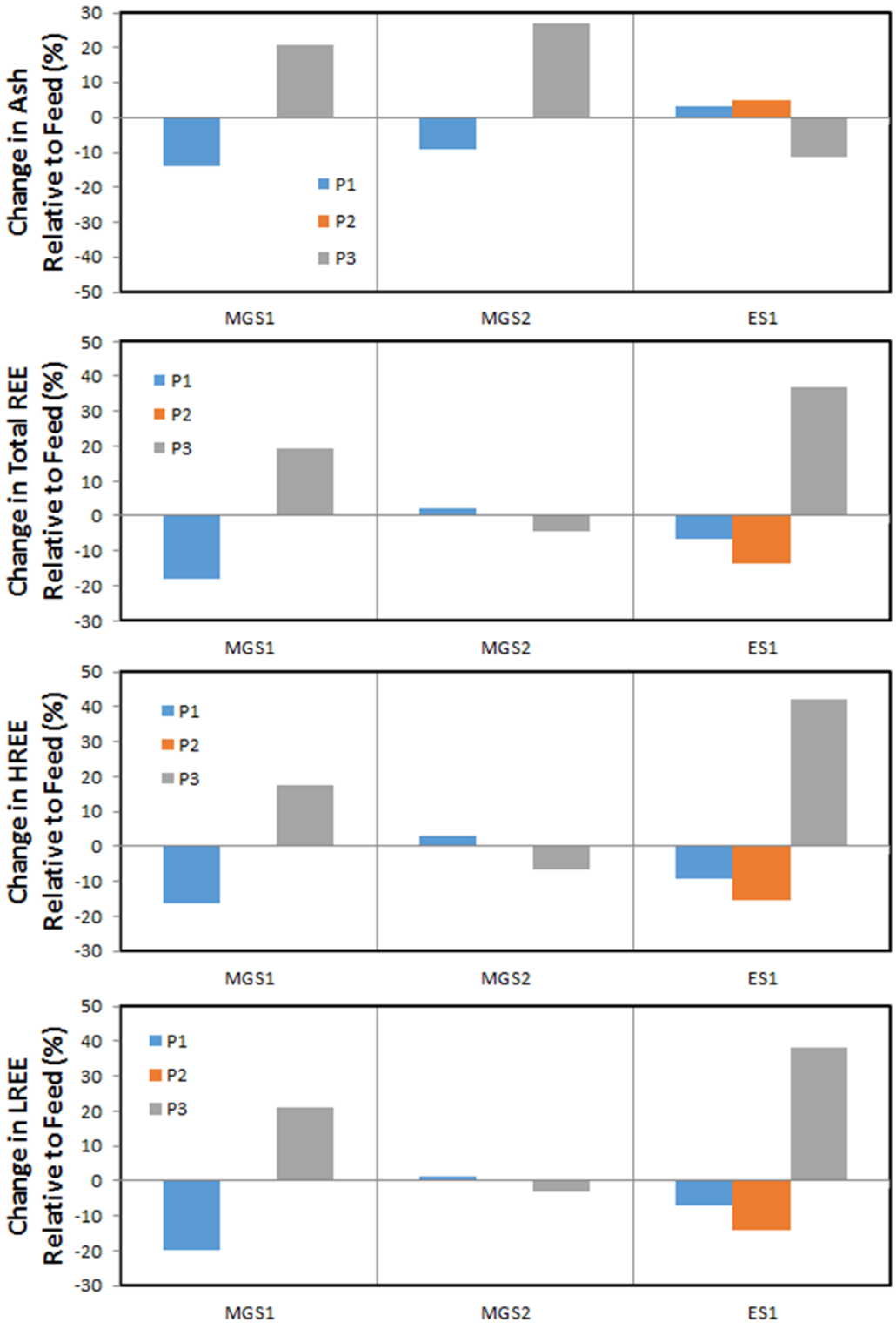



*Figure 21. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 20x100 mesh coarse refuse (Eagle Seam).*

b) Eagle Seam Coarse Refuse (100 Mesh x 0)

Table 18 shows the separation results obtained using the MGS and ESS for the 100 mesh x 0 split of the coarse refuse from the Eagle seam coal. Due to the size of this material, all three processes (MGS, SOA and ESS) were evaluated. The test data were also plotted in Figure 22 as percentage change relative to feed to make the results easier to interpret. As shown, the MGS light product reduced the concentration of REEs in the feed by about 44-46%. Similar reductions were also observed for the HREE and LREE. Unfortunately, the corresponding REE concentrations in the heavy product increased by only 12-18%.

*Table 18. Separation results for 100 mesh x 0 coarse refuse (Eagle Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 25.45 | 75.89 | 125.97 | 16.02 | 91.73 | -14.47 | -44.80 | -50.18 | -48.99 |
| High SG | 74.55 | 93.11 | 256.63 | 36.64 | 204.32 | 4.94 | 12.46 | 13.96 | 13.63 |
| Feed | 100.00 | 88.73 | 228.19 | 32.15 | 179.81 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 30.75 | 76.13 | 104.42 | 13.84 | 74.21 | -14.20 | -46.11 | -52.56 | -50.42 |
| High SG | 69.25 | 94.33 | 225.80 | 34.67 | 176.75 | 6.31 | 16.53 | 18.84 | 18.07 |
| Feed | 100.00 | 88.73 | 193.77 | 29.17 | 149.69 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 1 | 14.56 | 91.75 | 239.77 | 35.09 | 188.70 | 10.33 | 6.18 | 1.52 | 7.93 |
| Conc 2 | 3.26 | 36.21 | 282.43 | 47.52 | 212.76 | -56.46 | 25.08 | 37.48 | 21.69 |
| Tail | 82.18 | 91.14 | 221.26 | 33.63 | 171.61 | 9.60 | -2.01 | -2.70 | -1.84 |
| Feed | 100.00 | 83.16 | 225.81 | 34.56 | 174.84 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 14.27 | 21.08 | 407.19 | 78.18 | 298.78 | -74.63 | 74.08 | 113.42 | 65.52 |
| Conc 2 | 3.15 | 93.35 | 227.82 | 32.56 | 179.17 | 12.34 | -2.60 | -11.12 | -0.74 |
| Tail | 82.58 | 93.42 | 227.38 | 35.17 | 175.94 | 12.43 | -2.79 | -4.00 | -2.53 |
| Feed | 100.00 | 83.09 | 233.90 | 36.63 | 180.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 17.04 | 91.23 | 207.70 | 30.18 | 162.03 | 3.57 | -4.91 | -10.71 | -4.51 |
| Middling | 1.34 | 87.53 | 249.28 | 38.82 | 194.02 | -0.64 | 14.13 | 14.84 | 14.35 |
| Pinned | 81.63 | 87.44 | 220.25 | 34.51 | 170.94 | -0.73 | 0.84 | 2.09 | 0.75 |
| Feed | 100.00 | 88.09 | 218.42 | 33.80 | 169.67 | 0.00 | 0.00 | 0.00 | 0.00 |

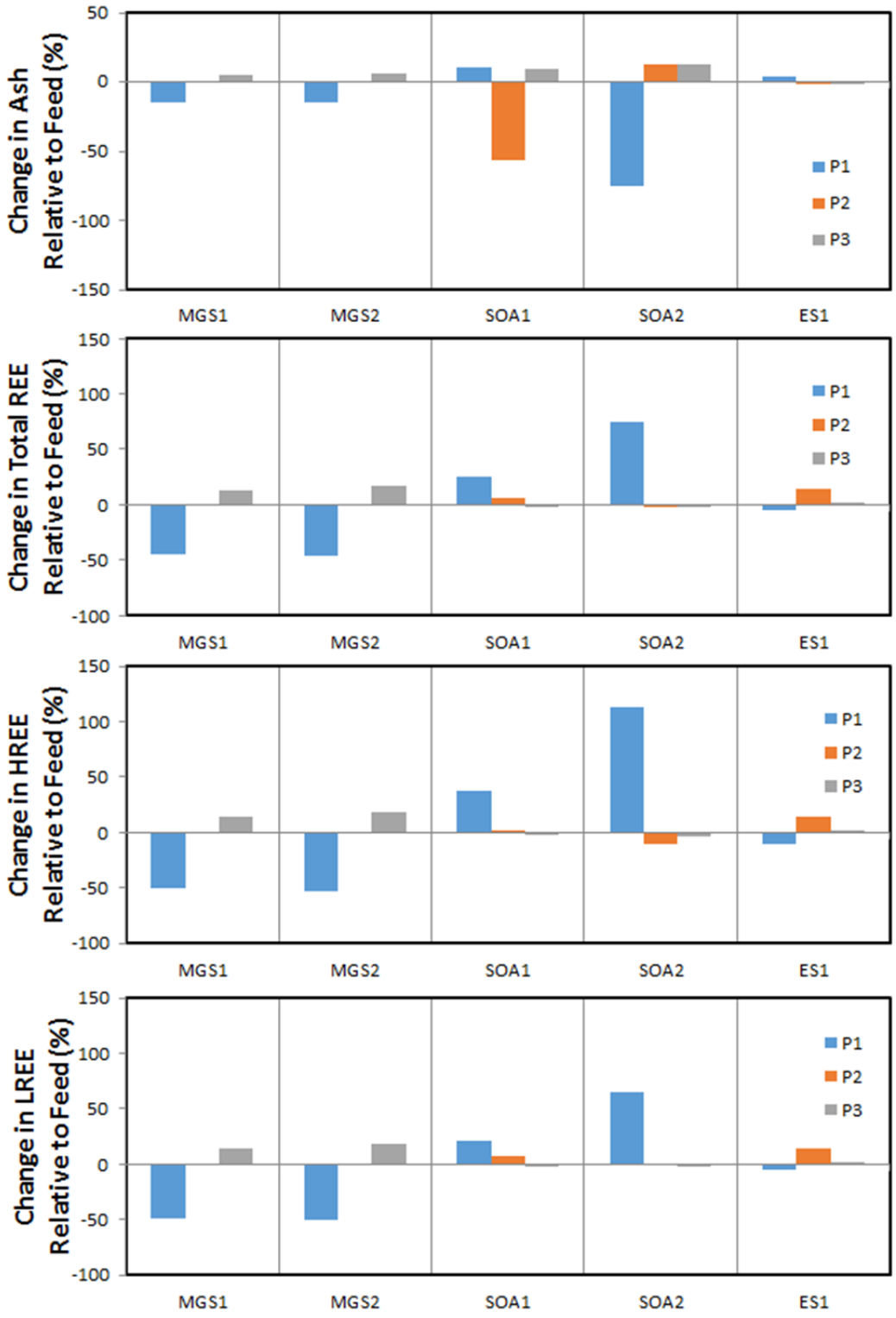



*Figure 22. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 coarse refuse (Eagle Seam).*

For the 100 mesh x 0 split of this particular sample, the largest impacts on REE concentrations were obtained using the SOA process. Three products were generated in each SOA test run. The first product (P1) was obtained using only the addition of oil, which separated naturally hydrophobic (organic) carbonaceous matter as a float product from hydrophilic (inorganic) mineral matter that remained in the water phase. After this initial separation step, a collector (hydroxamate) was added to the residual slurry containing mostly mineral matter. The collector was designed to enhance the hydrophobicity of minerals (such as monazite) that may be enriched in REEs. After conditioning for a short period of time with the collector, a second dosage of oil was added to separate any minerals rendered hydrophobic by the collector from other non-REE containing minerals. The resulting product (P2) was collected with the oil as agglomerate in the float product, while the slurry remaining in the separation vessel was collected as a final product (P3).

The test data obtained for the first SOA test (SOA1) showed a modest increase in REE concentrations by 25-35% upon the addition of oil. The increase was even larger in the second SOA test (SOA2), which used a higher dosage of oil. Unfortunately, no such increase in REE concentrations was observed upon the addition of collector in either of the SOA tests. These results suggest that the REEs contained in this particular size fraction of coal tended to partition to the organic rich fraction during the initial agglomeration step. Any minerals rich in REEs that remained in the non-floating faction after oil agglomeration were either not impacted greatly by the addition of the collector or were inadequately liberated to be effectively separated.

Finally, the separation results obtained using the ESS process showed that no enrichment occurred in any of the 100 x 325 mesh products generated by this method.

c) Eagle Seam Fine Refuse (100 Mesh x 0)

Table 19 shows the separation results obtained using the MGS and SOA for the 100 mesh x 0 split of fine refuse from the Eagle seam coal. The MGS method once again tended to slightly enrich the dense high-ash product in REEs by up to 23%. As such, the MGS testing suggested

*Table 19. Separation results for100 mesh x 0 fine refuse (Eagle Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 51.50 | 67.40 | 139.40 | 16.82 | 104.40 | -15.53 | -29.98 | -40.13 | -32.31 |
| High SG | 48.50 | 92.95 | 245.06 | 36.78 | 192.61 | 16.49 | 23.09 | 30.90 | 24.88 |
| Feed | 100.00 | 79.79 | 199.10 | 28.10 | 154.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 51.04 | 65.89 | 152.96 | 18.67 | 114.95 | -17.41 | -23.43 | -33.55 | -25.61 |
| High SG | 48.96 | 94.27 | 233.85 | 34.97 | 183.37 | 18.15 | 17.07 | 24.45 | 18.66 |
| Feed | 100.00 | 79.79 | 199.76 | 28.10 | 154.53 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 2 | 15.22 | 33.01 | 397.72 | 68.98 | 306.02 | -58.48 | 110.42 | 142.85 | 111.87 |
| Conc 1 | 2.79 | 22.58 | 331.46 | 56.57 | 250.91 | -71.59 | 75.36 | 99.16 | 73.71 |
| Tail | 81.99 | 91.65 | 179.94 | 26.62 | 137.59 | 15.28 | -4.80 | -6.29 | -4.74 |
| Feed | 100.00 | 79.50 | 189.02 | 28.40 | 144.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 14.56 | 15.13 | 410.60 | 74.04 | 307.29 | -81.05 | 67.93 | 112.62 | 60.93 |
| Conc 2 | 3.26 | 89.66 | 225.52 | 31.46 | 177.81 | 12.26 | -7.77 | -9.65 | -6.88 |
| Tail | 82.18 | 90.95 | 240.36 | 33.80 | 188.03 | 13.88 | -1.70 | -2.94 | -1.53 |
| Feed | 100.00 | 79.87 | 244.51 | 34.82 | 190.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 3 | | | | | | | | | |
| Conc 1 | 14.27 | 33.84 | 279.48 | 46.16 | 212.65 | -59.73 | 39.48 | 68.93 | 36.78 |
| Conc 2 | 3.15 | 90.78 | 235.09 | 33.36 | 185.70 | 8.02 | 17.33 | 22.06 | 19.44 |
| Tail | 82.58 | 92.46 | 194.06 | 25.91 | 150.72 | 10.02 | -3.15 | -5.19 | -3.06 |
| Feed | 100.00 | 84.04 | 200.37 | 27.33 | 155.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 15.25 | 84.77 | 242.76 | 37.55 | 188.59 | 7.14 | 6.40 | 1.80 | 7.51 |
| Middling | 1.52 | 72.13 | 242.88 | 39.83 | 184.76 | -8.83 | 6.45 | 7.97 | 5.33 |
| Pinned | 83.23 | 78.22 | 225.01 | 36.70 | 172.64 | -1.15 | -1.38 | -0.49 | -1.58 |
| Feed | 100.00 | 79.12 | 228.16 | 36.89 | 175.41 | 0.00 | 0.00 | 0.00 | 0.00 |

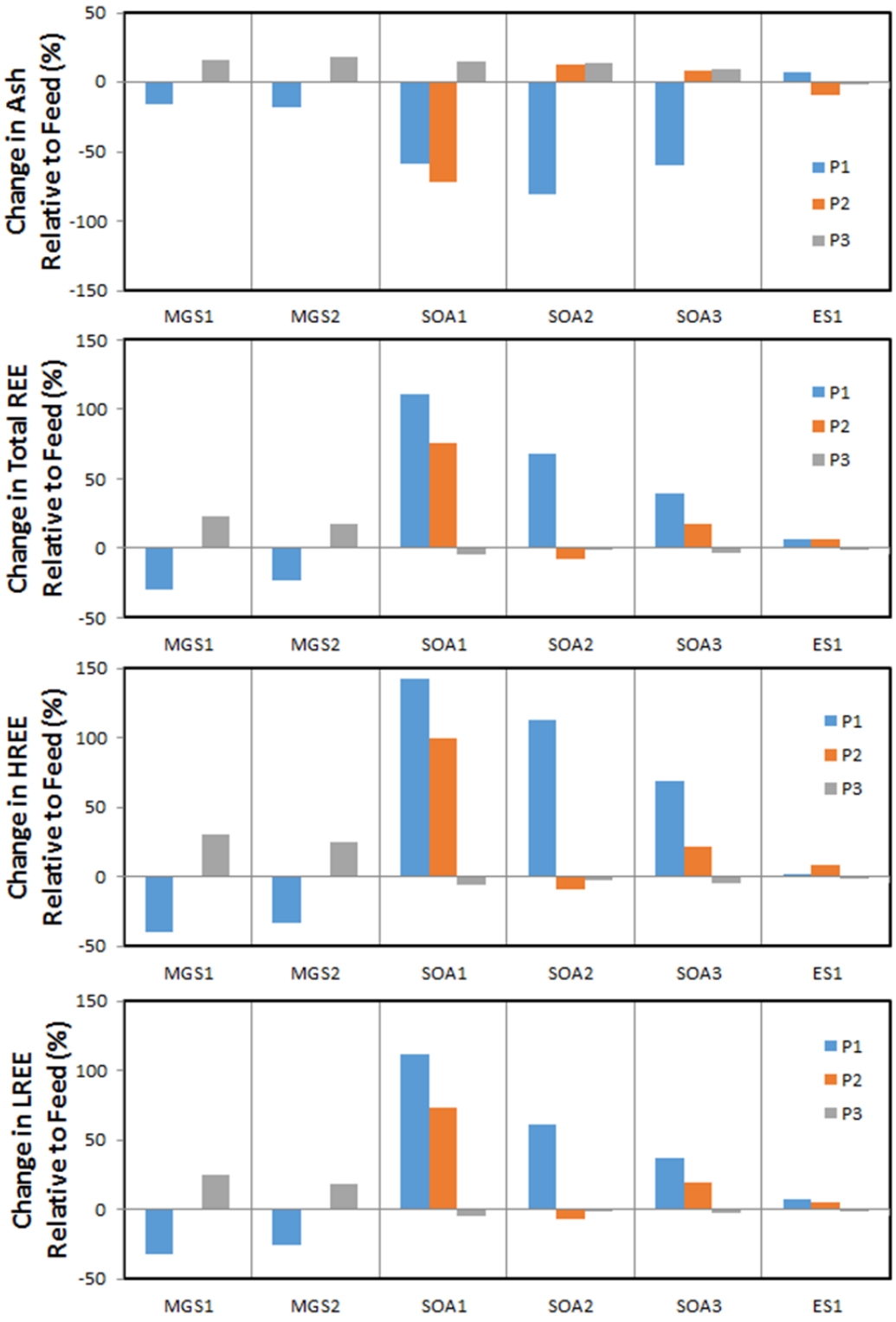



*Figure 23. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 fine refuse (Eagle Seam).*

that REE concentrations could be increased in the dense high-ash product. This finding is in sharp contrast to other separation results that tended to show an inverse relationship between ash content and REE concentration.

Figure 23 shows the percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 split of fine refuse from the Eagle Seam. In this particular case, three separate SOA tests were conducted with each having a slightly higher dosage of collector added during the second stage of processing (i.e., after standard oil agglomeration to separator organic and inorganic matter). The data show that the REE concentrations increased considerably upon the addition of oil in both the SOA1 (99% increase in REE concentration) and SOA2 (68% increase in REE concentration) test runs. The increase in REE concentration corresponded to a decrease in ash resulting from the separation of organic and inorganic matter during oil agglomeration. Interestingly, the addition of collector (hydroxomate) in the SOA1 test run also increased the concentration of total REEs by about 75%, which the largest impact resulting from a more than 100% increase in HREE concentrations. Large increases were not observed in two additional SOA tests (SOA2 and SOA3), which were conducted using higher dosages of collector (hydroxamate). This finding suggests that overdosing of collector is possible when attempting to selectively separate REEs from other waste minerals.

Finally, the ESS process had essentially no impact on the separation, which was consistent with the findings obtained for the coarse refuse. Not surprisingly, these findings suggest that the ESS process is not suitable for upgrading fine material in the 100 x 325 mesh size range.

a) Fire Clay Seam Coarse Refuse (20 x 100 Mesh)

Table 20 shows the separation results obtained using the MGS and ESS for the 20 x 100 mesh split of the coarse refuse from the Fire Clay seam coal. As indicated previously, only the MGS and ESS processes could be used with this coarse material. The percentage change data, which is shown in Figure 24, shows that the MGS process could significantly increase/decrease the REE concentration in this size fraction. The results also again indicate a direct correlation between ash content and REE concentration when using the MGS process.

The results obtained using the ESS process suggested a small increase in REE concentration for the pinned product (P3), although the change was again relatively small (less than 14% increase in REE concentration).

*Table 20. Separation results for 20x100 mesh coarse refuse (Fire Clay Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 28.39 | 78.74 | 178.08 | 29.58 | 134.52 | -5.34 | 37.77 | 40.68 | 37.87 |
| High SG | 71.61 | 84.94 | 111.32 | 17.89 | 83.99 | 2.12 | -13.88 | -14.95 | -13.92 |
| Feed | 100.00 | 83.18 | 129.26 | 21.03 | 97.57 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 37.66 | 73.76 | 171.62 | 25.69 | 130.76 | -11.32 | -33.83 | -37.07 | -35.67 |
| High SG | 62.34 | 88.87 | 303.35 | 48.40 | 239.63 | 6.84 | 16.96 | 18.58 | 17.88 |
| Feed | 100.00 | 83.18 | 259.36 | 40.82 | 203.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 8.26 | 85.59 | 213.01 | 36.09 | 165.20 | 2.06 | -2.85 | -1.91 | -1.29 |
| Middling | 62.36 | 85.67 | 206.83 | 34.07 | 157.79 | 2.16 | -5.67 | -7.39 | -5.72 |
| Pinned | 29.38 | 79.53 | 249.54 | 43.22 | 189.88 | -5.17 | 13.82 | 17.47 | 13.46 |
| Feed | 100.00 | 83.86 | 219.25 | 36.79 | 167.36 | 0.00 | 0.00 | 0.00 | 0.00 |

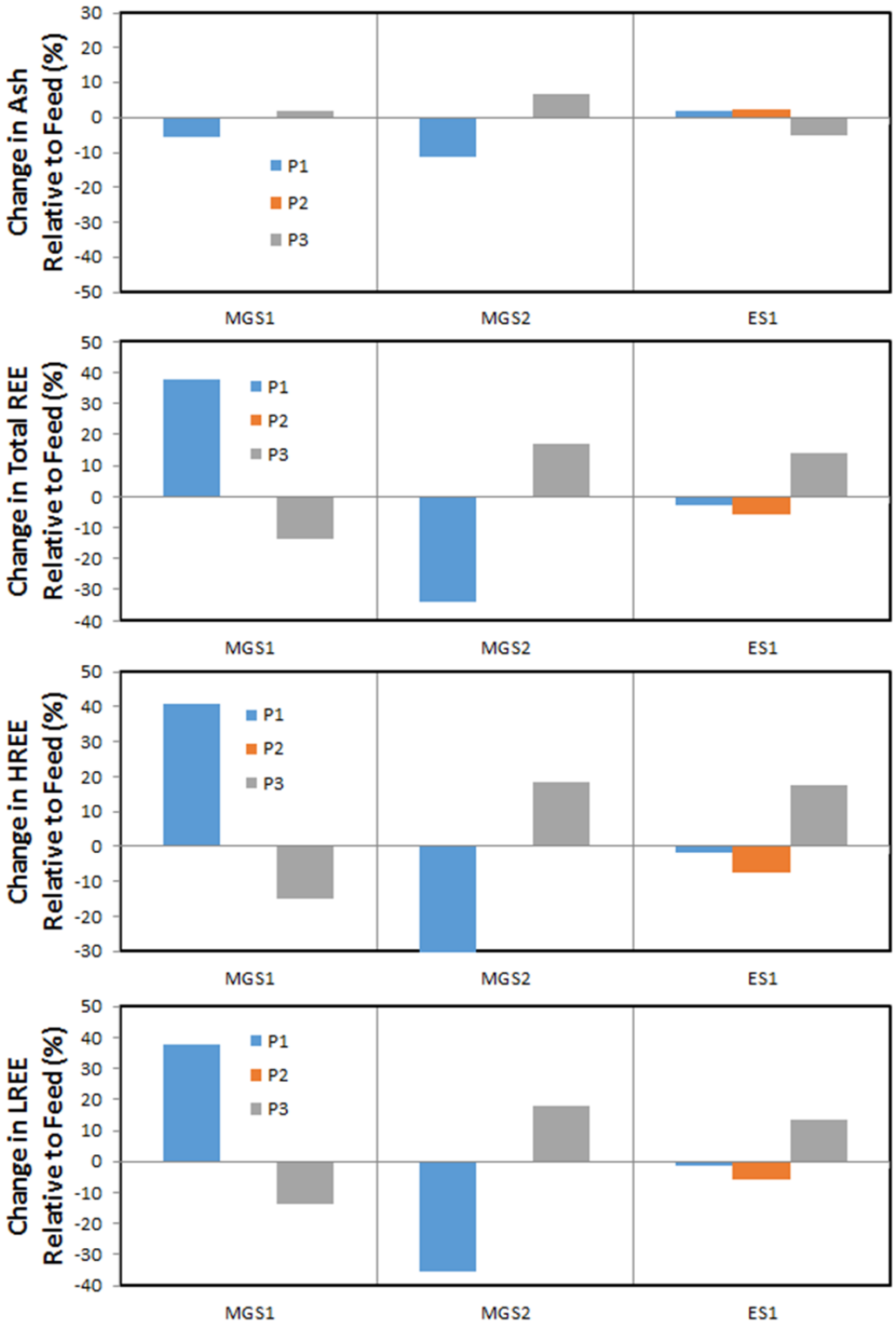



*Figure 24. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 20x100 mesh coarse refuse (Fire Clay Seam).*

b) Fire Clay Seam Coarse Refuse (100 Mesh x 0)

Table 21 shows the separation results for the 100 mesh x 0 size fraction of fine refuse from the fire clay seam. The percentage change plots are provided in Figure 25. As shown, the MGS provided modest increases/decreases (30-40%) in REE concentrations, while the SOA process achieved much larger reductions (>65%) in total REE concentrations. ESS once again had little or no net impact on the REE enrichment.

*Table 21. Separation results for 100 mesh x 0 coarse refuse (Fire Clay Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 27.67 | 75.51 | 162.37 | 21.52 | 123.48 | -11.66 | -37.25 | -43.00 | -39.58 |
| High SG | 72.33 | 89.29 | 289.93 | 43.01 | 230.56 | 4.46 | 12.05 | 13.91 | 12.81 |
| Feed | 100.00 | 85.48 | 258.75 | 37.75 | 204.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 35.21 | 76.75 | 159.37 | 22.90 | 119.07 | -10.21 | -30.31 | -37.03 | -32.56 |
| High SG | 64.79 | 90.22 | 260.75 | 42.59 | 203.14 | 5.55 | 14.01 | 17.12 | 15.05 |
| Feed | 100.00 | 85.48 | 228.69 | 36.36 | 176.56 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 1 | 50.18 | 83.49 | 96.53 | 16.98 | 72.04 | -1.98 | -65.40 | -63.16 | -66.78 |
| Conc 2 | 3.56 | 80.74 | 299.93 | 50.29 | 233.65 | -5.20 | 7.49 | 9.09 | 7.75 |
| Tail | 46.26 | 90.11 | 271.74 | 44.10 | 210.83 | 5.79 | -2.62 | -4.33 | -2.77 |
| Feed | 100.00 | 85.17 | 279.04 | 46.10 | 216.85 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 44.26 | 78.20 | 309.90 | 52.66 | 241.17 | -7.27 | 2.59 | 5.93 | 2.33 |
| Conc 2 | 6.55 | 85.41 | 316.89 | 51.80 | 249.21 | 1.28 | 4.90 | 4.20 | 5.74 |
| Tail | 49.19 | 89.70 | 294.07 | 47.14 | 229.67 | 6.37 | -2.65 | -5.18 | -2.55 |
| Feed | 100.00 | 84.33 | 302.08 | 49.71 | 235.69 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 22.24 | 86.42 | 250.34 | 43.67 | 194.19 | 5.19 | 3.32 | 1.75 | 5.22 |
| Middling | 1.43 | 81.76 | 245.75 | 43.55 | 188.58 | -0.48 | 1.43 | 1.47 | 2.18 |
| Pinned | 76.33 | 80.92 | 239.72 | 42.67 | 181.49 | -1.50 | -1.06 | -0.57 | -1.67 |
| Feed | 100.00 | 82.16 | 242.29 | 42.92 | 184.56 | 0.00 | 0.00 | 0.00 | 0.00 |

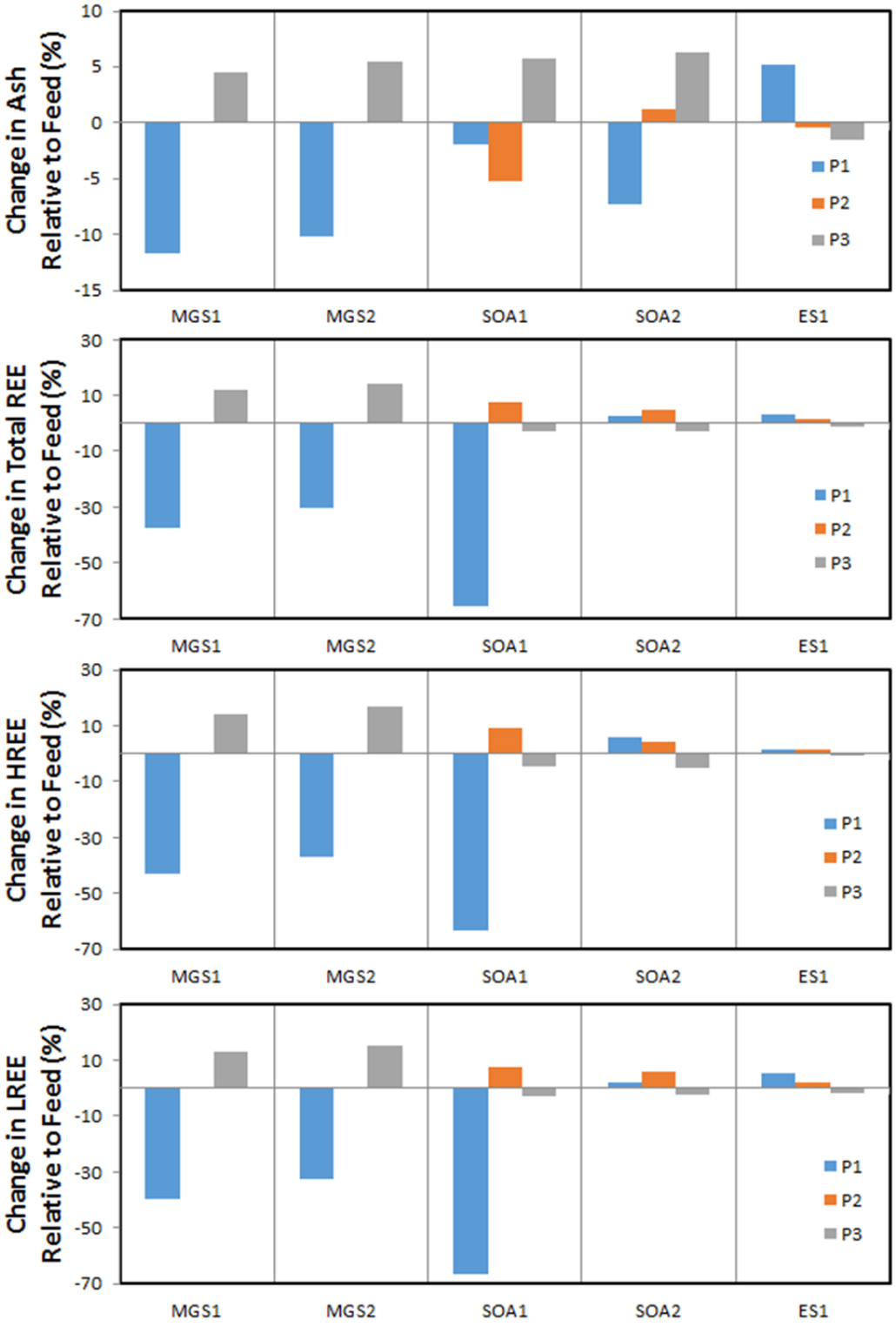



*Figure 25. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 coarse refuse (Fire Clay Seam).*

c) Fire Clay Seam Fine Refuse (100 Mesh x 0)

Table 22 and Figure 26 shows the separation results obtained for treating the 100 mesh x 0 fines of the Fire Clay fine refuse. Once again, modest increases/decreases REE concentrations were observed for the MGS process, while much larger enrichments/depletions were observed for the SOA process. Depending on the dosages of oil and collector employed during SOA, the REE concentrations could be increased in either the first (oil only) or second (oil + collector) stages. Unfortunately, the ESS process did not substantially impact the REE concentrations.

*Table 22. Separation results for 100 mesh x 0 fine refuse (Fire Clay Seam).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 77.60 | 47.96 | 368.18 | 61.79 | 282.13 | -15.37 | 9.97 | 11.08 | 9.76 |
| High SG | 22.40 | 86.87 | 270.98 | 43.84 | 209.07 | 53.28 | -19.07 | -21.19 | -18.67 |
| Feed | 100.00 | 56.68 | 334.81 | 55.63 | 257.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 78.28 | 46.85 | 367.42 | 61.21 | 282.18 | -17.33 | 15.28 | 19.45 | 14.46 |
| High SG | 21.72 | 92.07 | 229.40 | 32.97 | 181.15 | 62.45 | -28.02 | -35.67 | -26.52 |
| Feed | 100.00 | 56.68 | 318.72 | 51.25 | 246.53 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 2 | 44.63 | 83.91 | 291.28 | 42.44 | 229.68 | 42.49 | -12.09 | -22.78 | -9.85 |
| Conc 1 | 1.23 | 19.25 | 565.37 | 116.64 | 418.76 | -67.31 | 70.63 | 112.23 | 64.36 |
| Tail | 54.15 | 90.99 | 291.37 | 44.46 | 226.72 | 54.51 | -12.06 | -19.09 | -11.02 |
| Feed | 100.00 | 58.89 | 331.34 | 54.96 | 254.79 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 46.99 | 19.61 | 597.45 | 126.58 | 440.82 | -65.78 | 85.17 | 140.34 | 77.27 |
| Conc 2 | 2.13 | 86.73 | 283.68 | 40.87 | 224.09 | 51.33 | -12.08 | -22.41 | -9.89 |
| Tail | 50.88 | 90.90 | 269.45 | 38.41 | 211.36 | 58.60 | -16.49 | -27.07 | -15.00 |
| Feed | 100.00 | 57.31 | 322.65 | 52.67 | 248.67 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 30.73 | 74.17 | 254.13 | 43.79 | 193.50 | 85.18 | -20.36 | -30.69 | -17.34 |
| Middling | 0.13 | 56.19 | 281.93 | 54.34 | 208.05 | 40.29 | -11.65 | -13.99 | -11.12 |
| Pinned | 69.14 | 24.86 | 405.45 | 88.93 | 288.01 | -37.94 | 27.06 | 40.76 | 23.04 |
| Feed | 100.00 | 40.05 | 319.11 | 63.18 | 234.08 | 0.00 | 0.00 | 0.00 | 0.00 |

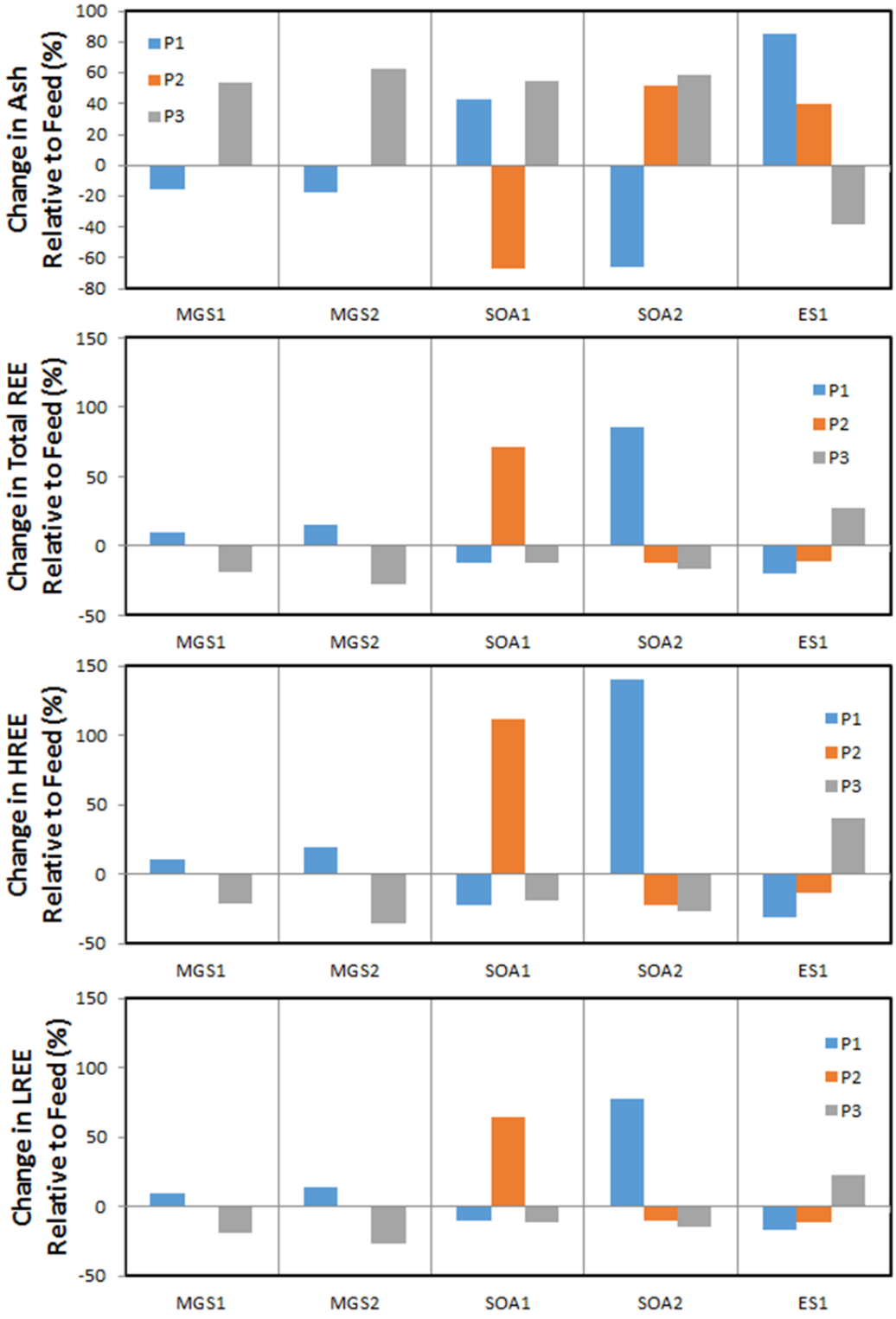



*Figure 26. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 fine refuse (Fire Clay Seam).*

a) Fire Clay Rider Coarse Refuse (20 x 100 Mesh)

Table 23 shows the separation results obtained for treating the 100 mesh x 0 fines of the Fire Clay Rider. The corresponding percentage changes in ash and REE concentrations are also plotted in Figure 27 for ease of reference. As observed for the previous samples tested as part of this study, the MGS provided a modest enrichment/depletion in REE concentrations. The largest changes occurred during test run 2, which provided a reduction in REE concentration by about 20-25%. The MGS again tended to increase the concentration of REEs in the high-ash fraction, which suggests that high SG minerals are being concentrated by this process.

The ESS process did not significantly impact the separation of REEs, which was found to be consistent with other samples tested under this experimental investigation.

*Table 23. Separation results for 20x100 mesh coarse refuse (Fire Clay Rider).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 21.06 | 75.77 | 238.20 | 35.47 | 185.67 | -9.41 | -9.38 | -11.45 | -10.45 |
| High SG | 78.94 | 85.74 | 268.68 | 41.14 | 212.45 | 2.51 | 2.21 | 2.70 | 2.46 |
| Feed | 100.00 | 83.64 | 262.86 | 40.06 | 207.34 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 20.46 | 77.77 | 216.87 | 31.77 | 169.06 | -7.02 | -20.26 | -24.08 | -21.14 |
| High SG | 79.54 | 85.15 | 284.91 | 44.21 | 225.01 | 1.81 | 4.76 | 5.66 | 4.97 |
| Feed | 100.00 | 83.64 | 271.97 | 41.84 | 214.36 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 10.58 | 85.97 | 199.43 | 34.98 | 148.78 | 2.10 | -7.94 | -7.66 | -8.45 |
| Middling | 21.08 | 85.73 | 206.12 | 36.63 | 153.94 | 1.82 | -4.85 | -3.30 | -5.27 |
| Pinned | 68.33 | 83.45 | 222.71 | 38.74 | 167.41 | -0.89 | 2.81 | 2.27 | 3.02 |
| Feed | 100.00 | 84.20 | 216.63 | 37.88 | 162.50 | 0.00 | 0.00 | 0.00 | 0.00 |

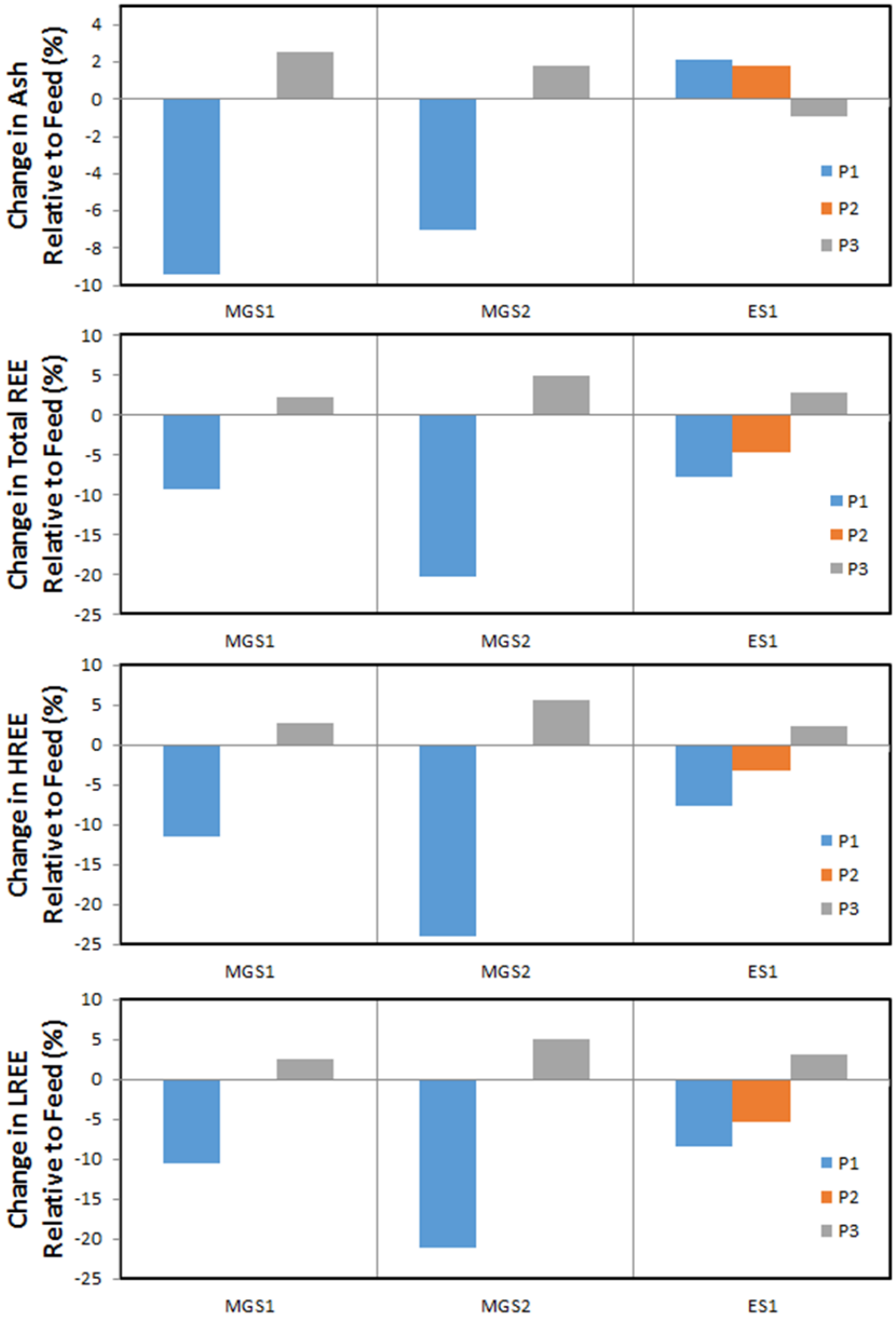



*Figure 27. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 20x100 mesh coarse refuse (Fire Clay Rider).*

b) Fire Clay Rider Coarse Refuse (100 Mesh x 0)

Table 24 and Figure 28 shows the separation results obtained for treating the 100 mesh x 0 fines of the Fire Clay Rider sample. The MGS once again provided a modest depletion of REE concentrations in the light product and a very small enrichment of REE concentrations in the dense product. The depletion tended to be much larger depletion (16-34%) in the lights compared to the enrichment (2-8%) in the heavies. The SOA process also provided very enrichments in REE concentrations after the addition of the collector (hydroxamate). The ESS process also provided a very small enrichment in total REE concentration of about 9%.

*Table 24. Separations results for 100 mesh x 0 coarse refuse (Fire Clay Rider).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 16.87 | 73.78 | 209.19 | 27.60 | 162.06 | -16.19 | -15.92 | -24.47 | -17.49 |
| High SG | 83.13 | 90.92 | 255.32 | 38.01 | 202.06 | 3.29 | 2.62 | 4.03 | 2.88 |
| Feed | 100.00 | 88.03 | 248.80 | 36.54 | 196.40 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 23.61 | 74.41 | 153.88 | 18.92 | 118.07 | -15.47 | -34.29 | -45.25 | -36.03 |
| High SG | 76.39 | 92.23 | 254.20 | 38.47 | 201.16 | 4.78 | 8.55 | 11.28 | 8.98 |
| Feed | 100.00 | 88.03 | 234.18 | 34.57 | 184.58 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 2 | 29.29 | 89.88 | 248.09 | 40.62 | 193.33 | 10.98 | -5.25 | -4.60 | -4.85 |
| Conc 1 | 3.98 | 56.51 | 280.15 | 50.28 | 212.10 | -30.22 | 7.00 | 18.09 | 4.39 |
| Tail | 66.73 | 91.19 | 257.65 | 40.60 | 201.34 | 12.61 | -1.59 | -4.65 | -0.91 |
| Feed | 100.00 | 80.98 | 261.83 | 42.58 | 203.18 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 6.80 | 50.68 | 306.07 | 54.46 | 232.70 | -42.79 | 6.14 | 15.51 | 3.46 |
| Conc 2 | 11.78 | 91.05 | 256.79 | 41.90 | 200.63 | 2.79 | -10.95 | -11.13 | -10.80 |
| Tail | 81.42 | 91.39 | 292.11 | 47.57 | 228.06 | 3.17 | 1.29 | 0.89 | 1.40 |
| Feed | 100.00 | 88.58 | 288.38 | 47.15 | 224.92 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 25.76 | 89.68 | 199.91 | 34.99 | 152.00 | 3.22 | 9.00 | 3.86 | 11.52 |
| Middling | 2.92 | 88.08 | 193.37 | 33.77 | 146.33 | 1.38 | 5.43 | 0.25 | 7.36 |
| Pinned | 71.32 | 85.82 | 176.77 | 33.19 | 129.95 | -1.22 | -3.62 | -1.47 | -4.66 |
| Feed | 100.00 | 86.88 | 183.41 | 33.69 | 136.30 | 0.00 | 0.00 | 0.00 | 0.00 |

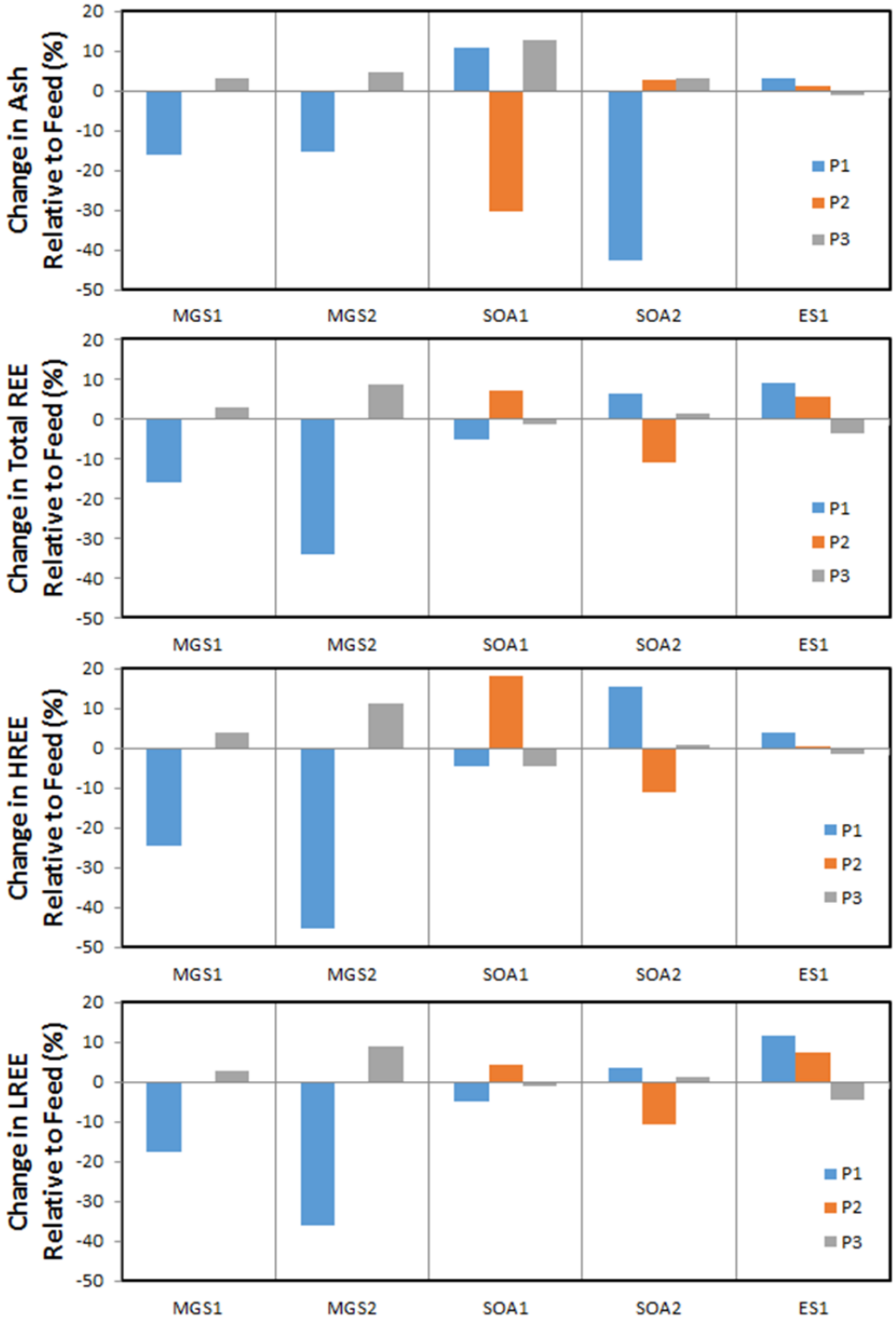



*Figure 28. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 coarse refuse (Fire Clay Rider).*

c) Fire Clay Rider Fine Refuse (100 Mesh x 0)

The separation results for the 100 mesh x 0 fraction of fine refuse for the Fine Clay Rider sample is provided in Table 25. The data are also plotted in Figure 29 as percentage change values. As shown, the MGS and ESS tests provided little change in REE concentrations. In contrast, the SOA process with the addition of collector (hydroxamate) reduced the ash by more than 60% in the first test (SOA1) and increased the total REE concentrations by 24%. The increase in REEs was largely due to an increase in HREEs, which increased by more than 75%.

*Table 25. Separation result for 100 mesh x 0 fine refuse (Fire Clay Rider).*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 66.33 | 58.92 | 310.18 | 44.76 | 241.23 | -15.46 | 10.11 | 2.96 | 10.72 |
| Midds | - | - | - | - | - | - | - | - | - |
| High SG | 33.67 | 90.93 | 245.36 | 41.83 | 188.08 | 30.46 | -12.90 | -3.78 | -13.68 |
| Feed | 100.00 | 69.70 | 281.70 | 43.47 | 217.88 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 68.24 | 58.87 | 309.76 | 44.12 | 241.29 | -15.54 | 6.54 | -0.85 | 7.03 |
| Midds | - | - | - | - | - | - | - | - | - |
| High SG | 31.76 | 92.97 | 264.87 | 45.01 | 203.86 | 33.39 | -8.90 | 1.15 | -9.57 |
| Feed | 100.00 | 69.70 | 290.75 | 44.50 | 225.43 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 2 | 26.57 | 56.93 | 270.88 | 44.36 | 206.33 | -15.78 | -3.94 | 6.08 | -6.06 |
| Conc 1 | 2.37 | 23.82 | 370.24 | 73.34 | 268.79 | -64.76 | 31.29 | 75.38 | 22.38 |
| Tail | 71.06 | 84.32 | 272.93 | 38.43 | 214.75 | 24.74 | -3.22 | -8.10 | -2.23 |
| Feed | 100.00 | 67.60 | 282.00 | 41.82 | 219.65 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 24.78 | 28.24 | 333.58 | 65.49 | 242.62 | -59.03 | 23.13 | 58.53 | 16.04 |
| Conc 2 | 7.05 | 46.13 | 329.05 | 56.43 | 250.88 | -33.07 | 21.46 | 36.61 | 19.99 |
| Tail | 68.17 | 86.08 | 260.21 | 37.59 | 202.76 | 24.88 | -3.95 | -9.01 | -3.02 |
| Feed | 100.00 | 68.93 | 270.91 | 41.31 | 209.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 23.54 | 57.05 | 226.03 | 42.87 | 165.43 | 26.04 | 2.81 | -6.55 | 7.85 |
| Middling | 1.48 | 47.77 | 224.42 | 45.51 | 159.97 | 5.54 | 2.07 | -0.79 | 4.29 |
| Pinned | 74.98 | 41.51 | 217.10 | 47.18 | 148.05 | -8.28 | -1.26 | 2.85 | -3.48 |
| Feed | 100.00 | 45.26 | 219.86 | 45.87 | 153.39 | 0.00 | 0.00 | 0.00 | 0.00 |

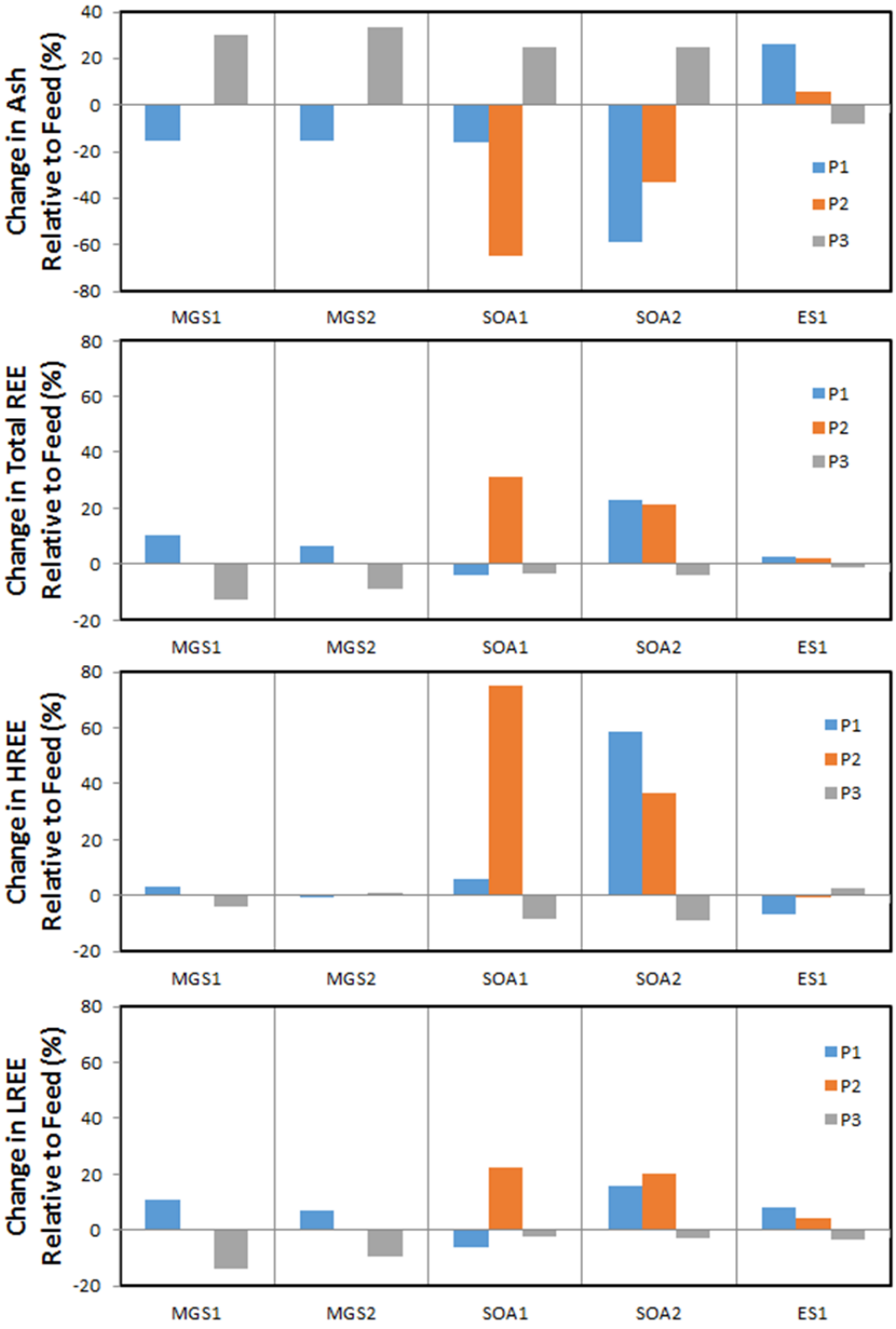



*Figure 29. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 fine refuse (Fire Clay Rider).*

a. Pittsburgh Fines

Table 26 shows the separation results obtained using the MGS, SOA and ESS for the Pittsburgh Fines sample provided by LTI. Two test runs were completed using the MGS and SOA units, while one test was conducted using the ESS unit. The percentage change in ash, total REEs, heavy REEs and light REEs are plotted in Figure 30. Table 26 shows that the concentration ratio for the SOA process was approximately 177 (i.e., REE concentration increased from about 140 to 389 in Run 1 and from about 157 to 435 in Run 2). The ESS process did not substantially upgrade REEs for this particular sample. Unfortunately, the MGS tests were completed for this particular sample, but elemental analyses of the REE concentrations were not completed prior to the project end date. Therefore, the performance results from the MGS tests are unknown for this particular sample.

*Table 26. Separation results for 100 mesh x 0 Pittsburgh Fines.*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| SOA Run 1 | | | | | | | | | |
| Conc 2 | 3.86 | 29.32 | 250.34 | 35.62 | 191.02 | -41.84 | 78.48 | 54.69 | 82.88 |
| Conc 1 | 2.82 | 18.63 | 389.14 | 61.74 | 294.48 | -63.03 | 177.44 | 168.14 | 181.93 |
| Tail | 93.32 | 52.36 | 134.73 | 22.24 | 100.19 | 3.87 | -3.94 | -3.40 | -4.08 |
| Feed | 100.00 | 50.40 | 140.26 | 23.03 | 104.45 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 3.32 | 20.94 | 401.25 | 63.16 | 306.46 | -56.05 | 154.99 | 108.56 | 174.25 |
| Conc 2 | 3.64 | 16.94 | 435.91 | 77.07 | 321.66 | -64.45 | 177.01 | 154.51 | 187.86 |
| Tail | 93.04 | 49.80 | 149.99 | 29.17 | 106.02 | 4.52 | -4.68 | -3.69 | -5.12 |
| Feed | 100.00 | 47.65 | 157.36 | 30.28 | 111.74 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 49.26 | 6.49 | 471.05 | 103.78 | 324.93 | -26.23 | 11.16 | 23.40 | 7.28 |
| Middling | 2.11 | 15.83 | 313.48 | 52.75 | 235.27 | 79.86 | -26.02 | -37.28 | -22.32 |
| Pinned | 48.63 | 10.84 | 402.04 | 74.15 | 293.78 | 23.11 | -5.12 | -11.84 | -3.00 |
| Feed | 100.00 | 8.80 | 423.75 | 84.11 | 302.88 | 0.00 | 0.00 | 0.00 | 0.00 |

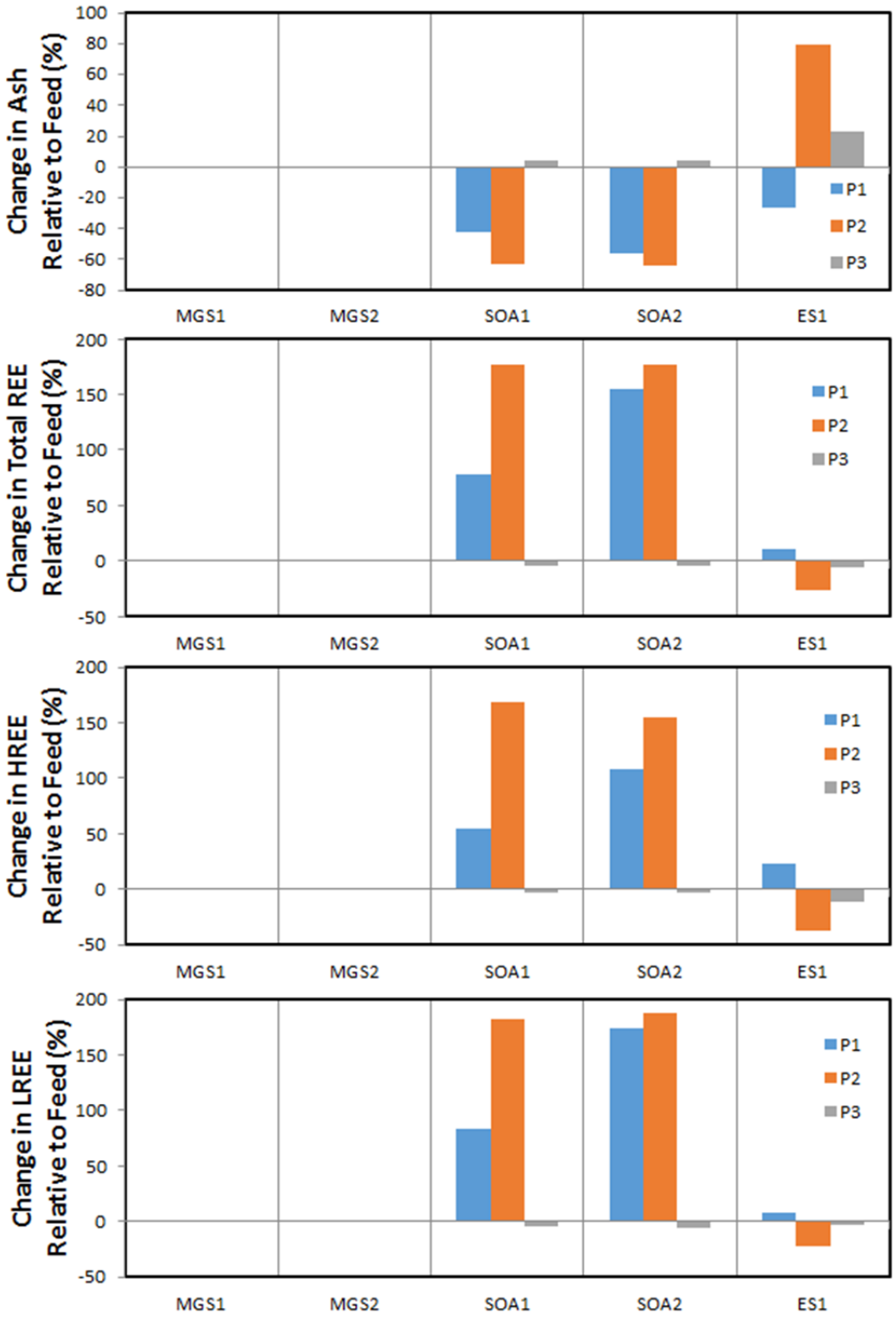



*Figure 30. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 Pittsburgh Fines.*

a. Fly Ash

Table 27 and Figure 31 show the separation results obtained for the fly ash sample provided by LTI. The test indicate the MGS and EGS processes provided little change in the relative concentrations of REEs in the products from these two processes. In contrast, the SOA process provided relatively large changes in REE concentrations after the addition of collector (hydroxamate). In test SOA1, the addition of collector reduced the REE, HREE and LREE concentrations in the feed by nearly 100%.

*Table 27. Separation results for the 100 mesh x 0 Fly Ash Sample.*

| Product | Mass | Ash | Concentration (ppm, ash basis) | | | Concentration Ratio | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stream | (%, dry) | (%, dry) | REE | HREE | LREE | Ash | REE | HREE | LREE |
| MGS Run 1 | | | | | | | | | |
| Low SG | 31.69 | 85.72 | 570.96 | 120.50 | 411.15 | -9.53 | -8.84 | -12.86 | -7.83 |
| High SG | 68.31 | 98.94 | 648.62 | 145.43 | 460.10 | 4.42 | 3.55 | 5.17 | 3.15 |
| Feed | 100.00 | 94.75 | 626.35 | 138.28 | 446.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| MGS Run 2 | | | | | | | | | |
| Low SG | 40.23 | 87.41 | 489.29 | 101.23 | 353.54 | -7.75 | -19.14 | -21.40 | -18.68 |
| High SG | 59.77 | 99.69 | 673.41 | 145.06 | 482.67 | 5.21 | 11.29 | 12.63 | 11.02 |
| Feed | 100.00 | 94.75 | 605.08 | 128.79 | 434.75 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 1 | | | | | | | | | |
| Conc 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Conc 2 | 6.79 | 78.40 | 396.38 | 86.18 | 278.56 | -16.48 | -37.55 | -38.57 | -38.33 |
| Tail | 93.21 | 94.99 | 649.03 | 143.54 | 462.05 | 1.20 | 2.26 | 2.32 | 2.30 |
| Feed | 100.00 | 93.87 | 634.71 | 140.29 | 451.65 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOA Run 2 | | | | | | | | | |
| Conc 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Conc 2 | 6.34 | 78.64 | 685.29 | 150.56 | 489.17 | -16.30 | 10.26 | 12.28 | 9.71 |
| Tail | 93.66 | 95.00 | 617.94 | 133.18 | 443.44 | 1.10 | -0.57 | -0.69 | -0.54 |
| Feed | 100.00 | 93.96 | 621.51 | 134.10 | 445.87 | 0.00 | 0.00 | 0.00 | 0.00 |
| ESS Run 1 | | | | | | | | | |
| Thrown | 26.44 | 81.29 | 544.51 | 115.73 | 394.17 | -10.08 | -6.86 | -4.46 | -7.72 |
| Middling | 8.92 | 75.44 | 636.66 | 126.57 | 470.05 | -16.56 | 8.90 | 4.49 | 10.05 |
| Pinned | 64.64 | 96.20 | 592.86 | 122.41 | 433.88 | 6.41 | 1.41 | 1.06 | 1.58 |
| Feed | 100.00 | 90.41 | 584.62 | 121.14 | 427.13 | 0.00 | 0.00 | 0.00 | 0.00 |

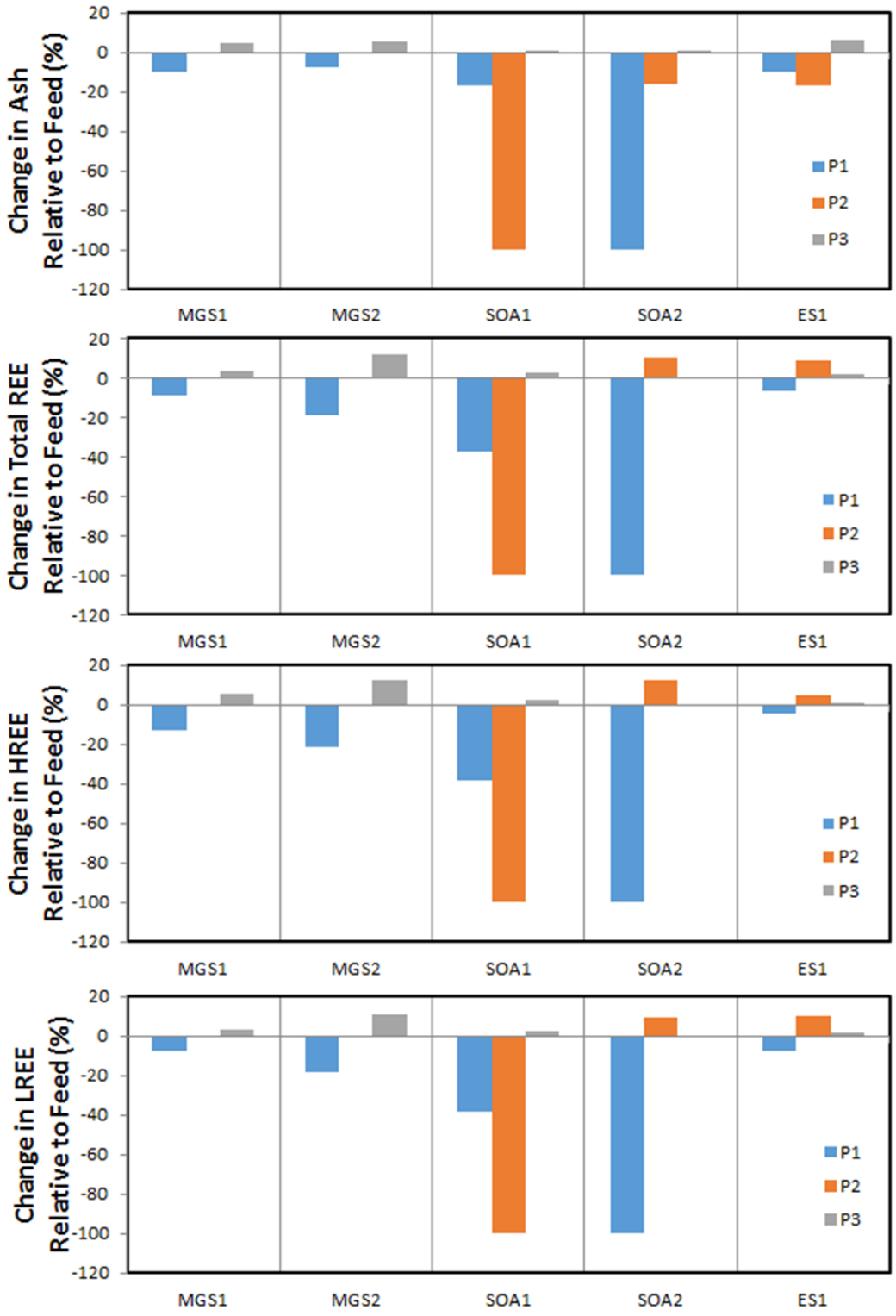



*Figure 31. Percentage change in ash, total REEs, heavy REEs and light REEs relative to feed for 100 mesh x 0 fly ash.*

### 3.3 Mineral Release Study

Mineralogical studies indicate that the rare earth elements existing in coal occur in monazite, xenotime, bastnasite and clay minerals. The grain sizes of the minerals are generally smaller than 10 microns. In addition, the rare earth minerals may be selectively associated with the more abundant minerals dispersed within the coal. Given that physical concentration of REE requires liberation of the associated minerals, a study was conducted involving successive comminution and separation steps.

A Fire Clay coal sample from the middlings stream of a coal preparation plant was used for the study due to known elevated REE concentrations. The selection of the middlings stream was based on the absence of out-of-seam mineral components which was prominent within the plant feed coal.

The middlings sample was crushed to a top particle size of 6 mm (¼-inch) and subjected to a separation process using a medium specific gravity of 1.5. As shown is Figure 32, the REE concentration nearly doubled in the 1.5 sink material where 35.1% by weight of the REEs in the feed material reported. A similar result was obtained from grinding the 1.5 float material to a top size of 1 mm (16 mesh). The 1.5 float material from the second step was ground to a top size of 150 microns (-100 mesh). The -150 micron material was treated using froth flotation. The separation was continued to exhaustion (i.e., flotation product was collected until particles no longer reported to the froth). Based on the finding presented in Figure 32, grinding to below 150 microns did not liberate additional mineral matter and thus REEs as indicated by the low weight yield and REE content in the flotation tailings.

The flotation product was subsequently ground in an attrition mill to produce a top size of 10 microns. A repeat of the froth flotation treatment showed that both mineral matter and REEs

were released as result of the particle size reduction. The flotation tailings material contained 89.05% ash-based material which was significantly higher than the contents of the float-sink and initial froth flotation tailings. The REE content increased from 118 ppm in the -10 micron flotation feed to 565 ppm in the flotation tailings which equated to a concentration of 480%. The flotation tailings represented only 2.1% of the total -6mm feed but contained 7.7% of the total REE.

The findings that are presented in Figure 32 indicate that the RE minerals can be liberated through particle size reduction and concentrated using physical separation techniques. The 1.5 sink fraction in the -6 mm material appears to be an excellent source of REEs given that 35% of the REEs in the feed reported to the stream with only 17.7% of the total feed weight. Also, the concentration success with the -10 micron coal is an indicator that the thickener underflow at an operating plant may be a source of liberated RE minerals that may be effectively concentrated using specific reagents and conditions in a flotation process or other surface chemistry-based process.

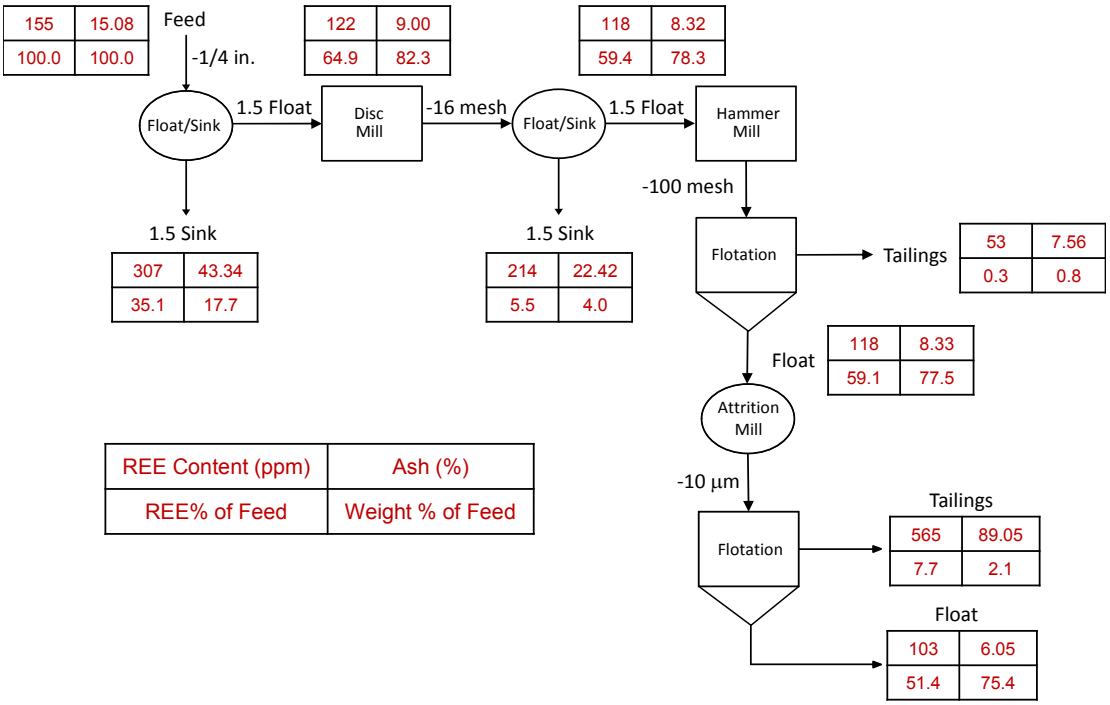



*Figure 32. Results obtain from a RE mineral release study conducted on Fire Clay coal collected from the middlings stream of an operating preparation plant.*

## 3.4 Coal Preparation Plant Results

### *3.4.1 Data Overview*

REE analyses were completed for all samples generated from the 20 coal processing facilities examined in the present study. Completed material balances for 15 of the 20 plants are summarized in Appendix 5.6. Mass balances for all sites were not possible due to practicalities associated with securing timed samples for some of the sampling locations. For each site, summaries were prepared to show the cumulative annual tonnages of total solids, total ash and total REE present in the feed, clean coal and refuse (coarse and fine) streams generated by each facility. These summaries are provided in Table 28 and graphical form in Figure 33.

Figure 33(a) shows the concentration of total REEs present in the "whole" samples (before ashing) for clean coal, coarse refuse and fine refuse from each plant. The data suggests that the concentrations of REEs in the clean coal products are similar and range from a low of 23

to a high of 84 ppm. For the coarse refuse, the values are also in a similar range, which varies from a low of 118 to a high of 266 ppm. Interestingly, the concentrations in the fine refuse were found to be more variable with a broad span from a low of 81 ppm to a high of 224 ppm.

Figure 33(b) shows the concentration of total REEs present in the "ash" samples (after ashing) for clean coal, coarse refuse and fine refuse from each of the 20 plants. When reported on this basis, the clean coal products contained considerably higher residual concentrations of REEs. The increase in mass concentration should be expected since REEs are not volatile and are concentrated during the ashing step. The clean coal values for REEs ranged from a low of 355 to a high of 746 ppm when reported on an ash-basis. The coarse and fine refuse products contained similar concentations of REEs for each coal site, and typically ranged from 136 to 359 for the coarse refuse and 151 to 327 ppm for the fine refuse when reported on an ash-basis.

Finally, Figure 33(c) shows the total tonnages of dry solids, ash and REEs generated by the coal processing facilities evaluated in this study. The data suggest that most of the mass tonnages of REEs are present in the coarse reject streams from each plant. The data also indicate that depending on the facility examined, vastly different amounts of REEs are present in the clean coal and fine refuse streams. This finding suggests that some plants tend to partition more of the REEs to the clean coal product, while others tend to partition more of the REEs to the fine refuse. The former may be best recovered from the downstream fly ash generated by consumers, while the later may be most suitable for separation at the preparation facility prior to combustion. For quick reference, the total tonnages of solids, ash and REEs from the facilities with complete mass balances are summarized in Table 29. Average REE concentrations, reported on "whole" and "ash" basis, are also provided. The data summarized in Table 28 suggest that the 15 plants examined in this study contain just under 10,000 tons per year of total REEs.

*Table 28. Summary tables for tonnages and concentrations of solids, ash and REEs produced by 15 representative coal preparation plants.*

| Plant/Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole*** | REE/Ash*** |
|---|---|---|---|---|---|
| 1 | | | | | |
| Plant Feed | 6,581,428 | 3,599,091 | 815.2 | 123.9 | 226.5 |
| Clean Coal | 2,442,212 | 230,205 | 101.7 | 41.6 | 441.8 |
| Coarse Refuse | 3,040,824 | 2,626,046 | 431.7 | 142.0 | 164.4 |
| Fine Refuse | 1,098,392 | 742,840 | 111.9 | 101.9 | 150.6 |
| 2 | | | | | |
| Plant Feed | 3,755,933 | 1,535,927 | 457.9 | 121.9 | 298.1 |
| Clean Coal | 1,474,518 | 136,716 | 75.8 | 51.4 | 554.8 |
| Coarse Refuse | 1,714,121 | 1,127,788 | 404.4 | 235.9 | 358.6 |
| Fine Refuse | 567,293 | 271,423 | 88.7 | 156.4 | 326.9 |
| 3 | | | | | |
| Plant Feed | 7,413,610 | 3,943,143 | 1,074.6 | 144.9 | 272.5 |
| Clean Coal | 3,146,870 | 364,961 | 146.1 | 46.4 | 400.4 |
| Coarse Refuse | 3,412,062 | 2,961,706 | 402.2 | 117.9 | 135.8 |
| Fine Refuse | 854,678 | 616,476 | 154.6 | 180.8 | 250.7 |
| 5 | | | | | |
| Plant Feed | 2,848,646 | 1,845,184 | 530.8 | 186.3 | 287.6 |
| Clean Coal | 815,394 | 60,646 | 26.4 | 32.4 | 435.8 |
| Coarse Refuse | 1,578,768 | 1,401,255 | 355.7 | 225.3 | 253.8 |
| Fine Refuse | 454,483 | 383,283 | 101.9 | 224.2 | 265.8 |
| 6 | | | | | |
| Plant Feed | 9,504,327 | 6,017,545 | 1,469.2 | 154.6 | 244.2 |
| Clean Coal | 2,554,200 | 168,554 | 59.8 | 23.4 | 354.9 |
| Coarse Refuse | 5,855,375 | 5,170,321 | 822.7 | 140.5 | 159.1 |
| Fine Refuse | 1,094,752 | 678,670 | 181.0 | 165.4 | 266.8 |
| 7 | | | | | |
| Plant Feed | 6,778,406 | 3,306,209 | 1,089.0 | 160.7 | 329.4 |
| Clean Coal | 3,436,307 | 550,406 | 288.5 | 84.0 | 524.2 |
| Coarse Refuse | 2,913,402 | 2,481,846 | 431.9 | 148.3 | 174.0 |
| Fine Refuse | 428,700 | 273,956 | 78.3 | 182.6 | 285.7 |
| 8 | | | | | |
| Plant Feed | 4,282,245 | 1,947,913 | 490.9 | 114.6 | 252.0 |
| Clean Coal | 2,114,393 | 133,542 | 69.4 | 32.8 | 519.9 |
| Coarse Refuse | 1,906,004 | 1,663,917 | 362.7 | 190.3 | 218.0 |
| Fine Refuse | 261,848 | 150,454 | 45.6 | 174.1 | 303.0 |
| 9 | | | | | |
| Plant Feed | 3,316,988 | 2,253,662 | 528.6 | 159.4 | 234.6 |
| Clean Coal | 859,440 | 59,567 | 44.4 | 51.7 | 745.7 |
| Coarse Refuse | 2,210,910 | 1,994,070 | 587.6 | 265.8 | 294.7 |
| Fine Refuse | 246,639 | 172,009 | 48.2 | 195.5 | 280.4 |

**Size-by-size values do not sum due to size degradation*
***REEs do not sum due to missing samples/analytical errors*
****Unless otherwise noted, REE values reported in ppm*
*****Assumes 5,500 hours per year operation*

*Table 28 (Continued). Summary tables for tonnages and concentrations of solids, ash and REEs produced by 15 representative coal preparation plants.*

| Plant/Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole*** | REE/Ash*** |
|---|---|---|---|---|---|
| 12 | | | | | |
| Plant Feed | 9,193,397 | 2,322,512 | 757.1 | 82.4 | 326.0 |
| Clean Coal | 6,816,008 | 591,128 | 241.8 | 35.5 | 409.0 |
| Coarse Refuse | 655,595 | 540,384 | 160.5 | 244.9 | 297.1 |
| Fine Refuse | 1,721,795 | 819,852 | 175.7 | 102.0 | 214.3 |
| 13 | | | | | |
| Plant Feed | 960,402 | 222,964 | 77.1 | 80.3 | 345.9 |
| Clean Coal | 716,979 | 44,867 | 24.4 | 34.0 | 542.8 |
| Coarse Refuse | 213,031 | 170,583 | 52.2 | 245.1 | 306.1 |
| Fine Refuse | 30,393 | 7,514 | 2.5 | 80.6 | 326.1 |
| 14 | | | | | |
| Plant Feed | 10,006,825 | 2,858,544 | 883.8 | 88.3 | 309.2 |
| Clean Coal | 6,977,385 | 565,946 | 225.5 | 32.3 | 398.4 |
| Coarse Refuse | 2,220,940 | 1,862,509 | 559.1 | 251.7 | 300.2 |
| Fine Refuse | 808,502 | 430,089 | 125.9 | 155.7 | 292.7 |
| 15 | | | | | |
| Plant Feed | 1,586,527 | 626,036 | 180.2 | 113.6 | 287.9 |
| Clean Coal | 814,151 | 70,158 | 25.7 | 31.6 | 366.8 |
| Coarse Refuse | 707,536 | 534,898 | 188.1 | 265.9 | 351.7 |
| Fine Refuse | 64,839 | 20,980 | 6.5 | 100.6 | 310.9 |
| 16 | | | | | |
| Plant Feed | 3,298,006 | 1,999,129 | 597.6 | 181.2 | 298.9 |
| Clean Coal | 1,123,328 | 149,340 | 74.8 | 66.6 | 501.1 |
| Coarse Refuse | 1,960,428 | 1,688,481 | 503.2 | 256.7 | 298.0 |
| Fine Refuse | 214,250 | 161,308 | 47.4 | 221.3 | 294.0 |
| 17 | | | | | |
| Plant Feed | 5,742,630 | 2,748,859 | 635.3 | 110.6 | 231.1 |
| Clean Coal | 2,283,163 | 205,065 | 157.2 | 68.9 | 766.8 |
| Coarse Refuse | 2,930,286 | 2,201,000 | 668.2 | 228.0 | 303.6 |
| Fine Refuse | 529,180 | 342,794 | 99.4 | 187.8 | 289.9 |
| 19 | | | | | |
| Plant Feed | 3,298,006 | 1,759,459 | 312.1 | 94.6 | 177.4 |
| Clean Coal | 1,123,328 | 104,507 | 58.5 | 52.0 | 559.4 |
| Coarse Refuse | 1,960,428 | 1,735,878 | 354.9 | 181.0 | 204.5 |
| Fine Refuse | 214,250 | 156,288 | 45.5 | 212.4 | 291.1 |

**Size-by-size values do not sum due to size degradation*
***REEs do not sum due to missing samples/analytical errors*
****Unless otherwise noted, REE values reported in ppm*
*****Assumes 5,500 hours per year operation*

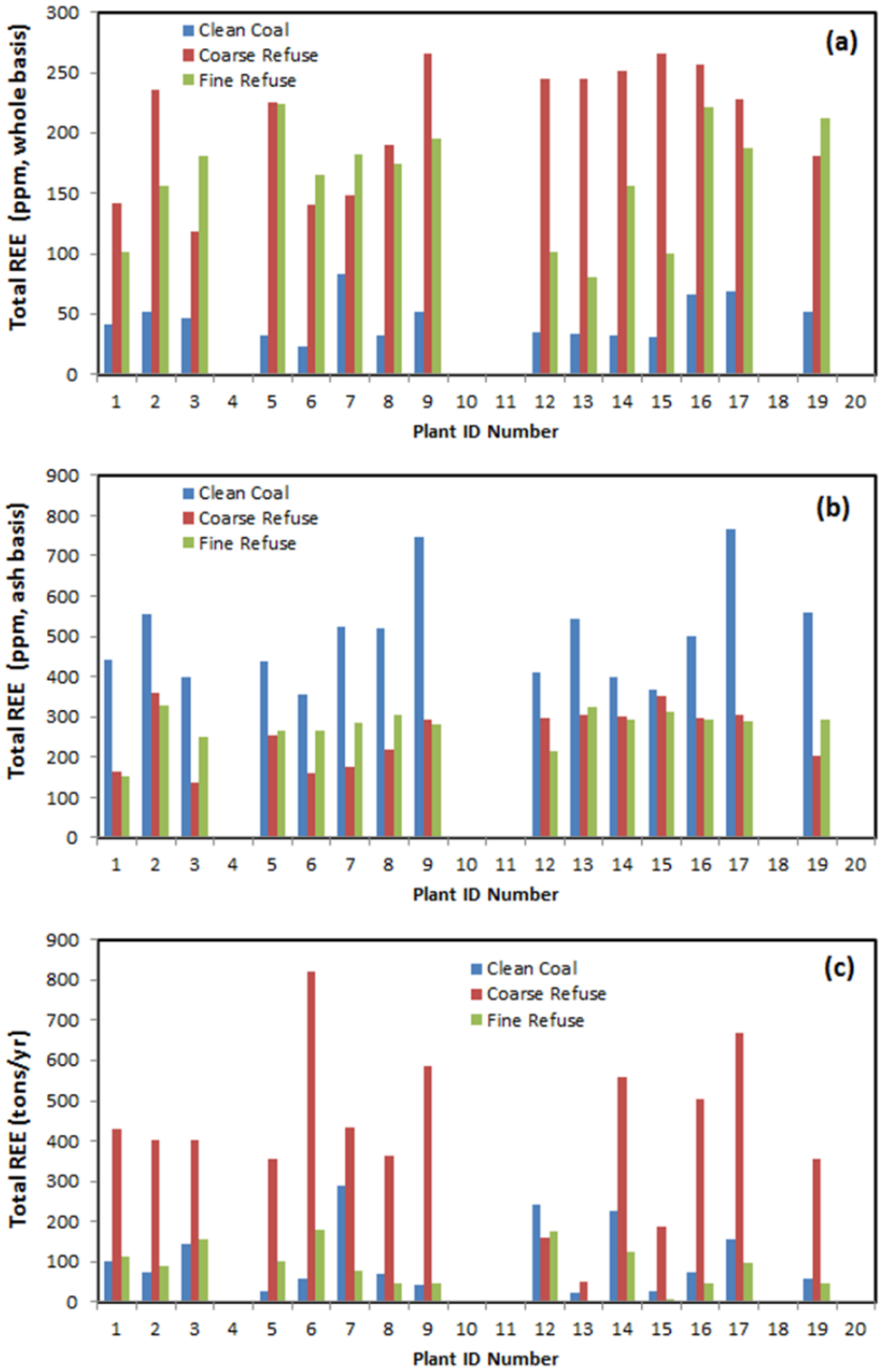



*Figure 33. Summary plots for tonnages and concentrations of solids, ash and REEs produced by a representative fleet of eastern U.S. coal preparation plants.*

*Table 29. Production of mass, ash and REEs for 15 coal processing facilities.*

| Stream | Mass TPY | Ash TPY | REE TPY | REE/Whole | REE/Ash |
|---|---|---|---|---|---|
| Plant Feed | 78,567,376 | 36,986,176 | 9,899 | 126 | 268 |
| Clean Coal | 36,697,676 | 3,435,608 | 1,620 | 44 | 472 |
| Coarse Refuse | 33,279,712 | 28,160,683 | 6,285 | 189 | 223 |
| Fine Refuse | 8,589,993 | 5,227,936 | 1,313 | 153 | 251 |

### *3.4.2 Correlation of REEs and Ash*

Figure 34 shows the concentration of total rare earth elements plotted as a function of ash content for all 20 of the coal processing facilities examined in this study. The REE concentrations plotted in Figure 34(a) are reported on a "whole-basis", while those reported in Figure 34(b) are reported on an "ash-basis". Figure 34(a) shows that the concentrations of REEs generally increase with ash content when reported on a whole-coal basis. This trend suggests that the REEs present in the whole coal have a mineral association. However, when reported on an ash-basis (i.e., ppm of REEs per unit of residual ash in each sample), the data indicate that the residual ash contained in the lower ash (clean coal) products contain substantially higher concentrations for REEs. In particular, products containing less than 20% ash have REE concentrations that are up to three times higher than that of products containing higher ash contents after pre-concentration via combustion/ashing.

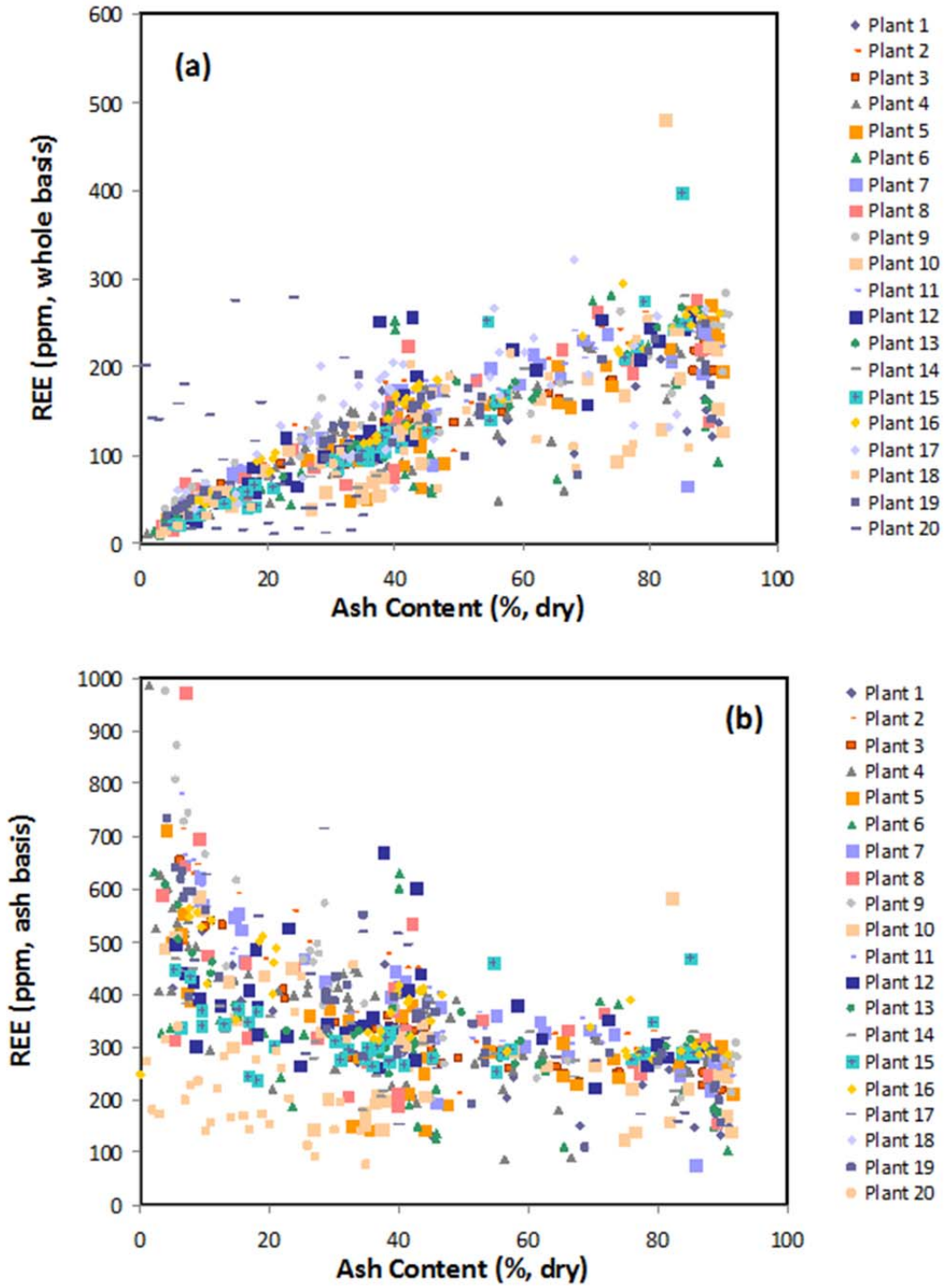



*Figure 34. Total REE concentration versus ash content for products generated by 20 coal eastern U.S. coal preparation plants. (a) Values reported on a whole-coal basis, (b) values reported on an ash-basis.*

### *3.4.3 Comparison with Crustal Concentrations*

A mineral deposit should contain concentrations of elements in excess of those present in the earth's crust. To evaluate this criteria for coal-derived REEs, the concentrations of REEs in the preparation plant products were divided by the concentrations of REEs in the earth's crust and reported as an enrichment ratio (REE/REE* ratio). The ppm crustal concentrations (REE*) used in this study were: Sc=16; Y=24; La=30; Ce=60; Pr=6.7; Nd=27; Sm=5.3; Eu=1.3; Gd=4.0; Tb=0.65; Dy=3.8; Ho=0.8; Er=2.1; Tm=0.30; Yb=2.0; Lu=0.35 (Reference: Beauford, R., 2014. "An Introduction to the Geology of Rare Earth Elements and Associated Mineral Ores," www.rareearthelements.us/ree_geology). The calculations associated with this normalization procedure are summarized in the later sections of Appendix 5.6.

Figure 35 shows the REE/REE* ratio plotted as a function of ash content for each plant. In this plot, ratios greater than unity indicate concentrations of REEs above that found in the earth's crust. The data plotted in Figure 35 clearly show ratios greater than unity for all of the products – both clean coal and wastes - generated by nearly all of the coal processing facilities investigated in the field study. Only a few notable exceptions, such as Plant 20, displayed low ratio values. In general, the REE/REE* ratio increased steadily from about 1.5 to 2.5 as the ash content of the products was reduced from about 90% ash to the low teens. A notable spike in the REE/REE* ratio was observed below about 10% ash, reaching values of 3 or greater for selected samples from several of the coal preparation plants evaluated in this particular study.

### *3.4.4 Distribution Heavy and Light REEs*

Due to their high economic value, the availability of heavy REEs are of particular interest to industry. In this report, the heavy rare earth elements (HREEs) included Tb, Dy Ho, Er, Tm,

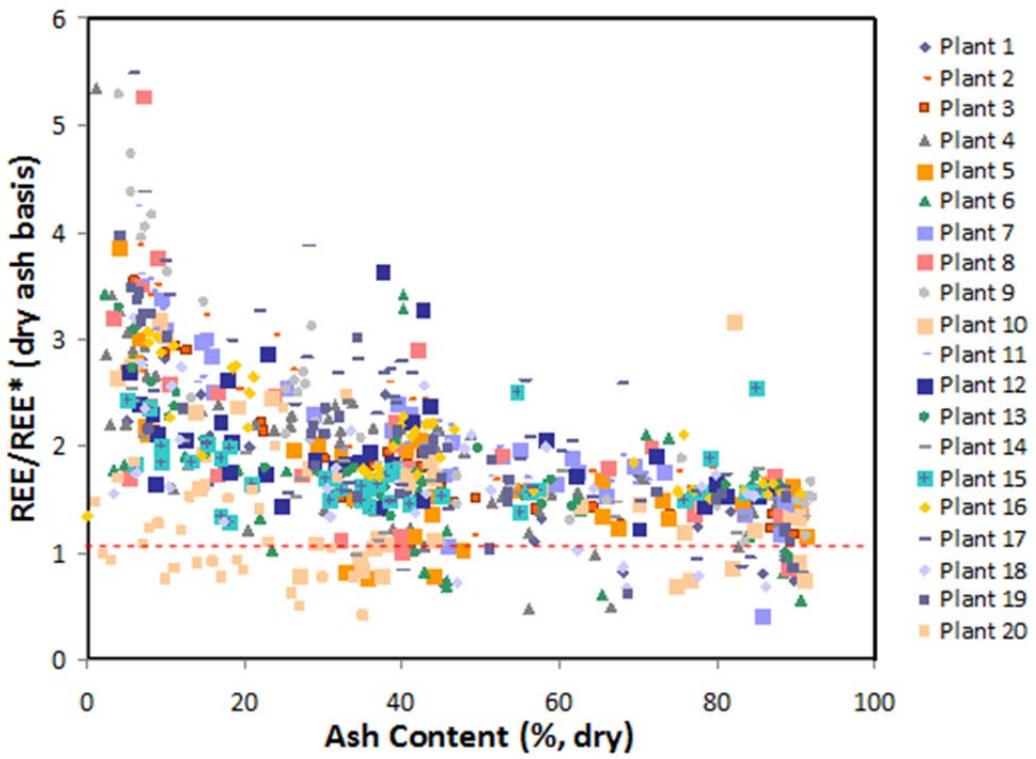



*Figure 35. Ratio of REE concentrations in the products from 20 coal preparation plants versus those present in the earth's crust. Note that values occurring above the dashed line represents concentrations above crustal.*

Yb, Lu and Y, while the remaining elements of La, Ce, Pr, Nd, Sm, Eu and Gd were reported as light rare earth elements (LREEs). Figure 36 shows the ratio of heavy-to-light rare earth elements (HREE/LREE ratio) as a function of ash content for all of the products generated from the 20 coal processing facilities. The data indicate that the ratio of heavy to light REEs is about 0.25 and holds relatively constant for products having ash contents greater than about 50% ash. The ratio then increases steadily to about 0.25 as the ash content is lowered from 50% down to about 20% ash, representing a shift from middlings products down to clean coal products. Below about 15-20% ash, the HREE/LREE ratio suddenly increases sharply, with many values in this lower ash "clean coal" region exceeding a HREE/LREE ratio of 0.40 or higher. The sharp rise in the proportion of heavy REEs in the low ash region suggests that these elements preferentially

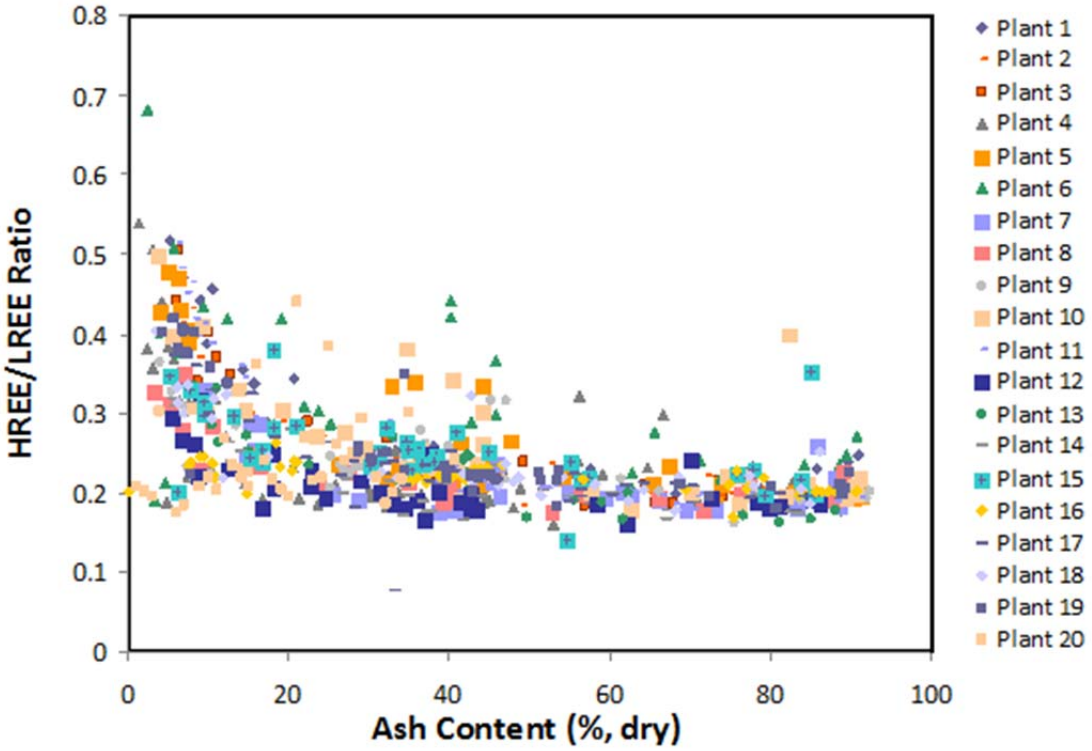



*Figure 36. Ratio of heavy-to-light rare earth elements (HREE/LREE) found in the in various clean coal and refuse products generated by 20 coal processing facilities.*

associate with either the organic matter or with the small fraction of minerals present in the clean coal matrix. The differences in the abundance of light and heavy REEs are even more pronounced when viewed as individual plots (see Figure 37). These plots show that the concentrations of heavy REEs tend to increase much more rapidly in the low ash region and tend to be less variable from site to site than the lighter REEs for many of the processing facilities.

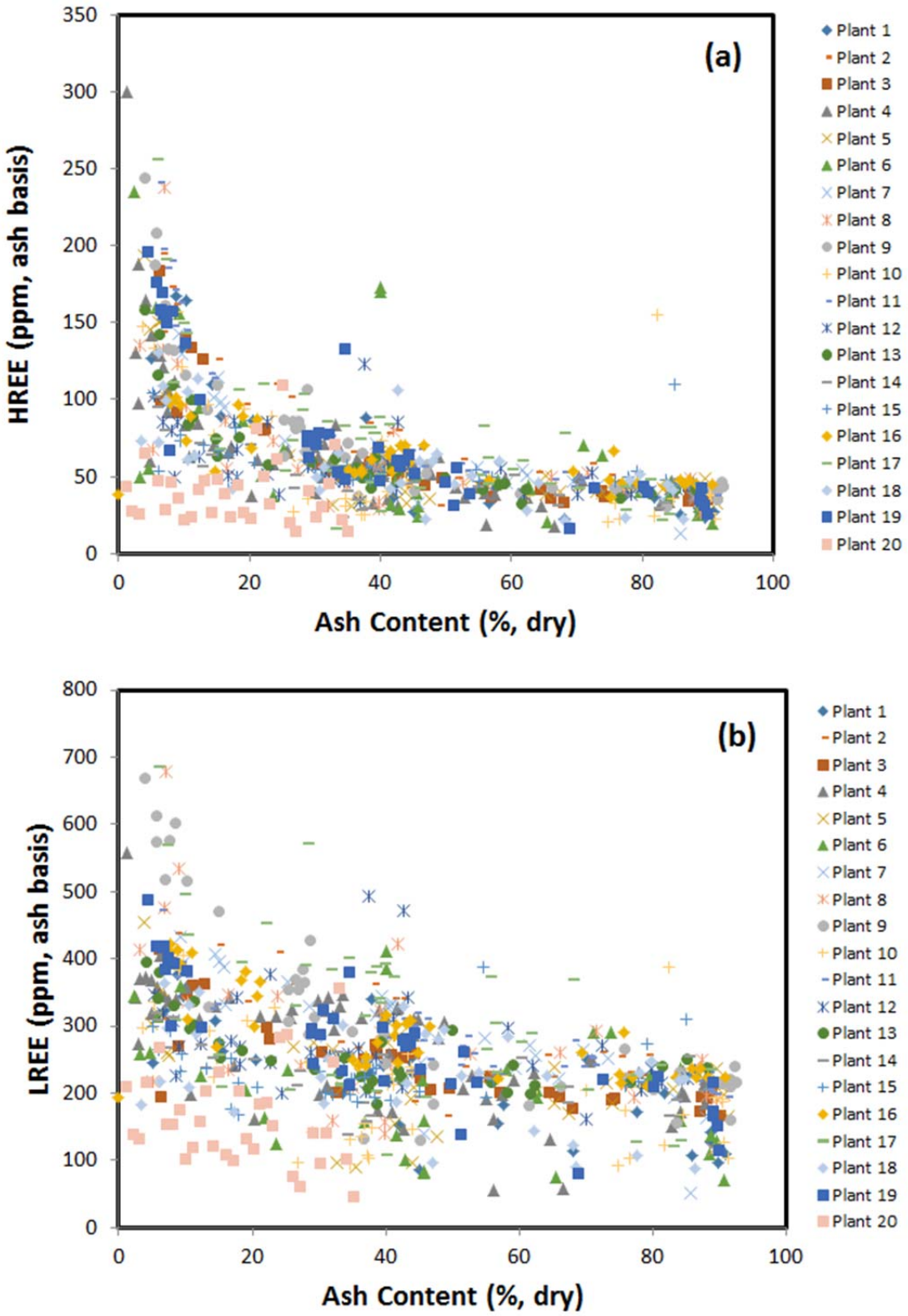



*Figure 37. Concentrations of (a) heavy and (b) light REEs in various clean coal and refuse products generated by 20 coal processing facilities.*

## 3.5 Mineralogical Studies

### *3.5.1 Mineral Matter in Coal and Coal Byproducts*

The results of this study are found in Appendix 5.5. The samples B-a, -b and -d were subjected to SEM-EDS analysis which are raw samples of feed coal, clean coal, bottom ash and fly ash. However, we could not find many RE minerals in these three samples. Part of the reasons was probably that the mineral matter isolated by flotation from the Fire Clay clean coal and raw plant feed still contained relatively large amounts of coal, which made it difficult to find RE minerals using the SEM-EDS technique.

We could not detect the X-ray signals for REEs from the bottom ash and fly ash samples using the SEM-EDS technique. Possible reasons may be that the REE concentrations were well distributed throughout the sample, and that the SEM-EDS did not have high enough sensitivities for the various REEs. In the bottom ash and fly ash samples, REE minerals are fused together with minerals containing no REEs, thereby producing materials (glass beads) containing very low concentrations of REEs. Typically, the RE-minerals found in coal may contain 0.2 to 5% by weight of REEs. During combustion, these REE-minerals fuse together with the mineral matter, e.g., silica and clay, containing no REEs, effectively diluting the REEs. Therefore, the analysis of bottom and fly ash samples require more sensitive methods such as ToF-SIMs.

Figure 3(a) in Appendix 5.5 shows the electron backscatter diffraction (EBSD), or simply backscattered, images of the fly ash sample from burning a clean coal sample produced at a Kentucky coal preparation plant, where the Fire Clay seam coal was cleaned. As shown, the ash particles were spherical. The EDS spectrum shown in Figure 3(b) of Appendix 5.5 show REE peaks. As has been noted in the foregoing paragraph, the REE concentration may be below the detection limit of the EDS due to the ‘dilution’ effect.

### *3.5.2 Mineral Matter from Middlings Isolated by Flotation*

Figures 4 - 6 in Appendix 5.5 show the EBSD and SEM images of the RE minerals found in the mineral matter isolated from the Fire Clay coal middlings. The middlings were micronized in a pug mill and floated several times to remove coal. It was found that the mineral matter obtained in this matter still contained >10% coal.

Figure 4(a) shows a tiny spot marked by a plus sign. The SEM image shown in Figure 4(b) shows an enlarged image of the same particle marked by a white circle. The particle size is approximately 1 μm. The EDS spectrum shows La, Ce, and Nd as the most prominent REEs. The spectrum also shows strong signals of P and O. It appears, therefore, that the RE mineral is monazite [(Ce, La, Th, Nd)$PO_4$].

Figure 4(c) shows the elemental composition of the monazite particle. The weight percentages of Ce, La and Nd are 0.60, 0.30 and 0.45%, respectively. The particle must also contain other REEs, whose concentrations may be below the detection limits of EDS. It should be noted here that the elemental concentrations shown in Figure 4(c) should be somewhat lower than the actual value, because we did not include the signals from the Pd and Au that have been used as a conductive coating materials. Judging from the high concentrations of Al and Si, the associated minerals may be clay minerals.

Figure 5 shows another image of a monazite particle found in the mineral matter isolated from the Fire Clay middlings. The particle size is about the same as the monazite particle shown in Figure 4, *i.e.*, <1 μm. Also, Ce, La, and Nd are the most prominent REEs. However, their concentrations are in the range of 7.9 to 14.7%, and the sum of the three elements is 32.7%. However, the actual REE concentrations should be lower, as our calculations have not included the C that was used as a coating material.

Figure 6 also shows the SEM image, EDS spectra, and the elemental composition of a monazite particle found in the Fire Clay middlings. The particle size is close to 1 μm.

### *3.5.3 Mineral Matter Obtained by Low-Temperature Ashing*

Fire Clay Clean Coal from an East Kentucky Preparation Plant

*SEM-EDS*: Figures 7 and 8 in Appendix 5.5 show the EBSD and SEM images of the RE mineral particles and corresponding EDS spectra of the Fire Clay clean coal. The particles shown in Figure 7(b) is an isolated particle containing REEs with a particle size of 4-5 μm. The mineral is likely monazite based on the elemental composition of the RE mineral which shows strong signals for P and Th.

The RE mineral particle shown in Figure 8(b) is associated with clay particles. The area emanating REE signals has a diameter of approximately 2 μm. The atomic ratio between P and the sum of La, Ce, Nd, and Th and K, Ca, and Fe is close to 1:1 as shown in Figures 7(d) and 8(d). Further, the concentration of Ce is higher than that of La. Thus, this particle may be a cerium monazite [(Ce, La, Th, Nd)$PO_4$] . The results obtained using the SEM-EDS method as described above are supported by the ToF-SIMS analysis result shown below.

*ToF-SIMS* Figure 9(a) shows the ToF-SIMs images of the Fire Clay clean coal ash with a high lateral resolution, while Figure 9(b) shows the corresponding SIMS spectra. The images on the top row show $Na^+$, $Al^+$, $Si^+$, and $K^+$ that are the main elements of clay minerals. The images shown on the second row show $Ca^+$, $Fe^+$, $Ti^+$, and $TiO^+$ species that may or may not be part of clay. The images on the third row show weak signals from $Y^+$, $Ce^+$, $Nd^+$, and $La^+$ that must be from RE minerals. The images of on the fourth row show much stronger signals from the $YO^+$, $CeO^+$, $Nd^+$, and $LaO^+$ species. Thus, the bright spots on the fourth row images represent the RE

minerals, whose particle sizes are about ~2 μm, which agrees well with the results obtained from the SEM images shown in Figures 7 and 8. These results indicate that the RE minerals are monazite containing significant amount of Y., *i.e.*, [(Ce, La, Th, Nd, Y)$PO_4$].

Fire Clay 1.6 SG-Float Coal from the UK 001 Coarse Reject Sample

*SEM-EDS* Figures 10 and 11 show the SEM-EDS images of the mineral matter isolated from the 1.6 SG float from the coarse reject. Both liberated and locked RE mineral particles are shown in Figures 10 and 11, respectively. The size of liberated RE mineral particle is 4 μm, while that of the locked particle is ~2 μm. The atomic ratio of P and sum of La, Nd, Ce, and Th and Ca, Fe, and K is also close to 1:1. Thus, the RE minerals are likely monazite [(Ce, La, Th, Nd)$PO_4$]. That we found locked particles in the coarse reject is not surprising. Further grinding should diminish the number of locked particles.

*ToF-SIMS* Figure 12(a) shows ToF-SIMS images of the mineral matter isolated from the 1.6 SG float coal of the coarse reject, and Figure 12(b) shows the corresponding SIMS spectra. The images on the top row show $Na^+$, $Al^+$, $Si^+$, and $K^+$, while the images in the second and third rows show a large dark-shaded region. The images in the fourth row show shiny spots of ~2 μm in size. The shiny spots are due to $LaO^+$, $CeO^+$ and $NdO^+$, with some $YO^+$. It appears that the dark-shaded area may represent a shallow hole, in which small RE minerals, most probably monazite, are finely disseminated. Again, these RE minerals may represent locked particles present in the coarse reject sample.

Run-of-Mine Fire Clay Seam Coal

Figures 13-15 in Appendix 5.5 show the SEM images of the mineral matter isolated by low-temperature ashing of the Fire Clay run-of-mine coal and corresponding EDS spectra. All of the RE minerals found in this sample were monazite. Figure 13(a) shows backscattered and SEM

images of a ~3-4 μm monazite particle, which is large as compared to those found in other samples.

Figure 14 shows EBSD and SEM images of the same sample. RE minerals were detected on the surface of a large particle containing Al and Si. The large particle may, therefore, be shale, and the RE mineral may be monazite. It is possible that the monazite is interlocked with the large shale particle.

Figure 15 shows the images of a 10 μm monazite particle, which was the largest RE mineral found in the present work. On the other hand, the EDS spectra show no significant Y spectrum.

Fly ash Produced from Fire Clay Coal

*SEM-EDS* The EDS spectra of the Fire Clay-based fly ash showed no signs of REEs, as shown in Figure 16(b). As has been noted, the REE concentrations may be below the detection limit due to the dilution effect.

*ToF-SIMS* Figure 17(a) shows the ToF-SIMS images with high lateral resolution. The images on the top-left were wide-scan (400×400 μm) images, while those on the right represent those obtained across a narrow scanning area (Figure 17(b)). The latter shows a significant amount of Y over a 40x40 μm area. It is interesting to note that some images, *e.g.*, the one shown in the bottom row, shows La-rich particles. Both the Y- and La-rich particles contain some Ce. It is possible that some ash particles are produced from Y-rich RE minerals such as xenotime, while others are formed from La-rich minerals such as bastnaesite.

Kentucky Utility Feed Coal from the Fireclay Seam Coal

The results of the SEM-EDS studies conducted on the Kentucky utility feed coal are given in Figures 18-21 in Appendix 5.5. Two different types of RE minerals have been found,

*i.e.*, monazite and xenotime. The particle shown in Figure 18 show La, Ce, Th and Nd, with atomic ratios between the total REEs and P being close to 1:1, which suggests that the mineral may be monazite [(Ce, La, Th, Nd)$PO_4$]. The particle show in Figure 19 shows Y and Zr in addition to La, Nd, Ce and Th. The atomic ratio between the total REEs and P is 1.5 to 1, suggesting that the mineral is not monazite. It may be one of bastnaesite [(La,Ce,Nd)CO3F], xenotime ($YPO_4$), doverite ($CaY(CO_3)F$), or cerite ($(Ce, Ca)_2Si(O,OH)_5$). However, the EDS spectra shown in Figure 20 and 21 show very high Y peaks. The spectra also show Sc, Gd, Dy, Er and Th. Since the atomic ratio between Y and P is close to 1:1, the RE mineral may be xenotime. It is known that xenotime usually contains small amounts of Gd, Dy and Er.

## 4.0 SUMMARY AND CONCLUSIONS

The feasibility of concentrating rare earth elements (REEs) present in coal was explored using traditional separation technologies and a detailed sampling campaign involving 20 coal preparation plants operating in the northern and central Appalachian coalfields. The separation technologies included riffle table concentration, wet high intensity magnetic separation (WHIMS), electrostatic concentration, enhanced gravity concentration (MGS), froth flotation and agglomeration.

The six samples used to evaluate the potential of REE concentration were identified based on pre-existing data indicating the potential for elevated REE contents. Information obtained from published articles along with the opinion of several experts led to the opinion that the majority of the REE exists in mineral form within the mineral matter distributed throughout the coal seam including partings. Evidence also indicated that elevated REE contents also exist in the immediate roof and floor rock material. As such, three of the six samples used in this study

were obtained from the coarse and fine refuse streams of operating coal preparation plants that upgrade coal extracted from seams known to contain elevated levels of REEs. One of the plants processes coal from the Fire Clay coal seam which contains high levels of REEs through exposure to volcanic ash deposition as concluded in previous studies. A fourth sample was bottom ash and fly ash collected from an electric utility that used Fire Clay seam coal as the primary fuel source over the past several decades. The final two samples were obtained from 1) fine coal waste generated from the processing of a Pittsburgh seam coal and 2) pit cleanings material at a Texas lignite mining operation.

## 4.1 Washability and Release Tests

### *4.1.1 Washability Study*

The concentration potential for the REEs was initially assessed through standard washability (float-and-sink) and flotation release analysis tests. All six samples were crushed to achieve a top particle size of 6 mm (1/4-inch) followed by screening to separate the material into three particle size fractions, i.e., 6 x 0.6 mm (1/4-inch x 28 mesh), 0.6 x 0.15 mm (28 x 100 mesh) and minus 0.15 mm (-100 mesh). A sample of the material in both the 6 x 0.6 mm and 0.6 x 0.15 mm size fractions were subjected to washability analysis using a range of specific gravities that was reflective of the material characteristics. Flotation release analysis was conducted on the size fraction containing material finer than 0.15 mm (100 mesh).

For the three coarse coal reject samples, the overall REE contents ranged from 252 to 326 ppm on a whole sample basis with the Fire Clay coarse reject having the highest amounts. The Fire Clay reject showed REE concentration in the 2.3 specific gravity (SG) float material. The 1.6 SG float fraction has a 144% higher REE content than the feed. In contrast, the REE contents were higher in the 2.2 SG sink material for the coarse reject from the plants treating

Eagle and Fire Clay Rider seam coals. The lowest REE content values were obtained from the 2.90 SG sink fractions in both particle size fractions of the Fire Clay and Eagle seam reject materials which measured 136 ppm and lower.

A significant finding is that the ash formed from the combustion of the material in the lowest specific gravity fractions had the highest REE contents in all samples except the bottom ash. The REE in the ash of the Fire Clay coarse reject increased from 401 to 2091 ppm in the 1.6 SG float of the 6 x 0.6 mm (1/4-in x 28 mesh) size fraction which equates to a concentration of 521%. A similar REE content elevation of 326% was released in the 0.6 x 0.15 mm (28 x 100 mesh) size fraction. The REE content of the ash material from the Eagle seam coal likewise increased from 305 ppm in the feed to 560 ppm in the 1.6 SG float.

Given that coal combustion provides REE concentration, it was expected that the bottom ash material from the utility using predominantly Fire Clay seam coal contained the highest overall REE content of around 790 ppm on a whole sample basis. Density fractionation did not indicate potential for REE concentration using density-based separators. The low SG fractions that contained carbon material have the lowest REE contents. However, the removal of the carbon would have limited impact on the overall REE content.

*4.1.2 Flotation Release Analysis Study*

Flotation release analyses were performed on the minus 0.15 mm (-100 mesh) size fractions of the three coarse reject samples and the Pittsburgh coal fines, the thickener underflow samples collected from the operating coal preparation plants and the fly ash sample which as collected at the same utility as the bottom ash material. The release tests were performed in a manner that focused on the removal of naturally hydrophobic particles from hydrophilic materials using fuel oil as a collector. The findings were similar to those previously described

from the washability data including the highest REE contents in the ash formed from the flotation concentrates with the highest coal contents. However, it is interesting to note that the highest REE contents on a whole sample basis were associated with the tailings material from the third and fourth flotation stages. In other words, the REE contents of the third and fourth stage were consistently higher than the tailings from the first and second stage despite the higher carbon contents in the third and fourth stage tailings. This finding implies concentration by elutriation of the liberated RE minerals and/or affiliated REEs with clays into the concentrate of the first and second stages of flotation.

## 4.2 Separations Analysis

### *4.2.1 Conventional Separation Processes*

Several series of laboratory and bench-scale separation tests were undertaken to determine whether existing types of conventional solid-solid separation processes can be used to further concentrate REEs in six sources of feed material. Test results provided the following conclusions:

- Riffle table tests operated in continuous mode resulted in product ash content variations of 20 to 30 absolute percentage points between the product samples for all coal sources except the bottom ash and Pittsburgh coal fines which provided an ash variance from below 10% to above 65%. However, very limited REE upgrading resulted for the treatment on a coal only basis. When evaluating the REE content of the ash generated from each product, the REE content was increased by around 140% for the Fire Clay coarse refuse, Pittsburgh coal fines and Texas lignite pit cleanings samples.
- Magnetic separation tests were conducted using a semi-bath operated WHIMS separator. Each sample was treated initially as slurry through the WHIMS unit with a field strength

of 1.5 Tesla to separate the magnetics from the non-magnetic particles. The magnetic fraction was re-treated in three subsequent steps starting with a field strength of 0.4 Tesla followed by 0.7 Tesla and 1.1 Tesla. The percentage of magnetics varied among the six samples from 0.30% to 12.87%. In general, higher REE content values were obtained in the magnetic fractions of all samples. For example, the REEs of the most strongly magnetic material in the Pittsburgh coal fines was 445 ppm on a whole sample basis compared to 69 ppm in the feed. The concentration equates to a REE enrichment of 645% with a mass recovery of 0.17%.

- Froth flotation tests using a laboratory Denver Cell in semi-batch mode were conducted on the thickener underflow samples collected from the three plants treating Fire Clay, Eagle and Fire Clay Rider seam coals, respectively, and the fly ash sample. The two stage treatment process involved removing the carbon material in the first stage and treating the first stage tailings in a second stage using three different collectors and varying collector concentrations. Oleic acid at a slurry pH of around 9.5 was found to be the most effective for maximizing the concentration of REEs. Froth flotation concentrated the REE by 213% for the Eagle seam thickener underflow, 150% for the Fire Clay thickener underflow, 157% for the Fire Clay Rider thickener underflow and 120% for the fly ash material.
- The test data showed that the MGS was capable of providing modest increases in the concentration of REEs in the high density product. As such, the high ash/high density product from this process tended to contain a higher proportion of REEs.
- In contrast, the SOA process tended to enrich the REEs in the organic fraction, although some tests showed that the addition of collector could be used to provide a REE enriched

product from largely inorganic mineral matter. This data set suggests that to a limited extent some REE rich minerals can be made hydrophobic and recovered by this process.

- The electrostatic separation process was generally not effective in concentrating REEs, probably due to the coarser size range that had to be fed to this particular process.

*4.2.2 Mineral Release Study*

A study was conducted to assess the liberation and concentration potential of the REEs in the middlings material produced at the preparation plant that treats Fire Clay seam coal. The middlings material was believed to be the ideal material for the study given that the extraneous out-of-seam material was removed during the cleaning process. The middlings material was crushed to a top size of 6 mm (1/4-inch) and cleaned in the float-sink process. The float was subsequently ground to 1 mm (16 mesh) top size and subjected to another float-sink cleaning step. The float was ground to a mean size of around 10 microns and treated in flotation using fuel oil as the collector.

The process was successful in proving that the RE minerals can be liberated and concentrated. The flotation process increased the REE content from 118 ppm to 565 ppm in the flotation underflow which equates to an enrichment of 479%. The 565 ppm REE content was the highest REE whole sample value obtained for any sample in the study except for the bottom ash and fly ash. The mass recovery to the high REE stream was 13%.

## 4.3 Preparation Plant Analysis

An experimental field study was conducted to investigate the concentrations of rare earth elements generated by a representative grouping of coal preparation plant facilities operating in the eastern U.S. coalfields. The study involved the field collection of representative samples of clean coal product, coarse coal refuse and fine coal refuse from 20 different preparation plant

sites. After collection, the samples were partitioned into several size and density classes and then subjected to ash and rare earth element analyses. A total of 771 individual samples were analyzed as part of this effort. Material balances for several of the industrial plants were then compiled to assess the tonnages of solids, ash and rare earth elements generated by these facilities. Based on these results, the following general observations were made:

- The total concentrations of rare earth elements (REEs) in the low-ash "clean coal" products were relatively low and ranged from a low of 23 ppm to a high of 84 ppm for the whole coal (as collected) samples. Higher concentrations of REEs were present in the refuse samples generated by and disposed at the preparation plant sites. The total concentrations of REEs in the "coarse refuse" varied from a low of 118 ppm to a high of 266 ppm when reported on a whole coal basis. The concentrations of REEs in the fine (minus 100 mesh) refuse products where somewhat more variable and ranged from a low of 81 ppm to 224 ppm when reported on a whole coal basis.
- The concentration of REEs in the plant products increased substantially after complete combustion and removal of the organic matter via high temperature ashing. After combustion/ashing, the total concentrations of REEs in the clean coal products ranged from a low of 355 ppm to a high of 746 ppm when reported on a per unit ash basis. The ashing step also increased the concentrations of REEs in the coarse and fine refuse products, albeit to a smaller extent. In the current study, the concentrations of REEs in the waste products ranged from 136 ppm to 359 ppm for the coarse refuse and 151 ppm to 327 ppm for the fine refuse when reported on an ash-basis.
- Material balances conducted for 15 selected plants indicate that nearly 10,000 tons per year of total REEs are present in the plant feeds. The data collected in this portion of the study

suggest that the vast majority of the tonnage of REEs (~60-70%) are present in the coarse refuse, while the remainder of the tonnage is roughly split between the clean coal and fine refuse products.

- A higher relative concentration of REEs were observed in the low density products generated by the float-sink tests. As such, the relative concentrations of REEs contained in the plant products increased as the ash contents of the products was lowered. No such general correlation could be established between particle size and REE concentration.
- When reported on an ash basis, the concentrations of REEs in the vast majority of plant products, both clean coal and waste refuse, exceeded baseline concentrations of REEs typically found in the earth's continental crust. For most sites, the average enrichment ratio ranged from a low of about 1.5 to a high of more than 4.0 as the ash content was lowered from 80-90% ash down to below 10% ash.
- A comparison of the concentrations of specific types of REEs in the plant products indicate that the relative concentrations of heavy REEs (i.e., Tb, Dy, Ho, Er, Tm, Yb, Lu and Y) are typically higher in the clean coal products generated by the processing plants. The most significant increases occurred for the clean coal products containing less than 15-20% ash. In this region, the ratio of heavy-to-light REEs exceeded 0.4 for clean coal products generated by many of the preparation plants.

### 4.4 Mineralogical Studies

The SEM-EDS technique was used to characterize i) the mineral matter isolated by micronization and flotation, ii) bottom ash, and iii) fly ash. The first sample showed the presence of small monazite particles of ~1 μm, containing La, Nd, and Ce. They are closely associated

with clay particles. The second and third samples showed no evidence for rare earth elements (REEs), suggesting that the concentrations of these elements are low.

Five different coal and coal byproducts have been analyzed using both the SEM-EDS and ToF-SIMS techniques. These include i) clean coal from a coal preparation plant treating Fire Clay seam coal, ii) 1.6 SG float of a Fire Clay middling, iii) run-of-mine (ROM) coal of Fire Clay coal, iv) utility station fly ash from burning Fire Clay clean coal, and v) utility station feed coal from the Fire Clay seam. RE minerals have been found in all samples with monazite being the most dominant. The particle sizes of the monazite are in the range of 1 to 10 μm. It appears, however, that xenotime may be the most dominant RE mineral in the power station feed coal. The xenotime particles contained significant amounts of heavy rare earth elements (HREEs) such as Gd, Er, and Dy. Some of the RE minerals found in the present work were fully liberated while others, particularly those found in the coarse reject sample, are locked particles. The ToF-SIMS analysis was useful for detecting REEs in the fly ash sample obtained from burning the Fire Clay clean coal. It has been found that some particles in the fly ash sample are La-rich while others are Y-rich.

# 5.0 APPENDIX

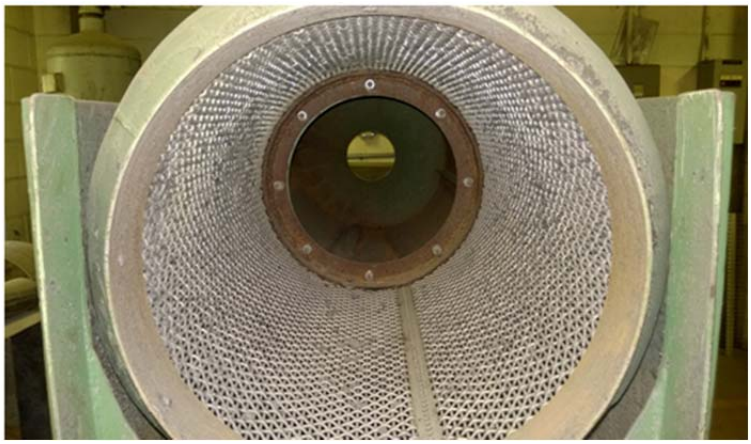
## Appendix 5.1 –Photographs of Equipment Used in Crushing, Sizing and Separations

*Appendix 5.1A – Crushing Equipment*

Jaw Crusher

Roll Crusher

Rotary Washer

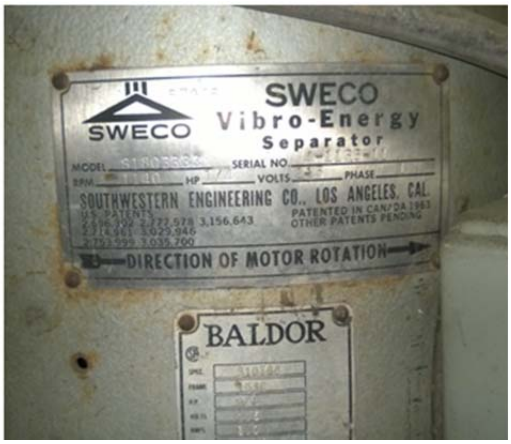


*Appendix 5.1B – Sizing Equipment*

Uniflex Screen

Large Sweco Screen

Small Sweco Screens



*Appendix 5.1C – Separation Equipment*

Multi-Gravity Separator

Electrostatic Separator

Selective Agglomeration Separator

Wet High Intensity Magnetic Separator (WHIMS)

Laboratory Denver Conventional Flotation Cells

## Appendix 5.2 – Data for Crushing/Sizing of Coarse Samples

*Appendix 5.2A – Data for Crushing/Sizing of Coarse Samples: Fire Clay Seam (UK001)*

Fire Clay Coarse Refuse

Head Weight

| Barrel | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| 1 | 47.5 | 755 | 707.5 |
| 2 | 29.5 | 683 | 653.5 |
| 3 | 36.5 | 696 | 659.5 |
| 4 | 39.5 | 687 | 647.5 |
| | | Total | 2668 |

| | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| SGS Sample | 19 | 259 | 240 |

| | | |
|---|---|---|
| Total Sample Shipped | 2580 | lbs |
| Sample Loss | 88 | lbs |

UK Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 76.5 | 1123 | 1046.5 | 92.16 |
| 20 M x 100 M | 3 | 67 | 64 | 5.64 |
| -100 M | 3 | 28 | 25 | 2.20 |
| | | Total | 1135.5 | 100.00 |

VT Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 48.5 | 1138 | 1089.5 | 90.45 |
| 20 M x 100 M | 4 | 86 | 82 | 6.81 |
| -100 M | 4 | 37 | 33 | 2.74 |
| | | Total | 1204.5 | 100.00 |

Fire Clay 1

% Solids Samples for Fine Refuse

| Sample | Tare (g) | Tare + Sample (g) | Sample (g) | % Solids |
|---|---|---|---|---|
| Wet | 73.02 | 1650.66 | 1577.64 | 28.65 |
| Dry | 850.19 | 1302.22 | 452.03 | |

Fire Clay 2

% Solids Samples for Fine Refuse

| Sample | Tare (g) | Tare + Sample (g) | Sample (g) | % Solids |
|---|---|---|---|---|
| Wet | 73.77 | 1418.64 | 1344.87 | 28.08 |
| Dry | 659.43 | 1037.13 | 377.70 | |

*Appendix 5.2B – Data for Crushing/Sizing of Coarse Samples: Fire Clay Rider (UK003)*

Fire Clay Rider Coarse
Refuse

Head Weight

| Barrel | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| 1 | 30 | 589 | 559 |
| 2 | 33 | 654 | 621 |
| 3 | 31 | 225 | 194 |
| | | Total | 1374 |

| | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| SGS Sample | 19 | 219 | 200 |

| | | |
|---|---|---|
| Total Sample Shipped | 1332 | lbs |
| Sample Loss | 42 | lbs |

UK Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 19 | 598 | 579 | 90.47 |
| 20 M x 100 M | 3 | 40 | 37 | 5.78 |
| -100 M | 3 | 27 | 24 | 3.75 |
| | | Total | 640 | 100.00 |

VT Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 35 | 475 | 440 | 89.43 |
| 20 M x 100 M | 4 | 36 | 32 | 6.50 |
| -100 M | 4 | 24 | 20 | 4.07 |
| | | Total | 492 | 100.00 |

Fire Clay
Rider

% Solids Samples for Fine Refuse

| Sample | Tare (g) | Tare + Sample (g) | Sample (g) | % Solids |
|---|---|---|---|---|
| Wet | 140.57 | 2555.36 | 2414.79 | 32.39 |
| Dry | 851.86 | 1633.91 | 782.05 | |

*Appendix 5.2C – Data for Crushing/Sizing of Coarse Samples: Eagle Seam (UK002)*

Head Weight

| Barrel | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| 1 | 19 | 694 | 675 |
| 2 | 19 | 693 | 674 |
| 3 | 19 | 664 | 645 |
| 4 | 19 | 708 | 689 |
| | | Total | 2683 |

| | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) |
|---|---|---|---|
| SGS Sample | 19 | 263 | 244 |

| | | |
|---|---|---|
| Total Sample Shipped | 2632 | lbs |
| Sample Loss | 51 | lbs |

UK Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 38 | 1239 | 1201 | 88.57 |
| 20 M x 100 M | 6 | 124 | 118 | 8.70 |
| -100 M | 3 | 40 | 37 | 2.73 |
| | | Total | 1356 | 100.00 |

VT Sample

| Size | Tare (lbs.) | Tare + Sample (lbs) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|
| 1/4" x 20 M | 38 | 945 | 907 | 87.89 |
| 20 M x 100 M | 4 | 97 | 93 | 9.01 |
| -100 M | 4 | 36 | 32 | 3.10 |
| | | Total | 1032 | 100.00 |

Eagle

% Solids Samples for Fine Refuse

| Sample | Tare (g) | Tare + Sample (g) | Sample (g) | % Solids |
|---|---|---|---|---|
| Wet | 136.36 | 3411.30 | 3274.94 | 32.94 |
| Dry | 1671.34 | 2750.24 | 1078.90 | |

## Appendix 5.3 – Data for Separation Tests on Coarse Samples

*Appendix 5.3A – Washability Data*

*Table 3A1. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 1.50 | 1.28 | 12.96 | 1.97 | 11.84 | 2.13 | 5.83 | 0.83 | 5.18 | 0.74 | 63.45 | 106 |
| 1.60 | 1.80 | 1.90 | 1.42 | 11.05 | 1.64 | 9.54 | 1.70 | 4.71 | 0.67 | 4.22 | 0.64 | 52.82 | 88 |
| 1.80 | 2.00 | 2.40 | 1.41 | 9.31 | 1.41 | 8.33 | 1.53 | 4.23 | 0.62 | 3.93 | 0.60 | 45.81 | 77 |
| 2.00 | 2.10 | 1.70 | 1.51 | 10.02 | 1.47 | 8.58 | 1.55 | 4.33 | 0.63 | 3.95 | 0.62 | 45.31 | 78 |
| 2.10 | 2.20 | 2.10 | 1.42 | 9.73 | 1.45 | 8.38 | 1.48 | 4.13 | 0.62 | 3.82 | 0.58 | 44.47 | 76 |
| 2.20 | 2.30 | 4.00 | 1.40 | 9.06 | 1.36 | 8.02 | 1.44 | 3.99 | 0.59 | 3.85 | 0.58 | 42.59 | 73 |
| 2.30 | 2.40 | 15.40 | 0.87 | 7.23 | 1.04 | 6.44 | 1.18 | 3.22 | 0.48 | 2.92 | 0.46 | 33.94 | 58 |
| 2.40 | 2.68 | 60.78 | 1.50 | 8.77 | 1.28 | 7.71 | 1.40 | 3.98 | 0.59 | 3.72 | 0.57 | 42.50 | 72 |
| 2.68 | 2.90 | 9.44 | 1.64 | 7.91 | 1.25 | 7.25 | 1.44 | 4.04 | 0.60 | 3.91 | 0.59 | 40.51 | 69 |
| 2.90 | Sink | 0.78 | 0.89 | 4.49 | 0.70 | 4.22 | 0.90 | 2.49 | 0.34 | 2.18 | 0.32 | 27.23 | 44 |
| Total | | 100.00 | 1.40 | 8.59 | 1.27 | 7.60 | 1.39 | 3.91 | 0.58 | 3.65 | 0.56 | 41.56 | 70 |

*Table 3A2. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 1.50 | 167 | 80 | 10 | 20 | 73 | 15 | 364 |
| 1.60 | 1.80 | 1.90 | 146 | 71 | 13 | 18 | 65 | 13 | 326 |
| 1.80 | 2.00 | 2.40 | 132 | 65 | 14 | 16 | 58 | 11 | 297 |
| 2.00 | 2.10 | 1.70 | 143 | 71 | 14 | 17 | 64 | 12 | 322 |
| 2.10 | 2.20 | 2.10 | 142 | 70 | 16 | 17 | 63 | 12 | 320 |
| 2.20 | 2.30 | 4.00 | 128 | 62 | 17 | 15 | 57 | 11 | 289 |
| 2.30 | 2.40 | 15.40 | 100 | 47 | 11 | 12 | 44 | 9 | 223 |
| 2.40 | 2.68 | 60.78 | 115 | 56 | 16 | 14 | 52 | 10 | 263 |
| 2.68 | 2.90 | 9.44 | 100 | 48 | 18 | 12 | 47 | 9 | 235 |
| 2.90 | Sink | 0.78 | 36 | 17 | 11 | 5 | 19 | 4 | 92 |
| Total | | 100.00 | 114 | 55 | 15 | 14 | 51 | 10 | 260 |

*Table 3A3. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 6.20 | 0.68 | 6.26 | 1.00 | 6.31 | 1.19 | 3.44 | 0.50 | 3.13 | 0.45 | 37.34 | 60 |
| 1.60 | 1.80 | 2.50 | 1.28 | 9.90 | 1.47 | 8.83 | 1.62 | 4.48 | 0.65 | 4.08 | 0.60 | 49.27 | 82 |
| 1.80 | 2.00 | 2.30 | 1.38 | 9.75 | 1.46 | 8.83 | 1.56 | 4.32 | 0.63 | 4.10 | 0.61 | 48.90 | 82 |
| 2.00 | 2.10 | 2.10 | 1.50 | 10.41 | 1.54 | 8.89 | 1.62 | 4.40 | 0.64 | 4.18 | 0.64 | 47.09 | 81 |
| 2.10 | 2.20 | 2.70 | 1.50 | 10.20 | 1.49 | 8.64 | 1.58 | 4.38 | 0.64 | 4.09 | 0.63 | 46.45 | 80 |
| 2.20 | 2.30 | 3.30 | 1.42 | 9.52 | 1.41 | 8.32 | 1.49 | 4.06 | 0.60 | 3.76 | 0.58 | 43.67 | 75 |
| 2.30 | 2.40 | 19.70 | 1.11 | 8.39 | 1.23 | 7.40 | 1.30 | 3.54 | 0.51 | 3.24 | 0.51 | 37.64 | 65 |
| 2.40 | 2.68 | 56.75 | 1.47 | 8.00 | 1.28 | 7.17 | 1.41 | 3.96 | 0.59 | 3.78 | 0.56 | 38.92 | 67 |
| 2.68 | 2.90 | 2.79 | 1.42 | 7.15 | 1.14 | 6.61 | 1.33 | 3.73 | 0.56 | 3.46 | 0.52 | 38.56 | 64 |
| 2.90 | - | 1.66 | 0.68 | 3.57 | 0.56 | 3.25 | 0.66 | 1.77 | 0.26 | 1.55 | 0.24 | 20.28 | 33 |
| Total | | 100.00 | 1.34 | 8.23 | 1.28 | 7.37 | 1.39 | 3.89 | 0.57 | 3.66 | 0.55 | 39.62 | 67.9 |

*Table 3A4. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 6.20 | 76 | 37 | 7 | 9 | 33 | 7 | 169 |
| 1.60 | 1.80 | 2.50 | 135 | 67 | 12 | 16 | 59 | 12 | 302 |
| 1.80 | 2.00 | 2.30 | 137 | 67 | 13 | 16 | 60 | 12 | 305 |
| 2.00 | 2.10 | 2.10 | 145 | 72 | 14 | 17 | 64 | 13 | 325 |
| 2.10 | 2.20 | 2.70 | 142 | 71 | 16 | 17 | 63 | 12 | 321 |
| 2.20 | 2.30 | 3.30 | 134 | 66 | 15 | 16 | 59 | 12 | 301 |
| 2.30 | 2.40 | 19.70 | 116 | 55 | 13 | 14 | 51 | 10 | 258 |
| 2.40 | 2.68 | 56.75 | 112 | 54 | 18 | 14 | 51 | 10 | 259 |
| 2.68 | 2.90 | 2.79 | 88 | 42 | 18 | 11 | 41 | 8 | 209 |
| 2.90 | - | 1.66 | 30 | 14 | 7 | 4 | 15 | 3 | 73 |
| Total | | 100.00 | 112 | 54 | 16 | 14 | 50 | 10 | 255 |

*Table 3A5. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 1.50 | 5.70 | 57.60 | 8.74 | 53 | 9 | 25.90 | 3.71 | 23.00 | 3.27 | 282 | 472 |
| 1.60 | 1.80 | 1.90 | 3.21 | 24.90 | 3.70 | 22 | 4 | 10.60 | 1.51 | 9.50 | 1.44 | 119 | 199 |
| 1.80 | 2.00 | 2.40 | 2.43 | 16.10 | 2.43 | 14 | 3 | 7.31 | 1.07 | 6.80 | 1.03 | 79 | 133 |
| 2.00 | 2.10 | 1.70 | 2.21 | 14.70 | 2.16 | 13 | 2 | 6.36 | 0.92 | 5.80 | 0.91 | 67 | 114 |
| 2.10 | 2.20 | 2.10 | 1.90 | 13.00 | 1.94 | 11 | 2 | 5.52 | 0.83 | 5.10 | 0.78 | 59 | 102 |
| 2.20 | 2.30 | 4.00 | 1.75 | 11.30 | 1.70 | 10 | 2 | 4.97 | 0.74 | 4.80 | 0.72 | 53 | 91 |
| 2.30 | 2.40 | 15.40 | 1.01 | 8.42 | 1.21 | 8 | 1 | 3.75 | 0.56 | 3.40 | 0.53 | 40 | 67 |
| 2.40 | 2.68 | 60.78 | 1.61 | 9.43 | 1.38 | 8 | 2 | 4.28 | 0.63 | 4.00 | 0.61 | 46 | 77 |
| 2.68 | 2.90 | 9.44 | 1.81 | 8.71 | 1.38 | 8 | 2 | 4.45 | 0.66 | 4.30 | 0.65 | 45 | 76 |
| 2.90 | Sink | 0.78 | 1.06 | 5.36 | 0.84 | 5 | 1 | 2.97 | 0.40 | 2.60 | 0.38 | 33 | 52 |
| Total | | 100.00 | 1.60 | 9.82 | 1.45 | 8.68 | 1.59 | 4.47 | 0.66 | 4.17 | 0.64 | 47.50 | 81 |

*Table 3A6. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 1.50 | 740 | 354 | 44 | 89 | 326 | 67 | 1620 |
| 1.60 | 1.80 | 1.90 | 330 | 159 | 29 | 40 | 146 | 30 | 734 |
| 1.80 | 2.00 | 2.40 | 228 | 113 | 25 | 27 | 101 | 20 | 514 |
| 2.00 | 2.10 | 1.70 | 210 | 104 | 21 | 26 | 94 | 18 | 473 |
| 2.10 | 2.20 | 2.10 | 190 | 93 | 21 | 23 | 84 | 16 | 428 |
| 2.20 | 2.30 | 4.00 | 159 | 77 | 21 | 19 | 71 | 14 | 361 |
| 2.30 | 2.40 | 15.40 | 116 | 55 | 13 | 14 | 51 | 10 | 259 |
| 2.40 | 2.68 | 60.78 | 124 | 60 | 17 | 15 | 56 | 11 | 283 |
| 2.68 | 2.90 | 9.44 | 110 | 53 | 20 | 14 | 52 | 10 | 259 |
| 2.90 | Sink | 0.78 | 43 | 21 | 13 | 6 | 22 | 5 | 110 |
| Total | | 100.00 | 130 | 63 | 17 | 16 | 59 | 11 | 297 |

*Table 3A7. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 6.20 | 4.41 | 40.60 | 6.50 | 41 | 8 | 22.30 | 3.23 | 20.30 | 2.94 | 242 | 391 |
| 1.60 | 1.80 | 2.50 | 2.89 | 22.30 | 3.31 | 20 | 4 | 10.10 | 1.46 | 9.20 | 1.35 | 111 | 185 |
| 1.80 | 2.00 | 2.30 | 2.43 | 17.10 | 2.56 | 16 | 3 | 7.58 | 1.10 | 7.20 | 1.07 | 86 | 143 |
| 2.00 | 2.10 | 2.10 | 2.26 | 15.70 | 2.32 | 13 | 2 | 6.64 | 0.97 | 6.30 | 0.96 | 71 | 122 |
| 2.10 | 2.20 | 2.70 | 2.01 | 13.70 | 2.00 | 12 | 2 | 5.89 | 0.86 | 5.50 | 0.85 | 62 | 107 |
| 2.20 | 2.30 | 3.30 | 1.78 | 11.90 | 1.76 | 10 | 2 | 5.08 | 0.75 | 4.70 | 0.72 | 55 | 94 |
| 2.30 | 2.40 | 19.70 | 1.27 | 9.59 | 1.41 | 8 | 1 | 4.05 | 0.58 | 3.70 | 0.58 | 43 | 74 |
| 2.40 | 2.68 | 56.75 | 1.59 | 8.68 | 1.39 | 8 | 2 | 4.29 | 0.64 | 4.10 | 0.61 | 42 | 73 |
| 2.68 | 2.90 | 2.79 | 1.56 | 7.84 | 1.25 | 7 | 1 | 4.09 | 0.61 | 3.80 | 0.57 | 42 | 71 |
| 2.90 | - | 1.66 | 0.88 | 4.61 | 0.72 | 4 | 1 | 2.29 | 0.33 | 2.00 | 0.31 | 26 | 42 |
| Total | | 100.00 | 1.62 | 9.96 | 1.55 | 8.91 | 1.69 | 4.70 | 0.69 | 4.43 | 0.67 | 47.92 | 82 |

*Table 3A8. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 6.20 | 492 | 238 | 44 | 59 | 216 | 45 | 1094 |
| 1.60 | 1.80 | 2.50 | 305 | 150 | 27 | 37 | 134 | 27 | 680 |
| 1.80 | 2.00 | 2.30 | 240 | 118 | 23 | 29 | 105 | 21 | 536 |
| 2.00 | 2.10 | 2.10 | 219 | 109 | 21 | 26 | 96 | 19 | 490 |
| 2.10 | 2.20 | 2.70 | 191 | 95 | 21 | 23 | 85 | 17 | 431 |
| 2.20 | 2.30 | 3.30 | 167 | 82 | 19 | 20 | 74 | 15 | 376 |
| 2.30 | 2.40 | 19.70 | 132 | 63 | 15 | 16 | 58 | 11 | 295 |
| 2.40 | 2.68 | 56.75 | 121 | 59 | 20 | 15 | 56 | 10 | 280 |
| 2.68 | 2.90 | 2.79 | 97 | 46 | 20 | 12 | 45 | 9 | 229 |
| 2.90 | - | 1.66 | 39 | 18 | 9 | 5 | 20 | 4 | 94 |
| Total | | 100.00 | 135 | 65 | 19 | 16 | 61 | 12 | 308 |

*Table 3A9. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 0.70 | 0.50 | 2.55 | 0.44 | 2.92 | 0.63 | 1.79 | 0.26 | 1.70 | 0.25 | 19.73 | 31 |
| 1.60 | 1.80 | 0.70 | 1.02 | 4.49 | 0.71 | 4.30 | 0.90 | 2.49 | 0.39 | 2.52 | 0.38 | 26.60 | 44 |
| 1.80 | 2.00 | 0.90 | 1.14 | 4.92 | 0.78 | 4.64 | 0.95 | 2.67 | 0.41 | 2.73 | 0.42 | 27.19 | 46 |
| 2.00 | 2.10 | 1.00 | 1.21 | 5.15 | 0.79 | 4.82 | 1.00 | 2.92 | 0.43 | 2.96 | 0.45 | 28.62 | 48 |
| 2.10 | 2.20 | 1.00 | 1.31 | 5.50 | 0.83 | 4.99 | 1.04 | 3.01 | 0.46 | 3.10 | 0.47 | 29.58 | 50 |
| 2.20 | 2.30 | 1.30 | 1.36 | 5.75 | 0.90 | 5.33 | 1.09 | 3.13 | 0.47 | 3.23 | 0.50 | 30.47 | 52 |
| 2.30 | 2.40 | 1.70 | 1.48 | 6.31 | 0.97 | 5.76 | 1.20 | 3.47 | 0.51 | 3.38 | 0.54 | 33.80 | 57 |
| 2.40 | 2.68 | 73.84 | 1.54 | 6.92 | 1.09 | 6.47 | 1.31 | 3.74 | 0.56 | 3.78 | 0.56 | 36.30 | 62 |
| 2.68 | 2.90 | 14.54 | 1.76 | 7.90 | 1.22 | 7.16 | 1.43 | 4.00 | 0.60 | 3.84 | 0.56 | 40.51 | 69 |
| 2.90 | Sink | 4.32 | 0.63 | 3.09 | 0.49 | 2.89 | 0.61 | 1.77 | 0.25 | 1.70 | 0.25 | 17.98 | 30 |
| Total | | 100.00 | 1.51 | 6.77 | 1.06 | 6.32 | 1.29 | 3.67 | 0.55 | 3.70 | 0.55 | 35.65 | 61 |

*Table 3A10. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 0.70 | 28 | 15 | 9 | 3 | 12 | 2 | 70 |
| 1.60 | 1.80 | 0.70 | 65 | 34 | 14 | 8 | 27 | 5 | 152 |
| 1.80 | 2.00 | 0.90 | 81 | 42 | 16 | 9 | 33 | 6 | 188 |
| 2.00 | 2.10 | 1.00 | 92 | 47 | 18 | 10 | 37 | 6 | 210 |
| 2.10 | 2.20 | 1.00 | 96 | 49 | 17 | 11 | 39 | 7 | 218 |
| 2.20 | 2.30 | 1.30 | 103 | 52 | 19 | 12 | 42 | 7 | 236 |
| 2.30 | 2.40 | 1.70 | 108 | 55 | 19 | 12 | 44 | 8 | 246 |
| 2.40 | 2.68 | 73.84 | 95 | 48 | 18 | 12 | 44 | 8 | 224 |
| 2.68 | 2.90 | 14.54 | 98 | 47 | 18 | 12 | 46 | 9 | 230 |
| 2.90 | Sink | 4.32 | 28 | 13 | 8 | 3 | 14 | 3 | 69 |
| Total | | 100.00 | 94.80 | 47.30 | 17.85 | 11.49 | 42.90 | 7.98 | 222 |

*Table 3A11. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 10.80 | 0.31 | 1.44 | 0.24 | 1.48 | 0.32 | 0.91 | 0.13 | 0.85 | 0.13 | 10.11 | 16 |
| 1.60 | 1.80 | 1.70 | 0.84 | 3.59 | 0.57 | 3.45 | 0.71 | 2.05 | 0.30 | 2.08 | 0.32 | 21.06 | 35 |
| 1.80 | 2.00 | 1.70 | 1.02 | 4.27 | 0.68 | 4.07 | 0.83 | 2.33 | 0.36 | 2.35 | 0.37 | 24.43 | 41 |
| 2.00 | 2.10 | 1.80 | 1.16 | 4.85 | 0.73 | 4.41 | 0.92 | 2.61 | 0.41 | 2.64 | 0.42 | 26.11 | 44 |
| 2.10 | 2.20 | 1.50 | 1.25 | 5.37 | 0.82 | 4.79 | 1.01 | 2.93 | 0.46 | 3.00 | 0.47 | 28.35 | 48 |
| 2.20 | 2.30 | 1.80 | 1.36 | 5.73 | 0.90 | 5.33 | 1.11 | 3.24 | 0.50 | 3.28 | 0.49 | 31.04 | 53 |
| 2.30 | 2.40 | 16.80 | 1.48 | 6.79 | 1.03 | 6.24 | 1.27 | 3.63 | 0.54 | 3.54 | 0.56 | 36.53 | 62 |
| 2.40 | 2.68 | 56.14 | 1.50 | 6.86 | 1.03 | 6.27 | 1.27 | 3.80 | 0.55 | 3.68 | 0.56 | 36.13 | 62 |
| 2.68 | 2.90 | 4.80 | 1.66 | 7.16 | 1.25 | 6.53 | 1.36 | 3.74 | 0.62 | 3.73 | 0.61 | 36.05 | 63 |
| 2.90 | Sink | 2.95 | 0.58 | 2.56 | 0.38 | 2.28 | 0.45 | 1.35 | 0.20 | 1.28 | 0.19 | 13.67 | 23 |
| Total | | 100.00 | 1.32 | 6.02 | 0.91 | 5.53 | 1.13 | 3.32 | 0.48 | 3.23 | 0.49 | 32.24 | 55 |

*Table 3A12. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 10.80 | 17 | 9 | 5 | 2 | 7 | 1 | 42 |
| 1.60 | 1.80 | 1.70 | 58 | 31 | 11 | 7 | 24 | 4 | 135 |
| 1.80 | 2.00 | 1.70 | 74 | 39 | 13 | 8 | 30 | 5 | 170 |
| 2.00 | 2.10 | 1.80 | 89 | 46 | 16 | 10 | 36 | 6 | 203 |
| 2.10 | 2.20 | 1.50 | 98 | 50 | 17 | 11 | 40 | 7 | 223 |
| 2.20 | 2.30 | 1.80 | 103 | 52 | 18 | 12 | 42 | 7 | 235 |
| 2.30 | 2.40 | 16.80 | 100 | 50 | 18 | 12 | 44 | 8 | 230 |
| 2.40 | 2.68 | 56.14 | 96 | 47 | 18 | 12 | 43 | 8 | 225 |
| 2.68 | 2.90 | 4.80 | 95 | 46 | 18 | 12 | 44 | 8 | 224 |
| 2.90 | Sink | 2.95 | 27 | 12 | 6 | 3 | 13 | 3 | 64 |
| Total | | 100.00 | 87 | 43 | 16 | 10 | 38 | 7 | 201 |

*Table 3A13. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 0.70 | 2.80 | 14.20 | 2.47 | 16.30 | 3.52 | 9.98 | 1.43 | 9.50 | 1.40 | 110 | 172 |
| 1.60 | 1.80 | 0.70 | 2.19 | 9.63 | 1.53 | 9.21 | 1.92 | 5.33 | 0.83 | 5.40 | 0.82 | 57 | 94 |
| 1.80 | 2.00 | 0.90 | 1.97 | 8.48 | 1.35 | 8.00 | 1.63 | 4.61 | 0.71 | 4.70 | 0.72 | 47 | 79 |
| 2.00 | 2.10 | 1.00 | 1.79 | 7.65 | 1.18 | 7.16 | 1.48 | 4.34 | 0.64 | 4.40 | 0.67 | 43 | 72 |
| 2.10 | 2.20 | 1.00 | 1.77 | 7.45 | 1.12 | 6.77 | 1.41 | 4.08 | 0.62 | 4.20 | 0.64 | 40 | 68 |
| 2.20 | 2.30 | 1.30 | 1.73 | 7.30 | 1.14 | 6.77 | 1.38 | 3.98 | 0.60 | 4.10 | 0.64 | 39 | 66 |
| 2.30 | 2.40 | 1.70 | 1.80 | 7.65 | 1.18 | 6.99 | 1.46 | 4.21 | 0.62 | 4.10 | 0.66 | 41 | 70 |
| 2.40 | 2.68 | 73.84 | 1.63 | 7.32 | 1.15 | 6.84 | 1.39 | 3.96 | 0.59 | 4.00 | 0.59 | 38 | 66 |
| 2.68 | 2.90 | 14.54 | 1.88 | 8.42 | 1.30 | 7.64 | 1.53 | 4.27 | 0.64 | 4.10 | 0.60 | 43 | 74 |
| 2.90 | Sink | 4.32 | 0.82 | 4.00 | 0.63 | 3.74 | 0.79 | 2.29 | 0.33 | 2.20 | 0.32 | 23 | 38 |
| Total | | 100.00 | 1.66 | 7.42 | 1.17 | 6.96 | 1.42 | 4.04 | 0.60 | 4.08 | 0.60 | 39.40 | 67 |

*Table 3A14. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 0.70 | 156 | 81 | 51 | 18 | 69 | 14 | 388 |
| 1.60 | 1.80 | 0.70 | 139 | 72 | 30 | 16 | 58 | 11 | 326 |
| 1.80 | 2.00 | 0.90 | 140 | 72 | 28 | 16 | 58 | 10 | 324 |
| 2.00 | 2.10 | 1.00 | 136 | 69 | 26 | 16 | 55 | 9 | 311 |
| 2.10 | 2.20 | 1.00 | 130 | 66 | 23 | 15 | 53 | 10 | 296 |
| 2.20 | 2.30 | 1.30 | 131 | 66 | 24 | 15 | 54 | 9 | 299 |
| 2.30 | 2.40 | 1.70 | 131 | 66 | 23 | 15 | 54 | 10 | 299 |
| 2.40 | 2.68 | 73.84 | 101 | 50 | 19 | 12 | 46 | 9 | 237 |
| 2.68 | 2.90 | 14.54 | 104 | 51 | 19 | 13 | 50 | 10 | 246 |
| 2.90 | Sink | 4.32 | 36 | 17 | 11 | 4 | 18 | 4 | 90 |
| Total | | 100.00 | 104.13 | 52.01 | 19.77 | 12.60 | 47.00 | 8.73 | 244 |

*Table 3A15. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 10.80 | 3.13 | 14.70 | 2.42 | 15.10 | 3.22 | 9.25 | 1.34 | 8.70 | 1.28 | 103 | 162 |
| 1.60 | 1.80 | 1.70 | 1.90 | 8.12 | 1.28 | 7.81 | 1.60 | 4.65 | 0.69 | 4.70 | 0.73 | 48 | 79 |
| 1.80 | 2.00 | 1.70 | 1.83 | 7.63 | 1.21 | 7.28 | 1.49 | 4.17 | 0.65 | 4.20 | 0.66 | 44 | 73 |
| 2.00 | 2.10 | 1.80 | 1.76 | 7.36 | 1.11 | 6.69 | 1.39 | 3.96 | 0.62 | 4.00 | 0.63 | 40 | 67 |
| 2.10 | 2.20 | 1.50 | 1.66 | 7.16 | 1.09 | 6.39 | 1.34 | 3.90 | 0.61 | 4.00 | 0.62 | 38 | 65 |
| 2.20 | 2.30 | 1.80 | 1.66 | 6.99 | 1.10 | 6.51 | 1.36 | 3.96 | 0.61 | 4.00 | 0.60 | 38 | 65 |
| 2.30 | 2.40 | 16.80 | 1.59 | 7.29 | 1.11 | 6.69 | 1.36 | 3.90 | 0.58 | 3.80 | 0.60 | 39 | 66 |
| 2.40 | 2.68 | 56.14 | 1.59 | 7.27 | 1.09 | 6.65 | 1.35 | 4.03 | 0.58 | 3.90 | 0.59 | 38 | 65 |
| 2.68 | 2.90 | 4.80 | 1.78 | 7.69 | 1.34 | 7.01 | 1.46 | 4.02 | 0.67 | 4.00 | 0.65 | 39 | 67 |
| 2.90 | Sink | 2.95 | 0.77 | 3.39 | 0.50 | 3.02 | 0.59 | 1.79 | 0.26 | 1.70 | 0.25 | 18 | 30 |
| Total | | 100.00 | 1.79 | 8.16 | 1.26 | 7.67 | 1.58 | 4.63 | 0.67 | 4.47 | 0.68 | 46.32 | 77 |

*Table 3A16. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 10.80 | 176 | 91 | 47 | 21 | 76 | 15 | 425 |
| 1.60 | 1.80 | 1.70 | 132 | 70 | 24 | 15 | 55 | 10 | 306 |
| 1.80 | 2.00 | 1.70 | 133 | 70 | 23 | 15 | 54 | 10 | 304 |
| 2.00 | 2.10 | 1.80 | 135 | 70 | 24 | 15 | 54 | 9 | 307 |
| 2.10 | 2.20 | 1.50 | 131 | 67 | 23 | 15 | 53 | 9 | 297 |
| 2.20 | 2.30 | 1.80 | 126 | 64 | 22 | 15 | 51 | 9 | 287 |
| 2.30 | 2.40 | 16.80 | 107 | 53 | 19 | 13 | 47 | 9 | 247 |
| 2.40 | 2.68 | 56.14 | 102 | 50 | 19 | 12 | 46 | 9 | 238 |
| 2.68 | 2.90 | 4.80 | 102 | 50 | 19 | 13 | 48 | 9 | 240 |
| 2.90 | Sink | 2.95 | 35 | 16 | 8 | 4 | 17 | 4 | 84 |
| Total | | 100.00 | 114 | 57 | 23 | 14 | 50 | 9 | 267 |

*Table 3A17. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 3.20 | 0.62 | 2.83 | 0.46 | 2.85 | 0.60 | 1.77 | 0.26 | 1.69 | 0.25 | 17.94 | 29 |
| 1.60 | 1.80 | 3.30 | 0.86 | 3.72 | 0.59 | 3.66 | 0.77 | 2.23 | 0.33 | 2.26 | 0.35 | 22.78 | 38 |
| 1.80 | 2.00 | 2.60 | 1.07 | 4.79 | 0.77 | 4.72 | 0.98 | 2.85 | 0.44 | 3.01 | 0.47 | 28.60 | 48 |
| 2.00 | 2.10 | 2.60 | 1.24 | 5.52 | 0.87 | 5.14 | 1.08 | 3.09 | 0.49 | 3.10 | 0.49 | 30.33 | 51 |
| 2.10 | 2.20 | 3.10 | 1.26 | 5.88 | 0.92 | 5.41 | 1.14 | 3.19 | 0.51 | 3.24 | 0.52 | 32.67 | 55 |
| 2.20 | 2.30 | 2.50 | 1.39 | 6.21 | 0.95 | 5.58 | 1.14 | 3.31 | 0.50 | 3.34 | 0.51 | 33.22 | 56 |
| 2.30 | 2.40 | 2.10 | 1.59 | 7.17 | 1.08 | 6.47 | 1.28 | 3.66 | 0.53 | 3.39 | 0.52 | 37.34 | 63 |
| 2.40 | - | 80.60 | 1.78 | 8.00 | 1.20 | 6.99 | 1.44 | 3.96 | 0.59 | 3.97 | 0.63 | 41.40 | 70 |
| Total | | 100.00 | 1.71 | 7.66 | 1.15 | 6.73 | 1.39 | 3.83 | 0.57 | 3.84 | 0.61 | 39.90 | 67 |

*Table 3A18. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 3.20 | 36.03 | 18.67 | 9.19 | 4.26 | 15.64 | 3.05 | 87 |
| 1.60 | 1.80 | 3.30 | 59.12 | 31.12 | 12.17 | 6.87 | 24.73 | 4.43 | 138 |
| 1.80 | 2.00 | 2.60 | 79.18 | 41.84 | 14.18 | 9.16 | 32.74 | 5.73 | 183 |
| 2.00 | 2.10 | 2.60 | 89.36 | 45.73 | 13.37 | 10.69 | 38.70 | 6.90 | 205 |
| 2.10 | 2.20 | 3.10 | 92.04 | 46.32 | 12.82 | 10.79 | 39.98 | 7.09 | 209 |
| 2.20 | 2.30 | 2.50 | 94.58 | 47.77 | 13.51 | 11.29 | 40.77 | 7.47 | 215 |
| 2.30 | 2.40 | 2.10 | 95.22 | 46.04 | 13.25 | 11.59 | 43.97 | 8.45 | 219 |
| 2.40 | - | 80.60 | 113.65 | 56.27 | 15.71 | 13.77 | 51.28 | 9.52 | 260 |
| Total | | 100.00 | 109.52 | 54.36 | 15.33 | 13.24 | 49.22 | 9.12 | 251 |

*Table 3A19. Heavy REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 5.70 | 0.51 | 2.41 | 0.40 | 2.55 | 0.52 | 1.51 | 0.22 | 1.42 | 0.21 | 16.08 | 26 |
| 1.60 | 1.80 | 2.90 | 0.86 | 3.72 | 0.60 | 3.78 | 0.79 | 2.30 | 0.34 | 2.28 | 0.35 | 22.88 | 38 |
| 1.80 | 2.00 | 2.70 | 1.05 | 4.54 | 0.72 | 4.45 | 0.94 | 2.74 | 0.41 | 2.80 | 0.41 | 27.38 | 45 |
| 2.00 | 2.10 | 2.80 | 1.18 | 5.29 | 0.82 | 5.01 | 1.04 | 3.06 | 0.47 | 3.11 | 0.48 | 30.26 | 51 |
| 2.10 | 2.20 | 2.30 | 1.26 | 5.92 | 0.90 | 5.52 | 1.18 | 3.35 | 0.51 | 3.46 | 0.51 | 33.31 | 56 |
| 2.20 | 2.30 | 2.50 | 1.41 | 6.15 | 0.97 | 5.69 | 1.19 | 3.42 | 0.53 | 3.43 | 0.51 | 33.61 | 57 |
| 2.30 | 2.40 | 7.30 | 1.59 | 7.29 | 1.10 | 6.48 | 1.33 | 3.69 | 0.56 | 3.64 | 0.55 | 38.01 | 64 |
| 2.40 | - | 73.80 | 1.69 | 7.66 | 1.19 | 6.64 | 1.36 | 3.78 | 0.55 | 3.59 | 0.55 | 38.24 | 65 |
| Total | | 100.00 | 1.62 | 7.34 | 1.14 | 6.43 | 1.32 | 3.67 | 0.54 | 3.52 | 0.54 | 37.19 | 63 |

*Table 3A20. Light REE analysis data on a whole coal basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 5.70 | 25.51 | 13.03 | 7.58 | 3.65 | 13.91 | 2.44 | 66 |
| 1.60 | 1.80 | 2.90 | 57.09 | 29.87 | 11.17 | 6.58 | 23.75 | 4.34 | 133 |
| 1.80 | 2.00 | 2.70 | 74.47 | 39.14 | 12.88 | 8.62 | 30.91 | 5.43 | 171 |
| 2.00 | 2.10 | 2.80 | 86.17 | 44.83 | 13.61 | 10.04 | 36.09 | 6.48 | 197 |
| 2.10 | 2.20 | 2.30 | 92.29 | 47.95 | 13.70 | 10.96 | 39.29 | 6.99 | 211 |
| 2.20 | 2.30 | 2.50 | 98.27 | 50.62 | 14.82 | 11.62 | 42.74 | 7.57 | 226 |
| 2.30 | 2.40 | 7.30 | 101.31 | 50.14 | 14.72 | 12.12 | 45.03 | 8.49 | 232 |
| 2.40 | - | 73.80 | 101.37 | 49.12 | 14.74 | 12.44 | 46.35 | 8.94 | 233 |
| Total | | 100.00 | 98.85 | 48.27 | 14.54 | 12.07 | 44.85 | 8.58 | 227 |

*Table 3A21. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 3.20 | 2.58 | 11.70 | 1.91 | 11.80 | 2.47 | 7.33 | 1.09 | 7.00 | 1.05 | 74 | 121 |
| 1.60 | 1.80 | 3.30 | 1.97 | 8.56 | 1.35 | 8.43 | 1.78 | 5.12 | 0.77 | 5.20 | 0.81 | 52 | 86 |
| 1.80 | 2.00 | 2.60 | 1.81 | 8.11 | 1.31 | 7.99 | 1.66 | 4.83 | 0.74 | 5.10 | 0.79 | 48 | 81 |
| 2.00 | 2.10 | 2.60 | 1.76 | 7.85 | 1.24 | 7.31 | 1.53 | 4.39 | 0.69 | 4.40 | 0.70 | 43 | 73 |
| 2.10 | 2.20 | 3.10 | 1.67 | 7.79 | 1.22 | 7.17 | 1.51 | 4.23 | 0.67 | 4.30 | 0.69 | 43 | 73 |
| 2.20 | 2.30 | 2.50 | 1.75 | 7.81 | 1.20 | 7.02 | 1.44 | 4.17 | 0.63 | 4.20 | 0.64 | 42 | 71 |
| 2.30 | 2.40 | 2.10 | 1.92 | 8.66 | 1.31 | 7.82 | 1.55 | 4.42 | 0.64 | 4.10 | 0.63 | 45 | 76 |
| 2.40 | - | 80.60 | 1.93 | 8.66 | 1.30 | 7.56 | 1.56 | 4.29 | 0.64 | 4.30 | 0.68 | 45 | 76 |
| Total | | 100.00 | 1.92 | 8.62 | 1.30 | 7.60 | 1.57 | 4.34 | 0.65 | 4.35 | 0.69 | 45.11 | 76 |

*Table 3A22. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 3.20 | 149 | 77.20 | 38.00 | 17.60 | 64.70 | 12.60 | 359 |
| 1.60 | 1.80 | 3.30 | 136 | 71.60 | 28.00 | 15.80 | 56.90 | 10.20 | 319 |
| 1.80 | 2.00 | 2.60 | 134 | 70.80 | 24.00 | 15.50 | 55.40 | 9.70 | 309 |
| 2.00 | 2.10 | 2.60 | 127 | 65.00 | 19.00 | 15.20 | 55.00 | 9.80 | 291 |
| 2.10 | 2.20 | 3.10 | 122 | 61.40 | 17.00 | 14.30 | 53.00 | 9.40 | 277 |
| 2.20 | 2.30 | 2.50 | 119 | 60.10 | 17.00 | 14.20 | 51.30 | 9.40 | 271 |
| 2.30 | 2.40 | 2.10 | 115 | 55.60 | 16.00 | 14.00 | 53.10 | 10.20 | 264 |
| 2.40 | - | 80.60 | 123 | 60.90 | 17.00 | 14.90 | 55.50 | 10.30 | 282 |
| Total | | 100.00 | 123.45 | 61.38 | 17.52 | 14.91 | 55.38 | 10.25 | 283 |

*Table 3A23. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 5.70 | 3.30 | 15.60 | 2.61 | 16.50 | 3.39 | 9.75 | 1.41 | 9.20 | 1.35 | 104 | 167 |
| 1.60 | 1.80 | 2.90 | 2.07 | 9.00 | 1.46 | 9.14 | 1.90 | 5.56 | 0.81 | 5.50 | 0.84 | 55 | 92 |
| 1.80 | 2.00 | 2.70 | 1.87 | 8.11 | 1.29 | 7.94 | 1.68 | 4.89 | 0.73 | 5.00 | 0.74 | 49 | 81 |
| 2.00 | 2.10 | 2.80 | 1.82 | 8.17 | 1.26 | 7.74 | 1.61 | 4.72 | 0.73 | 4.80 | 0.74 | 47 | 78 |
| 2.10 | 2.20 | 2.30 | 1.75 | 8.21 | 1.25 | 7.66 | 1.63 | 4.64 | 0.71 | 4.80 | 0.71 | 46 | 78 |
| 2.20 | 2.30 | 2.50 | 1.81 | 7.89 | 1.24 | 7.30 | 1.52 | 4.39 | 0.68 | 4.40 | 0.66 | 43 | 73 |
| 2.30 | 2.40 | 7.30 | 1.84 | 8.42 | 1.27 | 7.48 | 1.54 | 4.26 | 0.65 | 4.20 | 0.64 | 44 | 74 |
| 2.40 | - | 73.80 | 1.83 | 8.31 | 1.29 | 7.21 | 1.48 | 4.10 | 0.60 | 3.90 | 0.60 | 42 | 71 |
| Total | | 100.00 | 1.85 | 8.39 | 1.30 | 7.39 | 1.52 | 4.24 | 0.62 | 4.07 | 0.62 | 42.92 | 73 |

*Table 3A24. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 5.70 | 165.00 | 84.30 | 49 | 23.60 | 90.00 | 15.80 | 428 |
| 1.60 | 1.80 | 2.90 | 138.00 | 72.20 | 27 | 15.90 | 57.40 | 10.50 | 321 |
| 1.80 | 2.00 | 2.70 | 133.00 | 69.90 | 23 | 15.40 | 55.20 | 9.70 | 306 |
| 2.00 | 2.10 | 2.80 | 133.00 | 69.20 | 21 | 15.50 | 55.70 | 10.00 | 304 |
| 2.10 | 2.20 | 2.30 | 128.00 | 66.50 | 19 | 15.20 | 54.50 | 9.70 | 293 |
| 2.20 | 2.30 | 2.50 | 126.00 | 64.90 | 19 | 14.90 | 54.80 | 9.70 | 289 |
| 2.30 | 2.40 | 7.30 | 117.00 | 57.90 | 17 | 14.00 | 52.00 | 9.80 | 268 |
| 2.40 | - | 73.80 | 110.00 | 53.30 | 16 | 13.50 | 50.30 | 9.70 | 253 |
| Total | | 100.00 | 113.17 | 55.43 | 16.95 | 13.82 | 51.35 | 9.79 | 261 |

*Table 3A25. Heavy REE analysis data on a whole sample basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole sample basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 9.50 | 4.62 | 23.50 | 3.53 | 21.00 | 4.33 | 12.30 | 1.70 | 10.80 | 1.54 | 130.00 | 213 |
| 1.60 | 1.80 | 13.70 | 5.05 | 24.70 | 3.68 | 21.70 | 4.48 | 12.20 | 1.75 | 10.60 | 1.60 | 134 | 220 |
| 1.80 | 2.00 | 20.50 | 5.14 | 24.70 | 3.70 | 21.70 | 4.43 | 12.20 | 1.75 | 10.50 | 1.59 | 136 | 222 |
| 2.00 | 2.10 | 14.20 | 5.11 | 25.20 | 3.69 | 21.60 | 4.45 | 12.50 | 1.74 | 10.50 | 1.59 | 135 | 221 |
| 2.10 | 2.20 | 9.50 | 5.37 | 24.90 | 3.72 | 21.90 | 4.40 | 12.30 | 1.73 | 10.40 | 1.58 | 137 | 223 |
| 2.20 | 2.30 | 7.10 | 5.20 | 24.40 | 3.61 | 21.30 | 4.36 | 12.20 | 1.67 | 10.40 | 1.54 | 133 | 218 |
| 2.30 | 2.40 | 6.00 | 4.95 | 23.80 | 3.48 | 20.30 | 4.10 | 11.50 | 1.62 | 9.90 | 1.47 | 128 | 209 |
| 2.40 | - | 19.50 | 5.11 | 23.30 | 3.44 | 19.90 | 4.10 | 11.40 | 1.58 | 9.80 | 1.43 | 125 | 205 |
| Total | | 100.00 | 5.07 | 23.81 | 3.52 | 20.55 | 4.22 | 11.73 | 1.64 | 10.10 | 1.49 | 128.65 | 211 |

*Table 3A26. Light REE analysis data on a whole sample basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole sample basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 9.50 | 247 | 121 | 36 | 30 | 118 | 24 | 576 |
| 1.60 | 1.80 | 13.70 | 253 | 122 | 37 | 31 | 123 | 26 | 592 |
| 1.80 | 2.00 | 20.50 | 250 | 121 | 38 | 31 | 122 | 25 | 587 |
| 2.00 | 2.10 | 14.20 | 247 | 120 | 38 | 31 | 120 | 25 | 581 |
| 2.10 | 2.20 | 9.50 | 252 | 122 | 37 | 31 | 123 | 26 | 591 |
| 2.20 | 2.30 | 7.10 | 244 | 118 | 36 | 30 | 120 | 25 | 573 |
| 2.30 | 2.40 | 6.00 | 234 | 114 | 36 | 29 | 113 | 24 | 549 |
| 2.40 | - | 19.50 | 237 | 115 | 34 | 29 | 118 | 24 | 558 |
| Total | | 100.00 | 241 | 117 | 35 | 30 | 119 | 24 | 567 |

*Table 3A27. Heavy REE analysis data on a whole sample basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole sample basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 2.50 | 3.85 | 20.16 | 3.09 | 17.90 | 3.65 | 10.36 | 1.48 | 9.04 | 1.35 | 112.10 | 183 |
| 1.60 | 1.80 | 3.10 | 3.92 | 20.59 | 3.29 | 19.25 | 3.93 | 11.21 | 1.59 | 9.67 | 1.46 | 118.77 | 194 |
| 1.80 | 2.00 | 10.40 | 4.28 | 22.61 | 3.52 | 20.48 | 4.18 | 11.69 | 1.68 | 10.14 | 1.54 | 126.56 | 207 |
| 2.00 | 2.10 | 13.10 | 4.69 | 23.97 | 3.67 | 21.78 | 4.49 | 12.53 | 1.76 | 11.04 | 1.65 | 133.29 | 219 |
| 2.10 | 2.20 | 19.00 | 4.85 | 23.69 | 3.68 | 21.09 | 4.36 | 12.40 | 1.74 | 10.70 | 1.57 | 134.95 | 219 |
| 2.20 | 2.30 | 21.40 | 5.29 | 24.90 | 3.80 | 22.50 | 4.57 | 12.70 | 1.78 | 11.00 | 1.66 | 140.00 | 228 |
| 2.30 | 2.40 | 17.90 | 5.19 | 24.40 | 3.72 | 21.70 | 4.40 | 12.30 | 1.73 | 10.60 | 1.58 | 138.00 | 224 |
| 2.40 | - | 12.60 | 5.11 | 23.30 | 3.50 | 20.30 | 4.08 | 11.50 | 1.61 | 10.00 | 1.50 | 128.00 | 209 |
| Total | | 100.00 | 4.87 | 23.67 | 3.63 | 21.22 | 4.32 | 12.13 | 1.71 | 10.50 | 1.57 | 133.56 | 217 |

*Table 3A28. Light REE analysis data on a whole sample basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole sample basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 2.50 | 219 | 106 | 32 | 27 | 104 | 21 | 509 |
| 1.60 | 1.80 | 3.10 | 230 | 112 | 32 | 28 | 108 | 22 | 532 |
| 1.80 | 2.00 | 10.40 | 241 | 117 | 35 | 30 | 115 | 24 | 561 |
| 2.00 | 2.10 | 13.10 | 253 | 121 | 36 | 31 | 120 | 25 | 586 |
| 2.10 | 2.20 | 19.00 | 247 | 120 | 37 | 30 | 119 | 24 | 578 |
| 2.20 | 2.30 | 21.40 | 252 | 121 | 39 | 31 | 123 | 26 | 592 |
| 2.30 | 2.40 | 17.90 | 241 | 116 | 39 | 30 | 119 | 25 | 570 |
| 2.40 | - | 12.60 | 234 | 111 | 35 | 29 | 116 | 24 | 549 |
| Total | | 100.00 | 242 | 117 | 37 | 30 | 117 | 24 | 567 |

*Table 3A29. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 9.50 | 4.62 | 23.50 | 3.53 | 21.00 | 4.33 | 12.30 | 1.70 | 10.80 | 1.54 | 130 | 213 |
| 1.60 | 1.80 | 13.70 | 5.05 | 24.70 | 3.68 | 21.70 | 4.48 | 12.20 | 1.75 | 10.60 | 1.60 | 134 | 220 |
| 1.80 | 2.00 | 20.50 | 5.14 | 24.70 | 3.70 | 21.70 | 4.43 | 12.20 | 1.75 | 10.50 | 1.59 | 136 | 222 |
| 2.00 | 2.10 | 14.20 | 5.11 | 25.20 | 3.69 | 21.60 | 4.45 | 12.50 | 1.74 | 10.50 | 1.59 | 135 | 221 |
| 2.10 | 2.20 | 9.50 | 5.37 | 24.90 | 3.72 | 21.90 | 4.40 | 12.30 | 1.73 | 10.40 | 1.58 | 137 | 223 |
| 2.20 | 2.30 | 7.10 | 5.20 | 24.40 | 3.61 | 21.30 | 4.36 | 12.20 | 1.67 | 10.40 | 1.54 | 133 | 218 |
| 2.30 | 2.40 | 6.00 | 4.95 | 23.80 | 3.48 | 20.30 | 4.10 | 11.50 | 1.62 | 9.90 | 1.47 | 128 | 209 |
| 2.40 | - | 19.50 | 5.11 | 23.30 | 3.44 | 19.90 | 4.10 | 11.40 | 1.58 | 9.80 | 1.43 | 125 | 205 |
| Total | | 100.00 | 5.07 | 23.81 | 3.52 | 20.55 | 4.22 | 11.73 | 1.64 | 10.10 | 1.49 | 129 | 211 |

*Table 3A30. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 9.50 | 247 | 121 | 36 | 30 | 118 | 24 | 576 |
| 1.60 | 1.80 | 13.70 | 253 | 122 | 37 | 31 | 123 | 26 | 592 |
| 1.80 | 2.00 | 20.50 | 250 | 121 | 38 | 31 | 122 | 25 | 587 |
| 2.00 | 2.10 | 14.20 | 247 | 120 | 38 | 31 | 120 | 25 | 581 |
| 2.10 | 2.20 | 9.50 | 252 | 122 | 37 | 31 | 123 | 26 | 591 |
| 2.20 | 2.30 | 7.10 | 244 | 118 | 36 | 30 | 120 | 25 | 573 |
| 2.30 | 2.40 | 6.00 | 234 | 114 | 36 | 29 | 113 | 24 | 549 |
| 2.40 | - | 19.50 | 237 | 115 | 34 | 29 | 118 | 24 | 558 |
| Total | | 100.00 | 241 | 117 | 35 | 30 | 119 | 24 | 567 |

*Table 3A31. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.60 | 2.50 | 4.09 | 21.40 | 3.28 | 19.00 | 3.88 | 11.00 | 1.57 | 9.60 | 1.43 | 119 | 194 |
| 1.60 | 1.80 | 3.10 | 4.09 | 21.50 | 3.44 | 20.10 | 4.10 | 11.70 | 1.66 | 10.10 | 1.52 | 124 | 202 |
| 1.80 | 2.00 | 10.40 | 4.43 | 23.40 | 3.64 | 21.20 | 4.33 | 12.10 | 1.74 | 10.50 | 1.59 | 131 | 214 |
| 2.00 | 2.10 | 13.10 | 4.72 | 24.10 | 3.69 | 21.90 | 4.51 | 12.60 | 1.77 | 11.10 | 1.66 | 134 | 220 |
| 2.10 | 2.20 | 19.00 | 4.85 | 23.70 | 3.68 | 21.10 | 4.36 | 12.40 | 1.74 | 10.70 | 1.57 | 135 | 219 |
| 2.20 | 2.30 | 21.40 | 5.29 | 24.90 | 3.80 | 22.50 | 4.57 | 12.70 | 1.78 | 11.00 | 1.66 | 140 | 228 |
| 2.30 | 2.40 | 17.90 | 5.19 | 24.40 | 3.72 | 21.70 | 4.40 | 12.30 | 1.73 | 10.60 | 1.58 | 138 | 224 |
| 2.40 | - | 12.60 | 5.11 | 23.30 | 3.50 | 20.30 | 4.08 | 11.50 | 1.61 | 10.00 | 1.50 | 128 | 209 |
| Total | | 100.00 | 4.91 | 23.88 | 3.67 | 21.42 | 4.37 | 12.24 | 1.73 | 10.60 | 1.58 | 135 | 219 |

*Table 3A32. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash sample (UK004).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.60 | 2.50 | 232 | 113 | 34 | 29 | 110 | 23 | 540 |
| 1.60 | 1.80 | 3.10 | 240 | 117 | 33 | 30 | 113 | 23 | 556 |
| 1.80 | 2.00 | 10.40 | 249 | 121 | 36 | 31 | 119 | 25 | 580 |
| 2.00 | 2.10 | 13.10 | 254 | 122 | 36 | 31 | 121 | 25 | 589 |
| 2.10 | 2.20 | 19.00 | 247 | 120 | 37 | 31 | 119 | 25 | 578 |
| 2.20 | 2.30 | 21.40 | 252 | 121 | 39 | 31 | 123 | 26 | 592 |
| 2.30 | 2.40 | 17.90 | 241 | 116 | 39 | 30 | 119 | 25 | 570 |
| 2.40 | - | 12.60 | 234 | 111 | 35 | 29 | 116 | 24 | 549 |
| Total | | 100.00 | 244 | 118 | 38 | 30 | 119 | 25 | 573 |

*Table 3A33. Heavy REE analysis data on a whole sample basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.40 | 93.2 | 0.17 | 0.84 | 0.13 | 0.81 | 0.15 | 0.44 | 0.06 | 0.41 | 0.06 | 4.81 | 8 |
| 1.40 | 1.60 | 2.60 | 0.44 | 2.10 | 0.32 | 1.98 | 0.38 | 1.10 | 0.17 | 1.08 | 0.18 | 11.50 | 19 |
| 1.60 | 1.80 | 1.30 | 0.63 | 2.84 | 0.42 | 2.64 | 0.50 | 1.49 | 0.22 | 1.57 | 0.25 | 15.29 | 26 |
| 1.80 | 2.00 | 1.40 | 0.72 | 3.19 | 0.50 | 3.12 | 0.60 | 1.79 | 0.26 | 1.84 | 0.29 | 18.05 | 30 |
| 2.00 | 2.10 | 0.60 | 0.84 | 3.62 | 0.56 | 3.47 | 0.65 | 2.05 | 0.32 | 2.12 | 0.34 | 20.50 | 34 |
| 2.10 | 2.20 | 0.20 | 0.98 | 4.33 | 0.66 | 3.97 | 0.75 | 2.27 | 0.35 | 2.27 | 0.37 | 23.76 | 40 |
| 2.20 | 2.30 | 0.20 | 1.10 | 4.85 | 0.74 | 4.58 | 0.87 | 2.50 | 0.38 | 2.56 | 0.41 | 26.60 | 45 |
| 2.30 | 2.40 | 0.20 | 1.23 | 5.55 | 0.83 | 4.97 | 0.94 | 2.67 | 0.42 | 2.83 | 0.45 | 28.34 | 48 |
| 2.40 | - | 0.30 | 1.14 | 5.25 | 0.82 | 5.09 | 0.96 | 2.88 | 0.44 | 2.86 | 0.46 | 29.67 | 50 |
| Total | | 100.00 | 0.20 | 0.98 | 0.15 | 0.94 | 0.18 | 0.52 | 0.08 | 0.49 | 0.08 | 5.60 | 9.2 |

*Table 3A34. Light REE analysis data on a whole sample basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.40 | 93.2 | 8.32 | 3.66 | 2.64 | 0.94 | 3.65 | 0.81 | 20 |
| 1.40 | 1.60 | 2.60 | 27.50 | 14.35 | 7.50 | 3.30 | 12.20 | 2.38 | 67 |
| 1.60 | 1.80 | 1.30 | 46.19 | 26.99 | 9.86 | 5.83 | 20.63 | 3.59 | 113 |
| 1.80 | 2.00 | 1.40 | 59.20 | 34.09 | 12.65 | 7.13 | 24.72 | 4.25 | 142 |
| 2.00 | 2.10 | 0.60 | 72.09 | 38.76 | 13.23 | 8.14 | 28.64 | 4.89 | 166 |
| 2.10 | 2.20 | 0.20 | 81.57 | 40.86 | 14.19 | 8.80 | 31.07 | 5.46 | 182 |
| 2.20 | 2.30 | 0.20 | 88.41 | 46.53 | 14.73 | 10.08 | 35.83 | 6.36 | 202 |
| 2.30 | 2.40 | 0.20 | 92.25 | 48.04 | 15.79 | 10.80 | 39.06 | 7.15 | 213 |
| 2.40 | - | 0.30 | 105.47 | 49.87 | 14.30 | 10.90 | 38.88 | 6.79 | 226 |
| Total | | 100.00 | 11.17 | 5.26 | 3.17 | 1.27 | 4.83 | 1.01 | 26.7 |

*Table 3A35. Heavy REE analysis data on a whole sample basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.40 | 90.3 | 0.18 | 0.87 | 0.14 | 0.85 | 0.17 | 0.48 | 0.07 | 0.44 | 0.07 | 5.27 | 9 |
| 1.40 | 1.60 | 4.90 | 0.37 | 1.71 | 0.26 | 1.66 | 0.32 | 0.93 | 0.14 | 0.91 | 0.14 | 9.93 | 16 |
| 1.60 | 1.80 | 1.90 | 0.44 | 2.07 | 0.32 | 1.95 | 0.37 | 1.08 | 0.16 | 1.10 | 0.17 | 11.66 | 19 |
| 1.80 | 2.00 | 0.90 | 0.58 | 2.60 | 0.39 | 2.48 | 0.47 | 1.40 | 0.21 | 1.43 | 0.22 | 14.77 | 25 |
| 2.00 | 2.10 | 0.40 | 0.75 | 3.45 | 0.50 | 3.18 | 0.61 | 1.76 | 0.27 | 1.80 | 0.28 | 18.75 | 31 |
| 2.10 | 2.20 | 0.20 | 0.90 | 4.01 | 0.60 | 3.78 | 0.70 | 2.10 | 0.31 | 2.09 | 0.32 | 22.02 | 37 |
| 2.20 | 2.30 | 0.20 | 1.01 | 4.52 | 0.67 | 4.24 | 0.77 | 2.25 | 0.34 | 2.26 | 0.36 | 23.84 | 40 |
| 2.30 | 2.40 | 0.30 | 1.12 | 4.99 | 0.72 | 4.49 | 0.82 | 2.45 | 0.37 | 2.48 | 0.38 | 26.36 | 44 |
| 2.40 | - | 0.90 | 1.12 | 4.96 | 0.76 | 4.64 | 0.89 | 2.57 | 0.40 | 2.66 | 0.40 | 27.42 | 46 |
| Total | | 100.00 | 0.21 | 1.03 | 0.16 | 1.00 | 0.19 | 0.56 | 0.08 | 0.53 | 0.08 | 6.09 | 10 |

*Table 3A36. Light REE analysis data on a whole sample basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.40 | 90.3 | 8.15 | 3.86 | 2.93 | 0.98 | 3.87 | 0.87 | 21 |
| 1.40 | 1.60 | 4.90 | 22.75 | 11.00 | 6.00 | 2.65 | 9.84 | 1.94 | 54 |
| 1.60 | 1.80 | 1.90 | 31.36 | 15.56 | 6.70 | 3.56 | 13.06 | 2.47 | 73 |
| 1.80 | 2.00 | 0.90 | 43.33 | 21.71 | 7.57 | 4.92 | 17.71 | 3.24 | 98 |
| 2.00 | 2.10 | 0.40 | 59.43 | 29.77 | 10.90 | 6.65 | 23.99 | 4.25 | 135 |
| 2.10 | 2.20 | 0.20 | 70.55 | 35.77 | 11.04 | 7.91 | 28.28 | 5.09 | 159 |
| 2.20 | 2.30 | 0.20 | 78.11 | 38.99 | 13.02 | 8.84 | 31.86 | 5.76 | 177 |
| 2.30 | 2.40 | 0.30 | 83.37 | 41.46 | 12.77 | 9.46 | 35.00 | 6.38 | 188 |
| 2.40 | - | 0.90 | 101.42 | 52.52 | 14.61 | 11.09 | 39.28 | 6.79 | 226 |
| Total | | 100.00 | 11.16 | 5.38 | 3.39 | 1.32 | 5.06 | 1.07 | 27.4 |

*Table 3A37. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (ash-based) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.40 | 93.2 | 3.39 | 16.8 | 2.54 | 16.2 | 3.07 | 8.85 | 1.27 | 8.2 | 1.29 | 96.5 | 158 |
| 1.40 | 1.60 | 2.60 | 1.76 | 8.39 | 1.28 | 7.90 | 1.50 | 4.41 | 0.66 | 4.30 | 0.70 | 46.00 | 77 |
| 1.60 | 1.80 | 1.30 | 1.41 | 6.33 | 0.94 | 5.89 | 1.11 | 3.33 | 0.50 | 3.50 | 0.56 | 34.10 | 58 |
| 1.80 | 2.00 | 1.40 | 1.25 | 5.55 | 0.87 | 5.42 | 1.04 | 3.12 | 0.46 | 3.20 | 0.51 | 31.40 | 53 |
| 2.00 | 2.10 | 0.60 | 1.27 | 5.47 | 0.84 | 5.25 | 0.99 | 3.10 | 0.48 | 3.20 | 0.51 | 31.00 | 52 |
| 2.10 | 2.20 | 0.20 | 1.38 | 6.10 | 0.93 | 5.60 | 1.06 | 3.20 | 0.49 | 3.20 | 0.52 | 33.50 | 56 |
| 2.20 | 2.30 | 0.20 | 1.42 | 6.25 | 0.95 | 5.91 | 1.12 | 3.23 | 0.49 | 3.30 | 0.53 | 34.30 | 58 |
| 2.30 | 2.40 | 0.20 | 1.48 | 6.68 | 1.00 | 5.98 | 1.13 | 3.21 | 0.50 | 3.40 | 0.54 | 34.10 | 58 |
| 2.40 | - | 0.30 | 1.28 | 5.87 | 0.92 | 5.70 | 1.07 | 3.22 | 0.49 | 3.20 | 0.51 | 33.20 | 55 |
| Total | | 100.00 | 2.59 | 12.59 | 1.91 | 12.10 | 2.29 | 6.66 | 0.97 | 6.29 | 0.99 | 71.71 | 118 |

*Table 3A38. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 6 x 0.6 mm (1/4-inch x 28 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (ash-based) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.40 | 93.2 | 167 | 73.4 | 53 | 18.8 | 73.3 | 16.3 | 402 |
| 1.40 | 1.60 | 2.60 | 110 | 57.40 | 30.00 | 13.20 | 48.80 | 9.50 | 269 |
| 1.60 | 1.80 | 1.30 | 103 | 60.20 | 22.00 | 13.00 | 46.00 | 8.00 | 252 |
| 1.80 | 2.00 | 1.40 | 103 | 59.30 | 22.00 | 12.40 | 43.00 | 7.40 | 247 |
| 2.00 | 2.10 | 0.60 | 109 | 58.60 | 20.00 | 12.30 | 43.30 | 7.40 | 251 |
| 2.10 | 2.20 | 0.20 | 115 | 57.60 | 20.00 | 12.40 | 43.80 | 7.70 | 257 |
| 2.20 | 2.30 | 0.20 | 114 | 60.00 | 19.00 | 13.00 | 46.20 | 8.20 | 260 |
| 2.30 | 2.40 | 0.20 | 111 | 57.80 | 19.00 | 13.00 | 47.00 | 8.60 | 256 |
| 2.40 | - | 0.30 | 118 | 55.80 | 16.00 | 12.20 | 43.50 | 7.60 | 253 |
| Total | | 100.00 | 143 | 67 | 41 | 16 | 62 | 13 | 342 |

*Table 3A39. Heavy REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Heavy Rare Earth Elements (ash-based) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| - | 1.40 | 90.3 | 3.68 | 17.9 | 2.81 | 17.5 | 3.39 | 9.77 | 1.41 | 9.1 | 1.37 | 108 | 175 |
| 1.40 | 1.60 | 4.90 | 1.79 | 8.28 | 1.28 | 8.02 | 1.53 | 4.48 | 0.68 | 4.40 | 0.69 | 48.00 | 79 |
| 1.60 | 1.80 | 1.90 | 1.46 | 6.81 | 1.04 | 6.41 | 1.22 | 3.54 | 0.53 | 3.60 | 0.55 | 38.30 | 63 |
| 1.80 | 2.00 | 0.90 | 1.38 | 6.18 | 0.93 | 5.90 | 1.11 | 3.33 | 0.50 | 3.40 | 0.53 | 35.10 | 58 |
| 2.00 | 2.10 | 0.40 | 1.38 | 6.33 | 0.92 | 5.84 | 1.11 | 3.22 | 0.49 | 3.30 | 0.52 | 34.40 | 58 |
| 2.10 | 2.20 | 0.20 | 1.47 | 6.53 | 0.97 | 6.16 | 1.14 | 3.42 | 0.51 | 3.40 | 0.52 | 35.90 | 60 |
| 2.20 | 2.30 | 0.20 | 1.48 | 6.59 | 0.98 | 6.19 | 1.13 | 3.28 | 0.50 | 3.30 | 0.53 | 34.80 | 59 |
| 2.30 | 2.40 | 0.30 | 1.49 | 6.65 | 0.96 | 5.98 | 1.09 | 3.26 | 0.49 | 3.30 | 0.50 | 35.10 | 59 |
| 2.40 | - | 0.90 | 1.30 | 5.77 | 0.88 | 5.40 | 1.04 | 2.99 | 0.46 | 3.10 | 0.47 | 31.90 | 53 |
| Total | | 100.00 | 2.73 | 13.06 | 2.04 | 12.68 | 2.44 | 7.07 | 1.03 | 6.70 | 1.02 | 77.58 | 126 |

*Table 3A40. Light REE analysis data on an ash-basis obtained from the float-sink analysis of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Specific Gravity | | Weight (%) | Light Rare Earth Elements (ash-based) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sink | Float | | Ce (ppm) | La (ppm) | Sc (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| - | 1.40 | 90.3 | 167 | 79 | 60 | 20.1 | 79.4 | 17.8 | 423 |
| 1.40 | 1.60 | 4.90 | 110 | 53.20 | 29.00 | 12.80 | 47.60 | 9.40 | 262 |
| 1.60 | 1.80 | 1.90 | 103 | 51.10 | 22.00 | 11.70 | 42.90 | 8.10 | 239 |
| 1.80 | 2.00 | 0.90 | 103 | 51.60 | 18.00 | 11.70 | 42.10 | 7.70 | 234 |
| 2.00 | 2.10 | 0.40 | 109 | 54.60 | 20.00 | 12.20 | 44.00 | 7.80 | 248 |
| 2.10 | 2.20 | 0.20 | 115 | 58.30 | 18.00 | 12.90 | 46.10 | 8.30 | 259 |
| 2.20 | 2.30 | 0.20 | 114 | 56.90 | 19.00 | 12.90 | 46.50 | 8.40 | 258 |
| 2.30 | 2.40 | 0.30 | 111 | 55.20 | 17.00 | 12.60 | 46.60 | 8.50 | 251 |
| 2.40 | - | 0.90 | 118 | 61.10 | 17.00 | 12.90 | 45.70 | 7.90 | 263 |
| Total | | 100.00 | 142.07 | 68.46 | 43.23 | 16.75 | 64.47 | 13.68 | 349 |

*Appendix 5.3B – Flotation Release Data*

*Table 3B1. Heavy REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal -basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.18 | 0.17 | 1.20 | 0.17 | 0.86 | 0.33 | 0.63 | 0.10 | 0.56 | 0.09 | 5.69 | 9.81 |
| C2 | 3.55 | 0.45 | 3.09 | 0.38 | 2.35 | 0.84 | 1.44 | 0.24 | 1.33 | 0.22 | 12.97 | 23.29 |
| T4 | 8.25 | 0.69 | 4.19 | 0.50 | 3.33 | 1.19 | 1.92 | 0.35 | 1.78 | 0.24 | 16.15 | 30.33 |
| T3 | 2.68 | 0.67 | 3.86 | 0.56 | 3.00 | 1.47 | 1.98 | 0.42 | 2.08 | 0.29 | 13.20 | 27.52 |
| T2 | 12.15 | 0.41 | 2.45 | 0.50 | 1.93 | 0.93 | 1.14 | 0.29 | 1.35 | 0.18 | 7.17 | 16.35 |
| T1 | 68.20 | 0.58 | 3.52 | 0.49 | 2.69 | 0.90 | 1.50 | 0.29 | 1.40 | 0.23 | 12.35 | 23.94 |
| **Total** | 100.00 | 0.54 | 3.32 | 0.47 | 2.55 | 0.91 | 1.46 | 0.28 | 1.39 | 0.22 | 11.74 | 22.89 |

*Table 3B2. Light REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.18 | 6.93 | 13.14 | 1.86 | 2.88 | 7.77 | 1.50 | 34.07 |
| C2 | 3.55 | 19.87 | 36.97 | 4.87 | 7.50 | 19.48 | 4.07 | 92.76 |
| T4 | 8.25 | 28.50 | 52.79 | 7.61 | 10.05 | 26.56 | 5.71 | 131.21 |
| T3 | 2.68 | 20.41 | 67.40 | 12.85 | 12.26 | 21.97 | 4.88 | 139.78 |
| T2 | 12.15 | 11.02 | 43.43 | 10.08 | 9.08 | 13.33 | 3.10 | 90.05 |
| T1 | 68.20 | 20.63 | 41.03 | 7.83 | 8.95 | 19.67 | 4.69 | 102.81 |
| **Total** | 100.00 | 19.37 | 41.41 | 7.81 | 8.78 | 18.91 | 4.40 | 100.67 |

*Table 3B3. Heavy REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.18 | 2.53 | 17.85 | 2.55 | 12.82 | 4.96 | 9.36 | 1.53 | 8.40 | 1.41 | 84.80 | 146.21 |
| C2 | 3.55 | 2.11 | 14.50 | 1.76 | 11.01 | 3.93 | 6.74 | 1.14 | 6.22 | 1.03 | 60.86 | 109.31 |
| T4 | 8.25 | 1.82 | 11.05 | 1.31 | 8.79 | 3.13 | 5.06 | 0.92 | 4.68 | 0.63 | 42.58 | 79.96 |
| T3 | 2.68 | 0.78 | 4.54 | 0.66 | 3.53 | 1.73 | 2.33 | 0.49 | 2.44 | 0.34 | 15.53 | 32.39 |
| T2 | 12.15 | 0.56 | 3.34 | 0.69 | 2.63 | 1.26 | 1.56 | 0.40 | 1.83 | 0.24 | 9.77 | 22.29 |
| T1 | 68.20 | 1.23 | 7.46 | 1.03 | 5.70 | 1.90 | 3.17 | 0.60 | 2.96 | 0.48 | 26.14 | 50.67 |
| **Total** | 100.00 | 1.21 | 7.42 | 1.04 | 5.69 | 1.99 | 3.26 | 0.62 | 3.08 | 0.48 | 26.62 | 51.42 |

*Table 3B4. Light REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001).*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.18 | 103.24 | 195.84 | 27.67 | 42.94 | 115.73 | 22.33 | 507.75 |
| C2 | 3.55 | 93.25 | 173.49 | 22.83 | 35.19 | 91.40 | 19.11 | 435.28 |
| T4 | 8.25 | 75.13 | 139.17 | 20.06 | 26.49 | 70.03 | 15.05 | 345.93 |
| T3 | 2.68 | 24.02 | 79.32 | 15.12 | 14.43 | 25.85 | 5.75 | 164.50 |
| T2 | 12.15 | 15.03 | 59.21 | 13.74 | 12.38 | 18.18 | 4.22 | 122.75 |
| T1 | 68.20 | 43.66 | 86.82 | 16.57 | 18.94 | 41.62 | 9.92 | 217.55 |
| **Total** | 100.00 | 43.66 | 90.40 | 16.74 | 19.25 | 42.46 | 9.83 | 222.34 |

*Table 3B5. Heavy REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal -basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 7.70 | 0.49 | 2.89 | 0.34 | 2.07 | 0.82 | 1.46 | 0.28 | 1.27 | 0.19 | 11.83 | 21.65 |
| C2 | 1.07 | 0.78 | 4.58 | 0.45 | 3.24 | 1.39 | 2.45 | 0.41 | 2.18 | 0.33 | 19.29 | 35.10 |
| T4 | 2.54 | 1.36 | 7.59 | 0.69 | 5.13 | 2.30 | 3.88 | 0.65 | 3.57 | 0.50 | 29.68 | 55.35 |
| T3 | 2.88 | 0.91 | 4.89 | 0.87 | 3.70 | 1.57 | 2.16 | 0.43 | 2.19 | 0.21 | 15.19 | 32.12 |
| T2 | 9.00 | 0.64 | 3.66 | 0.42 | 2.68 | 1.52 | 1.86 | 0.44 | 1.88 | 0.23 | 10.35 | 23.69 |
| T1 | 76.80 | 0.87 | 4.59 | 0.71 | 3.48 | 1.47 | 2.00 | 0.43 | 2.06 | 0.21 | 14.22 | 30.04 |
| **Total** | 100.00 | 0.83 | 4.46 | 0.66 | 3.35 | 1.44 | 2.00 | 0.43 | 2.03 | 0.22 | 14.17 | 29.58 |

*Table 3B6. Light REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.18 | 6.93 | 13.14 | 1.86 | 2.88 | 7.77 | 1.50 | 34.07 |
| C2 | 3.55 | 19.87 | 36.97 | 4.87 | 7.50 | 19.48 | 4.07 | 92.76 |
| T4 | 8.25 | 28.50 | 52.79 | 7.61 | 10.05 | 26.56 | 5.71 | 131.21 |
| T3 | 2.68 | 20.41 | 67.40 | 12.85 | 12.26 | 21.97 | 4.88 | 139.78 |
| T2 | 12.15 | 11.02 | 43.43 | 10.08 | 9.08 | 13.33 | 3.10 | 90.05 |
| T1 | 68.20 | 20.63 | 41.03 | 7.83 | 8.95 | 19.67 | 4.69 | 102.81 |
| **Total** | 100.00 | 19.37 | 41.41 | 7.81 | 8.78 | 18.91 | 4.40 | 100.67 |

*Table 3B7. Heavy REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 7.70 | 2.16 | 12.58 | 1.50 | 9.04 | 3.58 | 6.35 | 1.21 | 5.55 | 0.83 | 51.55 | 94.36 |
| C2 | 1.07 | 2.01 | 11.86 | 1.17 | 8.37 | 3.59 | 6.35 | 1.06 | 5.65 | 0.85 | 49.93 | 90.85 |
| T4 | 2.54 | 1.87 | 10.41 | 0.94 | 7.04 | 3.15 | 5.33 | 0.88 | 4.89 | 0.68 | 40.69 | 75.88 |
| T3 | 2.88 | 0.96 | 5.16 | 0.91 | 3.90 | 1.66 | 2.28 | 0.45 | 2.31 | 0.22 | 16.03 | 33.89 |
| T2 | 9.00 | 0.69 | 3.92 | 0.45 | 2.87 | 1.63 | 1.99 | 0.47 | 2.02 | 0.25 | 11.09 | 25.38 |
| T1 | 76.80 | 0.97 | 5.13 | 0.79 | 3.88 | 1.64 | 2.23 | 0.49 | 2.30 | 0.23 | 15.87 | 33.53 |
| **Total** | 100.00 | 0.99 | 5.31 | 0.78 | 3.98 | 1.72 | 2.38 | 0.51 | 2.41 | 0.26 | 16.82 | 35.15 |

*Table 3B8. Light REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Eagle seam coarse reject (UK002).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 7.70 | 16.34 | 30.26 | 7.14 | 7.82 | 15.70 | 3.04 | 80.29 |
| C2 | 1.07 | 29.38 | 53.73 | 9.80 | 11.54 | 28.35 | 5.13 | 137.94 |
| T4 | 2.54 | 54.13 | 98.35 | 15.52 | 19.03 | 51.78 | 9.64 | 248.45 |
| T3 | 2.88 | 21.44 | 56.60 | 14.16 | 12.44 | 25.84 | 6.04 | 136.52 |
| T2 | 9.00 | 13.96 | 57.05 | 14.49 | 10.90 | 19.24 | 3.78 | 119.42 |
| T1 | 76.80 | 22.06 | 57.98 | 14.03 | 11.91 | 25.21 | 5.94 | 137.13 |
| **Total** | 100.00 | 21.77 | 56.70 | 13.53 | 11.70 | 24.66 | 5.61 | 133.98 |

*Table 3B9. Heavy REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal -basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.62 | 0.73 | 4.35 | 0.89 | 3.72 | 0.94 | 4.02 | 0.35 | 2.10 | 1.03 | 14.78 | 32.90 |
| C2 | 13.02 | 1.52 | 8.22 | 1.45 | 6.44 | 2.03 | 3.84 | 0.67 | 4.16 | 1.41 | 32.35 | 62.08 |
| C3 | 7.59 | 1.00 | 5.63 | 1.09 | 4.44 | 1.12 | 4.44 | 0.36 | 2.48 | 1.09 | 16.73 | 38.38 |
| T4 | 4.68 | 1.29 | 6.95 | 1.10 | 5.19 | 1.89 | 3.17 | 0.56 | 3.20 | 0.69 | 24.66 | 48.69 |
| T3 | 8.50 | 1.24 | 6.77 | 0.95 | 4.88 | 1.60 | 5.31 | 0.45 | 2.59 | 0.70 | 18.59 | 43.07 |
| T2 | 2.87 | 1.01 | 5.53 | 0.84 | 4.11 | 1.56 | 2.43 | 0.46 | 2.52 | 0.56 | 17.87 | 36.88 |
| T1 | 57.73 | 1.27 | 6.73 | 0.94 | 4.83 | 1.57 | 2.74 | 0.43 | 2.47 | 0.54 | 21.32 | 42.84 |
| **Total** | 100.00 | 1.24 | 6.69 | 1.02 | 4.95 | 1.58 | 3.31 | 0.46 | 2.71 | 0.74 | 21.87 | 44.57 |

*Table 3B10. Light REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.62 | 20.85 | 36.47 | 8.42 | 3.03 | 21.89 | 6.16 | 96.82 |
| C2 | 13.02 | 49.56 | 95.24 | 16.85 | 27.53 | 50.44 | 12.10 | 251.72 |
| C3 | 7.59 | 29.81 | 53.27 | 10.44 | 5.15 | 31.44 | 8.57 | 138.69 |
| T4 | 4.68 | 39.01 | 82.64 | 15.72 | 20.42 | 41.68 | 9.51 | 208.99 |
| T3 | 8.50 | 35.36 | 66.78 | 13.74 | 5.97 | 38.69 | 9.22 | 169.76 |
| T2 | 2.87 | 32.63 | 76.60 | 14.56 | 18.35 | 33.62 | 7.51 | 183.27 |
| T1 | 57.73 | 36.64 | 71.83 | 14.63 | 18.78 | 37.54 | 8.92 | 188.34 |
| **Total** | 100.00 | 36.80 | 71.69 | 14.23 | 16.98 | 38.05 | 9.17 | 186.92 |

*Table 3B11. Heavy REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.62 | 2.00 | 11.88 | 2.43 | 10.16 | 2.57 | 10.99 | 0.95 | 5.73 | 2.80 | 40.39 | 89.90 |
| C2 | 13.02 | 1.63 | 8.82 | 1.56 | 6.90 | 2.18 | 4.11 | 0.72 | 4.46 | 1.51 | 34.69 | 66.58 |
| C3 | 7.59 | 1.45 | 8.17 | 1.58 | 6.45 | 1.63 | 6.44 | 0.52 | 3.60 | 1.58 | 24.28 | 55.69 |
| T4 | 4.68 | 1.38 | 7.41 | 1.17 | 5.53 | 2.01 | 3.38 | 0.60 | 3.41 | 0.74 | 26.30 | 51.94 |
| T3 | 8.50 | 1.49 | 8.13 | 1.14 | 5.86 | 1.92 | 6.37 | 0.53 | 3.10 | 0.83 | 22.30 | 51.68 |
| T2 | 2.87 | 1.09 | 5.97 | 0.90 | 4.44 | 1.68 | 2.62 | 0.49 | 2.72 | 0.60 | 19.30 | 39.82 |
| T1 | 57.73 | 1.33 | 7.04 | 0.98 | 5.06 | 1.64 | 2.87 | 0.45 | 2.58 | 0.57 | 22.31 | 44.83 |
| **Total** | 100.00 | 1.39 | 7.50 | 1.14 | 5.54 | 1.76 | 3.78 | 0.51 | 3.02 | 0.82 | 24.25 | 49.72 |

*Table 3B12. Light REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003).*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 5.62 | 56.97 | 99.65 | 23.00 | 8.29 | 59.80 | 16.83 | 264.53 |
| C2 | 13.02 | 53.15 | 102.13 | 18.07 | 29.52 | 54.09 | 12.98 | 269.94 |
| C3 | 7.59 | 43.26 | 77.30 | 15.15 | 7.48 | 45.61 | 12.44 | 201.23 |
| T4 | 4.68 | 41.61 | 88.16 | 16.77 | 21.78 | 44.47 | 10.15 | 222.94 |
| T3 | 8.50 | 42.43 | 80.12 | 16.49 | 7.16 | 46.42 | 11.06 | 203.68 |
| T2 | 2.87 | 35.22 | 82.70 | 15.72 | 19.81 | 36.29 | 8.11 | 197.85 |
| T1 | 57.73 | 38.33 | 75.15 | 15.31 | 19.65 | 39.28 | 9.33 | 197.05 |
| **Total** | 100.00 | 41.08 | 79.97 | 15.95 | 18.49 | 42.55 | 10.27 | 208.32 |

*Table 3B13. Heavy REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the fly ash sample (UK004).*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal -basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 2.22 | 5.56 | 28.58 | 3.90 | 23.38 | 6.80 | 19.08 | 3.59 | 12.05 | 1.77 | 135.59 | 240.29 |
| C2 | 3.84 | 1.45 | 7.52 | 1.12 | 6.51 | 2.15 | 3.65 | 1.12 | 3.27 | 0.42 | 33.74 | 60.95 |
| C3 | 2.12 | 5.18 | 26.75 | 3.31 | 21.79 | 6.74 | 18.69 | 3.29 | 11.15 | 1.43 | 125.31 | 223.64 |
| C4 | 4.30 | 4.30 | 22.88 | 3.07 | 18.35 | 5.44 | 15.40 | 2.91 | 9.60 | 1.31 | 105.78 | 189.03 |
| T4 | 2.72 | 4.36 | 22.96 | 3.11 | 18.38 | 5.58 | 15.73 | 3.05 | 9.78 | 1.30 | 107.38 | 191.64 |
| T3 | 4.80 | 1.61 | 8.81 | 1.12 | 6.98 | 2.08 | 5.83 | 1.06 | 3.64 | 0.54 | 40.23 | 71.91 |
| T2 | 7.34 | 1.47 | 8.07 | 1.07 | 6.43 | 1.88 | 5.34 | 0.98 | 3.32 | 0.49 | 36.52 | 65.57 |
| T1 | 72.66 | 3.57 | 19.80 | 2.47 | 15.41 | 4.63 | 13.10 | 2.19 | 8.03 | 1.22 | 88.57 | 159.00 |
| **Total** | 100.00 | 3.37 | 18.50 | 2.35 | 14.53 | 4.37 | 12.24 | 2.12 | 7.56 | 1.12 | 83.40 | 149.55 |

*Table 3B14. Light REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the fly ash sample (UK004).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 2.22 | 120.92 | 242.32 | 61.23 | 51.41 | 116.51 | 27.02 | 619.41 |
| C2 | 3.84 | 33.30 | 83.06 | 19.98 | 17.13 | 34.41 | 7.07 | 194.95 |
| C3 | 2.12 | 124.93 | 245.64 | 57.31 | 47.36 | 115.58 | 25.63 | 616.43 |
| C4 | 4.30 | 100.47 | 198.69 | 51.33 | 46.09 | 95.65 | 21.85 | 514.08 |
| T4 | 2.72 | 101.59 | 201.59 | 52.24 | 45.04 | 96.73 | 21.91 | 519.10 |
| T3 | 4.80 | 39.40 | 77.66 | 19.43 | 17.83 | 37.68 | 8.56 | 200.56 |
| T2 | 7.34 | 35.41 | 70.08 | 17.91 | 16.69 | 33.79 | 7.75 | 181.62 |
| T1 | 72.66 | 92.60 | 183.14 | 41.89 | 41.53 | 88.24 | 20.14 | 467.54 |
| **Total** | 100.00 | 85.47 | 169.75 | 39.65 | 38.26 | 81.51 | 18.56 | 433.20 |

*Table 3B15. Heavy REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the fly ash sample (UK004).*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 2.22 | 5.86 | 30.14 | 4.12 | 24.66 | 7.17 | 20.13 | 3.78 | 12.71 | 1.86 | 142.99 | 253.41 |
| C2 | 3.84 | 3.38 | 17.55 | 2.62 | 15.20 | 5.02 | 8.51 | 2.62 | 7.63 | 0.99 | 78.73 | 142.25 |
| C3 | 2.12 | 5.67 | 29.28 | 3.62 | 23.85 | 7.38 | 20.45 | 3.60 | 12.21 | 1.57 | 137.18 | 244.82 |
| C4 | 4.30 | 4.36 | 23.21 | 3.11 | 18.61 | 5.52 | 15.62 | 2.95 | 9.74 | 1.33 | 107.32 | 191.77 |
| T4 | 2.72 | 4.39 | 23.08 | 3.13 | 18.48 | 5.61 | 15.81 | 3.07 | 9.83 | 1.31 | 107.95 | 192.66 |
| T3 | 4.80 | 3.79 | 20.75 | 2.63 | 16.44 | 4.91 | 13.73 | 2.50 | 8.56 | 1.28 | 94.72 | 169.31 |
| T2 | 7.34 | 4.19 | 22.95 | 3.05 | 18.29 | 5.34 | 15.18 | 2.78 | 9.44 | 1.39 | 103.87 | 186.49 |
| T1 | 72.66 | 3.63 | 20.11 | 2.51 | 15.65 | 4.71 | 13.30 | 2.23 | 8.15 | 1.23 | 89.94 | 161.46 |
| **Total** | 100.00 | 3.81 | 20.88 | 2.66 | 16.44 | 4.94 | 13.75 | 2.41 | 8.55 | 1.27 | 94.18 | 168.90 |

*Table 3B16. Light REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the fly ash sample (UK004).*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 2.22 | 127.53 | 255.56 | 64.57 | 54.22 | 122.87 | 28.50 | 653.25 |
| C2 | 3.84 | 77.71 | 193.85 | 46.63 | 39.98 | 80.29 | 16.51 | 454.96 |
| C3 | 2.12 | 136.76 | 268.90 | 62.73 | 51.84 | 126.52 | 28.06 | 674.80 |
| C4 | 4.30 | 101.92 | 201.57 | 52.07 | 46.76 | 97.03 | 22.17 | 521.54 |
| T4 | 2.72 | 102.13 | 202.66 | 52.52 | 45.28 | 97.24 | 22.03 | 521.86 |
| T3 | 4.80 | 92.78 | 182.85 | 45.75 | 41.98 | 88.72 | 20.15 | 472.23 |
| T2 | 7.34 | 100.70 | 199.31 | 50.93 | 47.48 | 96.11 | 22.04 | 516.57 |
| T1 | 72.66 | 94.03 | 185.97 | 42.53 | 42.17 | 89.61 | 20.45 | 474.76 |
| **Total** | 100.00 | 96.04 | 191.53 | 45.06 | 43.22 | 91.73 | 20.86 | 488.44 |

*Table 3B17. Heavy REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal -basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 1.63 | 2.04 | 0.38 | 1.71 | 0.30 | 1.10 | 0.47 | 1.74 | 0.19 | 0.74 | 8.30 | 16.99 |
| C2 | 4.23 | 1.50 | 0.26 | 1.24 | 0.23 | 0.94 | 0.28 | 0.97 | 0.12 | 0.58 | 3.94 | 10.07 |
| C3 | 4.51 | 1.22 | 0.21 | 0.92 | 0.19 | 0.72 | 0.21 | 0.77 | 0.10 | 0.48 | 2.94 | 7.76 |
| C4 | 5.27 | 1.92 | 0.31 | 1.42 | 0.23 | 1.09 | 0.37 | 1.25 | 0.13 | 0.68 | 4.54 | 11.94 |
| C5 | 4.94 | 0.97 | 0.16 | 0.74 | 0.13 | 0.55 | 0.19 | 0.65 | 0.07 | 0.36 | 2.22 | 6.04 |
| C6 | 7.55 | 7.89 | 1.20 | 5.79 | 0.82 | 4.27 | 1.56 | 5.20 | 0.51 | 2.71 | 19.51 | 49.45 |
| C7 | 16.25 | 3.57 | 0.53 | 2.54 | 0.36 | 1.92 | 0.71 | 2.37 | 0.21 | 1.20 | 8.41 | 21.82 |
| T4 | 7.81 | 6.66 | 0.95 | 4.59 | 0.67 | 3.56 | 1.32 | 4.47 | 0.36 | 2.19 | 14.84 | 39.62 |
| T3 | 5.67 | 1.90 | 0.26 | 1.32 | 0.20 | 1.02 | 0.42 | 1.52 | 0.11 | 0.67 | 4.60 | 12.02 |
| T2 | 11.22 | 5.78 | 0.79 | 3.94 | 0.63 | 3.05 | 1.28 | 4.48 | 0.32 | 1.96 | 13.38 | 35.59 |
| T1 | 30.91 | 1.51 | 0.20 | 0.95 | 0.14 | 0.78 | 0.32 | 0.42 | 0.09 | 0.50 | 3.08 | 8.00 |
| **Total** | 100.00 | 3.22 | 0.47 | 2.25 | 0.34 | 1.73 | 0.66 | 2.05 | 0.20 | 1.09 | 7.50 | 19.50 |

*Table 3B18. Light REE analysis data on a whole coal basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Product | Weight (%) | Light Rare Earth Elements (whole coal-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 1.63 | 2.89 | 6.41 | 5.89 | 13.33 | 0.67 | 7.54 | 36.73 |
| C2 | 4.23 | 3.97 | 5.35 | 3.53 | 9.68 | 0.85 | 5.57 | 28.96 |
| C3 | 4.51 | 3.76 | 4.48 | 2.86 | 9.51 | 2.64 | 4.63 | 27.89 |
| C4 | 5.27 | 3.70 | 7.00 | 3.50 | 12.30 | 1.02 | 6.54 | 34.05 |
| C5 | 4.94 | 2.97 | 4.20 | 2.22 | 8.78 | 1.91 | 4.19 | 24.26 |
| C6 | 7.55 | 8.58 | 18.97 | 9.11 | 33.56 | 2.70 | 16.76 | 89.67 |
| C7 | 16.25 | 4.94 | 11.20 | 5.23 | 20.24 | 1.60 | 9.97 | 53.18 |
| T4 | 7.81 | 5.35 | 12.47 | 5.63 | 23.10 | 1.77 | 11.20 | 59.52 |
| T3 | 5.67 | 2.60 | 5.51 | 3.17 | 12.49 | 0.66 | 5.60 | 30.03 |
| T2 | 11.22 | 6.45 | 15.47 | 7.94 | 33.04 | 1.96 | 14.90 | 79.75 |
| T1 | 30.91 | 2.28 | 5.77 | 2.15 | 11.19 | 2.31 | 4.80 | 28.50 |
| **Total** | 100.00 | 4.17 | 9.17 | 4.38 | 17.64 | 1.89 | 8.35 | 45.60 |

*Table 3B19. Heavy REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 1.63 | 13.39 | 2.52 | 11.24 | 1.99 | 7.25 | 3.11 | 11.44 | 1.27 | 4.83 | 54.45 | 111.50 |
| C2 | 4.23 | 15.68 | 2.75 | 12.99 | 2.38 | 9.86 | 2.94 | 10.21 | 1.27 | 6.04 | 41.29 | 105.41 |
| C3 | 4.51 | 15.23 | 2.62 | 11.54 | 2.42 | 9.01 | 2.67 | 9.67 | 1.23 | 5.95 | 36.74 | 97.06 |
| C4 | 5.27 | 12.42 | 1.97 | 9.16 | 1.47 | 7.05 | 2.40 | 8.05 | 0.85 | 4.37 | 29.31 | 77.05 |
| C5 | 4.94 | 13.26 | 2.25 | 10.10 | 1.75 | 7.62 | 2.58 | 8.97 | 0.98 | 4.97 | 30.47 | 82.97 |
| C6 | 7.55 | 10.99 | 1.67 | 8.06 | 1.14 | 5.95 | 2.17 | 7.25 | 0.71 | 3.77 | 27.18 | 68.89 |
| C7 | 16.25 | 10.34 | 1.53 | 7.37 | 1.06 | 5.56 | 2.05 | 6.88 | 0.62 | 3.48 | 24.38 | 63.25 |
| T4 | 7.81 | 9.69 | 1.39 | 6.67 | 0.97 | 5.18 | 1.93 | 6.50 | 0.53 | 3.19 | 21.59 | 57.62 |
| T3 | 5.67 | 6.84 | 0.95 | 4.77 | 0.71 | 3.66 | 1.50 | 5.48 | 0.41 | 2.42 | 16.55 | 43.28 |
| T2 | 11.22 | 7.10 | 0.97 | 4.84 | 0.77 | 3.74 | 1.57 | 5.50 | 0.39 | 2.40 | 16.43 | 43.70 |
| T1 | 30.91 | 7.44 | 0.99 | 4.67 | 0.69 | 3.84 | 1.55 | 2.07 | 0.46 | 2.45 | 15.15 | 39.31 |
| **Total** | 100.00 | 8.16 | 1.14 | 5.47 | 0.83 | 4.32 | 1.69 | 4.13 | 0.50 | 2.75 | 18.03 | 47.04 |

*Table 3B20. Light REE analysis data on a dry ash-only basis obtained from flotation release analysis of the minus 0.15 mm (-100 mesh) particle size fraction of the Pittsburgh coal fines (UK005).*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| C1 | 1.63 | 26.73 | 59.31 | 54.45 | 123.33 | 6.24 | 69.79 | 339.85 |
| C2 | 4.23 | 46.38 | 62.57 | 41.29 | 113.12 | 9.92 | 65.12 | 338.39 |
| C3 | 4.51 | 48.29 | 57.54 | 36.74 | 122.06 | 33.86 | 59.38 | 357.87 |
| C4 | 5.27 | 31.01 | 58.69 | 29.31 | 103.06 | 8.52 | 54.78 | 285.37 |
| C5 | 4.94 | 40.83 | 57.71 | 30.47 | 120.59 | 26.18 | 57.51 | 333.30 |
| C6 | 7.55 | 25.60 | 56.59 | 27.18 | 100.14 | 8.07 | 49.99 | 267.56 |
| C7 | 16.25 | 23.04 | 52.19 | 24.38 | 94.33 | 7.43 | 46.46 | 247.83 |
| T4 | 7.81 | 20.49 | 47.78 | 21.59 | 88.52 | 6.80 | 42.92 | 228.09 |
| T3 | 5.67 | 13.55 | 28.74 | 16.55 | 65.18 | 3.45 | 29.19 | 156.67 |
| T2 | 11.22 | 13.35 | 32.01 | 16.43 | 68.37 | 4.06 | 30.83 | 165.04 |
| T1 | 30.91 | 16.05 | 40.68 | 15.15 | 78.85 | 16.26 | 33.85 | 200.83 |
| **Total** | 100.00 | 17.77 | 41.16 | 18.03 | 80.46 | 11.70 | 36.42 | 205.54 |

*Appendix 5.3C – Riffle Table Data*

*Table 3C1. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 12.18 | 0.85 | 5.58 | 0.61 | 3.78 | 1.65 | 4.92 | 0.50 | 2.47 | 0.29 | 21.17 | 41.83 | 12.26 |
| P2 | 3.99 | 0.83 | 6.54 | 0.76 | 5.26 | 1.83 | 3.12 | 0.53 | 2.74 | 0.34 | 27.05 | 49.00 | 4.71 |
| P3 | 48.59 | 0.80 | 6.42 | 0.78 | 5.45 | 1.88 | 2.82 | 0.52 | 2.57 | 0.23 | 23.32 | 44.77 | 52.35 |
| P4 | 19.68 | 0.47 | 4.11 | 0.52 | 3.68 | 1.41 | 1.95 | 0.41 | 1.94 | 0.22 | 13.59 | 28.30 | 13.41 |
| P5 | 15.55 | 0.90 | 6.81 | 1.08 | 5.94 | 1.48 | 2.84 | 0.48 | 2.67 | 0.79 | 23.17 | 46.15 | 17.27 |
| Total | 100.00 | 0.76 | 5.93 | 0.75 | 4.96 | 1.69 | 2.92 | 0.49 | 2.45 | 0.33 | 21.27 | 41.55 | 100.00 |

*Table 3C2. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 12.18 | 12.44 | 31.36 | 83.53 | 12.58 | 34.12 | 7.03 | 181.05 | 11.53 |
| P2 | 3.99 | 12.06 | 42.48 | 79.50 | 14.52 | 43.69 | 8.62 | 200.86 | 4.19 |
| P3 | 48.59 | 13.42 | 40.27 | 85.57 | 15.35 | 39.49 | 8.72 | 202.82 | 51.49 |
| P4 | 19.68 | 12.48 | 25.54 | 73.88 | 13.01 | 25.92 | 5.60 | 156.44 | 16.09 |
| P5 | 15.55 | 14.28 | 41.01 | 78.48 | 22.48 | 39.13 | 10.20 | 205.58 | 16.70 |
| Total | 100.00 | 13.20 | 36.49 | 81.67 | 15.63 | 36.28 | 8.13 | 191.39 | 100.00 |

*Table 3C3. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 12.18 | 1.26 | 8.28 | 0.91 | 5.60 | 2.44 | 7.30 | 0.74 | 3.67 | 0.43 | 31.40 | 62.03 |
| P2 | 3.99 | 1.32 | 10.38 | 1.20 | 8.34 | 2.90 | 4.95 | 0.85 | 4.34 | 0.54 | 42.91 | 77.71 |
| P3 | 48.59 | 0.95 | 7.64 | 0.93 | 6.48 | 2.23 | 3.35 | 0.61 | 3.05 | 0.27 | 27.75 | 53.27 |
| P4 | 19.68 | 0.52 | 4.58 | 0.58 | 4.10 | 1.57 | 2.17 | 0.46 | 2.16 | 0.24 | 15.14 | 31.53 |
| P5 | 15.55 | 1.00 | 7.54 | 1.19 | 6.57 | 1.63 | 3.14 | 0.53 | 2.96 | 0.88 | 25.65 | 51.11 |
| Total | 100.00 | 0.91 | 7.12 | 0.91 | 5.96 | 2.03 | 3.50 | 0.59 | 2.95 | 0.39 | 25.54 | 49.90 |

*Table 3C4. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 12.18 | 18.45 | 46.51 | 123.88 | 18.65 | 50.60 | 10.42 | 268.50 |
| P2 | 3.99 | 19.12 | 67.37 | 126.08 | 23.04 | 69.30 | 13.67 | 318.58 |
| P3 | 48.59 | 15.97 | 47.91 | 101.81 | 18.26 | 46.99 | 10.38 | 241.31 |
| P4 | 19.68 | 13.90 | 28.46 | 82.30 | 14.49 | 28.88 | 6.24 | 174.29 |
| P5 | 15.55 | 15.81 | 45.41 | 86.90 | 24.89 | 43.33 | 11.29 | 227.64 |
| Total | 100.00 | 15.85 | 43.81 | 98.07 | 18.76 | 43.56 | 9.76 | 229.81 |

*Table 3C5. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 17.67 | 0.67 | 3.87 | 0.50 | 3.24 | 1.18 | 1.82 | 0.34 | 1.71 | 0.18 | 13.92 | 27.45 | 14.05 |
| P2 | 4.48 | 0.66 | 4.00 | 0.50 | 3.20 | 1.19 | 1.82 | 0.32 | 1.72 | 0.22 | 13.86 | 27.51 | 3.57 |
| P3 | 40.54 | 0.86 | 5.21 | 0.71 | 4.30 | 1.61 | 2.43 | 0.42 | 2.35 | 0.26 | 17.19 | 35.34 | 41.48 |
| P4 | 22.51 | 1.07 | 5.67 | 0.85 | 3.78 | 1.46 | 5.36 | 0.44 | 2.44 | 0.53 | 17.05 | 38.65 | 25.18 |
| P5 | 14.80 | 0.95 | 5.30 | 1.31 | 5.11 | 0.68 | 2.86 | 0.29 | 2.47 | 1.69 | 16.02 | 36.68 | 15.72 |
| Total | 100.00 | 0.88 | 5.04 | 0.78 | 4.07 | 1.34 | 3.02 | 0.39 | 2.25 | 0.52 | 16.26 | 34.54 | 100.00 |

*Table 3C6. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 17.67 | 11.57 | 26.13 | 48.45 | 10.33 | 25.37 | 5.25 | 127.10 | 13.93 |
| P2 | 4.48 | 11.73 | 26.50 | 49.18 | 10.76 | 25.94 | 5.27 | 129.39 | 3.59 |
| P3 | 40.54 | 15.42 | 30.77 | 67.84 | 13.89 | 33.90 | 7.15 | 168.97 | 42.47 |
| P4 | 22.51 | 15.12 | 28.89 | 71.40 | 14.89 | 32.91 | 7.62 | 170.82 | 23.84 |
| P5 | 14.80 | 13.74 | 32.77 | 61.72 | 27.53 | 29.99 | 10.45 | 176.21 | 16.17 |
| Total | 100.00 | 14.26 | 29.63 | 63.47 | 15.36 | 31.23 | 7.32 | 161.29 | 100.00 |

*Table 3C7. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 17.67 | 1.13 | 6.53 | 0.85 | 5.47 | 2.00 | 3.07 | 0.58 | 2.89 | 0.30 | 23.48 | 46.30 |
| P2 | 4.48 | 1.11 | 6.70 | 0.84 | 5.37 | 2.00 | 3.06 | 0.54 | 2.88 | 0.37 | 23.24 | 46.12 |
| P3 | 40.54 | 0.96 | 5.81 | 0.79 | 4.79 | 1.79 | 2.71 | 0.47 | 2.62 | 0.29 | 19.14 | 39.36 |
| P4 | 22.51 | 1.14 | 6.07 | 0.91 | 4.05 | 1.57 | 5.74 | 0.47 | 2.62 | 0.57 | 18.27 | 41.40 |
| P5 | 14.80 | 1.04 | 5.80 | 1.44 | 5.59 | 0.74 | 3.13 | 0.31 | 2.70 | 1.85 | 17.53 | 40.13 |
| Total | 100.00 | 1.04 | 5.99 | 0.93 | 4.84 | 1.60 | 3.59 | 0.46 | 2.67 | 0.61 | 19.33 | 41.07 |

*Table 3C8. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 17.67 | 19.51 | 44.07 | 81.72 | 17.42 | 42.79 | 8.86 | 214.37 |
| P2 | 4.48 | 19.66 | 44.42 | 82.46 | 18.04 | 43.49 | 8.84 | 216.91 |
| P3 | 40.54 | 17.18 | 34.27 | 75.56 | 15.47 | 37.75 | 7.96 | 188.19 |
| P4 | 22.51 | 16.19 | 30.95 | 76.48 | 15.95 | 35.25 | 8.17 | 182.99 |
| P5 | 14.80 | 15.03 | 35.85 | 67.53 | 30.13 | 32.82 | 11.43 | 192.79 |
| Total | 100.00 | 16.96 | 35.24 | 75.48 | 18.27 | 37.14 | 8.71 | 191.80 |

*Table 3C9. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 16.85 | 0.76 | 4.44 | 0.73 | 3.95 | 1.16 | 2.05 | 0.36 | 2.05 | 0.61 | 15.54 | 31.65 | 13.62 |
| P2 | 4.81 | 0.84 | 4.78 | 0.78 | 4.21 | 1.23 | 2.24 | 0.35 | 2.11 | 0.58 | 17.12 | 34.22 | 4.21 |
| P3 | 43.24 | 1.04 | 6.02 | 0.88 | 5.10 | 1.50 | 2.70 | 0.38 | 2.55 | 0.71 | 20.30 | 41.18 | 45.48 |
| P4 | 23.05 | 1.10 | 6.30 | 0.98 | 5.20 | 1.43 | 2.77 | 0.37 | 2.63 | 0.92 | 20.60 | 42.31 | 24.91 |
| P5 | 12.05 | 1.06 | 5.99 | 1.43 | 5.47 | 0.44 | 2.05 | 0.14 | 2.48 | 2.19 | 17.04 | 38.29 | 11.78 |
| Total | 100.00 | 1.00 | 5.76 | 0.94 | 4.93 | 1.29 | 2.50 | 0.34 | 2.45 | 0.92 | 19.02 | 39.15 | 100.00 |

*Table 3C10. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 16.85 | 12.32 | 27.17 | 57.76 | 14.18 | 27.14 | 6.32 | 144.89 | 13.63 |
| P2 | 4.81 | 12.32 | 29.36 | 55.56 | 14.59 | 28.40 | 6.73 | 146.96 | 3.95 |
| P3 | 43.24 | 13.75 | 36.47 | 74.05 | 18.53 | 37.44 | 8.94 | 189.17 | 45.64 |
| P4 | 23.05 | 14.57 | 36.45 | 73.35 | 20.52 | 37.79 | 9.40 | 192.08 | 24.71 |
| P5 | 12.05 | 12.49 | 31.74 | 61.04 | 32.23 | 30.48 | 11.61 | 179.59 | 12.07 |
| Total | 100.00 | 13.48 | 33.99 | 68.69 | 19.72 | 34.51 | 8.82 | 179.19 | 100.00 |

*Table 3C11. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 16.85 | 1.14 | 6.67 | 1.10 | 5.93 | 1.74 | 3.07 | 0.54 | 3.07 | 0.92 | 23.35 | 47.54 |
| P2 | 4.81 | 1.27 | 7.25 | 1.18 | 6.38 | 1.86 | 3.40 | 0.54 | 3.20 | 0.88 | 25.98 | 51.93 |
| P3 | 43.24 | 1.20 | 6.96 | 1.02 | 5.89 | 1.74 | 3.12 | 0.44 | 2.94 | 0.82 | 23.45 | 47.58 |
| P4 | 23.05 | 1.20 | 6.88 | 1.07 | 5.68 | 1.57 | 3.03 | 0.41 | 2.87 | 1.01 | 22.52 | 46.24 |
| P5 | 12.05 | 1.18 | 6.63 | 1.58 | 6.05 | 0.49 | 2.27 | 0.15 | 2.75 | 2.42 | 18.86 | 42.37 |
| Total | 100.00 | 1.19 | 6.87 | 1.12 | 5.88 | 1.54 | 2.99 | 0.41 | 2.93 | 1.09 | 22.70 | 46.73 |

*Table 3C12. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 16.85 | 18.51 | 40.81 | 86.77 | 21.31 | 40.76 | 9.50 | 217.65 |
| P2 | 4.81 | 18.69 | 44.55 | 84.31 | 22.14 | 43.10 | 10.21 | 223.00 |
| P3 | 43.24 | 15.88 | 42.13 | 85.56 | 21.41 | 43.26 | 10.33 | 218.57 |
| P4 | 23.05 | 15.92 | 39.84 | 80.16 | 22.42 | 41.30 | 10.27 | 209.93 |
| P5 | 12.05 | 13.82 | 35.13 | 67.54 | 35.66 | 33.73 | 12.84 | 198.72 |
| Total | 100.00 | 16.08 | 40.56 | 81.98 | 23.53 | 41.19 | 10.52 | 213.86 |

*Table 3C13. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 7.90 | 3.83 | 22.20 | 2.98 | 18.41 | 4.84 | 10.07 | 2.20 | 8.90 | 2.09 | 105.63 | 181.16 | 8.46 |
| P2 | 2.44 | 3.84 | 22.26 | 3.01 | 18.61 | 4.79 | 10.12 | 2.20 | 8.95 | 2.10 | 106.27 | 182.14 | 2.62 |
| P3 | 35.17 | 3.85 | 21.77 | 2.92 | 17.84 | 4.46 | 9.58 | 2.08 | 8.58 | 2.52 | 100.81 | 174.41 | 36.24 |
| P4 | 12.75 | 4.22 | 22.87 | 3.07 | 18.61 | 4.44 | 9.92 | 2.09 | 8.78 | 2.69 | 104.37 | 181.05 | 13.64 |
| P5 | 41.74 | 3.76 | 20.33 | 2.86 | 16.41 | 3.86 | 8.74 | 1.78 | 7.80 | 2.96 | 89.80 | 158.29 | 39.04 |
| Total | 100.00 | 3.86 | 21.36 | 2.92 | 17.40 | 4.25 | 9.32 | 1.97 | 8.32 | 2.68 | 97.18 | 169.25 | 100.00 |

*Table 3C14. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 7.90 | 38.90 | 106.88 | 203.08 | 52.40 | 108.30 | 25.80 | 535.34 | 8.35 |
| P2 | 2.44 | 39.20 | 106.18 | 201.71 | 53.57 | 108.13 | 25.86 | 534.65 | 2.57 |
| P3 | 35.17 | 38.03 | 98.10 | 196.95 | 52.97 | 104.20 | 25.45 | 515.69 | 35.82 |
| P4 | 12.75 | 39.27 | 104.54 | 200.66 | 56.74 | 108.41 | 27.19 | 536.80 | 13.52 |
| P5 | 41.74 | 35.16 | 88.79 | 184.11 | 52.50 | 96.73 | 24.75 | 482.04 | 39.74 |
| Total | 100.00 | 37.09 | 95.93 | 192.66 | 53.22 | 102.04 | 25.42 | 506.35 | 100.00 |

*Table 3C15. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 7.90 | 3.83 | 22.20 | 2.98 | 18.41 | 4.84 | 10.07 | 2.20 | 8.90 | 2.09 | 105.63 | 181.16 |
| P2 | 2.44 | 3.84 | 22.26 | 3.01 | 18.61 | 4.79 | 10.12 | 2.20 | 8.95 | 2.10 | 106.27 | 182.14 |
| P3 | 35.17 | 3.85 | 21.77 | 2.92 | 17.84 | 4.46 | 9.58 | 2.08 | 8.58 | 2.52 | 100.81 | 174.41 |
| P4 | 12.75 | 4.22 | 22.87 | 3.07 | 18.61 | 4.44 | 9.92 | 2.09 | 8.78 | 2.69 | 104.37 | 181.05 |
| P5 | 41.74 | 3.76 | 20.33 | 2.86 | 16.41 | 3.86 | 8.74 | 1.78 | 7.80 | 2.96 | 89.80 | 158.29 |
| Total | 100.00 | 3.86 | 21.36 | 2.92 | 17.40 | 4.25 | 9.32 | 1.97 | 8.32 | 2.68 | 97.18 | 169.25 |

*Table 3C16. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 7.90 | 38.90 | 106.88 | 203.08 | 52.40 | 108.30 | 25.80 | 535.34 |
| P2 | 2.44 | 39.20 | 106.18 | 201.71 | 53.57 | 108.13 | 25.86 | 534.65 |
| P3 | 35.17 | 38.03 | 98.10 | 196.95 | 52.97 | 104.20 | 25.45 | 515.69 |
| P4 | 12.75 | 39.27 | 104.54 | 200.66 | 56.74 | 108.41 | 27.19 | 536.80 |
| P5 | 41.74 | 35.16 | 88.79 | 184.11 | 52.50 | 96.73 | 24.75 | 482.04 |
| Total | 100.00 | 37.09 | 95.93 | 192.66 | 53.22 | 102.04 | 25.42 | 506.35 |

*Table 3C17. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 10.30 | 0.24 | 1.02 | 0.23 | 1.02 | 0.27 | 0.74 | 0.12 | 0.53 | 0.14 | 4.69 | 8.99 | 10.54 |
| P2 | 33.18 | 0.19 | 0.79 | 0.17 | 0.77 | 0.25 | 0.61 | 0.09 | 0.41 | 0.13 | 3.48 | 6.87 | 25.97 |
| P3 | 50.09 | 0.23 | 1.00 | 0.22 | 1.02 | 0.29 | 0.77 | 0.11 | 0.53 | 0.14 | 4.52 | 8.83 | 50.37 |
| P4 | 3.72 | 0.26 | 1.19 | 0.29 | 1.28 | 0.42 | 1.15 | 0.14 | 0.64 | 0.16 | 4.48 | 10.00 | 4.23 |
| P5 | 2.72 | 0.70 | 3.84 | 0.65 | 4.03 | 1.58 | 3.98 | 0.36 | 1.78 | 0.28 | 11.51 | 28.71 | 8.89 |
| Total | 100.00 | 0.23 | 1.02 | 0.22 | 1.03 | 0.31 | 0.81 | 0.11 | 0.53 | 0.14 | 4.38 | 8.78 | 100.00 |

*Table 3C18. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 10.30 | 3.34 | 4.48 | 8.96 | 2.75 | 6.01 | 1.28 | 26.83 | 9.46 |
| P2 | 33.18 | 2.83 | 3.42 | 7.14 | 2.33 | 4.95 | 0.84 | 21.50 | 24.43 |
| P3 | 50.09 | 3.31 | 4.59 | 9.15 | 2.84 | 6.26 | 1.26 | 27.41 | 47.01 |
| P4 | 3.72 | 4.43 | 5.80 | 12.26 | 4.39 | 8.73 | 1.69 | 37.30 | 4.74 |
| P5 | 2.72 | 11.86 | 30.08 | 58.20 | 15.25 | 32.69 | 6.08 | 154.16 | 14.35 |
| Total | 100.00 | 3.43 | 4.93 | 9.91 | 3.05 | 6.61 | 1.27 | 29.20 | 100.00 |

*Table 3C19. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 10.30 | 3.78 | 16.31 | 3.67 | 16.42 | 4.40 | 11.85 | 1.88 | 8.53 | 2.23 | 75.23 | 144.30 |
| P2 | 33.18 | 3.04 | 12.87 | 2.77 | 12.57 | 4.03 | 9.95 | 1.46 | 6.78 | 2.11 | 57.02 | 112.61 |
| P3 | 50.09 | 3.05 | 13.36 | 3.00 | 13.56 | 3.85 | 10.22 | 1.52 | 7.07 | 1.88 | 60.20 | 117.71 |
| P4 | 3.72 | 1.50 | 6.85 | 1.66 | 7.33 | 2.42 | 6.62 | 0.80 | 3.65 | 0.90 | 25.73 | 57.47 |
| P5 | 2.72 | 1.00 | 5.48 | 0.93 | 5.76 | 2.26 | 5.70 | 0.52 | 2.54 | 0.40 | 16.45 | 41.04 |
| Total | 100.00 | 2.55 | 11.32 | 2.46 | 11.44 | 3.49 | 9.06 | 1.27 | 5.90 | 1.57 | 48.80 | 97.87 |

*Table 3C20. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 10.30 | 53.59 | 71.97 | 143.83 | 44.17 | 96.47 | 20.62 | 430.65 |
| P2 | 33.18 | 46.39 | 56.11 | 117.00 | 38.15 | 81.12 | 13.73 | 352.48 |
| P3 | 50.09 | 44.16 | 61.24 | 122.00 | 37.81 | 83.48 | 16.80 | 365.49 |
| P4 | 3.72 | 25.45 | 33.35 | 70.46 | 25.23 | 50.18 | 9.70 | 214.35 |
| P5 | 2.72 | 16.96 | 43.00 | 83.20 | 21.80 | 46.74 | 8.68 | 220.38 |
| Total | 100.00 | 38.22 | 54.97 | 110.49 | 34.04 | 73.69 | 14.15 | 325.56 |

*Table 3C21. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| P1 | 29.85 | 0.52 | 5.05 | 0.67 | 3.95 | 1.80 | 3.63 | 0.55 | 2.42 | 0.12 | 22.67 | 41.39 | 37.68 |
| P2 | 17.85 | 0.54 | 5.20 | 0.70 | 4.07 | 1.79 | 3.68 | 0.55 | 2.42 | 0.13 | 22.99 | 42.07 | 22.91 |
| P3 | 28.98 | 0.29 | 3.24 | 0.49 | 2.64 | 1.30 | 2.97 | 0.38 | 1.52 | 0.00 | 12.11 | 24.94 | 22.05 |
| P4 | 14.36 | 0.40 | 4.22 | 0.62 | 3.55 | 1.52 | 3.48 | 0.42 | 1.77 | 0.00 | 15.52 | 31.50 | 13.80 |
| P5 | 8.95 | 0.11 | 1.98 | 0.36 | 2.05 | 0.97 | 2.37 | 0.20 | 0.68 | 0.10 | 4.25 | 13.06 | 3.57 |
| Feed | 100.00 | 0.40 | 4.16 | 0.59 | 3.37 | 1.54 | 3.31 | 0.45 | 1.91 | 0.07 | 16.99 | 32.79 | 100.00 |

*Table 3C22. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| P1 | 29.85 | 10.33 | 23.96 | 42.85 | 13.45 | 40.00 | 4.46 | 135.05 | 37.49 |
| P2 | 17.85 | 10.29 | 25.53 | 45.62 | 13.64 | 40.01 | 4.85 | 139.95 | 23.24 |
| P3 | 28.98 | 6.08 | 12.43 | 15.75 | 8.81 | 28.13 | 2.77 | 73.98 | 19.94 |
| P4 | 14.36 | 7.26 | 20.88 | 33.93 | 11.60 | 29.69 | 4.17 | 107.53 | 14.36 |
| P5 | 8.95 | 3.94 | 7.00 | 21.78 | 9.60 | 15.00 | 2.33 | 59.64 | 4.97 |
| Feed | 100.00 | 8.08 | 18.94 | 32.32 | 11.53 | 32.85 | 3.81 | 107.52 | 100.00 |

*Table 3C23. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a riffle table concentrator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| P1 | 29.85 | 0.86 | 8.31 | 1.11 | 6.51 | 2.97 | 5.97 | 0.91 | 3.99 | 0.20 | 37.33 | 68.14 |
| P2 | 17.85 | 0.87 | 8.37 | 1.13 | 6.56 | 2.89 | 5.93 | 0.89 | 3.90 | 0.21 | 37.02 | 67.76 |
| P3 | 28.98 | 0.43 | 4.76 | 0.71 | 3.88 | 1.92 | 4.36 | 0.55 | 2.23 | 0.00 | 17.80 | 36.65 |
| P4 | 14.36 | 0.52 | 5.53 | 0.81 | 4.65 | 2.00 | 4.57 | 0.55 | 2.32 | 0.00 | 20.33 | 41.28 |
| P5 | 8.95 | 0.14 | 2.37 | 0.43 | 2.45 | 1.16 | 2.83 | 0.24 | 0.81 | 0.13 | 5.09 | 15.63 |
| Feed | 100.00 | 0.60 | 6.17 | 0.87 | 4.99 | 2.29 | 4.92 | 0.67 | 2.83 | 0.10 | 25.22 | 48.66 |

*Table 3C24. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a riffle table concentrator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| P1 | 29.85 | 17.00 | 39.45 | 70.55 | 22.15 | 65.86 | 7.34 | 222.34 |
| P2 | 17.85 | 16.57 | 41.11 | 73.48 | 21.97 | 64.44 | 7.82 | 225.40 |
| P3 | 28.98 | 8.93 | 18.27 | 23.14 | 12.94 | 41.34 | 4.08 | 108.70 |
| P4 | 14.36 | 9.52 | 27.35 | 44.46 | 15.20 | 38.90 | 5.46 | 140.89 |
| P5 | 8.95 | 4.71 | 8.38 | 26.07 | 11.48 | 17.96 | 2.78 | 71.38 |
| Feed | 100.00 | 11.99 | 28.11 | 47.97 | 17.11 | 48.74 | 5.65 | 159.57 |

*Appendix 5.3D – Magnetic Separation Data (28 x 100 mesh)*

*Table 3D1. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 94.82 | 0.63 | 5.05 | 0.62 | 4.60 | 1.70 | 2.34 | 0.46 | 2.27 | 0.24 | 18.13 | 36.03 | 93.07 |
| M1 | 0.79 | 0.92 | 7.18 | 2.13 | 6.86 | 0.23 | 3.89 | 0.30 | 3.07 | 2.96 | 20.88 | 48.41 | 1.04 |
| M2 | 0.76 | 1.15 | 7.17 | 1.91 | 7.20 | 0.53 | 3.78 | 0.43 | 3.12 | 2.38 | 23.48 | 51.16 | 1.06 |
| M3 | 3.04 | 0.95 | 7.09 | 1.00 | 5.96 | 1.84 | 3.11 | 0.54 | 2.78 | 0.45 | 25.06 | 48.77 | 4.04 |
| M4 | 0.59 | 1.13 | 7.10 | 1.50 | 6.55 | 1.05 | 3.36 | 0.46 | 2.99 | 1.63 | 23.57 | 49.33 | 0.79 |
| Total | 100.00 | 0.65 | 5.16 | 0.66 | 4.69 | 1.68 | 2.39 | 0.46 | 2.30 | 0.29 | 18.44 | 36.71 | 100.00 |

*Table 3D2. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 94.82 | 13.03 | 30.90 | 82.58 | 13.93 | 31.04 | 6.71 | 178.19 | 94.01 |
| M1 | 0.79 | 14.80 | 26.35 | 58.02 | 39.93 | 24.66 | 13.40 | 177.16 | 0.78 |
| M2 | 0.76 | 15.83 | 34.98 | 68.06 | 39.63 | 32.69 | 13.89 | 205.09 | 0.87 |
| M3 | 3.04 | 14.52 | 43.03 | 85.23 | 19.29 | 44.13 | 9.94 | 216.14 | 3.66 |
| M4 | 0.59 | 15.66 | 39.17 | 75.29 | 30.90 | 37.57 | 12.11 | 210.69 | 0.69 |
| Total | 100.00 | 13.13 | 31.31 | 82.31 | 14.60 | 31.44 | 6.94 | 179.73 | 100.00 |

*Table 3D3. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 94.82 | 0.76 | 6.06 | 0.74 | 5.52 | 2.04 | 2.81 | 0.56 | 2.72 | 0.28 | 21.77 | 43.26 |
| M1 | 0.79 | 1.10 | 8.60 | 2.55 | 8.21 | 0.27 | 4.65 | 0.35 | 3.67 | 3.55 | 25.00 | 57.95 |
| M2 | 0.76 | 1.34 | 8.32 | 2.22 | 8.36 | 0.62 | 4.39 | 0.50 | 3.62 | 2.76 | 27.25 | 59.38 |
| M3 | 3.04 | 1.11 | 8.36 | 1.18 | 7.03 | 2.17 | 3.66 | 0.64 | 3.28 | 0.53 | 29.55 | 57.52 |
| M4 | 0.59 | 1.29 | 8.09 | 1.71 | 7.47 | 1.19 | 3.82 | 0.52 | 3.40 | 1.86 | 26.86 | 56.21 |
| Total | 100.00 | 0.78 | 6.18 | 0.79 | 5.62 | 2.01 | 2.87 | 0.56 | 2.76 | 0.35 | 22.11 | 44.02 |

*Table 3D4. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 94.82 | 15.64 | 37.09 | 99.14 | 16.73 | 37.26 | 8.05 | 213.91 |
| M1 | 0.79 | 17.71 | 31.54 | 69.46 | 47.81 | 29.53 | 16.04 | 212.09 |
| M2 | 0.76 | 18.38 | 40.60 | 79.00 | 46.00 | 37.94 | 16.13 | 238.06 |
| M3 | 3.04 | 17.13 | 50.74 | 100.51 | 22.75 | 52.05 | 11.72 | 254.91 |
| M4 | 0.59 | 17.84 | 44.63 | 85.79 | 35.20 | 42.81 | 13.80 | 240.08 |
| Total | 100.00 | 15.74 | 37.55 | 98.70 | 17.50 | 37.70 | 8.33 | 215.51 |

*Table 3D5. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 92.73 | 0.83 | 4.59 | 0.55 | 3.24 | 1.35 | 4.65 | 0.41 | 2.04 | 0.28 | 13.94 | 31.88 | 91.08 |
| M1 | 1.57 | 1.08 | 5.60 | 3.09 | 7.73 | 1.75 | 5.65 | 0.20 | 3.12 | 5.25 | 13.51 | 46.97 | 2.27 |
| M2 | 1.14 | 1.11 | 5.93 | 2.34 | 6.91 | 0.57 | 4.65 | 0.23 | 2.97 | 3.77 | 15.87 | 44.34 | 1.56 |
| M3 | 3.46 | 0.86 | 5.04 | 0.87 | 4.47 | 1.35 | 2.51 | 0.39 | 2.32 | 0.62 | 16.40 | 34.84 | 3.71 |
| M4 | 1.10 | 0.98 | 5.86 | 2.14 | 6.13 | 0.07 | 3.69 | 0.25 | 2.95 | 3.03 | 15.48 | 40.59 | 1.38 |
| Total | 100.00 | 0.84 | 4.65 | 0.64 | 3.42 | 1.33 | 4.58 | 0.40 | 2.09 | 0.44 | 14.06 | 32.46 | 100.00 |

*Table 3D6. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 92.73 | 13.44 | 21.34 | 64.41 | 11.41 | 24.56 | 5.71 | 140.87 | 91.35 |
| M1 | 1.57 | 12.49 | 21.25 | 39.20 | 67.27 | 12.98 | 20.97 | 174.16 | 1.91 |
| M2 | 1.14 | 13.79 | 27.54 | 52.46 | 50.58 | 22.24 | 16.33 | 182.94 | 1.46 |
| M3 | 3.46 | 14.69 | 28.48 | 64.72 | 17.12 | 30.61 | 7.39 | 163.00 | 3.94 |
| M4 | 1.10 | 13.32 | 26.80 | 58.12 | 37.83 | 24.06 | 13.27 | 173.41 | 1.33 |
| Total | 100.00 | 13.47 | 21.72 | 63.82 | 13.22 | 24.56 | 6.21 | 143.00 | 100.00 |

*Table 3D7. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 92.73 | 1.00 | 5.51 | 0.66 | 3.88 | 1.62 | 5.58 | 0.49 | 2.45 | 0.34 | 16.72 | 38.23 |
| M1 | 1.57 | 1.33 | 6.94 | 3.83 | 9.57 | 2.17 | 6.99 | 0.25 | 3.87 | 6.50 | 16.73 | 58.17 |
| M2 | 1.14 | 1.31 | 6.99 | 2.76 | 8.15 | 0.67 | 5.48 | 0.27 | 3.51 | 4.45 | 18.71 | 52.28 |
| M3 | 3.46 | 0.98 | 5.74 | 0.99 | 5.09 | 1.54 | 2.86 | 0.45 | 2.64 | 0.71 | 18.67 | 39.66 |
| M4 | 1.10 | 1.12 | 6.70 | 2.45 | 7.00 | 0.08 | 4.22 | 0.28 | 3.37 | 3.47 | 17.70 | 46.40 |
| Total | 100.00 | 1.01 | 5.57 | 0.77 | 4.10 | 1.59 | 5.49 | 0.48 | 2.50 | 0.53 | 16.82 | 38.84 |

*Table 3D8. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 92.73 | 16.11 | 25.59 | 77.24 | 13.68 | 29.46 | 6.85 | 168.93 |
| M1 | 1.57 | 15.47 | 26.31 | 48.56 | 83.31 | 16.08 | 25.98 | 215.71 |
| M2 | 1.14 | 16.26 | 32.47 | 61.85 | 59.64 | 26.22 | 19.25 | 215.68 |
| M3 | 3.46 | 16.72 | 32.42 | 73.68 | 19.50 | 34.85 | 8.42 | 185.59 |
| M4 | 1.10 | 15.23 | 30.63 | 66.44 | 43.25 | 27.51 | 15.17 | 198.23 |
| Total | 100.00 | 16.12 | 25.99 | 76.37 | 15.82 | 29.39 | 7.43 | 171.12 |

*Table 3D9. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 95.70 | 1.05 | 5.95 | 1.01 | 5.13 | 1.35 | 2.55 | 0.32 | 2.47 | 0.86 | 19.36 | 40.04 | 95.41 |
| M1 | 0.49 | 1.27 | 6.84 | 2.13 | 7.37 | 0.09 | 4.09 | 0.29 | 3.21 | 3.22 | 20.83 | 49.34 | 0.60 |
| M2 | 0.83 | 1.19 | 6.77 | 1.45 | 5.68 | 0.92 | 4.73 | 0.36 | 2.80 | 1.71 | 19.80 | 45.41 | 0.94 |
| M3 | 2.45 | 1.07 | 5.88 | 1.05 | 4.78 | 1.09 | 4.73 | 0.37 | 2.47 | 1.10 | 17.72 | 40.26 | 2.46 |
| M4 | 0.53 | 1.21 | 6.57 | 1.58 | 5.63 | 0.84 | 4.73 | 0.34 | 2.85 | 1.90 | 19.14 | 44.79 | 0.59 |
| Total | 100.00 | 1.06 | 5.96 | 1.02 | 5.14 | 1.33 | 2.64 | 0.32 | 2.47 | 0.89 | 19.33 | 40.16 | 100.00 |

*Table 3D10. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 95.70 | 13.30 | 34.96 | 68.13 | 20.24 | 34.94 | 8.97 | 180.54 | 95.82 |
| M1 | 0.49 | 15.62 | 32.55 | 63.94 | 43.92 | 29.80 | 15.46 | 201.28 | 0.55 |
| M2 | 0.83 | 14.15 | 33.24 | 71.36 | 26.52 | 33.33 | 11.04 | 189.63 | 0.87 |
| M3 | 2.45 | 13.31 | 28.59 | 62.68 | 19.77 | 29.69 | 8.57 | 162.60 | 2.21 |
| M4 | 0.53 | 13.58 | 32.31 | 69.72 | 27.36 | 32.65 | 11.26 | 186.90 | 0.55 |
| Total | 100.00 | 13.32 | 34.76 | 68.01 | 20.44 | 34.76 | 9.02 | 180.31 | 100.00 |

*Table 3D11. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 95.70 | 1.26 | 7.11 | 1.20 | 6.12 | 1.61 | 3.05 | 0.38 | 2.95 | 1.03 | 23.14 | 47.84 |
| M1 | 0.49 | 1.47 | 7.91 | 2.46 | 8.51 | 0.11 | 4.73 | 0.34 | 3.71 | 3.72 | 24.07 | 57.01 |
| M2 | 0.83 | 1.35 | 7.67 | 1.64 | 6.44 | 1.04 | 5.36 | 0.41 | 3.17 | 1.93 | 22.44 | 51.46 |
| M3 | 2.45 | 1.24 | 6.79 | 1.21 | 5.53 | 1.26 | 5.46 | 0.43 | 2.85 | 1.27 | 20.47 | 46.51 |
| M4 | 0.53 | 1.35 | 7.35 | 1.76 | 6.30 | 0.94 | 5.30 | 0.38 | 3.19 | 2.12 | 21.42 | 50.12 |
| Total | 100.00 | 1.26 | 7.11 | 1.22 | 6.12 | 1.59 | 3.15 | 0.38 | 2.95 | 1.06 | 23.06 | 47.90 |

*Table 3D12. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 95.70 | 15.89 | 41.77 | 81.40 | 24.19 | 41.74 | 10.71 | 215.70 |
| M1 | 0.49 | 18.05 | 37.61 | 73.86 | 50.74 | 34.42 | 17.86 | 232.53 |
| M2 | 0.83 | 16.03 | 37.66 | 80.86 | 30.05 | 37.77 | 12.51 | 214.88 |
| M3 | 2.45 | 15.37 | 33.02 | 72.41 | 22.84 | 34.30 | 9.90 | 187.84 |
| M4 | 0.53 | 15.20 | 36.16 | 78.02 | 30.62 | 36.54 | 12.60 | 209.13 |
| Total | 100.00 | 15.89 | 41.46 | 81.11 | 24.37 | 41.45 | 10.75 | 215.03 |

*Table 3D13. Heavy REE analysis on a whole sample basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 87.13 | 3.98 | 22.28 | 2.93 | 18.08 | 4.74 | 9.96 | 2.20 | 8.79 | 2.09 | 105.12 | 180.18 | 87.05 |
| M1 | 5.03 | 3.99 | 21.76 | 3.29 | 18.36 | 4.00 | 9.38 | 2.04 | 8.76 | 3.03 | 100.87 | 175.49 | 4.89 |
| M2 | 2.85 | 4.13 | 22.82 | 3.21 | 18.80 | 4.61 | 9.91 | 2.15 | 8.99 | 2.52 | 107.48 | 184.61 | 2.92 |
| M3 | 3.73 | 4.45 | 24.22 | 2.84 | 18.20 | 4.91 | 13.38 | 2.33 | 9.07 | 1.94 | 107.03 | 188.36 | 3.90 |
| M4 | 1.26 | 3.93 | 22.18 | 2.92 | 18.02 | 4.68 | 9.82 | 2.12 | 8.71 | 2.07 | 104.08 | 178.53 | 1.25 |
| Total | 100.00 | 4.00 | 22.34 | 2.96 | 18.12 | 4.71 | 10.05 | 2.19 | 8.80 | 2.14 | 105.03 | 180.36 | 100.00 |

*Table 3D14. Light REE analysis on a whole sample basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 87.13 | 39.06 | 106.69 | 204.55 | 53.08 | 107.27 | 25.88 | 536.53 | 87.10 |
| M1 | 5.03 | 37.82 | 103.26 | 195.37 | 61.00 | 101.20 | 27.83 | 526.47 | 4.93 |
| M2 | 2.85 | 39.45 | 108.63 | 203.15 | 57.68 | 108.14 | 27.35 | 544.39 | 2.89 |
| M3 | 3.73 | 39.62 | 105.93 | 216.26 | 50.93 | 111.09 | 26.54 | 550.38 | 3.83 |
| M4 | 1.26 | 38.82 | 104.92 | 201.20 | 53.26 | 106.42 | 25.71 | 530.34 | 1.25 |
| Total | 100.00 | 39.02 | 106.53 | 204.44 | 53.53 | 107.12 | 26.04 | 536.69 | 100.00 |

*Table 3D15. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 87.13 | 3.98 | 22.28 | 2.93 | 18.08 | 4.74 | 9.96 | 2.20 | 8.79 | 2.09 | 105.12 | 180.18 |
| M1 | 5.03 | 3.99 | 21.76 | 3.29 | 18.36 | 4.00 | 9.38 | 2.04 | 8.76 | 3.03 | 100.87 | 175.49 |
| M2 | 2.85 | 4.13 | 22.82 | 3.21 | 18.80 | 4.61 | 9.91 | 2.15 | 8.99 | 2.52 | 107.48 | 184.61 |
| M3 | 3.73 | 4.45 | 24.22 | 2.84 | 18.20 | 4.91 | 13.38 | 2.33 | 9.07 | 1.94 | 107.03 | 188.36 |
| M4 | 1.26 | 3.93 | 22.18 | 2.92 | 18.02 | 4.68 | 9.82 | 2.12 | 8.71 | 2.07 | 104.08 | 178.53 |
| Total | 100.00 | 4.00 | 22.34 | 2.96 | 18.12 | 4.71 | 10.05 | 2.19 | 8.80 | 2.14 | 105.03 | 180.36 |

*Table 3D16. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the bottom ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 87.13 | 39.06 | 106.69 | 204.55 | 53.08 | 107.27 | 25.88 | 536.53 |
| M1 | 5.03 | 37.82 | 103.26 | 195.37 | 61.00 | 101.20 | 27.83 | 526.47 |
| M2 | 2.85 | 39.45 | 108.63 | 203.15 | 57.68 | 108.14 | 27.35 | 544.39 |
| M3 | 3.73 | 39.62 | 105.93 | 216.26 | 50.93 | 111.09 | 26.54 | 550.38 |
| M4 | 1.26 | 38.82 | 104.92 | 201.20 | 53.26 | 106.42 | 25.71 | 530.34 |
| Total | 100.00 | 39.02 | 106.53 | 204.44 | 53.53 | 107.12 | 26.04 | 536.69 |

*Table 3D17. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 99.66 | 1.52 | 6.94 | 1.47 | 6.26 | 1.79 | 5.29 | 0.80 | 3.65 | 1.00 | 32.64 | 61.35 | 99.64 |
| M1 | 0.08 | 2.17 | 10.71 | 2.89 | 10.99 | 1.02 | 6.49 | 0.82 | 5.33 | 4.07 | 41.14 | 85.64 | 0.12 |
| M2 | 0.06 | 2.29 | 10.48 | 3.57 | 11.81 | 0.25 | 5.72 | 0.83 | 5.66 | 5.07 | 40.38 | 86.07 | 0.08 |
| M3 | 0.15 | 0.97 | 4.75 | 0.92 | 4.42 | 1.07 | 3.61 | 0.33 | 2.37 | 1.16 | 18.62 | 38.21 | 0.09 |
| M4 | 0.05 | 2.33 | 11.04 | 3.30 | 11.39 | 0.87 | 6.48 | 0.95 | 5.74 | 4.48 | 42.04 | 88.63 | 0.07 |
| Total | 100.00 | 1.52 | 6.95 | 1.47 | 6.27 | 1.78 | 5.29 | 0.80 | 3.65 | 1.00 | 32.63 | 61.36 | 100.00 |

*Table 3D18. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 99.66 | 23.01 | 30.55 | 60.71 | 17.01 | 37.62 | 8.07 | 176.98 | 99.48 |
| M1 | 0.08 | 23.47 | 70.96 | 128.21 | 59.50 | 58.86 | 20.83 | 361.81 | 0.17 |
| M2 | 0.06 | 21.96 | 61.96 | 112.16 | 68.37 | 49.51 | 23.28 | 337.24 | 0.11 |
| M3 | 0.15 | 13.23 | 32.53 | 59.65 | 18.81 | 29.95 | 7.09 | 161.26 | 0.13 |
| M4 | 0.05 | 24.33 | 71.72 | 128.46 | 63.69 | 60.21 | 21.44 | 369.87 | 0.10 |
| Total | 100.00 | 22.99 | 30.63 | 60.83 | 17.11 | 37.65 | 8.10 | 177.30 | 100.00 |

*Table 3D19. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 99.66 | 3.20 | 14.60 | 3.08 | 13.17 | 3.76 | 11.13 | 1.68 | 7.67 | 2.09 | 68.65 | 129.04 |
| M1 | 0.08 | 2.26 | 11.11 | 3.00 | 11.40 | 1.06 | 6.74 | 0.85 | 5.53 | 4.22 | 42.68 | 88.84 |
| M2 | 0.06 | 2.49 | 11.39 | 3.87 | 12.83 | 0.27 | 6.21 | 0.91 | 6.15 | 5.51 | 43.87 | 93.49 |
| M3 | 0.15 | 1.91 | 9.35 | 1.82 | 8.71 | 2.10 | 7.11 | 0.64 | 4.66 | 2.29 | 36.70 | 75.30 |
| M4 | 0.05 | 2.44 | 11.53 | 3.45 | 11.90 | 0.91 | 6.77 | 0.99 | 5.99 | 4.68 | 43.92 | 92.58 |
| Total | 100.00 | 3.19 | 14.58 | 3.08 | 13.16 | 3.74 | 11.11 | 1.67 | 7.66 | 2.10 | 68.51 | 128.81 |

*Table 3D20. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 99.66 | 48.40 | 64.26 | 127.71 | 35.79 | 79.14 | 16.98 | 372.28 |
| M1 | 0.08 | 24.35 | 73.61 | 133.01 | 61.73 | 61.06 | 21.61 | 375.37 |
| M2 | 0.06 | 23.86 | 67.30 | 121.84 | 74.26 | 53.78 | 25.29 | 366.33 |
| M3 | 0.15 | 26.08 | 64.12 | 117.56 | 37.07 | 59.02 | 13.97 | 317.81 |
| M4 | 0.05 | 25.42 | 74.92 | 134.19 | 66.54 | 62.89 | 22.40 | 386.37 |
| Total | 100.00 | 48.27 | 64.29 | 127.70 | 35.91 | 79.03 | 17.00 | 372.20 |

*Table 3D21. Heavy REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 99.66 | 0.42 | 4.51 | 0.63 | 3.14 | 1.30 | 3.39 | 0.44 | 1.97 | 0.09 | 18.36 | 34.26 | 99.52 |
| M1 | 0.17 | 0.67 | 7.18 | 1.20 | 6.56 | 1.63 | 5.85 | 0.42 | 2.96 | 1.42 | 24.00 | 51.88 | 0.26 |
| M2 | 0.03 | 0.72 | 7.30 | 1.17 | 6.17 | 1.39 | 5.21 | 0.55 | 2.95 | 1.70 | 23.82 | 50.98 | 0.05 |
| M3 | 0.07 | 0.44 | 4.73 | 0.59 | 3.40 | 1.20 | 3.23 | 0.42 | 1.89 | 0.42 | 17.72 | 34.05 | 0.07 |
| M4 | 0.07 | 0.77 | 7.81 | 0.80 | 6.74 | 1.14 | 5.31 | 0.41 | 3.31 | 2.98 | 24.76 | 54.03 | 0.11 |
| Total | 100.00 | 0.43 | 4.51 | 0.63 | 3.15 | 1.30 | 3.40 | 0.44 | 1.97 | 0.09 | 18.38 | 34.31 | 100.00 |

*Table 3D22. Light REE analysis on a whole coal basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 99.66 | 8.46 | 19.71 | 31.95 | 11.03 | 29.94 | 4.10 | 105.18 | 99.41 |
| M1 | 0.17 | 12.11 | 34.73 | 69.47 | 32.85 | 34.35 | 9.08 | 192.58 | 0.32 |
| M2 | 0.03 | 13.48 | 36.05 | 66.80 | 35.57 | 34.72 | 8.76 | 195.38 | 0.06 |
| M3 | 0.07 | 8.89 | 22.84 | 42.58 | 16.54 | 26.63 | 4.54 | 122.02 | 0.08 |
| M4 | 0.07 | 13.71 | 36.77 | 68.57 | 45.05 | 34.59 | 7.81 | 206.50 | 0.13 |
| Total | 100.00 | 8.47 | 19.75 | 32.06 | 11.10 | 29.95 | 4.11 | 105.44 | 100.00 |

*Table 3D23. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 99.66 | 0.64 | 6.78 | 0.95 | 4.73 | 1.96 | 5.11 | 0.67 | 2.97 | 0.13 | 27.65 | 51.59 |
| M1 | 0.17 | 0.75 | 8.06 | 1.35 | 7.37 | 1.83 | 6.57 | 0.47 | 3.32 | 1.60 | 26.95 | 58.26 |
| M2 | 0.03 | 0.83 | 8.41 | 1.35 | 7.12 | 1.61 | 6.00 | 0.64 | 3.40 | 1.96 | 27.46 | 58.78 |
| M3 | 0.07 | 0.68 | 7.26 | 0.90 | 5.21 | 1.84 | 4.95 | 0.65 | 2.90 | 0.64 | 27.16 | 52.19 |
| M4 | 0.07 | 0.81 | 8.19 | 0.84 | 7.07 | 1.20 | 5.58 | 0.43 | 3.47 | 3.12 | 25.98 | 56.68 |
| Total | 100.00 | 0.64 | 6.79 | 0.95 | 4.74 | 1.96 | 5.11 | 0.67 | 2.97 | 0.14 | 27.65 | 51.61 |

*Table 3D24. Light REE analysis on a dry ash-only basis for samples collected from the processing of the 0.6 x 0.15 mm (28 x 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 99.66 | 12.73 | 29.68 | 48.11 | 16.60 | 45.08 | 6.17 | 158.37 |
| M1 | 0.17 | 13.59 | 39.00 | 78.02 | 36.89 | 38.58 | 10.19 | 216.26 |
| M2 | 0.03 | 15.54 | 41.56 | 77.03 | 41.01 | 40.04 | 10.10 | 225.28 |
| M3 | 0.07 | 13.62 | 35.01 | 65.27 | 25.35 | 40.82 | 6.96 | 187.03 |
| M4 | 0.07 | 14.38 | 38.58 | 71.94 | 47.26 | 36.29 | 8.19 | 216.64 |
| Total | 100.00 | 12.74 | 29.71 | 48.23 | 16.70 | 45.05 | 6.18 | 158.61 |

*Appendix 5.3E – Magnetic Separation Data (minus 100 mesh)*

*Table 3E1. Heavy REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 97.52 | 1.08 | 7.04 | 0.81 | 5.29 | 1.70 | 5.46 | 0.52 | 2.72 | 0.43 | 23.44 | 48.48 | 97.18 |
| M1 | 0.63 | 1.10 | 8.12 | 3.68 | 9.79 | 0.00 | 3.97 | 0.21 | 4.01 | 5.51 | 21.08 | 57.45 | 0.74 |
| M2 | 0.44 | 1.29 | 8.42 | 2.44 | 8.99 | 0.18 | 4.76 | 0.31 | 3.94 | 4.62 | 24.27 | 59.22 | 0.54 |
| M3 | 1.10 | 1.11 | 7.28 | 1.19 | 6.65 | 1.67 | 3.50 | 0.56 | 3.03 | 1.14 | 25.75 | 51.89 | 1.17 |
| M4 | 0.31 | 1.23 | 8.27 | 2.11 | 8.38 | 0.76 | 4.44 | 0.37 | 3.40 | 2.77 | 25.66 | 57.37 | 0.37 |
| Total | 100.00 | 1.08 | 7.06 | 0.84 | 5.36 | 1.68 | 5.43 | 0.51 | 2.74 | 0.50 | 23.46 | 48.65 | 100.00 |

*Table 3E2. Light REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 97.52 | 14.19 | 38.92 | 82.87 | 16.61 | 39.59 | 9.00 | 201.19 | 97.41 |
| M1 | 0.63 | 16.10 | 22.93 | 52.57 | 64.56 | 16.32 | 20.75 | 193.22 | 0.60 |
| M2 | 0.44 | 15.57 | 31.09 | 69.14 | 51.88 | 27.29 | 16.92 | 211.89 | 0.46 |
| M3 | 1.10 | 15.75 | 40.72 | 80.51 | 25.73 | 40.62 | 10.65 | 213.97 | 1.17 |
| M4 | 0.31 | 16.27 | 39.04 | 76.91 | 46.09 | 36.12 | 15.91 | 230.34 | 0.35 |
| Total | 100.00 | 14.23 | 38.81 | 82.58 | 17.26 | 39.39 | 9.15 | 201.41 | 100.00 |

*Table 3E3. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 97.52 | 1.26 | 8.26 | 0.95 | 6.21 | 1.99 | 6.41 | 0.61 | 3.19 | 0.50 | 27.50 | 56.89 |
| M1 | 0.63 | 1.34 | 9.94 | 4.50 | 11.98 | 0.00 | 4.86 | 0.25 | 4.90 | 6.75 | 25.80 | 70.34 |
| M2 | 0.44 | 1.51 | 9.85 | 2.85 | 10.51 | 0.21 | 5.57 | 0.37 | 4.60 | 5.40 | 28.39 | 69.25 |
| M3 | 1.10 | 1.29 | 8.47 | 1.39 | 7.73 | 1.94 | 4.08 | 0.66 | 3.53 | 1.33 | 29.95 | 60.36 |
| M4 | 0.31 | 1.42 | 9.56 | 2.44 | 9.70 | 0.88 | 5.13 | 0.43 | 3.93 | 3.20 | 29.68 | 66.37 |
| Total | 100.00 | 1.26 | 8.29 | 0.99 | 6.29 | 1.97 | 6.37 | 0.60 | 3.21 | 0.58 | 27.53 | 57.10 |

*Table 3E4. Light REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay seam coarse reject (UK001) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 97.52 | 16.65 | 45.68 | 97.26 | 19.49 | 46.46 | 10.57 | 236.11 |
| M1 | 0.63 | 19.71 | 28.07 | 64.36 | 79.05 | 19.98 | 25.40 | 236.56 |
| M2 | 0.44 | 18.21 | 36.36 | 80.85 | 60.67 | 31.92 | 19.78 | 247.80 |
| M3 | 1.10 | 18.31 | 47.36 | 93.63 | 29.93 | 47.25 | 12.39 | 248.86 |
| M4 | 0.31 | 18.82 | 45.16 | 88.97 | 53.31 | 41.78 | 18.41 | 266.44 |
| Total | 100.00 | 16.70 | 45.55 | 96.92 | 20.26 | 46.23 | 10.74 | 236.40 |

*Table 3E5. Heavy REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 97.30 | 0.92 | 5.11 | 0.50 | 3.49 | 1.50 | 5.09 | 0.42 | 2.21 | 0.38 | 15.70 | 35.32 | 95.75 |
| M1 | 0.60 | 1.50 | 7.34 | 3.50 | 9.98 | 1.52 | 6.10 | 0.33 | 4.13 | 5.82 | 23.36 | 63.57 | 1.06 |
| M2 | 0.52 | 1.45 | 7.84 | 2.72 | 9.15 | 0.21 | 5.38 | 0.43 | 3.81 | 4.04 | 25.59 | 60.61 | 0.88 |
| M3 | 1.18 | 1.25 | 6.91 | 1.27 | 6.37 | 1.49 | 3.41 | 0.50 | 2.99 | 1.15 | 23.18 | 48.52 | 1.59 |
| M4 | 0.40 | 1.96 | 8.28 | 3.27 | 9.69 | 0.37 | 4.30 | 0.34 | 4.44 | 4.71 | 27.19 | 64.54 | 0.72 |
| Total | 100.00 | 0.93 | 5.18 | 0.55 | 3.62 | 1.49 | 5.08 | 0.42 | 2.25 | 0.46 | 15.93 | 35.90 | 100.00 |

*Table 3E6. Light REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 97.30 | 13.97 | 24.04 | 65.87 | 11.90 | 28.34 | 6.01 | 150.12 | 96.00 |
| M1 | 0.60 | 13.88 | 27.87 | 55.19 | 73.70 | 20.16 | 24.87 | 215.67 | 0.85 |
| M2 | 0.52 | 14.41 | 34.94 | 76.20 | 56.42 | 31.78 | 19.74 | 233.49 | 0.80 |
| M3 | 1.18 | 15.93 | 40.25 | 81.36 | 25.78 | 41.76 | 11.28 | 216.37 | 1.68 |
| M4 | 0.40 | 13.32 | 41.95 | 82.42 | 61.02 | 36.78 | 22.23 | 257.72 | 0.68 |
| Total | 100.00 | 13.99 | 24.38 | 66.11 | 12.86 | 28.50 | 6.32 | 152.16 | 100.00 |

*Table 3E7. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 97.30 | 1.04 | 5.79 | 0.57 | 3.95 | 1.69 | 5.76 | 0.48 | 2.50 | 0.43 | 17.77 | 39.99 |
| M1 | 0.60 | 1.85 | 9.02 | 4.30 | 12.26 | 1.86 | 7.50 | 0.40 | 5.08 | 7.15 | 28.71 | 78.13 |
| M2 | 0.52 | 1.69 | 9.17 | 3.18 | 10.70 | 0.24 | 6.29 | 0.50 | 4.45 | 4.73 | 29.94 | 70.90 |
| M3 | 1.18 | 1.39 | 7.69 | 1.41 | 7.09 | 1.65 | 3.80 | 0.55 | 3.33 | 1.28 | 25.79 | 53.97 |
| M4 | 0.40 | 2.22 | 9.38 | 3.71 | 10.98 | 0.42 | 4.87 | 0.38 | 5.04 | 5.34 | 30.82 | 73.16 |
| Total | 100.00 | 1.06 | 5.86 | 0.63 | 4.10 | 1.68 | 5.75 | 0.48 | 2.54 | 0.52 | 18.04 | 40.65 |

*Table 3E8. Light REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Eagle seam coarse reject (UK002) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 97.30 | 15.82 | 27.21 | 74.56 | 13.47 | 32.08 | 6.80 | 169.94 |
| M1 | 0.60 | 17.05 | 34.26 | 67.83 | 90.57 | 24.77 | 30.57 | 265.05 |
| M2 | 0.52 | 16.86 | 40.88 | 89.15 | 66.00 | 37.18 | 23.09 | 273.15 |
| M3 | 1.18 | 17.73 | 44.78 | 90.52 | 28.68 | 46.46 | 12.54 | 240.71 |
| M4 | 0.40 | 15.10 | 47.55 | 93.43 | 69.17 | 41.69 | 25.20 | 292.13 |
| Total | 100.00 | 15.85 | 27.61 | 74.86 | 14.56 | 32.28 | 7.16 | 172.32 |

*Table 3E9. Heavy REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 98.31 | 1.21 | 6.58 | 0.88 | 4.75 | 1.46 | 5.19 | 0.40 | 2.54 | 0.72 | 20.01 | 43.73 | 97.92 |
| M1 | 0.30 | 1.68 | 8.70 | 2.91 | 10.04 | -0.06 | 5.78 | 0.50 | 4.23 | 4.34 | 28.10 | 66.22 | 0.45 |
| M2 | 0.26 | 1.52 | 8.21 | 2.31 | 8.81 | 0.54 | 4.81 | 0.46 | 3.62 | 3.15 | 25.37 | 58.81 | 0.35 |
| M3 | 0.91 | 1.20 | 6.58 | 1.09 | 4.93 | 1.43 | 5.29 | 0.44 | 2.69 | 0.97 | 20.24 | 44.87 | 0.93 |
| M4 | 0.22 | 1.74 | 9.51 | 2.14 | 9.39 | 1.32 | 5.11 | 0.56 | 4.12 | 2.61 | 33.98 | 70.48 | 0.35 |
| Total | 100.00 | 1.21 | 6.59 | 0.89 | 4.79 | 1.45 | 5.19 | 0.40 | 2.55 | 0.75 | 20.08 | 43.91 | 100.00 |

*Table 3E10. Light REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 98.31 | 13.57 | 34.27 | 75.04 | 18.25 | 36.20 | 9.00 | 186.33 | 98.01 |
| M1 | 0.30 | 17.76 | 38.00 | 83.03 | 59.59 | 36.02 | 21.48 | 255.89 | 0.41 |
| M2 | 0.26 | 15.51 | 38.36 | 88.61 | 48.13 | 38.15 | 18.00 | 246.76 | 0.34 |
| M3 | 0.91 | 13.89 | 32.30 | 73.37 | 20.46 | 35.73 | 9.42 | 185.17 | 0.90 |
| M4 | 0.22 | 16.35 | 51.67 | 102.62 | 42.98 | 51.31 | 18.15 | 283.08 | 0.33 |
| Total | 100.00 | 13.59 | 34.31 | 75.15 | 18.52 | 36.24 | 9.08 | 186.89 | 100.00 |

*Table 3E11. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 98.31 | 1.38 | 7.51 | 1.00 | 5.42 | 1.66 | 5.93 | 0.46 | 2.90 | 0.83 | 22.85 | 49.94 |
| M1 | 0.30 | 1.91 | 9.89 | 3.31 | 11.41 | -0.07 | 6.56 | 0.56 | 4.80 | 4.93 | 31.91 | 75.22 |
| M2 | 0.26 | 1.71 | 9.22 | 2.60 | 9.89 | 0.61 | 5.41 | 0.52 | 4.07 | 3.54 | 28.50 | 66.06 |
| M3 | 0.91 | 1.36 | 7.45 | 1.23 | 5.58 | 1.62 | 5.98 | 0.50 | 3.04 | 1.10 | 22.91 | 50.77 |
| M4 | 0.22 | 1.93 | 10.58 | 2.38 | 10.45 | 1.47 | 5.68 | 0.62 | 4.59 | 2.91 | 37.80 | 78.40 |
| Total | 100.00 | 1.38 | 7.53 | 1.02 | 5.46 | 1.65 | 5.93 | 0.46 | 2.91 | 0.85 | 22.93 | 50.13 |

*Table 3E12. Light REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Fire Clay Rider seam coarse reject (UK003) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 98.31 | 15.50 | 39.13 | 85.70 | 20.84 | 41.35 | 10.27 | 212.80 |
| M1 | 0.30 | 20.18 | 43.16 | 94.31 | 67.69 | 40.91 | 24.40 | 290.65 |
| M2 | 0.26 | 17.43 | 43.09 | 99.54 | 54.06 | 42.86 | 20.22 | 277.19 |
| M3 | 0.91 | 15.72 | 36.55 | 83.03 | 23.15 | 40.43 | 10.66 | 209.54 |
| M4 | 0.22 | 18.18 | 57.48 | 114.15 | 47.81 | 57.08 | 20.19 | 314.88 |
| Total | 100.00 | 15.52 | 39.18 | 85.81 | 21.15 | 41.38 | 10.37 | 213.40 |

*Table 3E13. Heavy REE analysis on a whole sample basis for samples collected from the processing of the fly ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 89.91 | 3.21 | 19.28 | 2.39 | 16.14 | 5.26 | 9.35 | 2.21 | 8.08 | 0.67 | 92.01 | 158.59 | 90.47 |
| M1 | 6.11 | 3.49 | 15.25 | 5.25 | 17.64 | 0.37 | 5.65 | 1.64 | 8.62 | 6.94 | 69.44 | 134.28 | 5.21 |
| M2 | 0.99 | 4.00 | 24.92 | 0.00 | 15.00 | 3.48 | 8.14 | 2.31 | 10.04 | 2.61 | 106.81 | 177.31 | 1.11 |
| M3 | 2.29 | 3.43 | 20.48 | 2.63 | 17.08 | 5.41 | 9.83 | 2.26 | 8.55 | 1.01 | 97.84 | 168.51 | 2.45 |
| M4 | 0.70 | 3.73 | 20.64 | 3.62 | 18.75 | 4.18 | 9.42 | 2.13 | 9.22 | 2.86 | 97.98 | 172.52 | 0.77 |
| Total | 100.00 | 3.25 | 19.13 | 2.55 | 16.26 | 4.94 | 9.13 | 2.17 | 8.15 | 1.10 | 90.95 | 157.62 | 100.00 |

*Table 3E14. Light REE analysis on a whole sample basis for samples collected from the processing of the fly ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 89.91 | 44.65 | 99.42 | 181.89 | 39.23 | 92.52 | 19.13 | 476.83 | 90.89 |
| M1 | 6.11 | 32.85 | 61.34 | 119.77 | 91.81 | 50.81 | 33.18 | 389.76 | 5.05 |
| M2 | 0.99 | 36.77 | 97.44 | 130.02 | 52.90 | 111.05 | 10.94 | 439.12 | 0.92 |
| M3 | 2.29 | 46.66 | 100.72 | 188.38 | 43.47 | 96.48 | 20.35 | 496.06 | 2.41 |
| M4 | 0.70 | 45.17 | 97.05 | 176.06 | 61.03 | 89.31 | 25.07 | 493.68 | 0.73 |
| Total | 100.00 | 43.90 | 97.09 | 177.69 | 42.83 | 90.22 | 19.97 | 471.70 | 100.00 |

*Table 3E15. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the fly ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 89.91 | 3.21 | 19.28 | 2.39 | 16.14 | 5.26 | 9.35 | 2.21 | 8.08 | 0.67 | 92.01 | 158.59 |
| M1 | 6.11 | 3.49 | 15.25 | 5.25 | 17.64 | 0.37 | 5.65 | 1.64 | 8.62 | 6.94 | 69.44 | 134.28 |
| M2 | 0.99 | 4.00 | 24.92 | 0.00 | 15.00 | 3.48 | 8.14 | 2.31 | 10.04 | 2.61 | 106.81 | 177.31 |
| M3 | 2.29 | 3.43 | 20.48 | 2.63 | 17.08 | 5.41 | 9.83 | 2.26 | 8.55 | 1.01 | 97.84 | 168.51 |
| M4 | 0.70 | 3.73 | 20.64 | 3.62 | 18.75 | 4.18 | 9.42 | 2.13 | 9.22 | 2.86 | 97.98 | 172.52 |
| Total | 100.00 | 3.25 | 19.13 | 2.55 | 16.26 | 4.94 | 9.13 | 2.17 | 8.15 | 1.10 | 90.95 | 157.62 |

*Table 3E16. Light REE analysis on a dry ash-only basis for samples collected from the processing of the fly ash material (UK004) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 89.91 | 44.65 | 99.42 | 181.89 | 39.23 | 92.52 | 19.13 | 476.83 |
| M1 | 6.11 | 32.85 | 61.34 | 119.77 | 91.81 | 50.81 | 33.18 | 389.76 |
| M2 | 0.99 | 36.77 | 97.44 | 130.02 | 52.90 | 111.05 | 10.94 | 439.12 |
| M3 | 2.29 | 46.66 | 100.72 | 188.38 | 43.47 | 96.48 | 20.35 | 496.06 |
| M4 | 0.70 | 45.17 | 97.05 | 176.06 | 61.03 | 89.31 | 25.07 | 493.68 |
| Total | 100.00 | 43.90 | 97.09 | 177.69 | 42.83 | 90.22 | 19.97 | 471.70 |

*Table 3E17. Heavy REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 99.47 | 0.25 | 1.31 | 0.23 | 1.34 | 0.48 | 1.33 | 0.07 | 0.68 | 0.25 | 4.62 | 10.58 | 96.93 |
| M1 | 0.17 | 2.06 | 9.71 | 4.87 | 13.61 | 0.00 | 4.62 | 0.50 | 6.34 | 7.41 | 37.40 | 86.52 | 1.38 |
| M2 | 0.12 | 2.25 | 7.71 | 5.52 | 12.69 | 0.00 | 2.82 | 0.41 | 6.30 | 8.80 | 25.59 | 72.09 | 0.77 |
| M3 | 0.17 | 0.71 | 4.14 | 0.72 | 4.32 | 1.28 | 3.47 | 0.41 | 2.15 | 0.73 | 18.12 | 36.04 | 0.55 |
| M4 | 0.07 | 1.33 | 6.77 | 1.88 | 7.72 | 1.00 | 5.08 | 0.55 | 3.77 | 2.83 | 23.94 | 54.86 | 0.37 |
| Total | 100.00 | 0.25 | 1.34 | 0.25 | 1.39 | 0.48 | 1.35 | 0.07 | 0.70 | 0.28 | 4.74 | 10.85 | 100.00 |

*Table 3E18. Light REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 99.47 | 3.90 | 12.03 | 21.69 | 6.06 | 11.20 | 2.10 | 56.97 | 97.49 |
| M1 | 0.17 | 17.06 | 53.56 | 96.90 | 112.35 | 43.87 | 34.67 | 358.40 | 1.06 |
| M2 | 0.12 | 13.32 | 39.06 | 69.50 | 126.94 | 25.13 | 40.13 | 314.08 | 0.63 |
| M3 | 0.17 | 10.01 | 31.98 | 57.47 | 18.45 | 31.25 | 6.13 | 155.28 | 0.45 |
| M4 | 0.07 | 16.12 | 59.87 | 105.03 | 53.71 | 50.82 | 15.59 | 301.14 | 0.37 |
| Total | 100.00 | 3.95 | 12.20 | 21.99 | 6.44 | 11.34 | 2.22 | 58.13 | 100.00 |

*Table 3E19. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 99.47 | 0.52 | 2.76 | 0.49 | 2.83 | 1.01 | 2.81 | 0.15 | 1.43 | 0.53 | 9.72 | 22.24 |
| M1 | 0.17 | 2.13 | 10.07 | 5.06 | 14.11 | 0.00 | 4.79 | 0.52 | 6.58 | 7.69 | 38.80 | 89.76 |
| M2 | 0.12 | 2.44 | 8.38 | 5.99 | 13.79 | 0.00 | 3.06 | 0.45 | 6.84 | 9.56 | 27.80 | 78.30 |
| M3 | 0.17 | 1.39 | 8.16 | 1.42 | 8.51 | 2.53 | 6.83 | 0.80 | 4.23 | 1.44 | 35.70 | 71.02 |
| M4 | 0.07 | 1.39 | 7.07 | 1.96 | 8.07 | 1.04 | 5.31 | 0.57 | 3.94 | 2.95 | 25.00 | 57.30 |
| Total | 100.00 | 0.53 | 2.81 | 0.52 | 2.91 | 1.01 | 2.82 | 0.16 | 1.47 | 0.58 | 9.93 | 22.74 |

*Table 3E20. Light REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Pittsburgh coal fines sample (UK005) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 99.47 | 8.19 | 25.30 | 45.62 | 12.74 | 23.56 | 4.42 | 119.84 |
| M1 | 0.17 | 17.70 | 55.56 | 100.52 | 116.56 | 45.51 | 35.97 | 371.82 |
| M2 | 0.12 | 14.47 | 42.43 | 75.49 | 137.88 | 27.29 | 43.60 | 341.17 |
| M3 | 0.17 | 19.72 | 63.02 | 113.27 | 36.36 | 61.58 | 12.08 | 306.03 |
| M4 | 0.07 | 16.84 | 62.54 | 109.71 | 56.11 | 53.09 | 16.29 | 314.57 |
| Total | 100.00 | 8.27 | 25.56 | 46.09 | 13.49 | 23.76 | 4.65 | 121.83 |

*Table 3E21. Heavy REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (whole coal basis) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) | Total HREE (%) |
| NM | 99.70 | 0.47 | 4.79 | 0.60 | 3.43 | 1.33 | 3.59 | 0.48 | 2.04 | 0.08 | 19.28 | 36.09 | 99.52 |
| M1 | 0.05 | 0.67 | 9.47 | 1.67 | 10.43 | 3.09 | 10.81 | 0.74 | 3.51 | 1.59 | 26.56 | 68.52 | 0.09 |
| M2 | 0.05 | 0.82 | 8.44 | 1.49 | 8.16 | 2.10 | 7.35 | 0.65 | 3.37 | 1.58 | 27.81 | 61.78 | 0.08 |
| M3 | 0.16 | 0.64 | 5.97 | 0.76 | 4.60 | 1.48 | 4.11 | 0.49 | 2.33 | 0.57 | 23.02 | 43.97 | 0.19 |
| M4 | 0.05 | 1.80 | 10.81 | 3.49 | 12.05 | 0.80 | 7.50 | 0.73 | 5.29 | 4.56 | 35.38 | 82.39 | 0.12 |
| Total | 100.00 | 0.47 | 4.80 | 0.61 | 3.45 | 1.33 | 3.60 | 0.48 | 2.04 | 0.08 | 19.30 | 36.15 | 100.00 |

*Table 3E22. Light REE analysis on a whole coal basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (whole coal basis) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) | Total LREE (%) |
| NM | 99.70 | 8.89 | 21.59 | 36.73 | 11.87 | 30.87 | 4.48 | 114.45 | 99.43 |
| M1 | 0.05 | 14.41 | 51.52 | 104.10 | 43.37 | 43.89 | 12.79 | 270.07 | 0.11 |
| M2 | 0.05 | 12.42 | 48.74 | 92.37 | 36.71 | 42.65 | 11.37 | 244.25 | 0.10 |
| M3 | 0.16 | 9.50 | 32.99 | 60.59 | 19.40 | 34.74 | 6.53 | 163.75 | 0.23 |
| M4 | 0.05 | 16.33 | 51.94 | 100.63 | 69.71 | 42.64 | 21.15 | 302.39 | 0.13 |
| Total | 100.00 | 8.90 | 21.65 | 36.86 | 11.94 | 30.90 | 4.50 | 114.76 | 100.00 |

*Table 3E23. Heavy REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eu (ppm) | Gd (ppm) | Tb (ppm) | Dy (ppm) | Ho (ppm) | Er (ppm) | Tm (ppm) | Yb (ppm) | Lu (ppm) | Y (ppm) | Total HREE (ppm) |
| NM | 99.70 | 0.71 | 7.15 | 0.90 | 5.13 | 1.98 | 5.36 | 0.72 | 3.05 | 0.12 | 28.80 | 53.91 |
| M1 | 0.05 | 0.83 | 11.87 | 2.09 | 13.07 | 3.87 | 13.54 | 0.93 | 4.39 | 2.00 | 33.29 | 85.87 |
| M2 | 0.05 | 1.03 | 10.62 | 1.88 | 10.28 | 2.65 | 9.25 | 0.82 | 4.25 | 1.99 | 35.02 | 77.79 |
| M3 | 0.16 | 0.86 | 8.06 | 1.02 | 6.21 | 1.99 | 5.54 | 0.66 | 3.14 | 0.77 | 31.07 | 59.33 |
| M4 | 0.05 | 2.01 | 12.10 | 3.91 | 13.50 | 0.89 | 8.40 | 0.82 | 5.92 | 5.10 | 39.62 | 92.27 |
| Total | 100.00 | 0.71 | 7.16 | 0.90 | 5.14 | 1.98 | 5.37 | 0.72 | 3.05 | 0.12 | 28.82 | 53.98 |

*Table 3E24. Light REE analysis on a dry ash-only basis for samples collected from the processing of the minus 0.15 mm (minus 100 mesh) particle size fraction of the Texas lignite pit cleanings sample (UK006) using a wet high intensity magnetic separator.*

| Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sc (ppm) | La (ppm) | Ce (ppm) | Pr (ppm) | Nd (ppm) | Sm (ppm) | Total LREE (ppm) |
| NM | 99.70 | 13.29 | 32.25 | 54.87 | 17.74 | 46.12 | 6.70 | 170.97 |
| M1 | 0.05 | 18.06 | 64.56 | 130.45 | 54.34 | 55.00 | 16.03 | 338.43 |
| M2 | 0.05 | 15.64 | 61.37 | 116.31 | 46.22 | 53.70 | 14.32 | 307.55 |
| M3 | 0.16 | 12.82 | 44.51 | 81.75 | 26.17 | 46.88 | 8.82 | 220.95 |
| M4 | 0.05 | 18.28 | 58.16 | 112.69 | 78.06 | 47.75 | 23.68 | 338.63 |
| Total | 100.00 | 13.29 | 32.33 | 55.03 | 17.83 | 46.13 | 6.72 | 171.34 |

*Appendix 5.3F – Multi-Gravity and Electrostatic Separations*

Fire Clay Coarse Refuse Separation Data

Coarse Ref Crushed < 1/4 " Electrostatic drying sample

| Size | Tare (g) | Tare + Sample (g) | Sample (g) |
|---|---|---|---|
| 20 x 100 M | 855.17 | 2982.69 | 2127.52 |

Coarse Ref Crushed < 1/4 " Electrostatic -100 M screened at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Weight (%) |
|---|---|---|---|---|
| 100 x 325 M | 661.18 | 2027.08 | 1365.90 | 37.64 |
| -325 | | | 2262.84 | 62.36 |
| | | Total | 3628.74 | 100.00 |

| | (lbs) | (g) |
|---|---|---|
| Electrostatic Sample | 8 | 3628.74 |

Electrostatic Coarse Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 362.8 | 661.3 | 298.5 | 0.66 | 22.24 | | |
| Mids | 337.1 | 356.3 | 19.2 | 0.04 | 1.43 | | |
| Non-Conductive | 454.1 | 1478.6 | 1024.5 | 2.26 | 76.33 | Material (%) | Loss |
| | | Total | 1342.20 | 2.96 | 100.00 | | 1.74 |

Electrostatic Coarse Ref 20 x 100 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 362.8 | 537.8 | 175.0 | 0.39 | 8.26 | | |
| Mids | 361.2 | 1682.4 | 1321.2 | 2.91 | 62.36 | | |
| Non-Conductive | 454.1 | 1076.6 | 622.5 | 1.37 | 29.38 | Material (%) | Loss |
| | | Total | 2118.70 | 4.67 | 100.00 | | 0.41 |

| MGS TESTING | From Coarse Refuse | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 m x 100 m | | | | 100 m x 0 | | | |
| | Test 1 (8/25/14) | | Test 2 (8/25/14) | | Test 1 (8/25/14) | | Test 2 (8/25/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 102.93 | 24.49 | 50.37 | 24.49 | 71.23 | 24.42 | 32.66 | 24.42 |
| Heavy | 58.30 | 37.56 | 2.03 | 34.32 | 32.97 | 35.90 | 8.65 | 57.08 |
| Light | 78.23 | 5.44 | 82.96 | 4.84 | 53.81 | 8.30 | 42.20 | 6.18 |
| Water | 34.61 | | 34.61 | | 18.20 | | 18.20 | |
| Heavy Yield (%, dry basis) | 83.72 | | 14.80 | | 72.61 | | 65.45 | |

Fire Clay Rider Seam Coal Separation Data

Coarse Ref Crushed < 1/4 " Electostatic drying sample

| Size | Tare (g) | Tare + Sample (g) | Sample (g) |
|---|---|---|---|
| 20 x 100 M | 821.98 | 2695.22 | 1873.24 |

Coarse Ref Crushed < 1/4 " Electostatic -100 M screened at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Weight (%) |
|---|---|---|---|---|
| 100 x 325 M | 856.83 | 1838.95 | 982.12 | 43.30 |
| -325 | | | 1285.84 | 56.70 |
| | | Total | 2267.96 | 100.00 |

| | (lbs) | (g) |
|---|---|---|
| Electrostatic Sample | 5 | 2267.96 |

Electrostatic Coarse Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 337.1 | 582.0 | 244.9 | 0.54 | 25.76 | | |
| Mids | 362.8 | 390.6 | 27.8 | 0.06 | 2.92 | | |
| Non-Conductive | 454.1 | 1132.1 | 678.0 | 1.49 | 71.32 | Material (%) | Loss |
| | | Total | 950.70 | 2.10 | 100.00 | | 3.20 |

Electrostatic Coarse Ref 20 x 100 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 361.2 | 558.5 | 197.3 | 0.43 | 10.58 | | |
| Mids | 362.8 | 755.8 | 393.0 | 0.87 | 21.08 | | |
| Non-Conductive | 337.1 | 1610.8 | 1273.7 | 2.81 | 68.33 | Material (%) | Loss |
| | | Total | 1864.00 | 4.11 | 100.00 | | 0.49 |

| MGS TESTING | From Coarse Refuse | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 m x 100 m | | | | 100 m x 0 | | | |
| | Test 1 (8/26/14) | | Test 2 (8/26/14) | | Test 1 (8/22/14) | | Test 2 (8/22/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 111.00 | 23.60 | 55.77 | 23.60 | 66.40 | 25.91 | 31.76 | 25.91 |
| Heavy | 49.74 | 32.18 | 40.72 | 31.67 | 34.53 | 36.05 | 10.56 | 55.12 |
| Light | 84.89 | 5.58 | 48.67 | 4.28 | 45.86 | 6.99 | 39.47 | 5.36 |
| Water | 33.62 | | 33.62 | | 18.27 | | 18.27 | |
| Heavy Yield (%, dry basis) | 77.18 | | 86.09 | | 79.53 | | 73.34 | |

Eagle Seam Coal Separation Data

Coarse Ref Crushed < 1/4 " Electostatic drying sample

| Size | Tare (g) | Tare + Sample (g) | Sample (g) |
|---|---|---|---|
| 20 x 100 M | 821.98 | 2695.22 | 1873.24 |

Coarse Ref Crushed < 1/4 " Electostatic -100 M screened at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Weight (%) |
|---|---|---|---|---|
| 100 x 325 M | 856.83 | 1838.95 | 982.12 | 43.30 |
| -325 | | | 1285.84 | 56.70 |
| | | Total | 2267.96 | 100.00 |

| | (lbs) | (g) |
|---|---|---|
| Electrostatic Sample | 5 | 2267.96 |

Electrostatic Coarse Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 337.1 | 582.0 | 244.9 | 0.54 | 25.76 | | |
| Mids | 362.8 | 390.6 | 27.8 | 0.06 | 2.92 | | |
| Non-Conductive | 454.1 | 1132.1 | 678.0 | 1.49 | 71.32 | Material (%) | Loss |
| | | Total | 950.70 | 2.10 | 100.00 | | 3.20 |

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) | | |
|---|---|---|---|---|---|---|---|
| Conductive | 361.2 | 558.5 | 197.3 | 0.43 | 10.58 | | |
| Mids | 362.8 | 755.8 | 393.0 | 0.87 | 21.08 | | |
| Non-Conductive | 337.1 | 1610.8 | 1273.7 | 2.81 | 68.33 | Material (%) | Loss |
| | | Total | 1864.00 | 4.11 | 100.00 | | 0.49 |

| MGS TESTING | From Coarse Refuse | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 m x 100 m | | | | 100 m x 0 | | | |
| | Test 1 (8/26/14) | | Test 2 (8/26/14) | | Test 1 (8/22/14) | | Test 2 (8/22/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 100.26 | 14.12 | 51.71 | 14.12 | 68.56 | 24.80 | 29.08 | 24.80 |
| Heavy | 35.34 | 29.79 | 9.63 | 36.62 | 31.48 | 37.63 | 7.74 | 60.33 |
| Light | 95.59 | 5.55 | 75.54 | 5.60 | 50.70 | 8.36 | 39.60 | 5.86 |
| Water | 33.46 | | 33.46 | | 18.26 | | 18.26 | |
| Heavy Yield (%, dry basis) | 66.47 | | 45.45 | | 73.64 | | 66.82 | |

## Appendix 5.4 –Separation Performance on Fine Samples

*Appendix 5.4A Froth Flotation Separation Data*

*Table 4A1. Flotation test conditions used to process the Fire Clay thickener underflow material.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Thickener Underflow (UK 001) | Talon 9400 | 1 | 9.53 | 1C | 1T |
| | | 1.5 | 9.49 | 2C | 2T |
| | | 2.5 | 9.24 | 3C | 3T |
| | Oleic Acid | 1 | 9.36 | 4C | 4T |
| | | 2.5 | 9.51 | 5C | 5T |
| | Sodium Oleate | 0.5 | 9.01 | 6C | 6T |
| | | 1 | 9.13 | 7C | 7T |
| | | 2.5 | 9.19 | 8C | 8T |

*Table 4A2. Results obtained from the flotation tests performed on Fire Clay thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | Total REE (ash basis) | Total REE (whole sample) | REE Distribution | Concentration Ratio |
|---|---|---|---|---|---|---|---|
| Fire Clay Thickener Underflow (UK 001) | 1C | 9.22 | 88.67 | 329 | 292 | 10.66 | 15.61 |
| | 1T | 90.78 | 91.30 | 272 | 248 | 89.34 | -1.59 |
| | | | | | | | |
| | 2C | 26.54 | 87.03 | 314 | 273 | 29.58 | 11.46 |
| | 2T | 73.46 | 92.94 | 253 | 235 | 70.42 | -4.14 |
| | | | | | | | |
| | 3C | 25.28 | 85.78 | 327 | 281 | 29.04 | 14.88 |
| | 3T | 74.72 | 92.94 | 250 | 232 | 70.96 | -5.04 |
| | | | | | | | |
| | 4C | 8.55 | 81.57 | 348 | 284 | 9.90 | 15.83 |
| | 4T | 91.45 | 91.94 | 263 | 241 | 90.10 | -1.48 |
| | | | | | | | |
| | 5C | 15.41 | 81.47 | 473 | 386 | 23.13 | 50.10 |
| | 5T | 84.59 | 92.85 | 251 | 233 | 76.87 | -9.13 |
| | | | | | | | |
| | 6C | 4.87 | 87.13 | 337 | 294 | 6.05 | 24.32 |
| | 6T | 95.13 | 91.35 | 255 | 233 | 93.95 | -1.25 |
| | | | | | | | |
| | 7C | 11.10 | 87.11 | 340 | 296 | 13.41 | 20.84 |
| | 7T | 88.90 | 91.63 | 261 | 239 | 86.59 | -2.60 |
| | | | | | | | |
| | 8C | 28.10 | 88.97 | 305 | 271 | 31.78 | 13.10 |
| | 8T | 71.90 | 91.78 | 248 | 228 | 68.22 | -5.12 |

*Table 4A3. Heavy REE analysis data from the flotation tests performed on Fire Clay thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Thickener Underflow (UK 001) | 1C | 9.22 | 11.98 | 1.55 | 9.66 | 1.06 | 6.48 | 2.16 | 6.56 | 0.65 | 3.59 | 21.04 | 64.74 |
| | 1T | 90.78 | 9.95 | 1.29 | 8.46 | 1.03 | 5.90 | 1.81 | 5.79 | 0.55 | 3.08 | 20.08 | 57.92 |
| | | | | | | | | | | | | | |
| | 2C | 26.54 | 10.90 | 1.44 | 11.08 | 1.25 | 6.57 | 2.13 | 6.42 | 0.65 | 3.68 | 24.58 | 68.69 |
| | 2T | 73.46 | 9.41 | 1.22 | 7.30 | 1.01 | 5.22 | 1.74 | 5.52 | 0.52 | 2.82 | 18.10 | 52.85 |
| | | | | | | | | | | | | | |
| | 3C | 25.28 | 11.48 | 1.46 | 12.02 | 1.33 | 7.06 | 2.13 | 6.68 | 0.64 | 3.80 | 25.96 | 72.55 |
| | 3T | 74.72 | 9.35 | 1.21 | 7.14 | 0.96 | 5.30 | 1.73 | 5.43 | 0.50 | 2.76 | 17.94 | 52.31 |
| | | | | | | | | | | | | | |
| | 4C | 8.55 | 12.95 | 1.58 | 11.24 | 1.31 | 7.24 | 2.24 | 6.84 | 0.69 | 4.02 | 22.28 | 70.39 |
| | 4T | 91.45 | 9.74 | 1.25 | 8.14 | 1.07 | 5.79 | 1.86 | 5.63 | 0.52 | 2.95 | 19.45 | 56.38 |
| | | | | | | | | | | | | | |
| | 5C | 15.41 | 2.09 | 22.51 | 0.88 | 7.15 | 1.38 | 8.90 | 0.82 | 4.00 | 1.69 | 41.93 | 91.36 |
| | 5T | 84.59 | 9.40 | 1.20 | 7.35 | 0.96 | 5.41 | 1.73 | 5.53 | 0.53 | 2.76 | 18.40 | 53.28 |
| | | | | | | | | | | | | | |
| | 6C | 4.87 | 1.70 | 11.86 | 1.14 | 7.25 | 2.33 | 6.86 | 0.70 | 3.83 | 0.80 | 31.83 | 68.31 |
| | 6T | 95.13 | 1.15 | 7.50 | 1.03 | 5.39 | 1.66 | 5.48 | 0.52 | 2.85 | 0.57 | 22.27 | 48.42 |
| | | | | | | | | | | | | | |
| | 7C | 11.10 | 11.90 | 1.58 | 11.58 | 1.21 | 7.26 | 2.34 | 6.82 | 0.69 | 3.85 | 24.89 | 72.14 |
| | 7T | 88.90 | 9.82 | 1.25 | 8.13 | 1.06 | 5.80 | 1.84 | 5.71 | 0.52 | 2.92 | 19.40 | 56.46 |
| | | | | | | | | | | | | | |
| | 8C | 28.10 | 10.62 | 1.42 | 10.42 | 1.15 | 6.58 | 2.07 | 6.28 | 0.63 | 3.48 | 24.33 | 66.99 |
| | 8T | 71.90 | 9.38 | 1.18 | 7.47 | 0.97 | 5.43 | 1.76 | 5.43 | 0.50 | 2.75 | 18.41 | 53.26 |

*Table 4A4. Light REE analysis data from the flotation tests performed on Fire Clay thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Thickener Underflow (UK 001) | 1C | 9.22 | 29.34 | 54.25 | 21.04 | 97.10 | 9.30 | 53.10 | 264.13 |
| | 1T | 90.78 | 24.58 | 42.03 | 20.08 | 77.47 | 7.36 | 42.44 | 213.97 |
| | | | | | | | | | |
| | 2C | 26.54 | 31.06 | 47.11 | 24.58 | 86.32 | 7.64 | 48.78 | 245.49 |
| | 2T | 73.46 | 21.73 | 40.14 | 18.10 | 73.30 | 6.98 | 39.93 | 200.18 |
| | | | | | | | | | |
| | 3C | 25.28 | 31.58 | 48.12 | 25.96 | 90.01 | 8.05 | 50.84 | 254.56 |
| | 3T | 74.72 | 20.82 | 39.07 | 17.94 | 73.17 | 7.07 | 39.17 | 197.25 |
| | | | | | | | | | |
| | 4C | 8.55 | 33.45 | 55.79 | 22.28 | 99.46 | 9.16 | 57.41 | 277.55 |
| | 4T | 91.45 | 22.81 | 40.86 | 19.45 | 74.69 | 7.01 | 41.38 | 206.19 |
| | | | | | | | | | |
| | 5C | 15.41 | 82.32 | 106.70 | 30.48 | 12.58 | 147.40 | 2.48 | 381.96 |
| | 5T | 84.59 | 20.46 | 40.41 | 18.40 | 72.35 | 7.37 | 39.16 | 198.15 |
| | | | | | | | | | |
| | 6C | 4.87 | 58.06 | 104.71 | 24.70 | 9.58 | 59.04 | 12.73 | 268.82 |
| | 6T | 95.13 | 37.93 | 81.19 | 19.29 | 21.57 | 37.96 | 9.06 | 207.00 |
| | | | | | | | | | |
| | 7C | 11.10 | 31.90 | 52.83 | 24.89 | 95.29 | 8.71 | 54.39 | 268.01 |
| | 7T | 88.90 | 21.86 | 40.47 | 19.40 | 74.06 | 7.38 | 41.03 | 204.19 |
| | | | | | | | | | |
| | 8C | 28.10 | 27.57 | 46.49 | 24.33 | 84.30 | 7.65 | 47.68 | 238.01 |
| | 8T | 71.90 | 20.28 | 39.16 | 18.41 | 71.27 | 6.87 | 38.77 | 194.77 |

*Table 4A5. Flotation test conditions used to process the Eagle seam thickener underflow material.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Eagle Seam Thickener Underflow (UK 002) | Talon 9400 | 1 | 9.3 | 1C | 1T |
| | | 2 | 9.69 | 2C | 2T |
| | | 5 | 9.48 | 3C | 3T |
| | Oleic Acid | 2 | 9.63 | 4C | 4T |
| | | 5 | 9.39 | 5C | 5T |

*Table 4A6. Results obtained from the flotation tests performed on Eagle seam thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | REE (ppm, ash basis) | REE (ppm, whole sample) | REE Distribution (%) | Concentration Ratio |
|---|---|---|---|---|---|---|---|
| Eagle Seam Thickener Underflow (UK 002) | 1C | 25.71 | 93.49 | 286 | 268 | 29.97 | 16.57 |
| | 1T | 74.29 | 95.29 | 227 | 217 | 70.03 | -5.73 |
| | | | | | | | |
| | 2C | 33.77 | 93.82 | 291 | 273 | 51.34 | 52.02 |
| | 2T | 66.23 | 95.33 | 139 | 132 | 48.66 | -26.53 |
| | | | | | | | |
| | 3C | 56.06 | 94.37 | 247 | 234 | 73.47 | 31.06 |
| | 3T | 43.94 | 95.09 | 113 | 108 | 26.53 | -39.63 |
| | | | | | | | |
| | 4C | 14.55 | 92.56 | 396 | 367 | 31.00 | 113.09 |
| | 4T | 85.45 | 95.29 | 146 | 139 | 69.00 | -19.26 |
| | | | | | | | |
| | 5C | 26.05 | 92.92 | 371 | 344 | 48.82 | 87.43 |
| | 5T | 73.95 | 95.24 | 133 | 127 | 51.18 | -30.80 |

*Table 4A7. Heavy REE analysis data from the flotation tests performed on Eagle seam thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Eagle Seam Thickener Underflow (UK 002) | 1C | 25.71 | 1.35 | 7.42 | 0.97 | 5.13 | 2.03 | 3.34 | 0.60 | 3.20 | 0.58 | 24.50 | 49.13 |
| | 1T | 74.29 | 1.25 | 6.23 | 0.90 | 4.76 | 1.81 | 2.81 | 0.49 | 2.68 | 0.19 | 20.34 | 41.47 |
| | | | | | | | | | | | | | |
| | 2C | 33.77 | 1.43 | 7.69 | 1.04 | 5.65 | 2.12 | 3.41 | 0.60 | 3.19 | 0.59 | 24.64 | 50.35 |
| | 2T | 66.23 | 0.78 | 4.20 | 0.77 | 3.29 | 1.41 | 1.83 | 0.44 | 1.93 | 0.03 | 11.51 | 26.19 |
| | | | | | | | | | | | | | |
| | 3C | 56.06 | 1.26 | 6.75 | 0.88 | 5.09 | 1.89 | 2.86 | 0.42 | 2.81 | 0.43 | 20.83 | 43.21 |
| | 3T | 43.94 | 0.66 | 3.51 | 0.79 | 2.69 | 1.22 | 1.52 | 0.42 | 1.74 | 0.00 | 9.17 | 21.73 |
| | | | | | | | | | | | | | |
| | 4C | 14.55 | 1.97 | 10.56 | 1.39 | 6.82 | 2.38 | 4.51 | 0.66 | 4.11 | 1.08 | 33.95 | 67.42 |
| | 4T | 85.45 | 0.80 | 4.34 | 0.80 | 3.51 | 1.45 | 1.94 | 0.43 | 1.99 | 0.03 | 11.80 | 27.08 |
| | | | | | | | | | | | | | |
| | 5C | 26.05 | 1.80 | 9.94 | 1.33 | 5.86 | 2.47 | 4.54 | 0.52 | 4.08 | 0.92 | 35.22 | 66.69 |
| | 5T | 73.95 | 0.75 | 3.93 | 0.72 | 3.33 | 1.37 | 1.72 | 0.44 | 1.86 | 0.00 | 10.78 | 24.90 |

*Table 4A8. Light REE analysis data from the flotation tests performed on Eagle seam thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Eagle Seam Thickener Underflow (UK 002) | 1C | 25.71 | 40.63 | 103.28 | 17.87 | 21.81 | 44.10 | 9.63 | 237.31 |
| | 1T | 74.29 | 39.17 | 76.33 | 18.06 | 5.65 | 38.13 | 8.46 | 185.80 |
| | | | | | | | | | |
| | 2C | 33.77 | 45.86 | 97.58 | 18.09 | 22.20 | 46.65 | 10.48 | 240.87 |
| | 2T | 66.23 | 15.62 | 46.77 | 14.77 | 9.92 | 20.39 | 4.86 | 112.32 |
| | | | | | | | | | |
| | 3C | 56.06 | 36.97 | 84.15 | 16.05 | 18.65 | 39.47 | 8.96 | 204.25 |
| | 3T | 43.94 | 10.55 | 36.47 | 14.99 | 8.60 | 16.80 | 3.99 | 91.40 |
| | | | | | | | | | |
| | 4C | 14.55 | 66.42 | 125.03 | 19.83 | 32.61 | 69.91 | 15.09 | 328.88 |
| | 4T | 85.45 | 17.19 | 48.78 | 15.15 | 10.79 | 21.65 | 5.22 | 118.79 |
| | | | | | | | | | |
| | 5C | 26.05 | 60.38 | 114.05 | 17.46 | 28.52 | 69.78 | 13.66 | 303.85 |
| | 5T | 73.95 | 14.44 | 46.01 | 15.21 | 9.56 | 18.60 | 4.75 | 108.58 |

*Table 4A9. Flotation test conditions used to process the Fire Clay Rider thickener underflow material.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Rider Seam Thickener Underflow (UK 003) | Talon 9400 | 1 | 9.3 | 1C | 1T |
| | | 2 | 9.69 | 2C | 2T |
| | | 5 | 9.48 | 3C | 3T |
| | Oleic Acid | 2 | 9.63 | 4C | 4T |
| | | 5 | 9.39 | 5C | 5T |

*Table 4A10. Results obtained from the flotation tests performed on Eagle seam thickener underflow.*

| Sample | Product | Weight (%) | Ash (%) | TREE (ppm, ash basis) | TREE (ppm, coal basis) | REE Distribution (%) | Concentration Ratio |
|---|---|---|---|---|---|---|---|
| Fire Clay Rider Seam Thickener Underflow (UK 003) | 1C | 22.31 | 93.17 | 317 | 295 | 26.77 | 20.01 |
| | 1T | 77.69 | 95.32 | 243 | 232 | 73.23 | -5.75 |
| | | | | | | | |
| | 2C | 25.62 | 93.13 | 348 | 324 | 35.10 | 37.02 |
| | 2T | 74.38 | 95.52 | 216 | 206 | 64.90 | -12.75 |
| | | | | | | | |
| | 3C | 49.66 | 94.15 | 310 | 292 | 64.23 | 29.32 |
| | 3T | 50.34 | 95.35 | 168 | 160 | 35.77 | -28.93 |
| | | | | | | | |
| | 4C | 8.48 | 92.84 | 406 | 377 | 13.31 | 56.94 |
| | 4T | 91.52 | 95.02 | 239 | 227 | 86.69 | -5.28 |
| | | | | | | | |
| | 5C | 17.79 | 91.33 | 340 | 311 | 26.04 | 46.42 |
| | 5T | 82.21 | 95.27 | 200 | 191 | 73.96 | -10.04 |

*Table 4A11. Heavy REE analysis data from the flotation tests performed on Fire Clay Rider seam thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Rider Seam Thickener Underflow (UK 003) | 1C | 22.31 | 1.70 | 8.75 | 1.14 | 6.44 | 2.10 | 3.72 | 0.60 | 3.44 | 0.91 | 29.37 | 58.18 |
| | 1T | 77.69 | 1.33 | 6.99 | 1.00 | 5.22 | 1.63 | 2.95 | 0.38 | 2.65 | 0.59 | 22.74 | 45.49 |
| | | | | | | | | | | | | | |
| | 2C | 25.62 | 1.88 | 10.23 | 1.36 | 7.21 | 2.09 | 3.91 | 0.58 | 3.54 | 1.05 | 31.04 | 62.91 |
| | 2T | 74.38 | 1.17 | 6.24 | 0.94 | 4.70 | 1.56 | 2.64 | 0.33 | 2.47 | 0.57 | 19.64 | 40.27 |
| | | | | | | | | | | | | | |
| | 3C | 49.66 | 1.67 | 9.24 | 1.28 | 6.57 | 1.93 | 3.73 | 0.42 | 3.32 | 0.96 | 28.93 | 58.04 |
| | 3T | 50.34 | 0.94 | 4.77 | 0.82 | 3.72 | 1.30 | 2.02 | 0.36 | 2.07 | 0.33 | 14.56 | 30.89 |
| | | | | | | | | | | | | | |
| | 4C | 8.48 | 2.19 | 13.63 | 1.82 | 8.79 | 2.30 | 5.01 | 0.57 | 4.35 | 1.57 | 42.00 | 82.22 |
| | 4T | 91.52 | 1.29 | 6.73 | 0.97 | 5.20 | 1.67 | 2.90 | 0.42 | 2.65 | 0.61 | 21.72 | 44.17 |
| | | | | | | | | | | | | | |
| | 5C | 17.79 | 1.83 | 11.90 | 1.77 | 7.78 | 1.98 | 4.48 | 0.70 | 4.13 | 1.57 | 36.51 | 72.65 |
| | 5T | 82.21 | 1.12 | 5.63 | 0.89 | 4.51 | 1.49 | 2.48 | 0.38 | 2.31 | 0.48 | 17.55 | 36.84 |

*Table 4A12. Light REE analysis data from the flotation tests performed on Fire Clay Rider seam thickener underflow; dry ash-basis.*

| Sample | Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Rider Seam Thickener Underflow (UK 003) | 1C | 22.31 | 51.10 | 100.59 | 18.46 | 25.05 | 51.10 | 12.04 | 258.34 |
| | 1T | 77.69 | 38.21 | 75.75 | 15.27 | 19.53 | 39.32 | 9.41 | 197.49 |
| | | | | | | | | | |
| | 2C | 25.62 | 56.57 | 108.22 | 19.49 | 31.27 | 55.68 | 13.67 | 284.90 |
| | 2T | 74.38 | 32.65 | 69.20 | 14.54 | 17.26 | 33.71 | 8.29 | 175.66 |
| | | | | | | | | | |
| | 3C | 49.66 | 49.41 | 95.37 | 17.32 | 27.57 | 50.01 | 12.30 | 251.97 |
| | 3T | 50.34 | 24.98 | 52.28 | 13.80 | 13.01 | 26.95 | 6.34 | 137.35 |
| | | | | | | | | | |
| | 4C | 8.48 | 60.64 | 116.61 | 21.90 | 41.86 | 65.96 | 16.39 | 323.37 |
| | 4T | 91.52 | 37.54 | 76.99 | 15.13 | 18.59 | 37.61 | 9.15 | 195.01 |
| | | | | | | | | | |
| | 5C | 17.79 | 45.72 | 90.69 | 21.87 | 40.51 | 54.72 | 13.87 | 267.39 |
| | 5T | 82.21 | 29.91 | 65.25 | 14.05 | 15.09 | 31.32 | 7.80 | 163.42 |

*Table 4A13. Flotation test conditions used to process the fly ash sample.*

| Sample | Collector Type | Collector Dosage (kg/ton) | Slurry pH | Products | |
|---|---|---|---|---|---|
| | | | | Float | Sink |
| Fire Clay Fly Ash (UK 004) | Oleic Acid | 5 | 10.5 | 1C | 1T |
| | | 2 | 10.5 | 2C | 2T |
| | | 1 | 10.5 | 3C | 3T |
| | Sodium Oleate | 5 | 10.5 | 4C | 4T |
| | | 2 | 10.5 | 5C | 5T |
| | | 1 | 10.5 | 6C | 6T |
| | Talon9400 | 5 | 10.5 | 7C | 7T |
| | | 2 | 10.5 | 8C | 8T |
| | | 1 | 10.5 | 9C | 9T |

*Table 4A14. Results obtained from the flotation tests performed on the fly ash material.*

| Sample | Product | Weight (%) | Ash (%) | Total REE (ash basis) | Total REE (whole sample) | Concentration Ratio |
|---|---|---|---|---|---|---|
| Fire Clay Fly Ash (UK 004) | 1C | 29.40 | 97.66 | 606 | 592 | 11.88 |
| | 1T | 70.60 | 97.68 | 515 | 503 | -4.94 |
| | | | | | | |
| | 2C | 20.47 | 98.25 | 649 | 638 | 14.65 |
| | 2T | 79.53 | 97.25 | 551 | 535 | -3.77 |
| | | | | | | |
| | 3C | 20.99 | 97.54 | 583 | 569 | 4.27 |
| | 3T | 79.01 | 98.46 | 548 | 539 | -1.14 |
| | | | | | | |
| | 4C | 13.85 | 97.16 | 535 | 525 | -6.43 |
| | 4T | 86.15 | 98.24 | 578 | 567 | 1.03 |
| | | | | | | |
| | 5C | 5.10 | 97.53 | 470 | 458 | -10.21 |
| | 5T | 94.90 | 97.92 | 524 | 513 | 0.55 |
| | | | | | | |
| | 6C | 10.16 | 98.27 | 620 | 609 | 14.50 |
| | 6T | 89.84 | 98.31 | 532 | 523 | -1.64 |
| | | | | | | |
| | 7C | 5.39 | 96.77 | 416 | 403 | -23.40 |
| | 7T | 94.61 | 98.12 | 543 | 533 | 1.33 |
| | | | | | | |
| | 8C | 9.37 | 97.98 | 575 | 563 | 2.71 |
| | 8T | 90.63 | 98.02 | 558 | 547 | -0.28 |
| | | | | | | |
| | 9C | 11.44 | 98.02 | 619 | 607 | 19.71 |
| | 9T | 88.56 | 98.29 | 503 | 494 | -2.55 |

*Table 4A15. Heavy REE analysis data from the flotation tests performed on the fly ash sample; dry ash-basis.*

| Sample | Product | Weight (%) | Heavy Rare Earth Elements (dry ash-basis) (ppm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | THREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Fly Ash (UK 004) | 1C | 29.40 | 3.69 | 21.05 | 3.03 | 18.41 | 5.47 | 14.59 | 2.36 | 9.04 | 1.73 | 46.85 | 126.22 |
| | 1T | 70.60 | 3.33 | 18.96 | 3.10 | 16.56 | 4.89 | 13.78 | 2.22 | 8.28 | 1.41 | 42.88 | 115.41 |
| | | | | | | | | | | | | | |
| | 2C | 20.47 | 4.21 | 24.14 | 4.03 | 21.40 | 6.14 | 17.40 | 2.84 | 10.62 | 1.84 | 53.49 | 146.11 |
| | 2T | 79.53 | 3.45 | 19.59 | 3.08 | 16.88 | 5.06 | 14.09 | 2.30 | 8.52 | 1.52 | 44.92 | 119.40 |
| | | | | | | | | | | | | | |
| | 3C | 20.99 | 3.47 | 19.97 | 2.86 | 17.27 | 5.05 | 13.40 | 2.12 | 8.44 | 1.56 | 43.08 | 117.22 |
| | 3T | 79.01 | 3.32 | 19.08 | 2.71 | 16.61 | 4.80 | 13.00 | 2.03 | 8.15 | 1.56 | 41.68 | 112.94 |
| | | | | | | | | | | | | | |
| | 4C | 13.85 | 3.56 | 20.44 | 3.63 | 17.60 | 5.49 | 15.53 | 2.60 | 8.79 | 1.28 | 46.81 | 125.72 |
| | 4T | 86.15 | 3.76 | 21.36 | 3.53 | 18.91 | 5.54 | 16.01 | 2.70 | 9.52 | 1.67 | 48.35 | 131.35 |
| | | | | | | | | | | | | | |
| | 5C | 5.10 | 3.13 | 17.84 | 2.58 | 15.23 | 4.65 | 13.21 | 2.18 | 7.65 | 1.49 | 39.79 | 107.74 |
| | 5T | 94.90 | 3.41 | 19.37 | 3.20 | 17.13 | 5.01 | 14.03 | 2.33 | 8.52 | 1.41 | 43.31 | 117.72 |
| | | | | | | | | | | | | | |
| | 6C | 10.16 | 4.03 | 22.90 | 3.86 | 20.14 | 5.80 | 16.64 | 2.77 | 9.90 | 1.55 | 50.60 | 138.18 |
| | 6T | 89.84 | 3.67 | 20.74 | 3.72 | 18.70 | 5.42 | 16.17 | 2.68 | 9.47 | 1.56 | 47.50 | 129.64 |
| | | | | | | | | | | | | | |
| | 7C | 5.39 | 2.75 | 15.42 | 2.87 | 13.61 | 4.17 | 12.47 | 2.02 | 6.91 | 1.07 | 36.21 | 97.48 |
| | 7T | 94.61 | 3.43 | 19.46 | 2.78 | 16.93 | 5.24 | 14.09 | 2.26 | 8.49 | 1.74 | 43.16 | 117.60 |
| | | | | | | | | | | | | | |
| | 8C | 9.37 | 3.45 | 19.56 | 2.80 | 17.13 | 5.03 | 13.20 | 2.15 | 8.31 | 1.42 | 42.57 | 115.63 |
| | 8T | 90.63 | 3.38 | 19.13 | 2.73 | 16.65 | 4.82 | 12.83 | 2.07 | 8.15 | 1.51 | 41.42 | 112.69 |
| | | | | | | | | | | | | | |
| | 9C | 11.44 | 3.65 | 20.80 | 2.93 | 17.77 | 5.32 | 13.92 | 2.29 | 8.85 | 1.51 | 45.08 | 122.11 |
| | 9T | 88.56 | 3.13 | 17.70 | 2.65 | 15.38 | 4.55 | 12.53 | 2.03 | 7.67 | 1.43 | 38.72 | 105.77 |

*Table 4A16. Light REE analysis data from the flotation tests performed on fly ash sample; dry ash-basis.*

| Sample | Product | Weight (%) | Light Rare Earth Elements (dry ash-basis) (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | La | Ce | Sc | Pr | Nd | Sm | TLREE |
| | | | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) |
| Fire Clay Fly Ash (UK 004) | 1C | 29.40 | 97.82 | 185.09 | 24.20 | 51.04 | 99.66 | 22.14 | 479.94 |
| | 1T | 70.60 | 77.25 | 143.72 | 23.09 | 45.82 | 89.80 | 19.84 | 399.52 |
| | | | | | | | | | |
| | 2C | 20.47 | 100.15 | 182.89 | 20.99 | 58.43 | 114.87 | 25.94 | 503.28 |
| | 2T | 79.53 | 82.64 | 159.84 | 28.52 | 47.18 | 92.52 | 20.52 | 431.22 |
| | | | | | | | | | |
| | 3C | 20.99 | 97.51 | 179.71 | 25.96 | 47.27 | 94.48 | 21.12 | 466.06 |
| | 3T | 79.01 | 91.26 | 169.37 | 17.94 | 45.61 | 90.68 | 20.08 | 434.93 |
| | | | | | | | | | |
| | 4C | 13.85 | 75.02 | 134.68 | 30.31 | 50.17 | 97.93 | 21.02 | 409.13 |
| | 4T | 86.15 | 84.47 | 157.55 | 26.45 | 52.32 | 102.73 | 22.65 | 446.17 |
| | | | | | | | | | |
| | 5C | 5.10 | 67.54 | 115.29 | 34.45 | 42.64 | 85.29 | 17.05 | 362.25 |
| | 5T | 94.90 | 79.56 | 147.08 | 20.80 | 46.62 | 91.93 | 20.47 | 406.46 |
| | | | | | | | | | |
| | 6C | 10.16 | 93.51 | 165.92 | 33.84 | 54.49 | 109.75 | 24.15 | 481.65 |
| | 6T | 89.84 | 72.96 | 133.70 | 26.43 | 50.53 | 97.42 | 21.53 | 402.58 |
| | | | | | | | | | |
| | 7C | 5.39 | 54.86 | 104.78 | 29.87 | 38.35 | 74.76 | 16.19 | 318.82 |
| | 7T | 94.61 | 84.09 | 157.84 | 23.28 | 47.62 | 93.17 | 19.58 | 425.58 |
| | | | | | | | | | |
| | 8C | 9.37 | 96.81 | 177.82 | 24.33 | 45.94 | 93.51 | 20.69 | 459.08 |
| | 8T | 90.63 | 95.01 | 174.78 | 18.41 | 45.22 | 91.34 | 20.32 | 445.08 |
| | | | | | | | | | |
| | 9C | 11.44 | 105.78 | 192.26 | 25.54 | 49.16 | 101.97 | 22.32 | 497.04 |
| | 9T | 88.56 | 80.54 | 148.97 | 19.33 | 43.29 | 86.07 | 18.69 | 396.88 |

*Appendix 5.4B Electrostatic and Oil Agglomeration Separation Data*

a. Fire Clay Thickener Underflow

Fire Clay Fine Ref

| Sample | Tare (lbs) | Tare + Slurry (lbs) | Slurry (lbs) | % Solids | Solids (lbs) |
|---|---|---|---|---|---|
| Electrostatic | 2 | 50 | 48 | 28.08 | 13.48 |
| Oil Agg | 2 | 29 | 27 | | 7.58 |

Screening Fine Ref at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| 100 x 325 M | 662.59 | 2489.54 | 1826.95 | 4.03 | 29.88 |
| -325 M | | | 4287.74 | 9.45 | 70.12 |
| | | Total | 6114.69 | 13.48 | 100.00 |

Electrostatic Fine Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| Conductive | 361.2 | 912.4 | 551.2 | 1.22 | 30.73 |
| Mids | 337.1 | 339.4 | 2.3 | 0.01 | 0.13 |
| Non-Conductive | 816.9 | 2057.0 | 1240.1 | 2.73 | 69.14 |
| | | Total | 1793.60 | 3.95 | 100.00 |

| Material (%) | Loss |
|---|---|
| | 1.83 |

MGS TESTING

| | Thickener Underflow | | | |
|---|---|---|---|---|
| | Test 1 (8/20/14) | | Test 2 (8/20/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 62.92 | 27.35 | 24.48 | 27.35 |
| Heavy | 5.67 | 65.58 | 2.15 | 57.39 |
| Light | 77.94 | 17.48 | 41.05 | 12.14 |
| Water | 20.69 | | 20.69 | |
| Heavy Yield (%, dry basis) | 21.44 | | 19.85 | |

b. Eagle Seam Thickener Underflow Separation data

| Sample | Tare (lbs) | Tare + Slurry (lbs) | Slurry (lbs) | % Solids | Solids (lbs) |
|---|---|---|---|---|---|
| Electrostatic | 2 | 47 | 45 | 32.39 | 14.57 |
| Oil Agg | 2 | 26 | 24 | | 7.77 |

Screening Fine Ref at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| 100 x 325 M | 1534.00 | 3156.16 | 1622.16 | 3.58 | 24.54 |
| -325 M | | | 4988.33 | 11.00 | 75.46 |
| | | Total | 6610.49 | 14.57 | 100.00 |

Electrostatic Fine Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| Conductive | 337.1 | 705.4 | 368.3 | 0.81 | 23.54 |
| Mids | 362.8 | 385.9 | 23.1 | 0.05 | 1.48 |
| Non-Conductive | 815.3 | 1988.3 | 1173.0 | 2.59 | 74.98 |
| | | Total | 1564.40 | 3.45 | 100.00 |

| Material (%) | Loss |
|---|---|
| | 3.56 |

MGS TESTING

| | Thickener Underflow | | | |
|---|---|---|---|---|
| | Test 1 (8/21/14) | | Test 2 (8/21/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 67.72 | 27.94 | 28.30 | 27.94 |
| Heavy | 7.49 | 66.26 | 3.96 | 61.56 |
| Light | 76.16 | 16.67 | 50.46 | 13.81 |
| Water | 26.12 | | 26.12 | |
| Heavy Yield (%, dry basis) | 28.10 | | 25.94 | |

c. Fire Clay Rider Thickener Underflow Separation Data

| Sample | Tare (lbs) | Tare + Slurry (lbs) | Slurry (lbs) | % Solids | Solids (lbs) |
|---|---|---|---|---|---|
| Electrostatic | 2 | 48 | 46 | 32.94 | 15.15 |
| Oil Agg | 2 | 26 | 24 | | 7.91 |

Screening Fine Ref at 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| 100 x 325 M | 1464.42 | 2775.81 | 1311.39 | 2.89 | 19.08 |
| -325 M | | | 5562.49 | 12.26 | 80.92 |
| | | Total | 6873.88 | 15.15 | 100.00 |

Electrostatic Fine Ref 100 x 325 M

| Size | Tare (g) | Tare + Sample (g) | Sample (g) | Sample (lbs) | Weight (%) |
|---|---|---|---|---|---|
| Conductive | 362.8 | 551.1 | 188.3 | 0.42 | 15.25 |
| Mids | 361.2 | 380.0 | 18.8 | 0.04 | 1.52 |
| Non-Conductive | 337.1 | 1364.8 | 1027.7 | 2.27 | 83.23 |
| | | Total | 1234.80 | 2.72 | 100.00 |

| Material (%) | Loss |
|---|---|
| | 5.84 |

MGS TESTING

| | Thickener Underflow | | | |
|---|---|---|---|---|
| | Test 1 (8/21/14) | | Test 2 (8/21/14) | |
| | Slurry Rate (kg/hr) | Solids (%) | Slurry Rate (kg/hr) | Solids (%) |
| Feed | 74.26 | 25.82 | 26.77 | 25.82 |
| Heavy | 14.21 | 56.87 | 5.00 | 61.83 |
| Light | 76.37 | 12.72 | 42.46 | 9.24 |
| Water | 20.69 | | 20.69 | |
| Heavy Yield (%, dry basis) | 45.41 | | 44.08 | |

**Appendix 5.5 - Mineralogical Study**

A. Figures

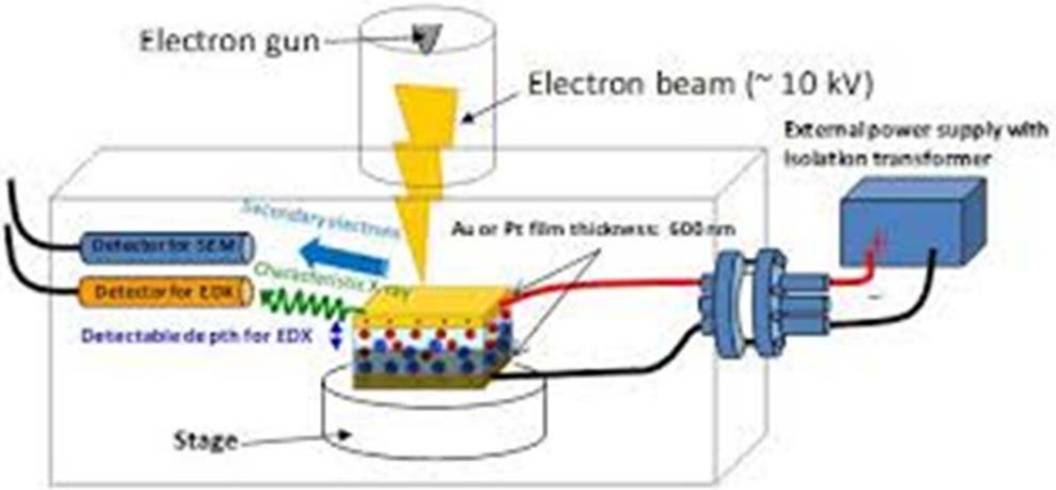



Fig. 1: Schematics of SEM-EDS

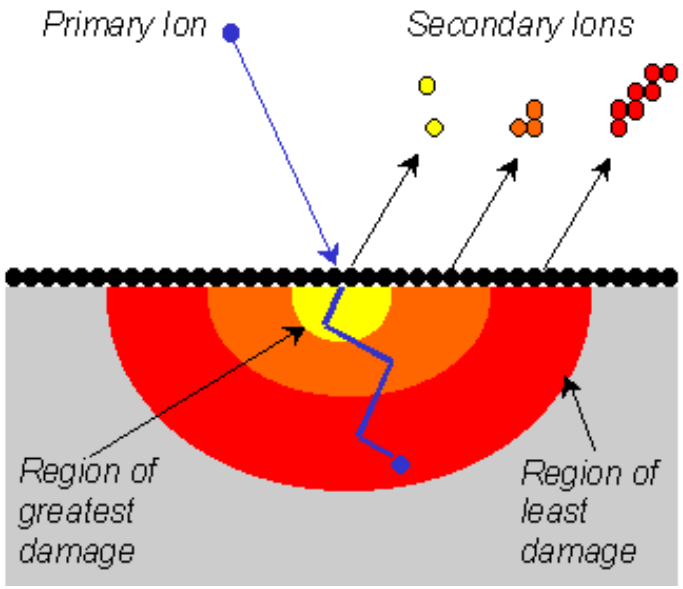
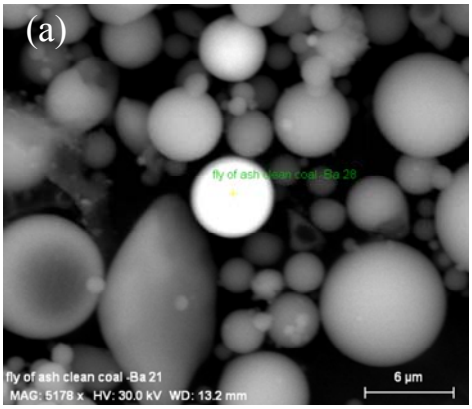
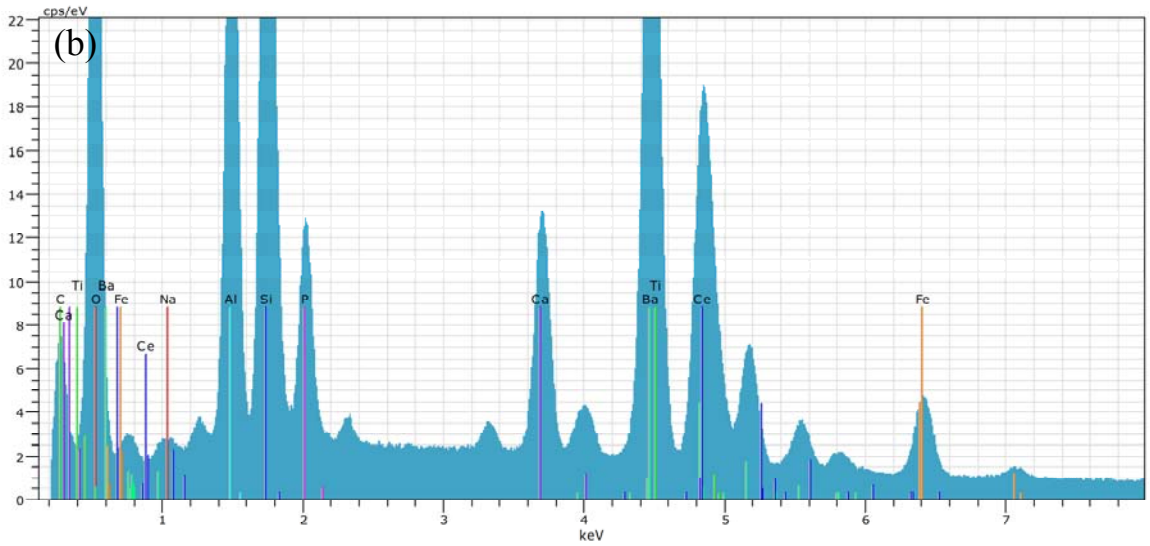



Fig. 2: Schematic representation of TOF-SIMS



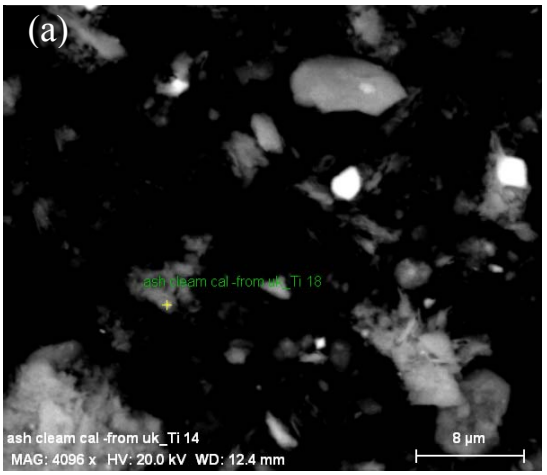



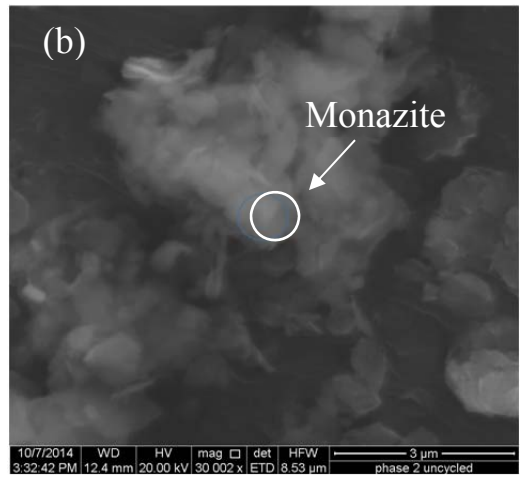

(c)

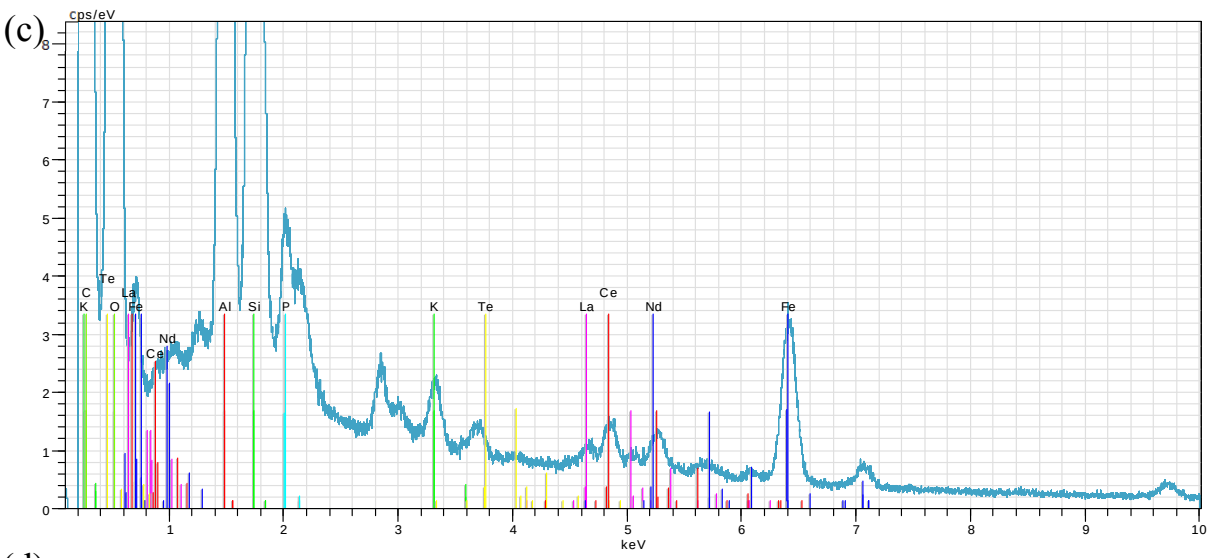
| El AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|
| C 6 | K-series | 17.62 | 14.35 | 24.50 | 2.19 |
| O 8 | K-series | 53.82 | 43.82 | 56.17 | 13.12 |
| Na 11 | K-series | 0.72 | 0.58 | 0.52 | 0.14 |
| Al 13 | K-series | 8.85 | 7.20 | 5.48 | 0.47 |
| Si 14 | K-series | 11.07 | 9.01 | 6.58 | 0.52 |
| P 15 | K-series | 2.71 | 2.20 | 1.46 | 0.13 |
| Ca 20 | K-series | 2.72 | 2.21 | 1.13 | 0.11 |
| Ti 22 | K-series | 3.39 | 2.76 | 1.18 | 0.13 |
| Fe 26 | K-series | 1.75 | 1.43 | 0.52 | 0.07 |
| Ba 56 | L-series | 18.54 | 15.09 | 2.25 | 0.76 |
| Ce 58 | L-series | 1.63 | 1.33 | 0.19 | 0.36 |
| Total: | | 122.82 | 100.00 | 100.00 | |

Figure 3:

a) EDS image of the fly ash generated from Fire Clay seam coal at a utility,
b) EDS spectra, and
c) Elemental concentration.



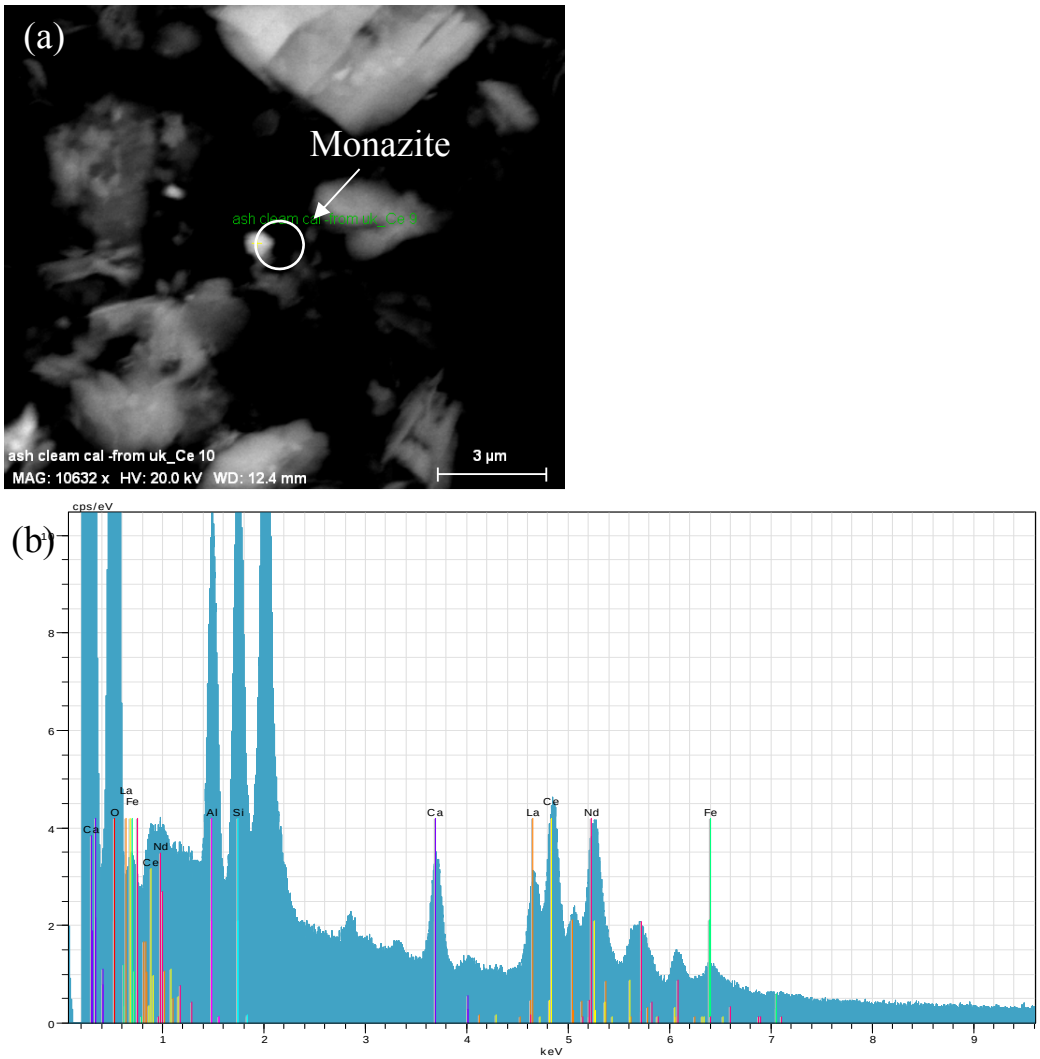




(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 71.89 | 45.16 | 55.55 | 8.52 |
| O | 8 | K-series | 66.94 | 42.05 | 38.83 | 7.06 |
| Al | 13 | K-series | 6.87 | 4.31 | 2.36 | 0.35 |
| Si | 14 | K-series | 6.84 | 4.29 | 2.26 | 0.32 |
| P | 15 | K-series | 0.88 | 0.55 | 0.26 | 0.06 |
| K | 19 | K-series | 0.38 | 0.24 | 0.09 | 0.04 |
| Fe | 26 | K-series | 2.92 | 1.83 | 0.49 | 0.10 |
| Te | 52 | L-series | 0.34 | 0.21 | 0.02 | 0.04 |
| La | 57 | L-series | 0.48 | 0.30 | 0.03 | 0.04 |
| Ce | 58 | L-series | 0.95 | 0.60 | 0.06 | 0.05 |
| Nd | 60 | L-series | 0.71 | 0.45 | 0.05 | 0.05 |
| Total: | | | 159.19 | 100.00 | 100.00 | |

Figure 4:

a) EBSD and b) SEM images of mineral matter present in the middlings processing stream at an east Kentucky coal processing plant treating Fire Clay seam coal. The mineral mater was isolated by flotation.
c) EDS spectra, and
d) Elemental concentration.



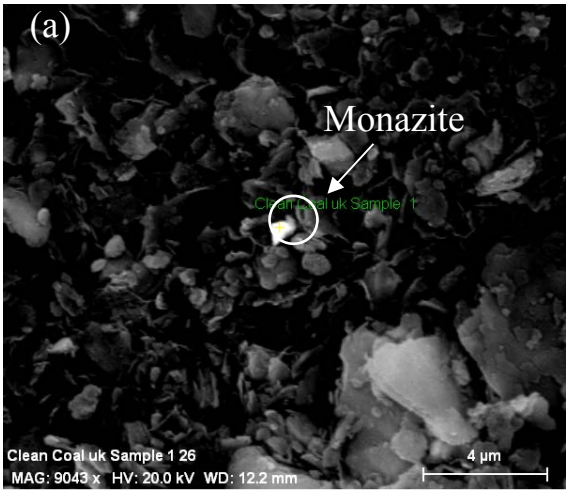

(c)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| O | 8 | K-series | 20.07 | 30.26 | 78.61 | 3.01 |
| Al | 13 | K-series | 3.43 | 6.15 | 5.79 | 0.19 |
| Si | 14 | K-series | 3.81 | 6.82 | 6.18 | 0.19 |
| P | 15 | K-series | 8.15 | 20.42 | 11.30 | 0.16 |
| Ca | 20 | K-series | 1.11 | 1.99 | 1.26 | 0.06 |
| Fe | 26 | K-series | 1.18 | 2.12 | 0.96 | 0.13 |
| La | 57 | L-series | 4.40 | 7.88 | 1.44 | 0.19 |
| Ce | 58 | L-series | 8.19 | 14.66 | 2.66 | 0.42 |
| Nd | 60 | L-series | 5.65 | 10.12 | 1.78 | 0.38 |
| Total: | | | 55.85 | 100.00 | 100.00 | |

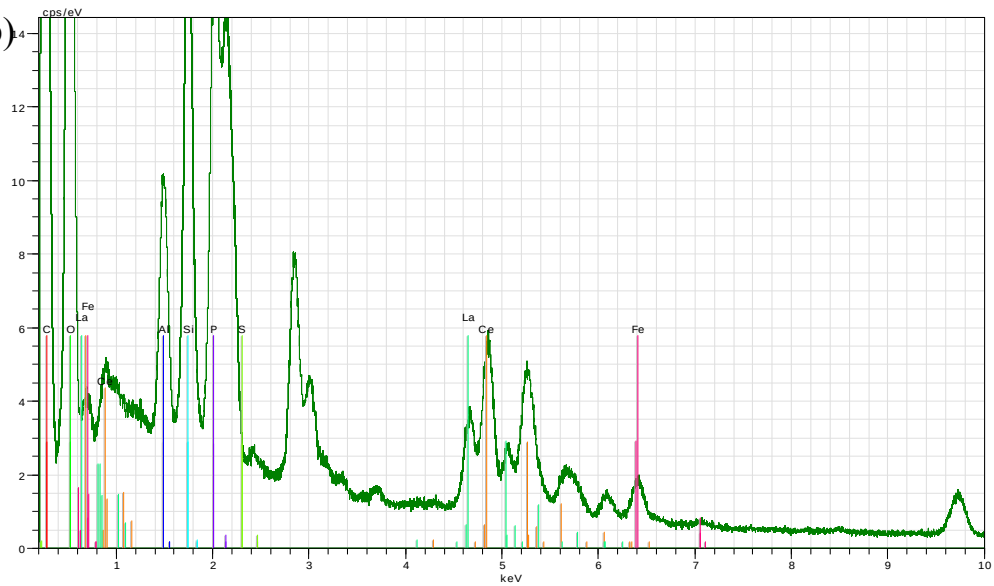
Figure 5:

a) EBSD images of mineral matter present in the middlings processing stream at an east Kentucky coal processing plant treating Fire Clay seam coal. The mineral mater was isolated by flotation.
b) EDS spectra, and
c) Elemental concentration.

(a)




(b)

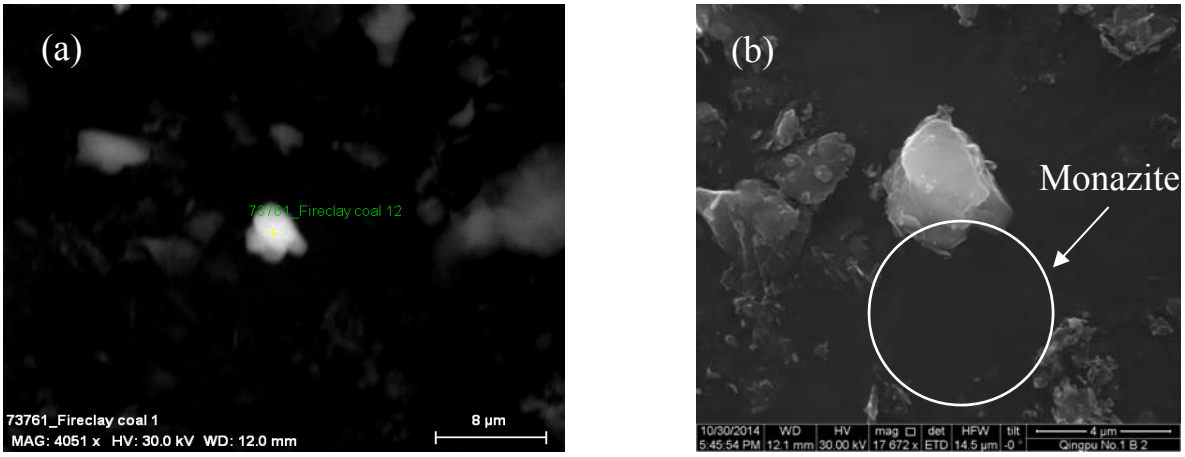


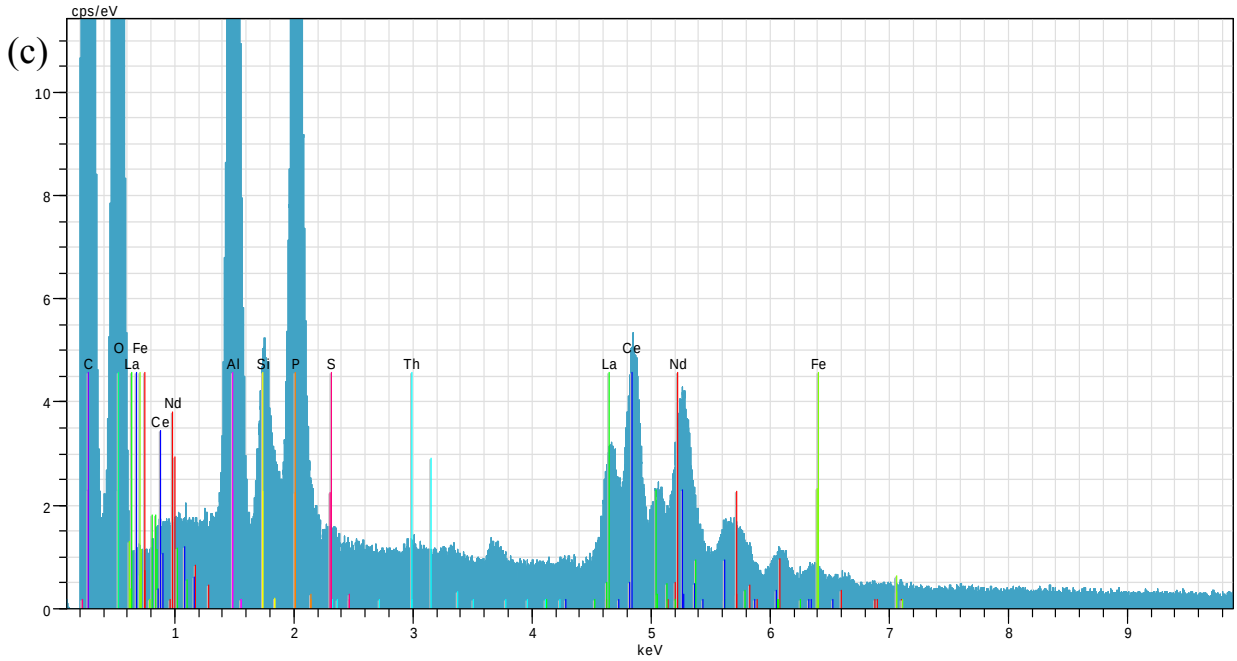

(c)

| El AN Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|
| C 6 K-series | 28.69 | 38.64 | 54.12 | 3.11 |
| O 8 K-series | 26.40 | 35.57 | 37.39 | 2.84 |
| Al 13 K-series | 1.39 | 1.87 | 1.17 | 0.09 |
| Si 14 K-series | 2.14 | 2.89 | 1.73 | 0.12 |
| P 15 K-series | 4.46 | 6.01 | 3.26 | 0.20 |
| S 16 K-series | 0.50 | 0.68 | 0.36 | 0.04 |
| Fe 26 K-series | 1.02 | 1.37 | 0.41 | 0.05 |
| La 57 L-series | 3.02 | 4.07 | 0.49 | 0.12 |
| Ce 58 L-series | 6.61 | 8.91 | 1.07 | 0.24 |
| Total: | 74.24 | 100.00 | 100.00 | |

Figure 6:

a) EBSD images of mineral matter present in the middlings processing stream at an east Kentucky coal processing plant treating Fire Clay seam coal. The mineral mater was isolated by flotation.
b) EDS spectra, and
c) Elemental concentration.



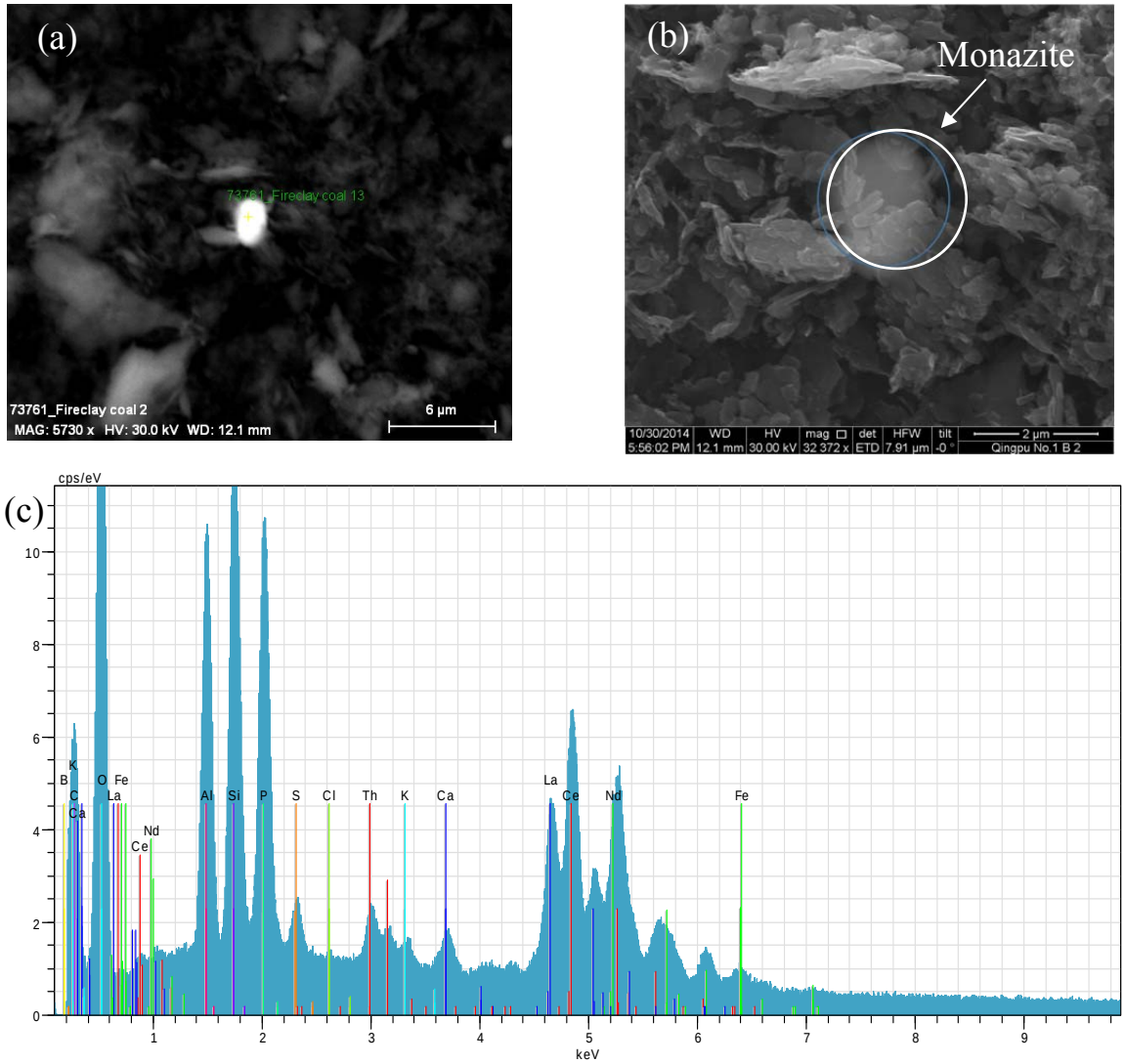




(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 127.85 | 49.05 | 59.51 | 13.86 |
| O | 8 | K-series | 105.32 | 40.41 | 36.80 | 11.57 |
| Al | 13 | K-series | 9.52 | 3.65 | 1.97 | 0.50 |
| Si | 14 | K-series | 1.46 | 0.56 | 0.29 | 0.09 |
| P | 15 | K-series | 5.31 | 2.04 | 0.96 | 0.24 |
| S | 16 | K-series | 0.09 | 0.04 | 0.02 | 0.03 |
| Fe | 26 | K-series | 0.18 | 0.07 | 0.02 | 0.03 |
| La | 57 | L-series | 3.40 | 1.30 | 0.14 | 0.13 |
| Ce | 58 | L-series | 5.97 | 2.29 | 0.24 | 0.26 |
| Nd | 60 | L-series | 1.41 | 0.54 | 0.05 | 0.16 |
| Th | 90 | M-series | 0.14 | 0.05 | 0.005 | 0.03 |
| Total: | | | 260.64 | 100.00 | 100.00 | |

Figure 7:

a) EBSD and b) SEM images of ash produced using a low temperature ashing of clean coal collected at an eastern Kentucky coal preparation plant treating Fire Clay seam coal,
c) EDS spectra, and
d) Elemental concentration.



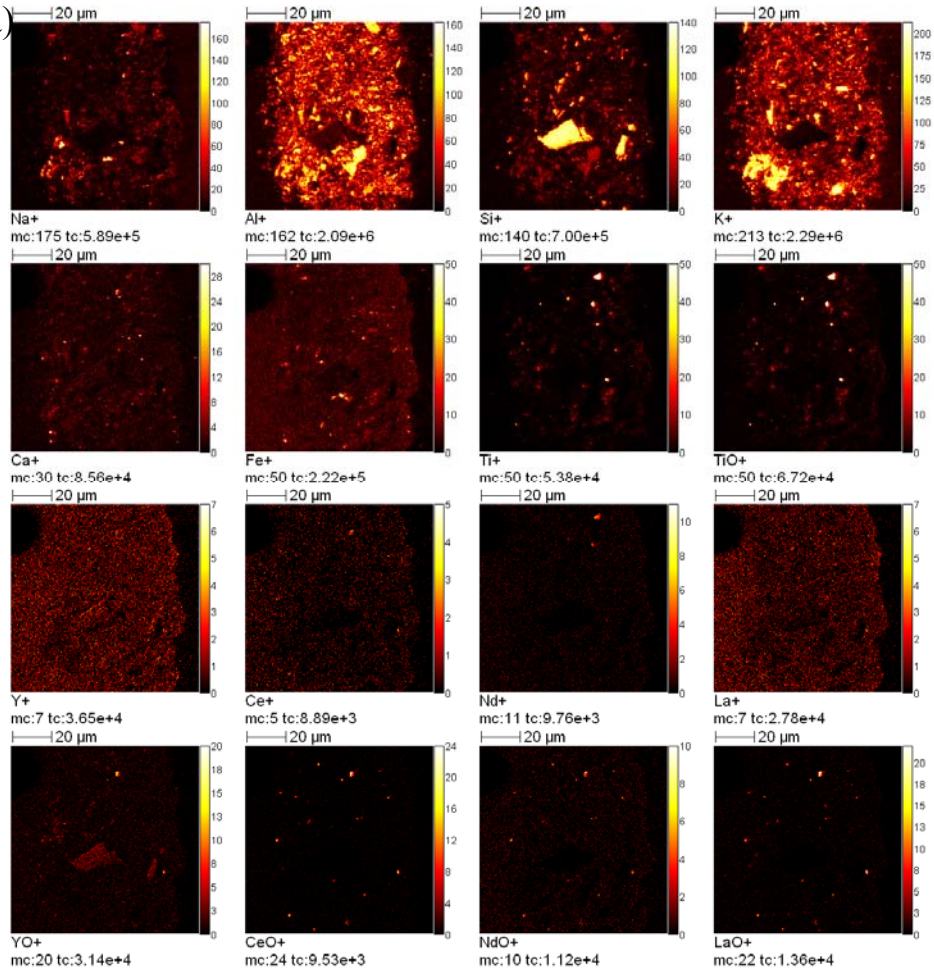

(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| B | 5 | K-series | 0.00 | 0.00 | 0.00 | 0.00 |
| C | 6 | K-series | 7.14 | 7.31 | 13.92 | 9.03 |
| O | 8 | K-series | 43.57 | 44.61 | 63.72 | 4.83 |
| Al | 13 | K-series | 7.27 | 7.44 | 6.30 | 0.39 |
| Si | 14 | K-series | 7.77 | 7.95 | 6.47 | 0.37 |
| P | 15 | K-series | 6.07 | 6.22 | 4.59 | 0.27 |
| S | 16 | K-series | 0.76 | 0.78 | 0.56 | 0.07 |
| Cl | 17 | K-series | 0.10 | 0.10 | 0.07 | 0.03 |
| K | 19 | K-series | 0.21 | 0.21 | 0.12 | 0.03 |
| Ca | 20 | K-series | 0.40 | 0.41 | 0.23 | 0.04 |
| Fe | 26 | K-series | 0.43 | 0.44 | 0.18 | 0.10 |
| La | 57 | L-series | 7.02 | 7.19 | 1.18 | 0.27 |
| Ce | 58 | L-series | 10.71 | 10.97 | 1.79 | 0.53 |
| Nd | 60 | L-series | 3.85 | 3.95 | 0.63 | 0.36 |
| Th | 90 | M-series | 2.36 | 2.41 | 0.24 | 0.11 |
| Total: | | | 97.66 | 100.00 | 100.00 | |

Figure 8:

a) EBSD and b) SEM images of ash produced using a low temperature ashing of a clean coal collected at an eastern Kentucky coal preparation plant treating Fire Clay seam coal,
c) EDS spectra, and
d) Elemental concentration.

(a)




(b)

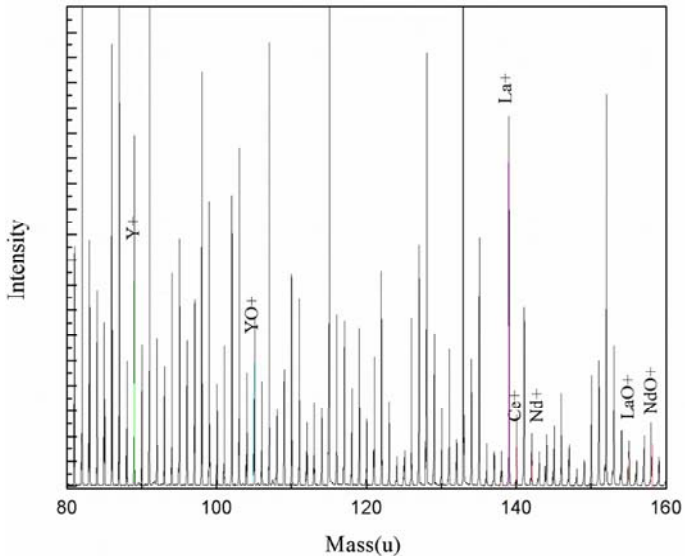
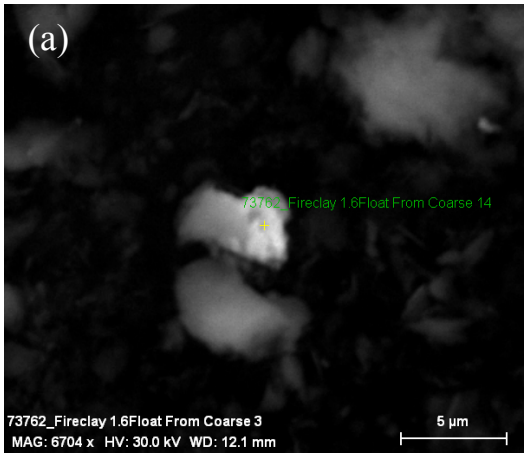
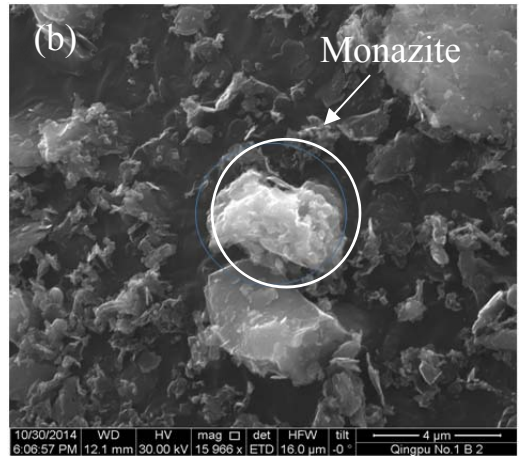
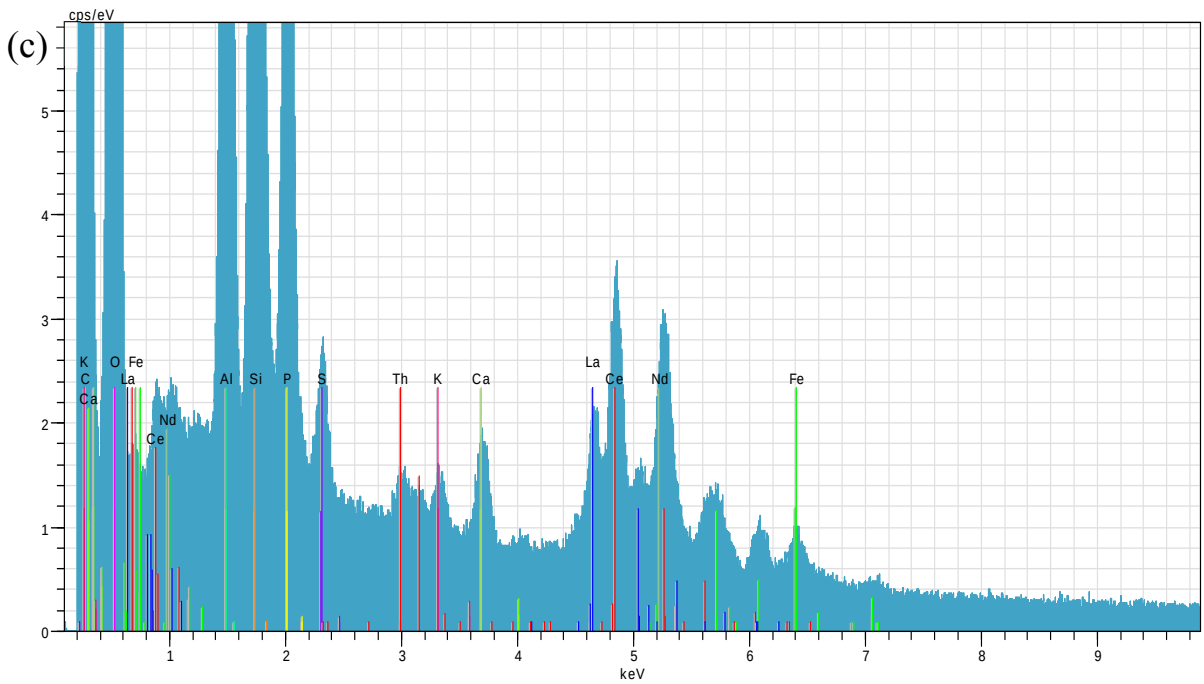



Figure 9:

a) ToF-SIMS high Lateral Resolution Images and
b) ToF-SIMS spectroscopy of low-temperature ash from clean coal originating from the Fire Clay coal seam.



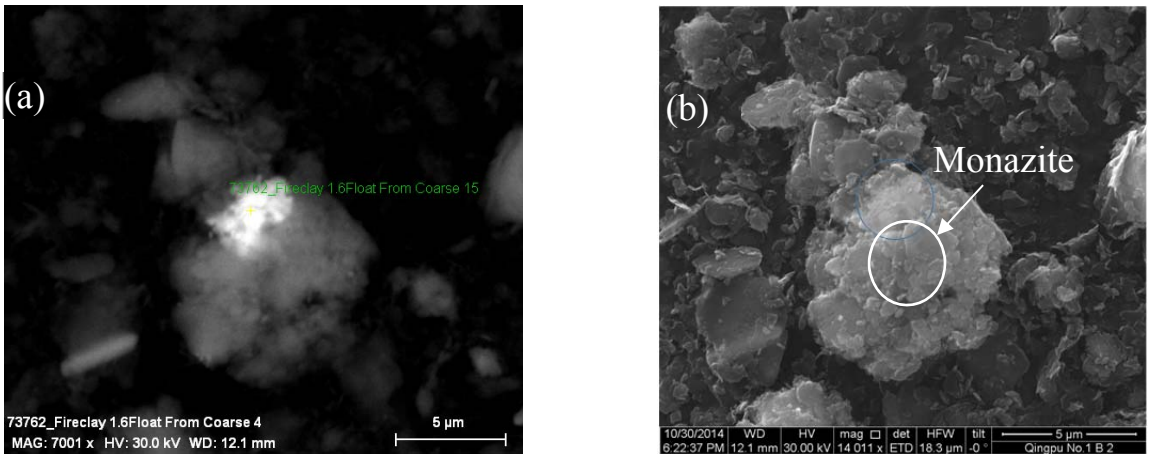




(d)

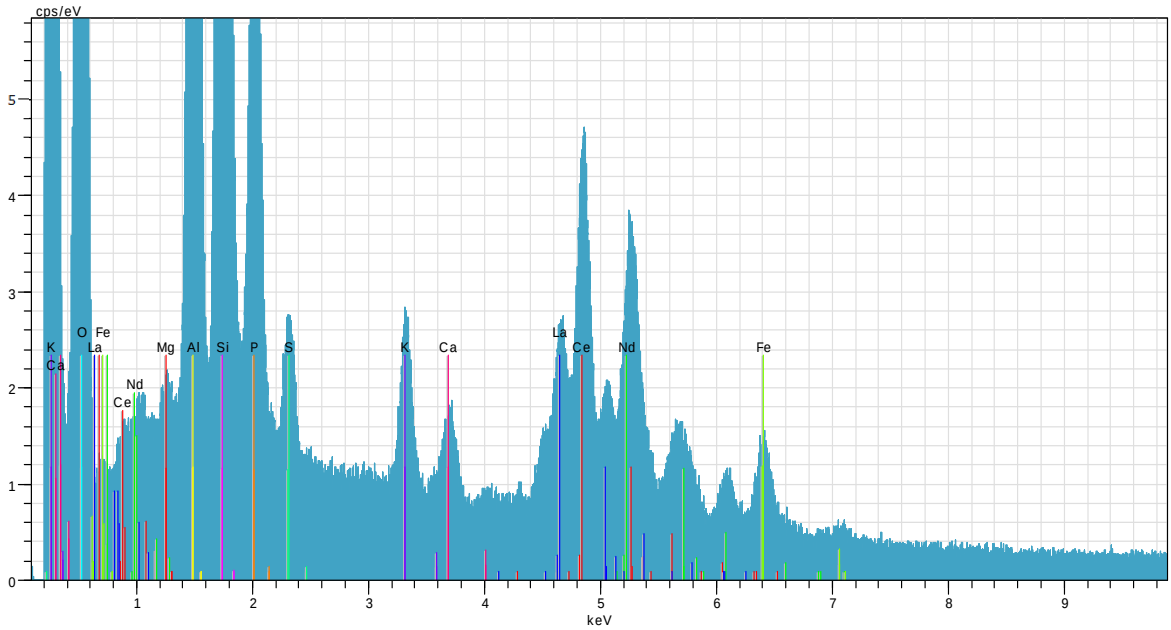
| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 28.20 | 21.42 | 30.17 | 17.43 |
| O | 8 | K-series | 74.96 | 56.94 | 60.20 | 8.09 |
| Al | 13 | K-series | 7.12 | 5.41 | 3.39 | 0.38 |
| Si | 14 | K-series | 8.09 | 6.14 | 3.70 | 0.39 |
| P | 15 | K-series | 3.13 | 2.38 | 1.30 | 0.15 |
| S | 16 | K-series | 0.50 | 0.38 | 0.20 | 0.04 |
| K | 19 | K-series | 0.15 | 0.12 | 0.05 | 0.03 |
| Ca | 20 | K-series | 0.36 | 0.27 | 0.11 | 0.04 |
| Fe | 26 | K-series | 0.42 | 0.32 | 0.10 | 0.08 |
| La | 57 | L-series | 2.11 | 1.60 | 0.20 | 0.11 |
| Ce | 58 | L-series | 3.87 | 2.94 | 0.36 | 0.21 |
| Nd | 60 | L-series | 2.26 | 1.72 | 0.20 | 0.21 |
| Th | 90 | M-series | 0.48 | 0.36 | 0.03 | 0.04 |
| Total: | | | 131.64 | 100.00 | 100.00 | |

Figure 10:

a) EBSD and b) SEM of ash material obtained using a low temperature ash unit and the 1.6 Specific Gravity float fraction from the coarse reject at a plant treating Fire Clay seam coal,
c) EDS spectra, and
d) Elemental concentration.




(c)



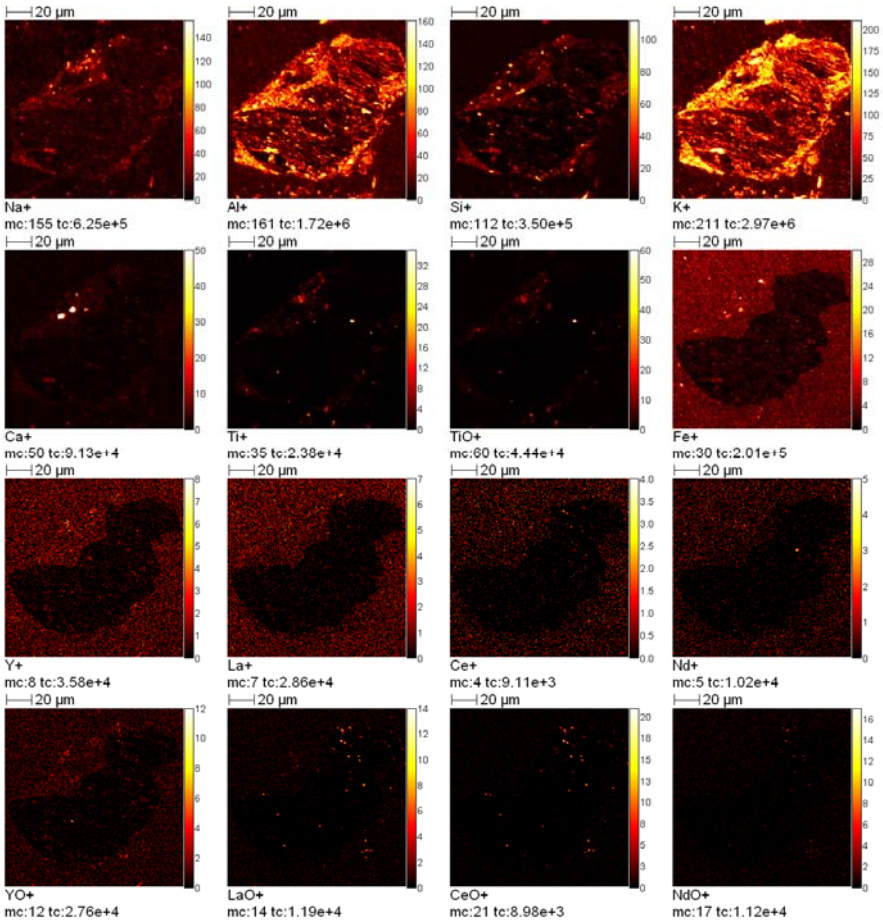

(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| O | 8 | K-series | 53.61 | 55.18 | 74.58 | 5.82 |
| Mg | 12 | K-series | 1.17 | 1.20 | 1.07 | 0.10 |
| Al | 13 | K-series | 9.91 | 10.20 | 8.17 | 0.52 |
| Si | 14 | K-series | 11.96 | 12.31 | 9.47 | 0.56 |
| P | 15 | K-series | 4.15 | 4.28 | 2.99 | 0.19 |
| S | 16 | K-series | 0.75 | 0.78 | 0.52 | 0.05 |
| K | 19 | K-series | 0.70 | 0.72 | 0.40 | 0.05 |
| Ca | 20 | K-series | 0.41 | 0.42 | 0.23 | 0.04 |
| Fe | 26 | K-series | 1.16 | 1.19 | 0.46 | 0.12 |
| La | 57 | L-series | 3.97 | 4.09 | 0.64 | 0.17 |
| Ce | 58 | L-series | 6.51 | 6.70 | 1.03 | 0.34 |
| Nd | 60 | L-series | 2.84 | 2.93 | 0.44 | 0.28 |
| Total: | | | 97.14 | 100.00 | 100.00 | |

Figure 11:

a) EBSD and b) SEM images of ash material obtained using a low temperature ashing of 1.6 specific gravity float coal from coarse reject obtained at a coal cleaning plant treating Fire Clay seam coal,
c) EDS spectra, and
d) Elemental concentration.

(a)




(b)

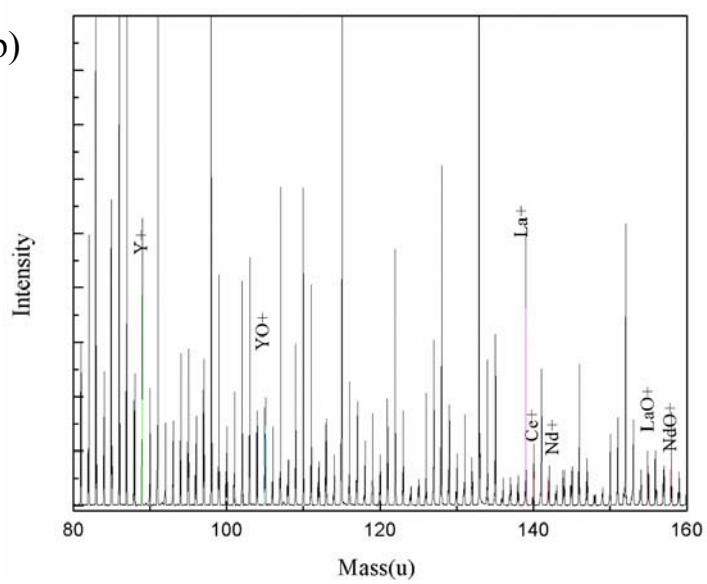
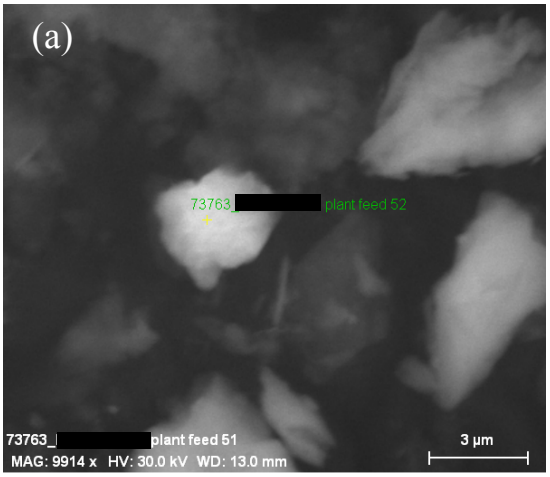
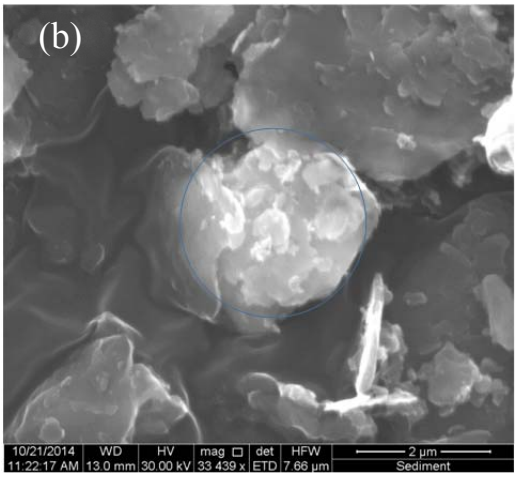
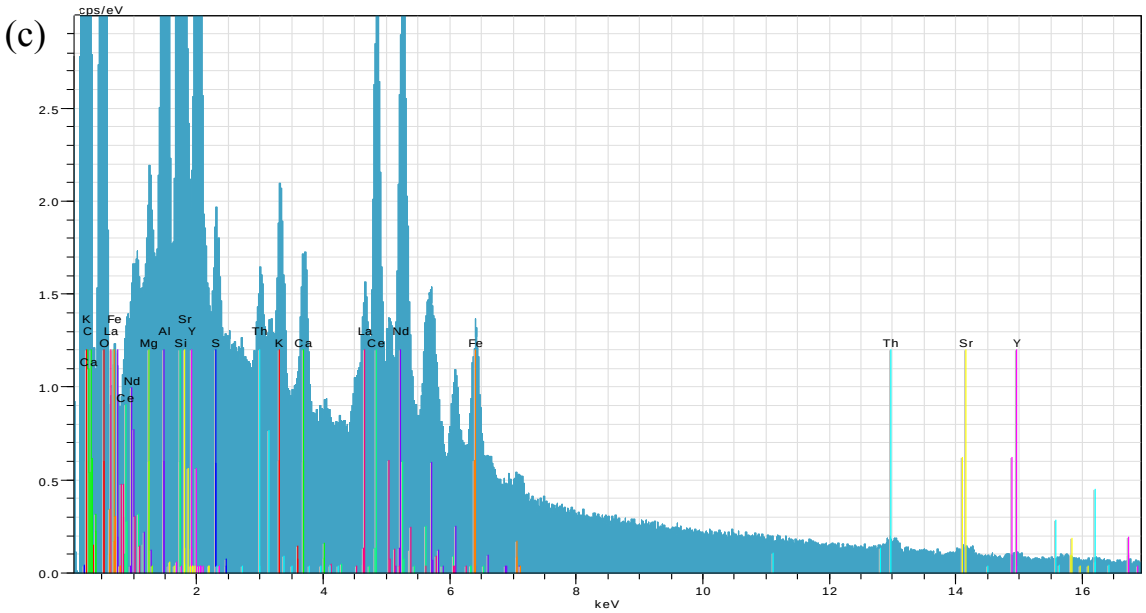



Figure 12:

a) ToF-SIMS High Lateral Resolution Images and
b) ToF-SIMS spectroscopy of low temperature ash from the 1.6-SG-float material of coarse reject from a plant treating Fire Clay seam coal.



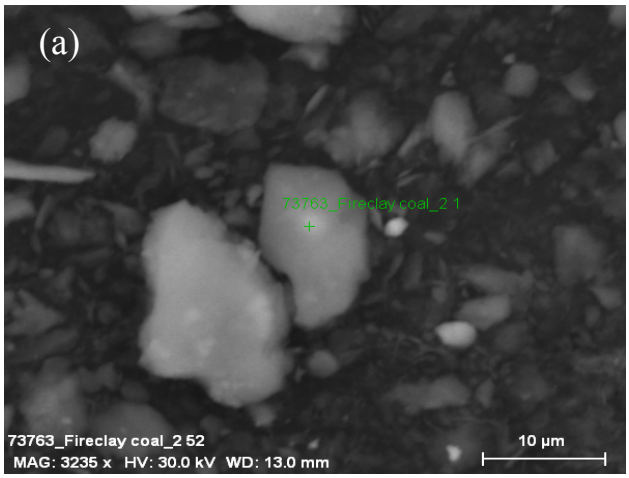



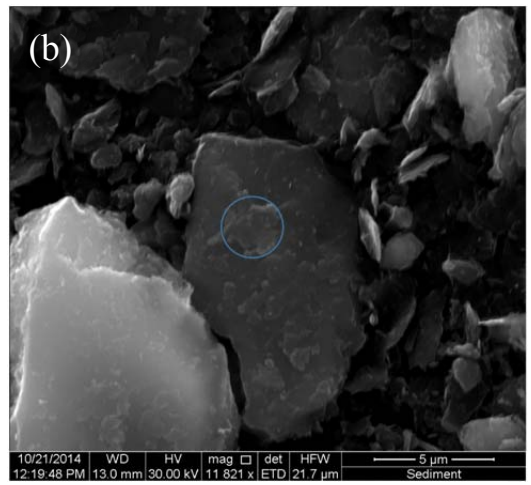

(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 7.89 | 9.76 | 16.07 | 9.95 |
| O | 8 | K-series | 44.24 | 54.68 | 67.62 | 4.81 |
| Mg | 12 | K-series | 1.18 | 1.46 | 1.19 | 0.10 |
| Al | 13 | K-series | 6.18 | 7.63 | 5.60 | 0.34 |
| Si | 14 | K-series | 7.47 | 9.23 | 6.50 | 0.36 |
| S | 16 | K-series | 0.30 | 0.37 | 0.23 | 0.04 |
| K | 19 | K-series | 0.34 | 0.42 | 0.21 | 0.04 |
| Ca | 20 | K-series | 0.34 | 0.42 | 0.21 | 0.04 |
| Fe | 26 | K-series | 0.99 | 1.22 | 0.43 | 0.10 |
| Sr | 38 | K-series | 0.45 | 0.55 | 0.13 | 0.04 |
| Y | 39 | K-series | 0.23 | 0.28 | 0.06 | 0.08 |
| La | 57 | L-series | 1.51 | 1.86 | 0.26 | 0.09 |
| Ce | 58 | L-series | 3.83 | 4.74 | 0.67 | 0.21 |
| Nd | 60 | L-series | 3.07 | 3.80 | 0.52 | 0.19 |
| Th | 90 | L-series | 2.90 | 3.59 | 0.31 | 0.11 |
| | | Total: | 80.91 | 100.00 | 100.00 | |

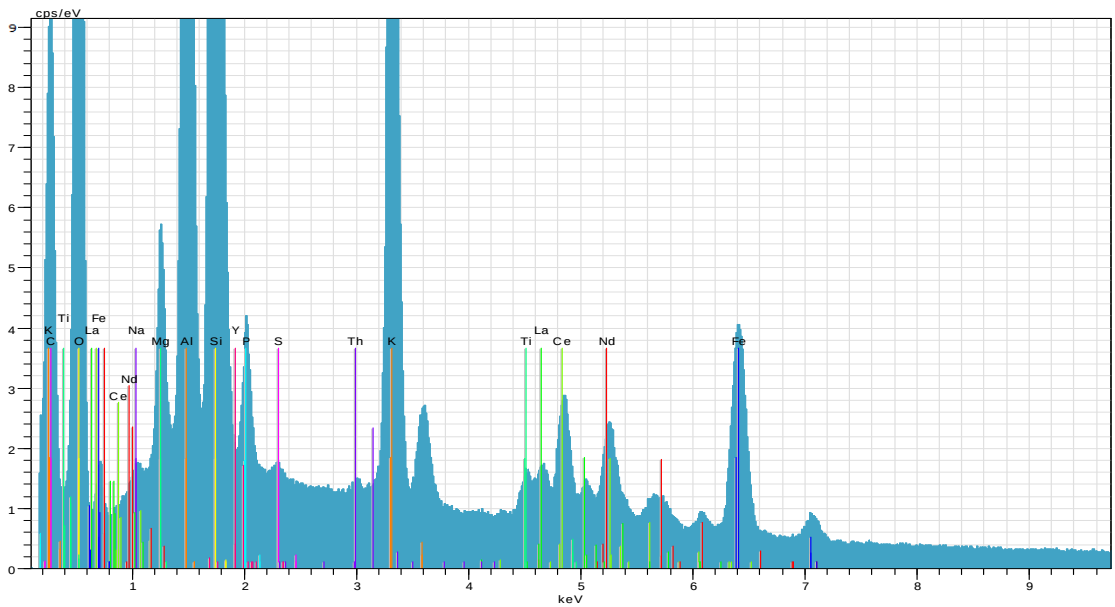
Figure 13:

a) EBSD and b) SEM images of low-temperature ash generated from run-of-mine Fire Clay coal from an eastern Kentucky coal preparation plant.
c) EDS spectra, and
d) Elemental concentration.




(c)

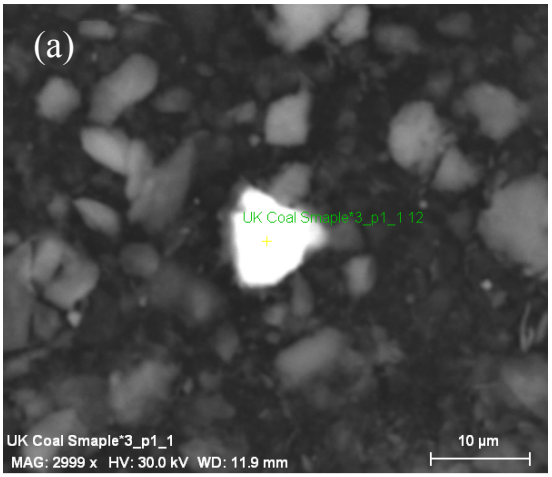


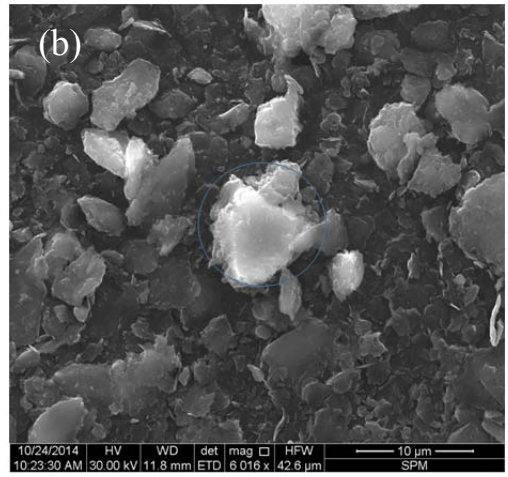

(d)

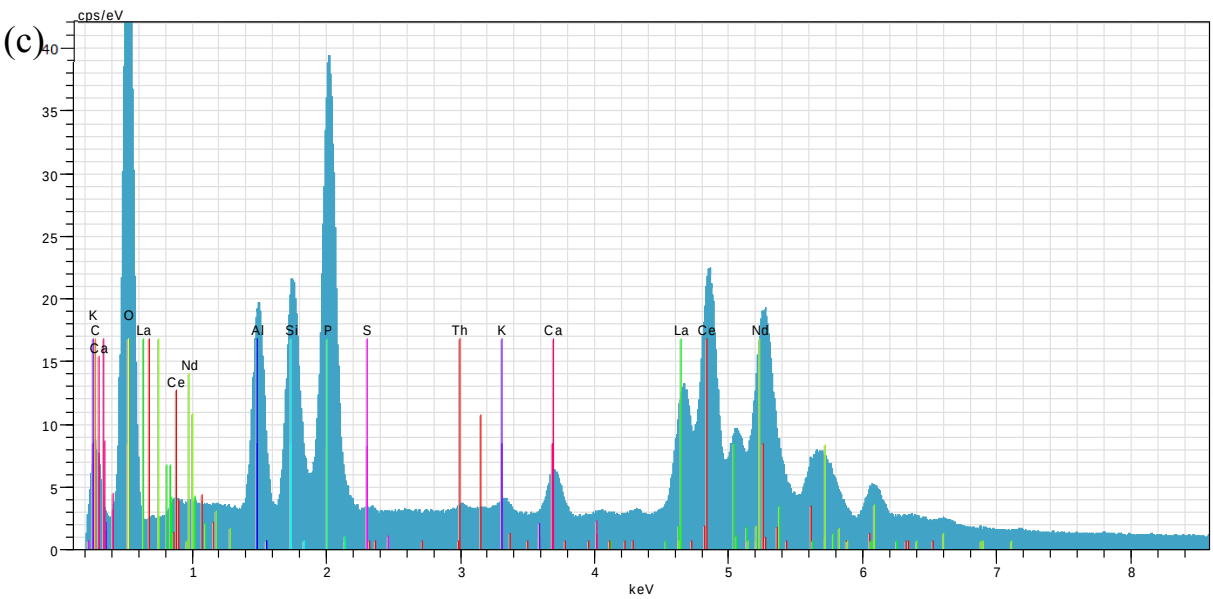
| El AN Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|
| C 6 K-series | 21.30 | 16.14 | 24.48 | 3.79 |
| O 8 K-series | 65.49 | 49.64 | 56.51 | 7.01 |
| Na 11 K-series | 0.45 | 0.34 | 0.27 | 0.07 |
| Mg 12 K-series | 2.27 | 1.72 | 1.29 | 0.16 |
| Al 13 K-series | 11.66 | 8.84 | 5.96 | 0.61 |
| Si 14 K-series | 16.53 | 12.53 | 8.12 | 0.76 |
| P 15 K-series | 0.85 | 0.64 | 0.38 | 0.07 |
| S 16 K-series | 0.15 | 0.11 | 0.06 | 0.03 |
| K 19 K-series | 4.58 | 3.47 | 1.62 | 0.17 |
| Ti 22 K-series | 0.30 | 0.23 | 0.09 | 0.03 |
| Fe 26 K-series | 2.76 | 2.09 | 0.68 | 0.10 |
| La 57 L-series | 1.11 | 0.84 | 0.12 | 0.08 |
| Ce 58 L-series | 3.11 | 2.36 | 0.31 | 0.11 |
| Nd 60 L-series | 0.96 | 0.73 | 0.09 | 0.06 |
| Th 90 L-series | 0.42 | 0.32 | 0.03 | 0.04 |
| Total: | 131.93 | 100.00 | 100.00 | |

Figure 14:

a) EBSD and b) SEM images of low-temperature ash made generated from run-of-mine Fire Clay seam coal from an eastern Kentucky coal preparation plant;
c) EDS spectra; and
d) Elemental concentration.



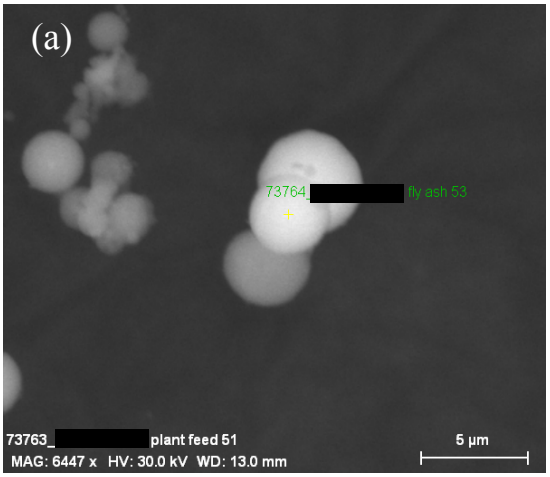



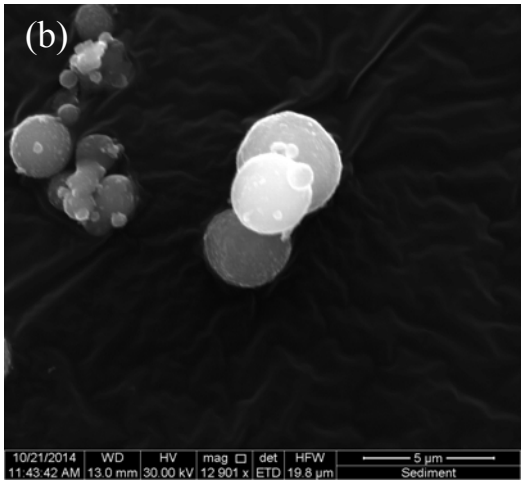

(d)

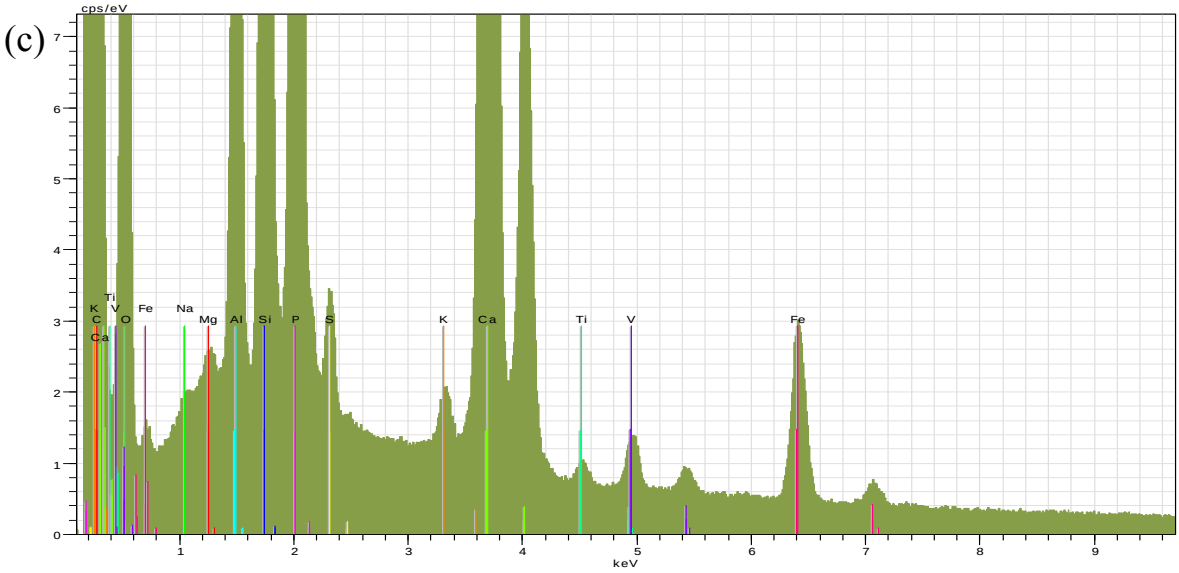
| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 5.43 | 5.28 | 10.95 | 3.97 |
| O | 8 | K-series | 43.74 | 42.54 | 66.28 | 4.70 |
| Al | 13 | K-series | 5.62 | 5.46 | 5.05 | 0.31 |
| Si | 14 | K-series | 5.38 | 5.23 | 4.64 | 0.26 |
| P | 15 | K-series | 8.98 | 8.73 | 7.03 | 0.39 |
| S | 16 | K-series | 0.11 | 0.10 | 0.08 | 0.03 |
| K | 19 | K-series | 0.15 | 0.15 | 0.09 | 0.03 |
| Ca | 20 | K-series | 0.70 | 0.68 | 0.42 | 0.05 |
| La | 57 | L-series | 7.68 | 7.47 | 1.34 | 0.28 |
| Ce | 58 | L-series | 14.80 | 14.40 | 2.56 | 0.71 |
| Nd | 60 | L-series | 7.59 | 7.38 | 1.28 | 0.39 |
| Th | 90 | L-series | 2.65 | 2.57 | 0.28 | 0.10 |
| Total: | | | 102.82 | 100.00 | 100.00 | |

Figure 15:

a) EBSD and b) SEM images of low-temperature ash generated from run-of-mine Fire Clay coal from an eastern Kentucky coal preparation plant.
c) EDS spectra, and
d) Elemental concentration.



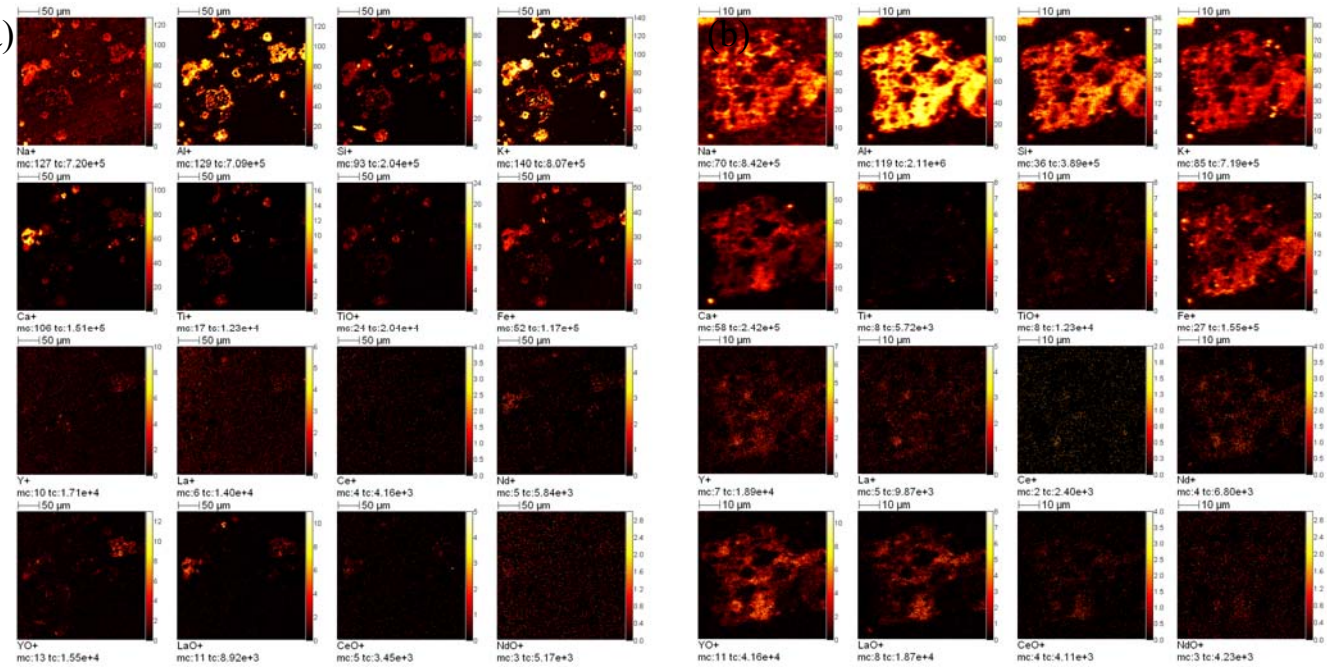

(d)

| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 25.46 | 16.77 | 25.22 | 21.04 |
| O | 8 | K-series | 77.68 | 51.15 | 57.76 | 10.83 |
| Na | 11 | K-series | 1.85 | 1.22 | 0.96 | 0.15 |
| Mg | 12 | K-series | 1.21 | 0.80 | 0.59 | 0.10 |
| Al | 13 | K-series | 4.67 | 3.08 | 2.06 | 0.26 |
| Si | 14 | K-series | 6.00 | 3.95 | 2.54 | 0.29 |
| P | 15 | K-series | 7.23 | 4.76 | 2.78 | 0.32 |
| S | 16 | K-series | 0.50 | 0.33 | 0.19 | 0.04 |
| K | 19 | K-series | 0.29 | 0.19 | 0.09 | 0.03 |
| Ca | 20 | K-series | 24.50 | 16.13 | 7.27 | 0.74 |
| Ti | 22 | K-series | 0.12 | 0.08 | 0.03 | 0.03 |
| V | 23 | K-series | 0.33 | 0.22 | 0.08 | 0.03 |
| Fe | 26 | K-series | 2.03 | 1.33 | 0.43 | 0.08 |
| Total: | | | 151.87 | 100.00 | 100.00 | |

Figure 16:

a) EBSD and b) SEM images of fly ash generated from the use of Fire Clay seam coal at an eastern U.S. utility;
c) EDS spectra, and
d) Elemental concentration.

(a)




(c)

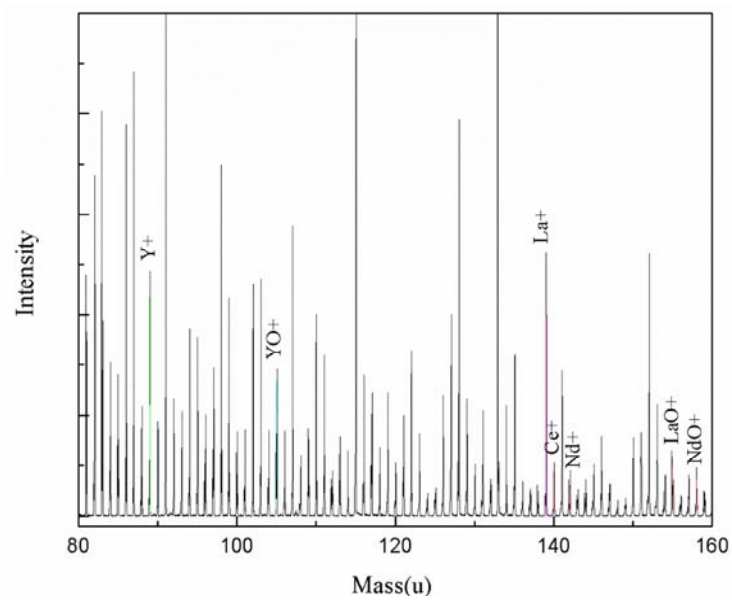
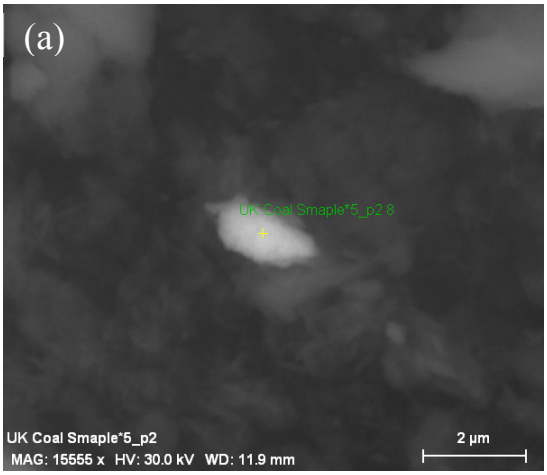
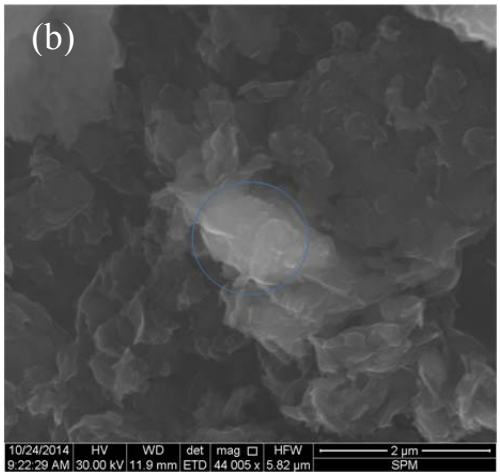
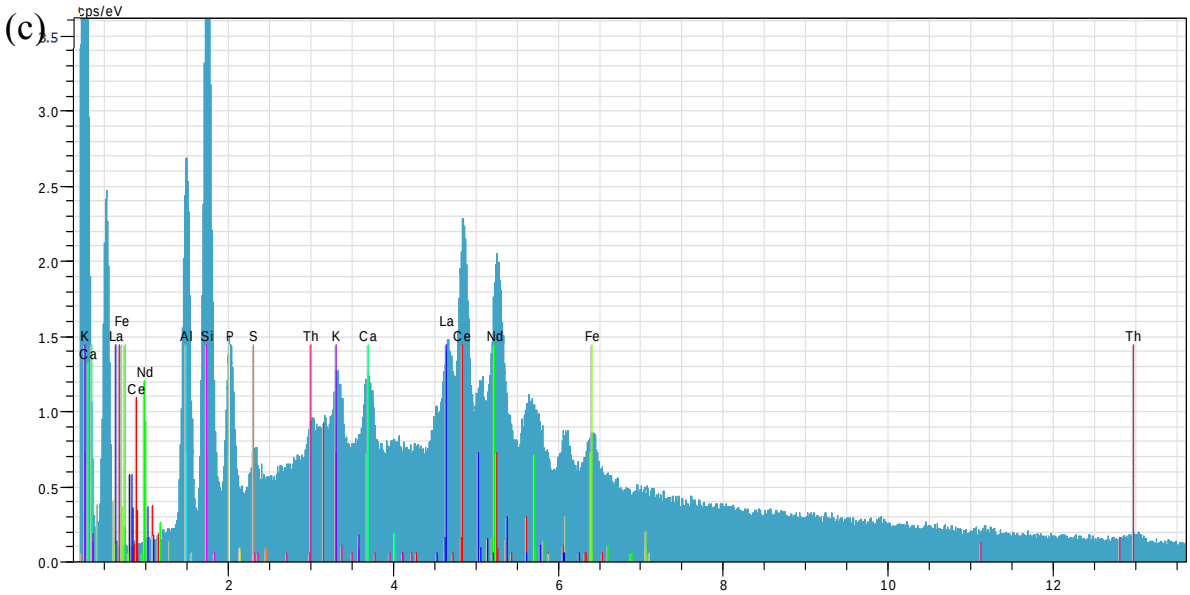



Figure 17:

a) ToF-SIMS High Lateral Resolution Images and
b) ToF-SIMS smaller area High Lateral Resolution Images and
c) ToF-SIMS spectroscopy of fly ash collected from a utility using Fire Clay seam coal.



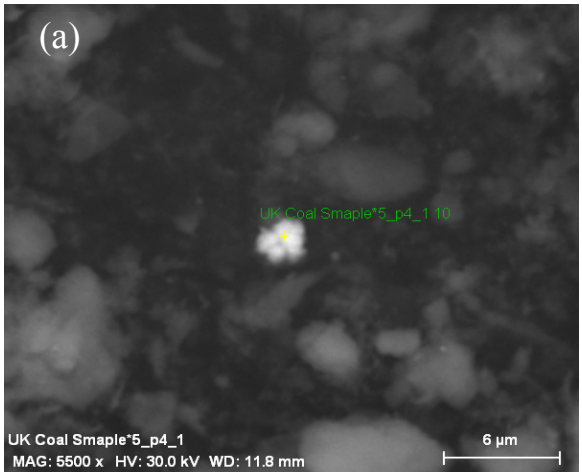

(d)

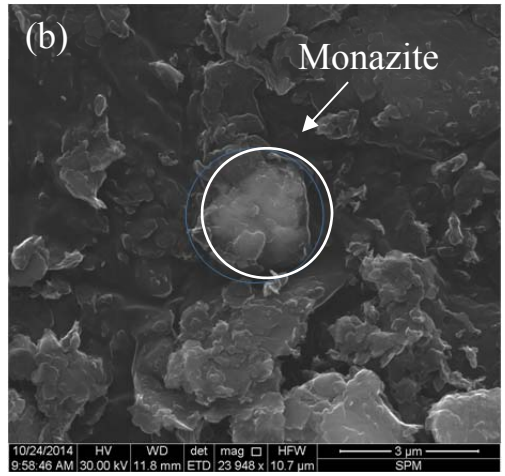
El AN Series unn. C norm. C Atom. C Error (1 Sigma)

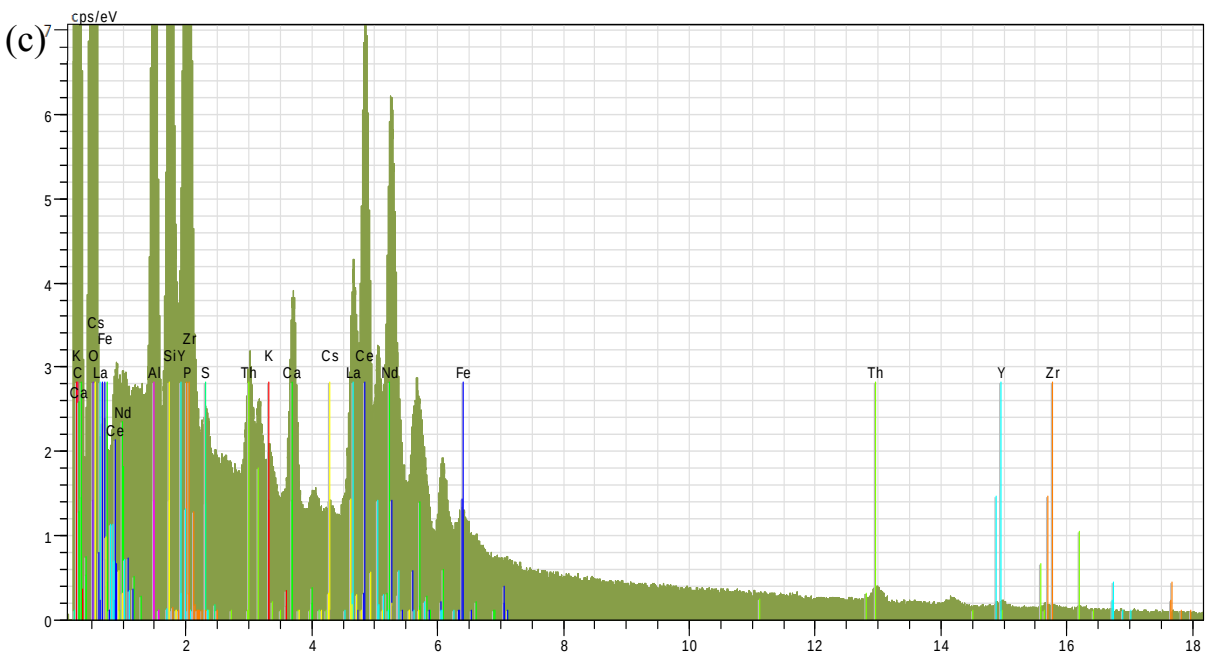
| | [wt.%] | [wt.%] | [at.%] | [wt.%] |
|---|---|---|---|---|
| Al 13 K-series | 8.44 | 18.06 | 30.11 | 0.45 |
| Si 14 K-series | 11.59 | 24.79 | 39.72 | 0.54 |
| P 15 K-series | 2.98 | 6.38 | 9.27 | 0.15 |
| S 16 K-series | 0.52 | 1.12 | 1.57 | 0.07 |
| K 19 K-series | 0.85 | 1.83 | 2.10 | 0.05 |
| Ca 20 K-series | 1.18 | 2.52 | 2.83 | 0.06 |
| Fe 26 K-series | 1.13 | 2.41 | 1.94 | 0.14 |
| La 57 L-series | 4.44 | 9.51 | 3.08 | 0.21 |
| Ce 58 L-series | 7.05 | 15.10 | 4.85 | 0.37 |
| Nd 60 L-series | 3.87 | 8.29 | 2.58 | 0.37 |
| Th 90 L-series | 4.67 | 10.00 | 1.94 | 0.16 |
| Total: | 46.73 | 100.00 | 100.00 | |

Figure 18:

a) EBSD and b) SEM images of low-temperature ash generated from Fire Clay seam coal used as fuel feedstock at an eastern Kentucky utility.
c) EDS spectra, and
d) Elemental concentration.



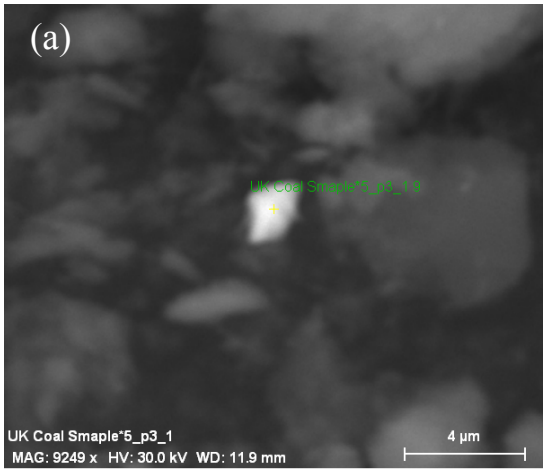



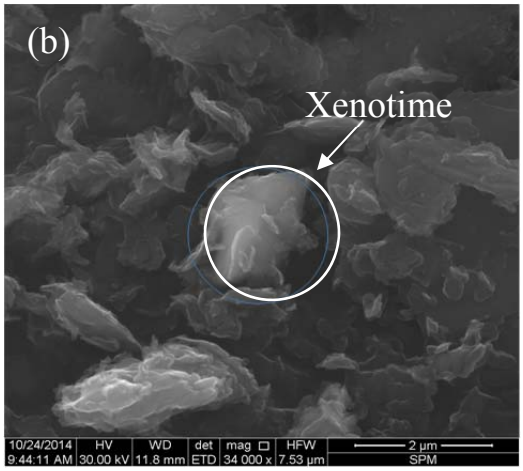

(d)

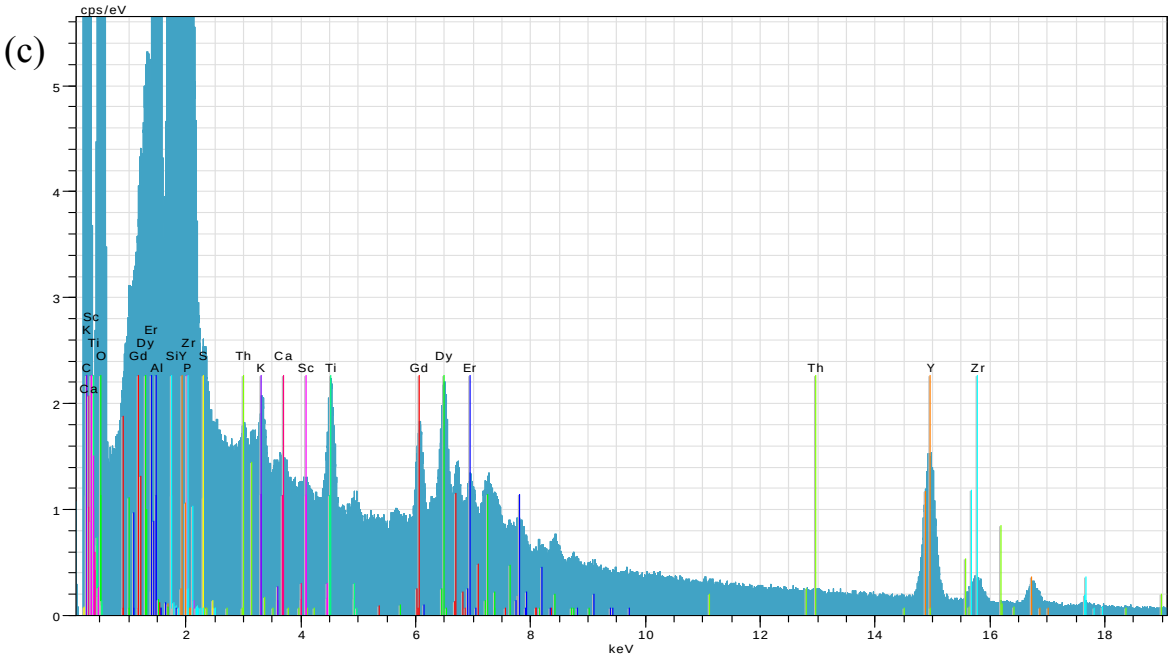
| El | AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|---|
| C | 6 | K-series | 27.07 | 22.13 | 34.48 | 12.33 |
| O | 8 | K-series | 58.79 | 48.05 | 56.22 | 6.31 |
| Al | 13 | K-series | 4.30 | 3.51 | 2.44 | 0.24 |
| Si | 14 | K-series | 3.55 | 2.91 | 1.94 | 0.19 |
| P | 15 | K-series | 3.49 | 2.85 | 1.72 | 0.30 |
| S | 16 | K-series | 0.23 | 0.19 | 0.11 | 0.13 |
| K | 19 | K-series | 0.11 | 0.09 | 0.04 | 0.03 |
| Ca | 20 | K-series | 0.78 | 0.63 | 0.30 | 0.05 |
| Fe | 26 | K-series | 0.39 | 0.32 | 0.11 | 0.07 |
| Y | 39 | K-series | 1.66 | 1.36 | 0.29 | 0.15 |
| Zr | 40 | K-series | 2.74 | 2.24 | 0.46 | 0.12 |
| La | 57 | L-series | 3.64 | 2.98 | 0.40 | 0.21 |
| Ce | 58 | L-series | 7.20 | 5.89 | 0.79 | 0.37 |
| Nd | 60 | L-series | 3.86 | 3.15 | 0.41 | 0.25 |
| Th | 90 | L-series | 4.53 | 3.70 | 0.30 | 0.16 |
| Total: | | | 122.35 | 100.00 | 100.00 | |

Figure 19:

a) EBSD and b) SEM images of low-temperature ash generated from Fire Clay seam coal used as fuel feedstock at an eastern Kentucky utility.
c) EDS spectra, and
d) Elemental concentration.



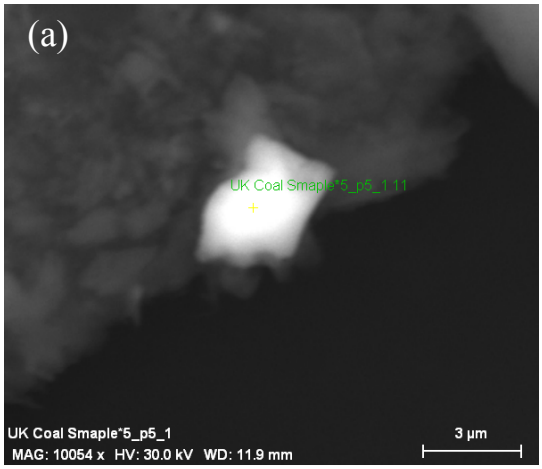



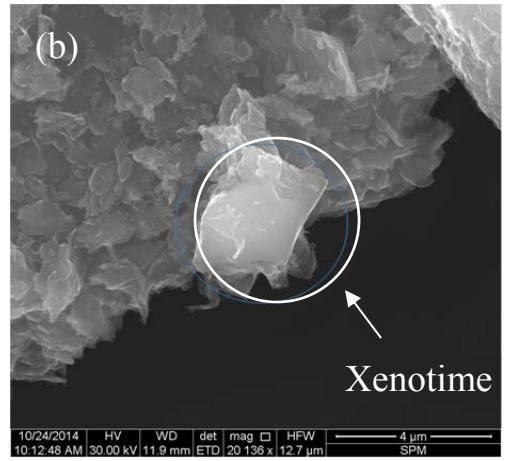

(d)

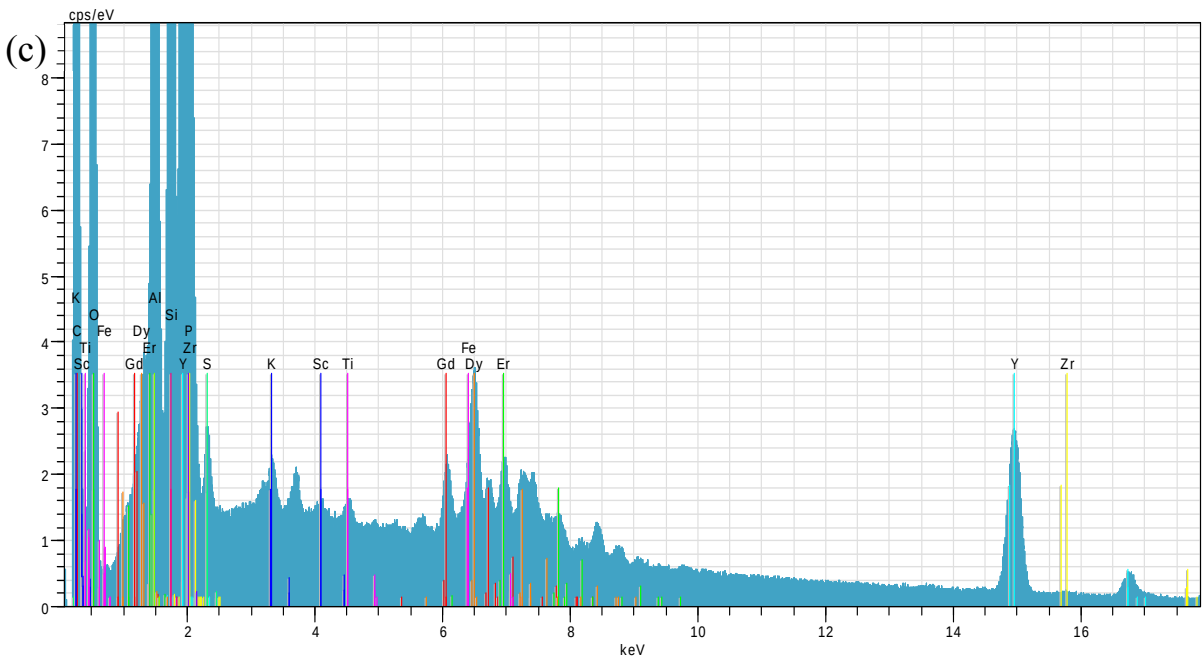
| El AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|
| C 6 | K-series | 58.02 | 32.60 | 46.12 | 12.91 |
| O 8 | K-series | 77.66 | 43.63 | 46.34 | 8.28 |
| Al 13 | K-series | 5.10 | 2.87 | 1.81 | 0.28 |
| Si 14 | K-series | 4.73 | 2.65 | 1.61 | 0.24 |
| P 15 | K-series | 4.76 | 2.68 | 1.47 | 0.41 |
| S 16 | K-series | 0.26 | 0.14 | 0.08 | 0.15 |
| K 19 | K-series | 0.16 | 0.09 | 0.04 | 0.03 |
| Ca 20 | K-series | 0.07 | 0.04 | 0.02 | 0.03 |
| Sc 21 | K-series | 0.03 | 0.01 | 0.01 | 0.03 |
| Ti 22 | K-series | 0.42 | 0.23 | 0.08 | 0.04 |
| Y 39 | K-series | 14.00 | 7.86 | 1.50 | 0.51 |
| Zr 40 | K-series | 4.78 | 2.68 | 0.50 | 0.17 |
| Gd 64 | L-series | 1.30 | 0.73 | 0.08 | 0.06 |
| Dy 66 | L-series | 3.40 | 1.91 | 0.20 | 0.11 |
| Er 68 | L-series | 1.04 | 0.58 | 0.06 | 0.07 |
| Th 90 | L-series | 2.27 | 1.28 | 0.09 | 0.10 |
| Total: | | 177.98 | 100.00 | 100.00 | |

Figure 20:

a) EBSD and b) SEM images of low-temperature ash generated from Fire Clay seam coal used as fuel feedstock at an eastern Kentucky utility.
c) EDS spectra, and
d) Elemental concentration.




(d)

| El AN | Series | unn. C [wt.%] | norm. C [wt.%] | Atom. C [at.%] | Error (1 Sigma) [wt.%] |
|---|---|---|---|---|---|
| C 6 | K-series | 31.81 | 25.62 | 42.19 | 5.49 |
| O 8 | K-series | 43.09 | 34.72 | 42.91 | 4.71 |
| Al 13 | K-series | 6.42 | 5.17 | 3.79 | 0.35 |
| Si 14 | K-series | 4.84 | 3.90 | 2.74 | 0.24 |
| P 15 | K-series | 6.17 | 4.97 | 3.17 | 0.36 |
| S 16 | K-series | 0.44 | 0.35 | 0.22 | 0.04 |
| K 19 | K-series | 0.28 | 0.22 | 0.11 | 0.03 |
| Sc 21 | K-series | 0.08 | 0.06 | 0.03 | 0.03 |
| Ti 22 | K-series | 0.13 | 0.10 | 0.04 | 0.03 |
| Fe 26 | K-series | 0.31 | 0.25 | 0.09 | 0.03 |
| Y 39 | K-series | 20.54 | 6.55 | 3.68 | 0.55 |
| Zr 40 | K-series | 0.42 | 0.34 | 0.07 | 0.04 |
| Gd 64 | L-series | 1.83 | 1.48 | 0.19 | 0.11 |
| Dy 66 | L-series | 5.36 | 4.32 | 0.53 | 0.17 |
| Er 68 | L-series | 2.43 | 1.96 | 0.23 | 0.17 |
| Total: | | 124.13 | 100.00 | 100.00 | |

Figure 21:

a) EBSD and b) SEM images of low-temperature ash made by Fire Clay seam coal at an eastern Kentucky utility.
c) EDS spectra, and
d) Elemental concentration.

## Appendix 5.6 - Preparation Plant Study Data

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7196 | - | Plant 01 | Raw Coal (100M x 0) | 56.68 |
| 7197 | - | Plant 01 | Raw Coal (1mm x 100M) | 33.54 |
| 7200 | - | Plant 01 | Raw Coal (1/2" x 1mm) | 41.92 |
| 7203 | - | Plant 01 | Raw Coal (1 1/4" x 1/2") | 57.58 |
| 7206 | - | Plant 01 | Raw Coal (+ x 1 1/4") | 77.66 |
| 7209 | - | Plant 01 | Fine Reject (100M x 0) | 68.02 |
| 7210 | - | Plant 01 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 5.35 |
| 7211 | - | Plant 01 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 39.72 |
| 7212 | - | Plant 01 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 88.77 |
| 7222 | - | Plant 01 | Coarse Reject (100M x 0) | 85.75 |
| 7223 | - | Plant 01 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 9.67 |
| 7224 | - | Plant 01 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 40.55 |
| 7225 | - | Plant 01 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 88.66 |
| 7226 | - | Plant 01 | Coarse Reject (1/2" x 1mm / Flt x 1.6 SG) | 15.56 |
| 7227 | - | Plant 01 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 43.58 |
| 7228 | - | Plant 01 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 88.73 |
| 7229 | - | Plant 01 | Coarse Reject (1 1/4" x 1/2" / Flt x 1.6 SG) | 14.37 |
| 7230 | - | Plant 01 | Coarse Reject (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 43.99 |
| 7231 | - | Plant 01 | Coarse Reject (1 1/4" x 1/2" / 1.8 x Snk SG) | 89.69 |
| 7232 | - | Plant 01 | Coarse Reject (+ x 1 1/4" / Flt x 1.6 SG) | 20.52 |
| 7233 | - | Plant 01 | Coarse Reject (+ x 1 1/4" / 1.6 x 1.8 SG) | 45.02 |
| 7234 | - | Plant 01 | Coarse Reject (+ x 1 1/4" / 1.8 x Snk SG) | 90.91 |
| 7235 | - | Plant 01 | Clean Coal (100M x 0) | 30.59 |
| 7236 | - | Plant 01 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 5.1 |
| 7237 | - | Plant 01 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 37.49 |
| 7238 | - | Plant 01 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 81.78 |
| 7239 | - | Plant 01 | Clean Coal (1/2" x 1mm / Flt x 1.6 SG) | 6.8 |
| 7240 | - | Plant 01 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 37.66 |
| 7241 | - | Plant 01 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 70.17 |
| 7242 | - | Plant 01 | Clean Coal (1 1/4" x 1/2" / Flt x 1.6 SG) | 8.89 |
| 7243 | - | Plant 01 | Clean Coal (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 37.89 |
| 7244 | - | Plant 01 | Clean Coal (1 1/4" x 1/2" / 1.8 x Snk SG) | 78.79 |
| 7245 | - | Plant 01 | Clean Coal (+ x 1 1/4" / Flt x 1.6 SG) | 10.31 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7196 | 17.89 | 16.66 | 23.21 | 75.97 | 15.48 | 27.17 | 6.09 | 1.00 | 4.93 | 0.81 | 4.93 | 1.83 | 5.35 | 0.62 | 2.45 | 0.38 | 204.8 | 153.9 | 33.0 | 0.21 |
| 7197 | 20.94 | 28.34 | 40.26 | 78.96 | 20.84 | 41.64 | 9.56 | 1.58 | 7.24 | 1.30 | 6.98 | 2.09 | 6.38 | 0.85 | 3.33 | 0.63 | 270.9 | 200.1 | 49.9 | 0.25 |
| 7200 | 18.20 | 19.09 | 23.43 | 70.30 | 16.55 | 28.57 | 6.99 | 1.09 | 5.20 | 1.00 | 5.41 | 1.80 | 5.69 | 0.72 | 2.67 | 0.52 | 207.2 | 152.1 | 36.9 | 0.24 |
| 7203 | 18.18 | 22.78 | 33.51 | 76.55 | 18.37 | 37.68 | 8.83 | 1.35 | 6.42 | 1.12 | 6.13 | 1.84 | 5.98 | 0.72 | 2.92 | 0.56 | 242.9 | 182.7 | 42.1 | 0.23 |
| 7206 | 17.71 | 20.93 | 29.30 | 73.19 | 17.57 | 35.02 | 8.45 | 1.29 | 6.14 | 1.10 | 6.04 | 1.84 | 5.94 | 0.65 | 2.83 | 0.54 | 228.5 | 171.0 | 39.9 | 0.23 |
| 7209 | 15.05 | 9.60 | 14.04 | 56.79 | 11.63 | 21.42 | 4.60 | 0.79 | 3.71 | 0.70 | 3.70 | 1.49 | 4.56 | 0.41 | 1.78 | 0.18 | 150.5 | 113.0 | 22.4 | 0.20 |
| 7210 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7211 | 23.21 | 29.29 | 50.74 | 98.33 | 19.96 | 51.50 | 10.17 | 1.78 | 8.13 | 1.13 | 7.22 | 2.61 | 7.47 | 0.73 | 3.53 | 0.28 | 316.1 | 240.6 | 52.3 | 0.22 |
| 7212 | 15.88 | 14.51 | 31.73 | 71.17 | 18.06 | 33.47 | 7.83 | 1.11 | 5.21 | 0.95 | 4.87 | 1.43 | 4.76 | 0.47 | 2.24 | 0.55 | 214.2 | 168.6 | 29.8 | 0.18 |
| 7222 | 14.97 | 11.31 | 16.26 | 48.98 | 11.43 | 20.74 | 5.17 | 0.76 | 4.31 | 0.89 | 3.13 | 1.42 | 5.33 | 0.40 | 2.07 | 0.26 | 147.4 | 107.7 | 24.8 | 0.23 |
| 7223 | 44.56 | 84.40 | 61.76 | 140.48 | 29.60 | 75.55 | 16.46 | 3.55 | 16.44 | 3.20 | 13.11 | 4.79 | 15.54 | 2.66 | 8.57 | 0.85 | 521.5 | 343.8 | 133.1 | 0.39 |
| 7224 | 22.82 | 25.83 | 40.43 | 91.46 | 22.65 | 43.61 | 9.70 | 1.47 | 8.23 | 1.22 | 5.89 | 2.34 | 8.18 | 0.83 | 3.52 | 0.52 | 288.7 | 217.5 | 48.3 | 0.22 |
| 7225 | 16.01 | 13.15 | 22.47 | 68.16 | 14.61 | 24.44 | 6.29 | 0.88 | 4.72 | 0.83 | 3.63 | 1.40 | 5.24 | 0.44 | 2.27 | 0.43 | 185.0 | 141.6 | 27.4 | 0.19 |
| 7226 | 33.42 | 55.18 | 48.29 | 108.97 | 22.04 | 57.97 | 12.52 | 2.25 | 11.33 | 1.88 | 8.98 | 3.39 | 10.98 | 1.97 | 5.87 | 0.68 | 385.7 | 263.4 | 88.9 | 0.34 |
| 7227 | 25.35 | 30.83 | 49.61 | 108.25 | 20.68 | 50.39 | 10.40 | 1.62 | 8.86 | 1.12 | 6.48 | 2.72 | 9.09 | 1.00 | 4.08 | 0.27 | 330.7 | 249.8 | 55.6 | 0.22 |
| 7228 | 15.18 | 13.82 | 20.44 | 54.65 | 13.51 | 25.35 | 6.59 | 0.92 | 5.14 | 0.96 | 3.78 | 1.38 | 5.59 | 0.46 | 2.37 | 0.40 | 170.5 | 126.6 | 28.8 | 0.23 |
| 7229 | 36.91 | 69.46 | 60.50 | 131.97 | 22.27 | 63.93 | 14.17 | 2.59 | 13.44 | 1.85 | 11.65 | 4.13 | 12.83 | 2.34 | 6.90 | 0.53 | 455.5 | 308.9 | 109.7 | 0.36 |
| 7230 | 26.52 | 28.95 | 43.84 | 100.77 | 17.00 | 48.60 | 9.23 | 1.54 | 8.46 | 1.06 | 6.04 | 2.96 | 9.59 | 1.10 | 3.97 | 0.00 | 309.6 | 229.4 | 53.7 | 0.23 |
| 7231 | 13.59 | 10.08 | 14.32 | 40.52 | 12.52 | 19.71 | 5.44 | 0.72 | 4.24 | 1.00 | 3.19 | 1.17 | 5.08 | 0.39 | 1.95 | 0.38 | 134.3 | 97.5 | 23.2 | 0.24 |
| 7232 | 31.53 | 50.49 | 42.76 | 109.86 | 15.35 | 57.85 | 10.60 | 1.90 | 11.04 | 1.43 | 8.40 | 4.13 | 13.75 | 2.65 | 5.21 | 0.00 | 366.9 | 249.4 | 86.0 | 0.35 |
| 7233 | 19.64 | 10.32 | 8.41 | 42.65 | 6.01 | 21.08 | 2.62 | 0.52 | 4.12 | 0.82 | 2.27 | 2.22 | 8.42 | 0.97 | 1.98 | 0.00 | 132.1 | 85.4 | 27.0 | 0.32 |
| 7234 | 13.93 | 12.65 | 16.32 | 45.79 | 12.90 | 22.15 | 5.96 | 0.81 | 4.77 | 0.99 | 3.57 | 1.34 | 5.45 | 0.42 | 2.19 | 0.40 | 149.6 | 108.7 | 27.0 | 0.25 |
| 7235 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7236 | 38.92 | 78.91 | 38.97 | 88.26 | 24.51 | 61.64 | 14.01 | 3.54 | 14.62 | 3.35 | 15.20 | 4.46 | 13.45 | 3.00 | 7.91 | 0.87 | 411.6 | 245.5 | 127.1 | 0.52 |
| 7237 | 22.29 | 29.68 | 44.89 | 87.74 | 24.69 | 48.75 | 10.17 | 1.66 | 8.16 | 1.31 | 7.58 | 2.51 | 7.58 | 0.95 | 3.62 | 0.54 | 302.1 | 226.1 | 53.8 | 0.24 |
| 7238 | 18.20 | 19.79 | 41.72 | 80.49 | 22.87 | 38.83 | 8.51 | 1.24 | 6.27 | 0.94 | 5.50 | 1.64 | 5.17 | 0.59 | 2.60 | 0.68 | 255.0 | 199.9 | 36.9 | 0.18 |
| 7239 | 42.33 | 100.43 | 59.12 | 123.29 | 30.31 | 73.03 | 17.55 | 3.55 | 16.86 | 3.08 | 17.53 | 4.80 | 13.59 | 3.02 | 8.63 | 1.30 | 518.4 | 323.7 | 152.4 | 0.47 |
| 7240 | 25.10 | 27.81 | 44.64 | 94.49 | 22.95 | 49.37 | 10.01 | 1.65 | 7.80 | 1.35 | 7.58 | 2.73 | 8.25 | 0.94 | 3.65 | 0.42 | 308.7 | 230.9 | 52.7 | 0.23 |
| 7241 | 19.09 | 25.13 | 50.88 | 95.10 | 35.03 | 46.59 | 13.46 | 1.58 | 7.81 | 1.67 | 7.47 | 1.48 | 6.00 | 0.63 | 3.37 | 1.68 | 317.0 | 250.5 | 47.4 | 0.19 |
| 7242 | 43.55 | 112.32 | 75.87 | 150.64 | 28.38 | 83.43 | 17.88 | 3.59 | 17.43 | 2.78 | 18.30 | 5.54 | 15.18 | 3.18 | 9.14 | 0.97 | 588.2 | 377.2 | 167.4 | 0.44 |
| 7243 | 28.23 | 51.56 | 68.21 | 147.36 | 18.16 | 77.31 | 14.17 | 2.60 | 12.55 | 1.20 | 10.99 | 4.79 | 12.57 | 1.46 | 5.28 | 0.00 | 456.5 | 340.4 | 87.9 | 0.26 |
| 7244 | 18.67 | 23.78 | 42.28 | 92.47 | 17.62 | 43.05 | 9.02 | 1.47 | 6.76 | 0.94 | 6.34 | 2.23 | 6.41 | 0.60 | 2.94 | 0.32 | 274.9 | 212.7 | 43.6 | 0.20 |
| 7245 | 42.22 | 110.16 | 72.90 | 146.12 | 22.21 | 81.69 | 16.52 | 3.50 | 17.03 | 2.55 | 17.81 | 5.83 | 15.43 | 3.24 | 8.88 | 0.39 | 566.5 | 360.0 | 164.3 | 0.46 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7196 | 10.14 | 9.44 | 13.16 | 43.06 | 8.78 | 15.40 | 3.45 | 0.57 | 2.79 | 0.46 | 2.80 | 1.04 | 3.03 | 0.35 | 1.39 | 0.22 | 116.1 | 87.2 | 18.7 | 0.21 |
| 7197 | 7.02 | 9.51 | 13.50 | 26.48 | 6.99 | 13.97 | 3.21 | 0.53 | 2.43 | 0.44 | 2.34 | 0.70 | 2.14 | 0.29 | 1.12 | 0.21 | 90.9 | 67.1 | 16.7 | 0.249 |
| 7200 | 7.63 | 8.00 | 9.82 | 29.47 | 6.94 | 11.98 | 2.93 | 0.46 | 2.18 | 0.42 | 2.27 | 0.75 | 2.39 | 0.30 | 1.12 | 0.22 | 86.9 | 63.8 | 15.5 | 0.243 |
| 7203 | 10.47 | 13.12 | 19.30 | 44.08 | 10.58 | 21.69 | 5.08 | 0.78 | 3.70 | 0.65 | 3.53 | 1.06 | 3.44 | 0.42 | 1.68 | 0.32 | 139.9 | 105.2 | 24.2 | 0.23 |
| 7206 | 13.75 | 16.26 | 22.75 | 56.84 | 13.65 | 27.19 | 6.56 | 1.00 | 4.77 | 0.85 | 4.69 | 1.43 | 4.61 | 0.51 | 2.20 | 0.42 | 177.5 | 132.8 | 31.0 | 0.233 |
| 7209 | 10.24 | 6.53 | 9.55 | 38.63 | 7.91 | 14.57 | 3.13 | 0.54 | 2.53 | 0.47 | 2.52 | 1.01 | 3.10 | 0.28 | 1.21 | 0.13 | 102.3 | 76.8 | 15.3 | 0.199 |
| 7210 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7211 | 9.22 | 11.64 | 20.15 | 39.06 | 7.93 | 20.45 | 4.04 | 0.71 | 3.23 | 0.45 | 2.87 | 1.04 | 2.97 | 0.29 | 1.40 | 0.11 | 125.5 | 95.6 | 20.8 | 0.217 |
| 7212 | 14.10 | 12.88 | 28.17 | 63.18 | 16.03 | 29.71 | 6.95 | 0.98 | 4.63 | 0.84 | 4.33 | 1.27 | 4.23 | 0.41 | 1.99 | 0.49 | 190.2 | 149.6 | 26.4 | 0.177 |
| 7222 | 12.84 | 9.69 | 13.94 | 42.00 | 9.80 | 17.79 | 4.43 | 0.65 | 3.70 | 0.76 | 2.68 | 1.22 | 4.57 | 0.34 | 1.78 | 0.22 | 126.4 | 92.3 | 21.3 | 0.23 |
| 7223 | 4.31 | 8.16 | 5.97 | 13.58 | 2.86 | 7.31 | 1.59 | 0.34 | 1.59 | 0.31 | 1.27 | 0.46 | 1.50 | 0.26 | 0.83 | 0.08 | 50.4 | 33.2 | 12.9 | 0.387 |
| 7224 | 9.25 | 10.47 | 16.39 | 37.09 | 9.18 | 17.68 | 3.93 | 0.59 | 3.34 | 0.49 | 2.39 | 0.95 | 3.32 | 0.34 | 1.43 | 0.21 | 117.1 | 88.2 | 19.6 | 0.222 |
| 7225 | 14.19 | 11.66 | 19.92 | 60.43 | 12.95 | 21.67 | 5.58 | 0.78 | 4.18 | 0.73 | 3.22 | 1.24 | 4.64 | 0.39 | 2.01 | 0.38 | 164.0 | 125.5 | 24.3 | 0.193 |
| 7226 | 5.20 | 8.59 | 7.51 | 16.96 | 3.43 | 9.02 | 1.95 | 0.35 | 1.76 | 0.29 | 1.40 | 0.53 | 1.71 | 0.31 | 0.91 | 0.11 | 60.0 | 41.0 | 13.8 | 0.338 |
| 7227 | 11.05 | 13.44 | 21.62 | 47.17 | 9.01 | 21.96 | 4.53 | 0.70 | 3.86 | 0.49 | 2.82 | 1.19 | 3.96 | 0.44 | 1.78 | 0.12 | 144.1 | 108.9 | 24.2 | 0.223 |
| 7228 | 13.47 | 12.26 | 18.13 | 48.49 | 11.99 | 22.49 | 5.85 | 0.82 | 4.56 | 0.85 | 3.35 | 1.23 | 4.96 | 0.41 | 2.10 | 0.36 | 151.3 | 112.3 | 25.5 | 0.227 |
| 7229 | 5.30 | 9.98 | 8.69 | 18.96 | 3.20 | 9.19 | 2.04 | 0.37 | 1.93 | 0.27 | 1.67 | 0.59 | 1.84 | 0.34 | 0.99 | 0.08 | 65.5 | 44.4 | 15.8 | 0.355 |
| 7230 | 11.66 | 12.73 | 19.28 | 44.33 | 7.48 | 21.38 | 4.06 | 0.68 | 3.72 | 0.46 | 2.66 | 1.30 | 4.22 | 0.48 | 1.75 | 0.00 | 136.2 | 100.9 | 23.6 | 0.234 |
| 7231 | 12.19 | 9.04 | 12.84 | 36.34 | 11.23 | 17.68 | 4.88 | 0.65 | 3.80 | 0.90 | 2.86 | 1.05 | 4.56 | 0.35 | 1.75 | 0.34 | 120.5 | 87.4 | 20.8 | 0.238 |
| 7232 | 6.47 | 10.36 | 8.78 | 22.54 | 3.15 | 11.87 | 2.18 | 0.39 | 2.26 | 0.29 | 1.72 | 0.85 | 2.82 | 0.54 | 1.07 | 0.00 | 75.3 | 51.2 | 17.7 | 0.345 |
| 7233 | 8.84 | 4.65 | 3.79 | 19.20 | 2.70 | 9.49 | 1.18 | 0.23 | 1.85 | 0.37 | 1.02 | 1.00 | 3.79 | 0.44 | 0.89 | 0.00 | 59.4 | 38.5 | 12.2 | 0.316 |
| 7234 | 12.66 | 11.50 | 14.84 | 41.63 | 11.73 | 20.13 | 5.42 | 0.74 | 4.33 | 0.90 | 3.25 | 1.22 | 4.95 | 0.38 | 1.99 | 0.36 | 136.0 | 98.8 | 24.6 | 0.248 |
| 7235 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7236 | 1.98 | 4.02 | 1.99 | 4.50 | 1.25 | 3.14 | 0.71 | 0.18 | 0.75 | 0.17 | 0.78 | 0.23 | 0.69 | 0.15 | 0.40 | 0.04 | 21.0 | 12.5 | 6.5 | 0.518 |
| 7237 | 8.36 | 11.13 | 16.83 | 32.89 | 9.26 | 18.28 | 3.81 | 0.62 | 3.06 | 0.49 | 2.84 | 0.94 | 2.84 | 0.36 | 1.36 | 0.20 | 113.3 | 84.8 | 20.2 | 0.238 |
| 7238 | 14.88 | 16.19 | 34.12 | 65.83 | 18.70 | 31.76 | 6.96 | 1.02 | 5.13 | 0.77 | 4.50 | 1.34 | 4.23 | 0.48 | 2.13 | 0.55 | 208.6 | 163.5 | 30.2 | 0.185 |
| 7239 | 2.88 | 6.83 | 4.02 | 8.38 | 2.06 | 4.97 | 1.19 | 0.24 | 1.15 | 0.21 | 1.19 | 0.33 | 0.92 | 0.21 | 0.59 | 0.09 | 35.3 | 22.0 | 10.4 | 0.471 |
| 7240 | 9.45 | 10.47 | 16.81 | 35.58 | 8.64 | 18.59 | 3.77 | 0.62 | 2.94 | 0.51 | 2.85 | 1.03 | 3.11 | 0.35 | 1.37 | 0.16 | 116.3 | 87.0 | 19.9 | 0.228 |
| 7241 | 13.40 | 17.63 | 35.70 | 66.73 | 24.58 | 32.69 | 9.45 | 1.11 | 5.48 | 1.17 | 5.24 | 1.04 | 4.21 | 0.44 | 2.37 | 1.18 | 222.4 | 175.7 | 33.3 | 0.189 |
| 7242 | 3.87 | 9.99 | 6.74 | 13.39 | 2.52 | 7.42 | 1.59 | 0.32 | 1.55 | 0.25 | 1.63 | 0.49 | 1.35 | 0.28 | 0.81 | 0.09 | 52.3 | 33.5 | 14.9 | 0.444 |
| 7243 | 10.70 | 19.54 | 25.85 | 55.84 | 6.88 | 29.29 | 5.37 | 0.99 | 4.76 | 0.45 | 4.16 | 1.81 | 4.76 | 0.55 | 2.00 | 0.00 | 173.0 | 129.0 | 33.3 | 0.258 |
| 7244 | 14.71 | 18.73 | 33.31 | 72.86 | 13.88 | 33.92 | 7.11 | 1.16 | 5.32 | 0.74 | 5.00 | 1.75 | 5.05 | 0.47 | 2.32 | 0.25 | 216.6 | 167.6 | 34.3 | 0.205 |
| 7245 | 4.35 | 11.36 | 7.52 | 15.06 | 2.29 | 8.42 | 1.70 | 0.36 | 1.76 | 0.26 | 1.84 | 0.60 | 1.59 | 0.33 | 0.92 | 0.04 | 58.4 | 37.1 | 16.9 | 0.456 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7196 | 0.63 | 0.39 | 0.44 | 0.72 | 1.31 | 0.57 | 0.65 | 0.44 | 0.70 | 0.71 | 0.74 | 1.30 | 1.44 | 1.06 | 0.69 | 0.61 | 0.63 | 0.65 | 0.55 | 1.18 |
| 7197 | 0.44 | 0.40 | 0.45 | 0.44 | 1.04 | 0.52 | 0.61 | 0.41 | 0.61 | 0.67 | 0.62 | 0.88 | 1.02 | 0.86 | 0.56 | 0.61 | 0.49 | 0.50 | 0.49 | 1.02 |
| 7200 | 0.48 | 0.33 | 0.33 | 0.49 | 1.04 | 0.44 | 0.55 | 0.35 | 0.54 | 0.64 | 0.60 | 0.94 | 1.14 | 0.92 | 0.56 | 0.63 | 0.47 | 0.47 | 0.45 | 1.04 |
| 7203 | 0.65 | 0.55 | 0.64 | 0.73 | 1.58 | 0.80 | 0.96 | 0.60 | 0.92 | 1.00 | 0.93 | 1.32 | 1.64 | 1.26 | 0.84 | 0.92 | 0.76 | 0.78 | 0.71 | 1.10 |
| 7206 | 0.86 | 0.68 | 0.76 | 0.95 | 2.04 | 1.01 | 1.24 | 0.77 | 1.19 | 1.31 | 1.23 | 1.79 | 2.19 | 1.54 | 1.10 | 1.19 | 0.96 | 0.99 | 0.91 | 1.09 |
| 7209 | 0.64 | 0.27 | 0.32 | 0.64 | 1.18 | 0.54 | 0.59 | 0.41 | 0.63 | 0.73 | 0.66 | 1.27 | 1.48 | 0.85 | 0.61 | 0.36 | 0.56 | 0.57 | 0.45 | 1.28 |
| 7210 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7211 | 0.58 | 0.48 | 0.67 | 0.65 | 1.18 | 0.76 | 0.76 | 0.54 | 0.81 | 0.69 | 0.75 | 1.30 | 1.41 | 0.88 | 0.70 | 0.32 | 0.68 | 0.71 | 0.61 | 1.17 |
| 7212 | 0.88 | 0.54 | 0.94 | 1.05 | 2.39 | 1.10 | 1.31 | 0.76 | 1.16 | 1.29 | 1.14 | 1.59 | 2.01 | 1.25 | 1.00 | 1.39 | 1.03 | 1.11 | 0.78 | 1.43 |
| 7222 | 0.80 | 0.40 | 0.46 | 0.70 | 1.46 | 0.66 | 0.84 | 0.50 | 0.92 | 1.18 | 0.71 | 1.52 | 2.17 | 1.03 | 0.89 | 0.63 | 0.69 | 0.69 | 0.62 | 1.10 |
| 7223 | 0.27 | 0.34 | 0.20 | 0.23 | 0.43 | 0.27 | 0.30 | 0.26 | 0.40 | 0.48 | 0.33 | 0.58 | 0.72 | 0.78 | 0.41 | 0.23 | 0.27 | 0.25 | 0.38 | 0.65 |
| 7224 | 0.58 | 0.44 | 0.55 | 0.62 | 1.37 | 0.65 | 0.74 | 0.46 | 0.83 | 0.76 | 0.63 | 1.18 | 1.58 | 1.02 | 0.71 | 0.60 | 0.64 | 0.66 | 0.58 | 1.14 |
| 7225 | 0.89 | 0.49 | 0.66 | 1.01 | 1.93 | 0.80 | 1.05 | 0.60 | 1.05 | 1.13 | 0.85 | 1.55 | 2.21 | 1.18 | 1.01 | 1.09 | 0.89 | 0.93 | 0.71 | 1.31 |
| 7226 | 0.32 | 0.36 | 0.25 | 0.28 | 0.51 | 0.33 | 0.37 | 0.27 | 0.44 | 0.45 | 0.37 | 0.66 | 0.81 | 0.93 | 0.46 | 0.30 | 0.33 | 0.31 | 0.41 | 0.75 |
| 7227 | 0.69 | 0.56 | 0.72 | 0.79 | 1.34 | 0.81 | 0.86 | 0.54 | 0.97 | 0.75 | 0.74 | 1.48 | 1.89 | 1.32 | 0.89 | 0.34 | 0.78 | 0.81 | 0.71 | 1.14 |
| 7228 | 0.84 | 0.51 | 0.60 | 0.81 | 1.79 | 0.83 | 1.10 | 0.63 | 1.14 | 1.30 | 0.88 | 1.53 | 2.36 | 1.24 | 1.05 | 1.02 | 0.82 | 0.84 | 0.75 | 1.12 |
| 7229 | 0.33 | 0.42 | 0.29 | 0.32 | 0.48 | 0.34 | 0.38 | 0.29 | 0.48 | 0.41 | 0.44 | 0.74 | 0.88 | 1.02 | 0.50 | 0.22 | 0.36 | 0.33 | 0.46 | 0.71 |
| 7230 | 0.73 | 0.53 | 0.64 | 0.74 | 1.12 | 0.79 | 0.77 | 0.52 | 0.93 | 0.71 | 0.70 | 1.63 | 2.01 | 1.46 | 0.87 | 0.00 | 0.74 | 0.75 | 0.69 | 1.08 |
| 7231 | 0.76 | 0.38 | 0.43 | 0.61 | 1.68 | 0.65 | 0.92 | 0.50 | 0.95 | 1.38 | 0.75 | 1.31 | 2.17 | 1.07 | 0.88 | 0.98 | 0.65 | 0.65 | 0.61 | 1.06 |
| 7232 | 0.40 | 0.43 | 0.29 | 0.38 | 0.47 | 0.44 | 0.41 | 0.30 | 0.57 | 0.45 | 0.45 | 1.06 | 1.34 | 1.65 | 0.53 | 0.00 | 0.41 | 0.38 | 0.52 | 0.73 |
| 7233 | 0.55 | 0.19 | 0.13 | 0.32 | 0.40 | 0.35 | 0.22 | 0.18 | 0.46 | 0.57 | 0.27 | 1.25 | 1.81 | 1.32 | 0.45 | 0.00 | 0.32 | 0.29 | 0.36 | 0.80 |
| 7234 | 0.79 | 0.48 | 0.49 | 0.69 | 1.75 | 0.75 | 1.02 | 0.57 | 1.08 | 1.38 | 0.85 | 1.52 | 2.36 | 1.14 | 1.00 | 1.04 | 0.74 | 0.74 | 0.72 | 1.02 |
| 7235 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7236 | 0.12 | 0.17 | 0.07 | 0.08 | 0.19 | 0.12 | 0.13 | 0.14 | 0.19 | 0.26 | 0.20 | 0.28 | 0.33 | 0.46 | 0.20 | 0.13 | 0.11 | 0.09 | 0.19 | 0.49 |
| 7237 | 0.52 | 0.46 | 0.56 | 0.55 | 1.38 | 0.68 | 0.72 | 0.48 | 0.76 | 0.75 | 0.75 | 1.18 | 1.35 | 1.08 | 0.68 | 0.57 | 0.61 | 0.63 | 0.59 | 1.07 |
| 7238 | 0.93 | 0.67 | 1.14 | 1.10 | 2.79 | 1.18 | 1.31 | 0.78 | 1.28 | 1.18 | 1.18 | 1.68 | 2.01 | 1.47 | 1.06 | 1.58 | 1.13 | 1.22 | 0.89 | 1.37 |
| 7239 | 0.18 | 0.28 | 0.13 | 0.14 | 0.31 | 0.18 | 0.23 | 0.19 | 0.29 | 0.32 | 0.31 | 0.41 | 0.44 | 0.62 | 0.29 | 0.25 | 0.19 | 0.16 | 0.30 | 0.54 |
| 7240 | 0.59 | 0.44 | 0.56 | 0.59 | 1.29 | 0.69 | 0.71 | 0.48 | 0.73 | 0.78 | 0.75 | 1.28 | 1.48 | 1.07 | 0.69 | 0.45 | 0.63 | 0.65 | 0.58 | 1.11 |
| 7241 | 0.84 | 0.73 | 1.19 | 1.11 | 3.67 | 1.21 | 1.78 | 0.85 | 1.37 | 1.81 | 1.38 | 1.30 | 2.00 | 1.34 | 1.18 | 3.37 | 1.21 | 1.31 | 0.98 | 1.34 |
| 7242 | 0.24 | 0.42 | 0.22 | 0.22 | 0.38 | 0.27 | 0.30 | 0.25 | 0.39 | 0.38 | 0.43 | 0.62 | 0.64 | 0.86 | 0.41 | 0.25 | 0.28 | 0.25 | 0.44 | 0.57 |
| 7243 | 0.67 | 0.81 | 0.86 | 0.93 | 1.03 | 1.08 | 1.01 | 0.76 | 1.19 | 0.70 | 1.10 | 2.27 | 2.27 | 1.68 | 1.00 | 0.00 | 0.94 | 0.96 | 0.98 | 0.98 |
| 7244 | 0.92 | 0.78 | 1.11 | 1.21 | 2.07 | 1.26 | 1.34 | 0.89 | 1.33 | 1.14 | 1.32 | 2.19 | 2.41 | 1.43 | 1.16 | 0.72 | 1.17 | 1.25 | 1.01 | 1.24 |
| 7245 | 0.27 | 0.47 | 0.25 | 0.25 | 0.34 | 0.31 | 0.32 | 0.28 | 0.44 | 0.40 | 0.48 | 0.75 | 0.76 | 1.01 | 0.46 | 0.12 | 0.32 | 0.28 | 0.50 | 0.56 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7196 | 1.12 | 0.69 | 0.77 | 1.27 | 2.31 | 1.01 | 1.15 | 0.77 | 1.23 | 1.25 | 1.30 | 2.29 | 2.55 | 1.87 | 1.22 | 1.08 | 1.11 | 1.15 | 0.97 | 1.18 |
| 7197 | 1.31 | 1.18 | 1.34 | 1.32 | 3.11 | 1.54 | 1.80 | 1.21 | 1.81 | 2.00 | 1.84 | 2.62 | 3.04 | 2.58 | 1.67 | 1.81 | 1.47 | 1.49 | 1.47 | 1.02 |
| 7200 | 1.14 | 0.80 | 0.78 | 1.17 | 2.47 | 1.06 | 1.32 | 0.84 | 1.30 | 1.54 | 1.42 | 2.25 | 2.71 | 2.19 | 1.34 | 1.50 | 1.12 | 1.13 | 1.08 | 1.04 |
| 7203 | 1.14 | 0.95 | 1.12 | 1.28 | 2.74 | 1.40 | 1.67 | 1.04 | 1.60 | 1.73 | 1.61 | 2.30 | 2.85 | 2.19 | 1.46 | 1.61 | 1.32 | 1.36 | 1.24 | 1.10 |
| 7206 | 1.11 | 0.87 | 0.98 | 1.22 | 2.62 | 1.30 | 1.59 | 0.99 | 1.54 | 1.69 | 1.59 | 2.31 | 2.83 | 1.98 | 1.42 | 1.53 | 1.24 | 1.27 | 1.17 | 1.09 |
| 7209 | 0.94 | 0.40 | 0.47 | 0.95 | 1.74 | 0.79 | 0.87 | 0.61 | 0.93 | 1.07 | 0.97 | 1.86 | 2.17 | 1.24 | 0.89 | 0.53 | 0.82 | 0.84 | 0.66 | 1.28 |
| 7210 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7211 | 1.45 | 1.22 | 1.69 | 1.64 | 2.98 | 1.91 | 1.92 | 1.37 | 2.03 | 1.74 | 1.90 | 3.27 | 3.56 | 2.21 | 1.76 | 0.80 | 1.71 | 1.79 | 1.54 | 1.17 |
| 7212 | 0.99 | 0.60 | 1.06 | 1.19 | 2.69 | 1.24 | 1.48 | 0.85 | 1.30 | 1.46 | 1.28 | 1.79 | 2.27 | 1.41 | 1.12 | 1.57 | 1.16 | 1.26 | 0.88 | 1.43 |
| 7222 | 0.94 | 0.47 | 0.54 | 0.82 | 1.71 | 0.77 | 0.98 | 0.58 | 1.08 | 1.37 | 0.82 | 1.78 | 2.54 | 1.20 | 1.04 | 0.73 | 0.80 | 0.80 | 0.73 | 1.10 |
| 7223 | 2.79 | 3.52 | 2.06 | 2.34 | 4.42 | 2.80 | 3.11 | 2.73 | 4.11 | 4.93 | 3.45 | 5.99 | 7.40 | 8.08 | 4.29 | 2.43 | 2.83 | 2.56 | 3.91 | 0.65 |
| 7224 | 1.43 | 1.08 | 1.35 | 1.52 | 3.38 | 1.62 | 1.83 | 1.13 | 2.06 | 1.87 | 1.55 | 2.92 | 3.89 | 2.51 | 1.76 | 1.49 | 1.57 | 1.62 | 1.42 | 1.14 |
| 7225 | 1.00 | 0.55 | 0.75 | 1.14 | 2.18 | 0.91 | 1.19 | 0.67 | 1.18 | 1.27 | 0.96 | 1.75 | 2.49 | 1.33 | 1.14 | 1.23 | 1.00 | 1.05 | 0.80 | 1.31 |
| 7226 | 2.09 | 2.30 | 1.61 | 1.82 | 3.29 | 2.15 | 2.36 | 1.73 | 2.83 | 2.89 | 2.36 | 4.24 | 5.23 | 5.97 | 2.93 | 1.93 | 2.09 | 1.96 | 2.61 | 0.75 |
| 7227 | 1.58 | 1.28 | 1.65 | 1.80 | 3.09 | 1.87 | 1.96 | 1.24 | 2.21 | 1.72 | 1.70 | 3.40 | 4.33 | 3.03 | 2.04 | 0.79 | 1.79 | 1.86 | 1.63 | 1.14 |
| 7228 | 0.95 | 0.58 | 0.68 | 0.91 | 2.02 | 0.94 | 1.24 | 0.71 | 1.28 | 1.47 | 0.99 | 1.73 | 2.66 | 1.40 | 1.19 | 1.15 | 0.93 | 0.94 | 0.85 | 1.12 |
| 7229 | 2.31 | 2.89 | 2.02 | 2.20 | 3.32 | 2.37 | 2.67 | 1.99 | 3.36 | 2.85 | 3.07 | 5.16 | 6.11 | 7.10 | 3.45 | 1.52 | 2.47 | 2.30 | 3.22 | 0.71 |
| 7230 | 1.66 | 1.21 | 1.46 | 1.68 | 2.54 | 1.80 | 1.74 | 1.19 | 2.11 | 1.63 | 1.59 | 3.70 | 4.57 | 3.33 | 1.99 | 0.00 | 1.68 | 1.71 | 1.58 | 1.08 |
| 7231 | 0.85 | 0.42 | 0.48 | 0.68 | 1.87 | 0.73 | 1.03 | 0.55 | 1.06 | 1.54 | 0.84 | 1.46 | 2.42 | 1.19 | 0.98 | 1.10 | 0.73 | 0.73 | 0.68 | 1.06 |
| 7232 | 1.97 | 2.10 | 1.43 | 1.83 | 2.29 | 2.14 | 2.00 | 1.46 | 2.76 | 2.19 | 2.21 | 5.16 | 6.55 | 8.03 | 2.60 | 0.00 | 1.99 | 1.86 | 2.53 | 0.73 |
| 7233 | 1.23 | 0.43 | 0.28 | 0.71 | 0.90 | 0.78 | 0.49 | 0.40 | 1.03 | 1.27 | 0.60 | 2.77 | 4.01 | 2.93 | 0.99 | 0.00 | 0.72 | 0.64 | 0.79 | 0.80 |
| 7234 | 0.87 | 0.53 | 0.54 | 0.76 | 1.93 | 0.82 | 1.13 | 0.63 | 1.19 | 1.52 | 0.94 | 1.67 | 2.59 | 1.26 | 1.10 | 1.14 | 0.81 | 0.81 | 0.79 | 1.02 |
| 7235 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7236 | 2.43 | 3.29 | 1.30 | 1.47 | 3.66 | 2.28 | 2.64 | 2.72 | 3.66 | 5.15 | 4.00 | 5.58 | 6.40 | 9.08 | 3.96 | 2.47 | 2.23 | 1.83 | 3.74 | 0.49 |
| 7237 | 1.39 | 1.24 | 1.50 | 1.46 | 3.68 | 1.81 | 1.92 | 1.28 | 2.04 | 2.01 | 1.99 | 3.14 | 3.61 | 2.87 | 1.81 | 1.53 | 1.64 | 1.68 | 1.58 | 1.07 |
| 7238 | 1.14 | 0.82 | 1.39 | 1.34 | 3.41 | 1.44 | 1.60 | 0.96 | 1.57 | 1.44 | 1.45 | 2.05 | 2.46 | 1.79 | 1.30 | 1.93 | 1.38 | 1.49 | 1.08 | 1.37 |
| 7239 | 2.65 | 4.18 | 1.97 | 2.05 | 4.52 | 2.70 | 3.31 | 2.73 | 4.21 | 4.74 | 4.61 | 6.00 | 6.47 | 9.16 | 4.31 | 3.73 | 2.81 | 2.41 | 4.48 | 0.54 |
| 7240 | 1.57 | 1.16 | 1.49 | 1.57 | 3.43 | 1.83 | 1.89 | 1.27 | 1.95 | 2.07 | 1.99 | 3.41 | 3.93 | 2.85 | 1.82 | 1.19 | 1.67 | 1.72 | 1.55 | 1.11 |
| 7241 | 1.19 | 1.05 | 1.70 | 1.59 | 5.23 | 1.73 | 2.54 | 1.22 | 1.95 | 2.57 | 1.97 | 1.85 | 2.86 | 1.91 | 1.69 | 4.80 | 1.72 | 1.86 | 1.39 | 1.34 |
| 7242 | 2.72 | 4.68 | 2.53 | 2.51 | 4.24 | 3.09 | 3.37 | 2.76 | 4.36 | 4.28 | 4.82 | 6.93 | 7.23 | 9.63 | 4.57 | 2.77 | 3.19 | 2.81 | 4.92 | 0.57 |
| 7243 | 1.76 | 2.15 | 2.27 | 2.46 | 2.71 | 2.86 | 2.67 | 2.00 | 3.14 | 1.85 | 2.89 | 5.98 | 5.99 | 4.43 | 2.64 | 0.00 | 2.48 | 2.53 | 2.58 | 0.98 |
| 7244 | 1.17 | 0.99 | 1.41 | 1.54 | 2.63 | 1.59 | 1.70 | 1.13 | 1.69 | 1.44 | 1.67 | 2.78 | 3.05 | 1.82 | 1.47 | 0.92 | 1.49 | 1.58 | 1.28 | 1.24 |
| 7245 | 2.64 | 4.59 | 2.43 | 2.44 | 3.31 | 3.03 | 3.12 | 2.70 | 4.26 | 3.92 | 4.69 | 7.28 | 7.35 | 9.81 | 4.44 | 1.13 | 3.07 | 2.68 | 4.83 | 0.56 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7368 | 54.6 | Plant 02 | Raw Coal (100M x 0 / - x - SG) | 52.47 |
| 7369 | 35.2 | Plant 02 | Raw Coal (1mm x 100M / - x - SG) | 32.9 |
| 7370 | 50.1 | Plant 02 | Raw Coal (3/4" x 1mm / - x - SG) | 35.5 |
| 7371 | 25.3 | Plant 02 | Raw Coal (+ x 3/4" / - x - SG) | 48.92 |
| 7372 | 24.7 | Plant 02 | Fine Reject (100M x 0 / - x - SG) | 51.59 |
| 7373 | 45.5 | Plant 02 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 7.81 |
| 7374 | 10.6 | Plant 02 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 39.98 |
| 7375 | 50 | Plant 02 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 76.37 |
| 7382 | 28.2 | Plant 02 | Coarse Reject (100M x 0 / - x - SG) | 74.92 |
| 7383 | 47.3 | Plant 02 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 14.89 |
| 7384 | 57 | Plant 02 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 41.1 |
| 7385 | 63.9 | Plant 02 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 78.24 |
| 7386 | 40.2 | Plant 02 | Coarse Reject (3/4" x 1mm / Flt x 1.6 SG) | 23.83 |
| 7387 | 42.3 | Plant 02 | Coarse Reject (3/4" x 1mm / 1.6 x 1.8 SG) | 42.53 |
| 7388 | 62.2 | Plant 02 | Coarse Reject (3/4" x 1mm / 1.8 x Snk SG) | 79.06 |
| 7389 | 49 | Plant 02 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 25.99 |
| 7390 | 57.4 | Plant 02 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 43.89 |
| 7391 | 59.7 | Plant 02 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 72.08 |
| 7392 | 38.7 | Plant 02 | Clean Coal (100M x 0 / - x - SG) | 19.11 |
| 7393 | 58.3 | Plant 02 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 6.55 |
| 7394 | 56.4 | Plant 02 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 38.24 |
| 7395 | 51.9 | Plant 02 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 63.83 |
| 7396 | 40.6 | Plant 02 | Clean Coal (3/4" x 1mm / Flt x 1.6 SG) | 8.58 |
| 7397 | 57.9 | Plant 02 | Clean Coal (3/4" x 1mm / 1.6 x 1.8 SG) | 38.06 |
| 7398 | 9 | Plant 02 | Clean Coal (3/4" x 1mm / 1.8 x Snk SG) | 64.85 |
| 7399 | 49.6 | Plant 02 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 6.47 |
| 7000 | 34.5 | Plant 03 | Raw Coal (100M x 0) | 64.37 |
| 7001 | 40.6 | Plant 03 | Raw Coal (1mm x 100M) | 46.56 |
| 7004 | 70.3 | Plant 03 | Raw Coal (5/8" x 1mm) | 44.99 |
| 7007 | 57.9 | Plant 03 | Raw Coal (1 1/4" x 5/8") | 49.34 |
| 7010 | 36.9 | Plant 03 | Raw Coal (+ x 1 1/4") | 73.68 |
| 7013 | 29 | Plant 03 | Fine Reject (100M x 0) | 74.03 |
| 7014 | 41 | Plant 03 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 6.29 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7368 | 22.38 | 36.41 | 55.46 | 109.72 | 20.01 | 50.25 | 11.59 | 1.84 | 9.03 | 1.14 | 7.26 | 2.59 | 8.17 | 0.73 | 4.02 | 0.54 | 341.2 | 257.9 | 60.9 | 0.24 |
| 7369 | 24.51 | 40.84 | 60.81 | 116.71 | 20.97 | 52.35 | 11.98 | 2.01 | 9.65 | 1.21 | 7.67 | 2.71 | 8.43 | 0.93 | 4.39 | 0.59 | 365.8 | 274.5 | 66.8 | 0.24 |
| 7370 | 24.96 | 38.97 | 57.91 | 114.28 | 22.27 | 49.94 | 11.82 | 2.03 | 9.30 | 1.37 | 7.82 | 2.67 | 8.27 | 0.89 | 4.46 | 0.77 | 357.7 | 267.5 | 65.2 | 0.24 |
| 7371 | 17.23 | 14.84 | 28.69 | 73.80 | 15.75 | 31.95 | 7.42 | 1.20 | 5.74 | 0.90 | 4.09 | 1.77 | 5.82 | 0.34 | 2.30 | 0.32 | 212.2 | 164.5 | 30.4 | 0.18 |
| 7372 | 20.49 | 27.76 | 47.76 | 104.75 | 20.70 | 45.06 | 11.43 | 1.82 | 8.15 | 1.13 | 6.26 | 2.12 | 6.66 | 0.68 | 3.39 | 0.73 | 308.9 | 239.7 | 48.7 | 0.20 |
| 7373 | 56.25 | 111.82 | 80.49 | 160.03 | 31.95 | 82.82 | 19.69 | 4.75 | 20.51 | 3.78 | 18.43 | 6.06 | 17.96 | 3.10 | 11.10 | 1.00 | 629.7 | 400.2 | 173.3 | 0.43 |
| 7374 | 24.47 | 31.09 | 51.06 | 110.84 | 17.34 | 48.15 | 9.76 | 1.66 | 7.92 | 0.89 | 6.15 | 2.76 | 8.53 | 0.81 | 3.81 | 0.19 | 325.4 | 246.7 | 54.2 | 0.22 |
| 7375 | 18.43 | 26.42 | 47.03 | 99.56 | 23.51 | 41.17 | 11.01 | 1.50 | 7.27 | 1.19 | 6.21 | 1.83 | 6.42 | 0.46 | 3.47 | 1.15 | 296.6 | 231.1 | 47.2 | 0.20 |
| 7382 | 19.69 | 27.82 | 54.69 | 105.20 | 22.59 | 49.25 | 12.07 | 1.76 | 8.41 | 1.29 | 7.17 | 2.21 | 7.26 | 0.64 | 3.57 | 0.82 | 324.4 | 254.0 | 50.8 | 0.20 |
| 7383 | 46.96 | 76.86 | 91.71 | 174.27 | 28.53 | 84.89 | 18.67 | 4.13 | 16.96 | 3.06 | 14.99 | 5.12 | 15.02 | 1.81 | 8.32 | 0.76 | 592.1 | 419.2 | 125.9 | 0.30 |
| 7384 | 28.95 | 45.97 | 74.14 | 148.26 | 22.15 | 68.32 | 14.24 | 2.38 | 11.63 | 1.31 | 9.76 | 3.90 | 11.02 | 1.11 | 4.97 | 0.28 | 448.4 | 341.1 | 78.3 | 0.23 |
| 7385 | 18.86 | 24.20 | 44.80 | 97.52 | 22.50 | 42.37 | 10.77 | 1.47 | 7.43 | 1.22 | 6.65 | 1.97 | 6.81 | 0.67 | 3.32 | 0.93 | 291.5 | 226.9 | 45.8 | 0.20 |
| 7386 | 41.28 | 66.89 | 93.35 | 170.57 | 28.39 | 79.98 | 17.65 | 3.44 | 14.94 | 2.31 | 13.36 | 4.55 | 13.01 | 1.60 | 7.18 | 0.91 | 559.4 | 408.3 | 109.8 | 0.27 |
| 7387 | 28.67 | 47.39 | 75.65 | 145.34 | 23.27 | 68.06 | 14.13 | 2.40 | 11.57 | 1.46 | 9.96 | 3.77 | 10.83 | 1.04 | 5.15 | 0.44 | 449.1 | 340.4 | 80.0 | 0.24 |
| 7388 | 20.37 | 29.83 | 55.58 | 107.95 | 21.15 | 50.42 | 11.71 | 1.70 | 8.43 | 1.14 | 6.94 | 2.36 | 7.56 | 0.72 | 3.63 | 0.65 | 330.2 | 256.9 | 52.8 | 0.21 |
| 7389 | 34.60 | 63.04 | 81.61 | 153.54 | 24.44 | 71.46 | 15.23 | 2.67 | 13.16 | 1.76 | 11.52 | 4.15 | 12.55 | 1.48 | 6.35 | 0.58 | 498.2 | 362.1 | 101.5 | 0.28 |
| 7390 | 21.62 | 21.46 | 32.84 | 80.20 | 14.88 | 43.63 | 7.77 | 1.08 | 6.51 | 1.04 | 5.92 | 2.73 | 8.61 | 0.71 | 2.97 | 0.00 | 252.0 | 186.9 | 43.4 | 0.23 |
| 7391 | 20.79 | 33.35 | 57.37 | 111.49 | 18.81 | 52.08 | 11.11 | 1.67 | 8.93 | 1.01 | 7.20 | 2.77 | 8.55 | 0.75 | 3.77 | 0.28 | 339.9 | 261.4 | 57.7 | 0.22 |
| 7392 | 33.02 | 60.50 | 72.23 | 134.77 | 31.45 | 64.23 | 15.95 | 2.88 | 13.44 | 2.20 | 10.94 | 3.49 | 10.86 | 1.30 | 6.27 | 1.25 | 464.8 | 334.9 | 96.8 | 0.29 |
| 7393 | 42.06 | 92.84 | 65.51 | 111.34 | 24.44 | 73.06 | 15.41 | 3.41 | 16.04 | 3.55 | 15.89 | 5.04 | 14.14 | 2.27 | 8.80 | 0.78 | 494.6 | 309.2 | 143.3 | 0.46 |
| 7394 | 22.91 | 24.96 | 35.79 | 90.36 | 16.12 | 41.06 | 8.85 | 1.49 | 7.26 | 1.03 | 5.39 | 2.49 | 8.12 | 0.73 | 3.34 | 0.20 | 270.1 | 200.9 | 46.3 | 0.23 |
| 7395 | 17.31 | 27.87 | 52.07 | 98.86 | 39.75 | 39.77 | 15.73 | 1.56 | 7.60 | 2.04 | 7.88 | 1.04 | 6.02 | 0.61 | 4.03 | 2.95 | 325.1 | 255.3 | 52.4 | 0.21 |
| 7396 | 48.28 | 107.77 | 92.59 | 177.86 | 32.57 | 90.54 | 20.50 | 3.53 | 18.80 | 3.01 | 18.37 | 5.38 | 14.34 | 2.48 | 8.90 | 1.27 | 646.2 | 436.4 | 161.5 | 0.37 |
| 7397 | 30.28 | 50.89 | 81.00 | 150.65 | 27.81 | 71.39 | 16.44 | 2.68 | 12.15 | 1.61 | 10.07 | 3.35 | 10.84 | 0.85 | 5.64 | 0.87 | 476.5 | 362.1 | 84.1 | 0.23 |
| 7398 | 12.00 | 19.56 | 38.85 | 71.45 | 61.28 | 23.27 | 21.13 | 1.21 | 6.26 | 3.33 | 8.90 | -0.82 | 3.56 | 0.31 | 4.08 | 5.81 | 280.2 | 223.5 | 44.7 | 0.20 |
| 7399 | 48.13 | 133.51 | 98.40 | 190.46 | 35.75 | 95.69 | 24.16 | 4.71 | 22.79 | 3.07 | 20.18 | 5.74 | 15.86 | 3.81 | 10.28 | 1.62 | 714.2 | 472.0 | 194.1 | 0.41 |
| 7000 | 18.75 | 24.03 | 41.98 | 79.03 | 23.43 | 38.35 | 9.40 | 1.35 | 7.57 | 1.08 | 5.26 | 1.71 | 5.78 | 0.27 | 3.13 | 0.90 | 262.0 | 201.1 | 42.2 | 0.21 |
| 7001 | 19.23 | 26.37 | 43.27 | 80.92 | 24.27 | 38.76 | 9.91 | 1.45 | 7.86 | 1.20 | 5.74 | 1.63 | 5.72 | 0.33 | 3.30 | 1.07 | 271.0 | 206.4 | 45.4 | 0.22 |
| 7004 | 19.58 | 30.52 | 44.64 | 84.52 | 28.69 | 44.30 | 11.79 | 1.47 | 8.01 | 1.49 | 7.32 | 1.84 | 3.71 | 0.48 | 3.62 | 1.23 | 293.2 | 223.4 | 50.2 | 0.22 |
| 7007 | 17.45 | 29.10 | 41.23 | 81.02 | 24.85 | 42.72 | 10.51 | 1.24 | 7.79 | 1.29 | 6.97 | 1.86 | 5.95 | 0.52 | 3.25 | 1.02 | 276.8 | 209.4 | 50.0 | 0.24 |
| 7010 | 15.60 | 23.87 | 39.21 | 75.49 | 20.64 | 37.68 | 9.29 | 1.35 | 7.37 | 1.04 | 5.17 | 1.65 | 5.27 | 0.29 | 2.87 | 0.79 | 247.6 | 191.0 | 41.0 | 0.21 |
| 7013 | 17.41 | 20.71 | 37.63 | 84.20 | 19.15 | 36.79 | 8.94 | 1.29 | 6.50 | 0.97 | 4.74 | 1.61 | 5.72 | 0.25 | 2.96 | 0.81 | 249.7 | 194.5 | 37.8 | 0.19 |
| 7014 | 43.59 | 57.22 | 23.78 | 71.12 | 29.48 | 45.26 | 11.94 | 2.68 | 12.37 | 3.42 | 11.05 | 3.39 | 12.35 | 2.36 | 7.62 | 1.82 | 339.5 | 196.6 | 99.2 | 0.50 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7368 | 11.74 | 19.10 | 29.10 | 57.57 | 10.50 | 26.37 | 6.08 | 0.96 | 4.74 | 0.60 | 3.81 | 1.36 | 4.29 | 0.38 | 2.11 | 0.29 | 179.0 | 135.3 | 31.9 | 0.236 |
| 7369 | 8.07 | 13.44 | 20.01 | 38.40 | 6.90 | 17.22 | 3.94 | 0.66 | 3.17 | 0.40 | 2.52 | 0.89 | 2.77 | 0.31 | 1.45 | 0.19 | 120.3 | 90.3 | 22.0 | 0.243 |
| 7370 | 8.86 | 13.84 | 20.56 | 40.57 | 7.90 | 17.73 | 4.19 | 0.72 | 3.30 | 0.49 | 2.78 | 0.95 | 2.93 | 0.32 | 1.58 | 0.27 | 127.0 | 95.0 | 23.2 | 0.244 |
| 7371 | 8.43 | 7.26 | 14.03 | 36.10 | 7.70 | 15.63 | 3.63 | 0.59 | 2.81 | 0.44 | 2.00 | 0.87 | 2.85 | 0.17 | 1.12 | 0.16 | 103.8 | 80.5 | 14.9 | 0.185 |
| 7372 | 10.57 | 14.32 | 24.64 | 54.04 | 10.68 | 23.25 | 5.90 | 0.94 | 4.20 | 0.58 | 3.23 | 1.09 | 3.44 | 0.35 | 1.75 | 0.37 | 159.4 | 123.6 | 25.1 | 0.203 |
| 7373 | 4.39 | 8.73 | 6.29 | 12.50 | 2.50 | 6.47 | 1.54 | 0.37 | 1.60 | 0.30 | 1.44 | 0.47 | 1.40 | 0.24 | 0.87 | 0.08 | 49.2 | 31.3 | 13.5 | 0.433 |
| 7374 | 9.78 | 12.43 | 20.41 | 44.31 | 6.93 | 19.25 | 3.90 | 0.66 | 3.16 | 0.36 | 2.46 | 1.10 | 3.41 | 0.32 | 1.52 | 0.08 | 130.1 | 98.6 | 21.7 | 0.22 |
| 7375 | 14.07 | 20.18 | 35.92 | 76.04 | 17.96 | 31.44 | 8.41 | 1.15 | 5.55 | 0.91 | 4.74 | 1.40 | 4.91 | 0.35 | 2.65 | 0.88 | 226.5 | 176.5 | 36.0 | 0.204 |
| 7382 | 14.75 | 20.84 | 40.97 | 78.81 | 16.93 | 36.90 | 9.04 | 1.32 | 6.30 | 0.97 | 5.37 | 1.65 | 5.44 | 0.48 | 2.67 | 0.61 | 243.1 | 190.3 | 38.0 | 0.2 |
| 7383 | 6.99 | 11.45 | 13.66 | 25.95 | 4.25 | 12.64 | 2.78 | 0.62 | 2.53 | 0.45 | 2.23 | 0.76 | 2.24 | 0.27 | 1.24 | 0.11 | 88.2 | 62.4 | 18.8 | 0.3 |
| 7384 | 11.90 | 18.89 | 30.47 | 60.93 | 9.10 | 28.08 | 5.85 | 0.98 | 4.78 | 0.54 | 4.01 | 1.60 | 4.53 | 0.45 | 2.04 | 0.12 | 184.3 | 140.2 | 32.2 | 0.23 |
| 7385 | 14.75 | 18.94 | 35.05 | 76.30 | 17.60 | 33.15 | 8.43 | 1.15 | 5.81 | 0.96 | 5.20 | 1.54 | 5.32 | 0.52 | 2.60 | 0.73 | 228.1 | 177.5 | 35.8 | 0.202 |
| 7386 | 9.84 | 15.94 | 22.24 | 40.65 | 6.76 | 19.06 | 4.21 | 0.82 | 3.56 | 0.55 | 3.18 | 1.09 | 3.10 | 0.38 | 1.71 | 0.22 | 133.3 | 97.3 | 26.2 | 0.269 |
| 7387 | 12.19 | 20.15 | 32.17 | 61.82 | 9.89 | 28.95 | 6.01 | 1.02 | 4.92 | 0.62 | 4.24 | 1.60 | 4.61 | 0.44 | 2.19 | 0.19 | 191.0 | 144.8 | 34.0 | 0.235 |
| 7388 | 16.10 | 23.59 | 43.94 | 85.35 | 16.72 | 39.86 | 9.26 | 1.35 | 6.67 | 0.90 | 5.49 | 1.87 | 5.98 | 0.57 | 2.87 | 0.51 | 261.0 | 203.1 | 41.8 | 0.206 |
| 7389 | 8.99 | 16.38 | 21.21 | 39.91 | 6.35 | 18.57 | 3.96 | 0.69 | 3.42 | 0.46 | 2.99 | 1.08 | 3.26 | 0.39 | 1.65 | 0.15 | 129.5 | 94.1 | 26.4 | 0.28 |
| 7390 | 9.49 | 9.42 | 14.41 | 35.20 | 6.53 | 19.15 | 3.41 | 0.47 | 2.86 | 0.45 | 2.60 | 1.20 | 3.78 | 0.31 | 1.30 | 0.00 | 110.6 | 82.0 | 19.1 | 0.232 |
| 7391 | 14.98 | 24.04 | 41.35 | 80.36 | 13.56 | 37.54 | 8.01 | 1.20 | 6.43 | 0.73 | 5.19 | 2.00 | 6.17 | 0.54 | 2.72 | 0.20 | 245.0 | 188.5 | 41.6 | 0.221 |
| 7392 | 6.31 | 11.56 | 13.80 | 25.75 | 6.01 | 12.27 | 3.05 | 0.55 | 2.57 | 0.42 | 2.09 | 0.67 | 2.08 | 0.25 | 1.20 | 0.24 | 88.8 | 64.0 | 18.5 | 0.289 |
| 7393 | 2.75 | 6.08 | 4.29 | 7.29 | 1.60 | 4.79 | 1.01 | 0.22 | 1.05 | 0.23 | 1.04 | 0.33 | 0.93 | 0.15 | 0.58 | 0.05 | 32.4 | 20.3 | 9.4 | 0.463 |
| 7394 | 8.76 | 9.55 | 13.69 | 34.55 | 6.16 | 15.70 | 3.39 | 0.57 | 2.78 | 0.40 | 2.06 | 0.95 | 3.10 | 0.28 | 1.28 | 0.08 | 103.3 | 76.8 | 17.7 | 0.23 |
| 7395 | 11.05 | 17.79 | 33.24 | 63.10 | 25.37 | 25.39 | 10.04 | 1.00 | 4.85 | 1.30 | 5.03 | 0.67 | 3.84 | 0.39 | 2.57 | 1.88 | 207.5 | 163.0 | 33.5 | 0.205 |
| 7396 | 4.14 | 9.25 | 7.94 | 15.26 | 2.79 | 7.77 | 1.76 | 0.30 | 1.61 | 0.26 | 1.58 | 0.46 | 1.23 | 0.21 | 0.76 | 0.11 | 55.4 | 37.4 | 13.9 | 0.37 |
| 7397 | 11.52 | 19.37 | 30.83 | 57.34 | 10.58 | 27.17 | 6.26 | 1.02 | 4.62 | 0.61 | 3.83 | 1.28 | 4.12 | 0.32 | 2.15 | 0.33 | 181.4 | 137.8 | 32.0 | 0.232 |
| 7398 | 7.78 | 12.68 | 25.20 | 46.34 | 39.74 | 15.09 | 13.70 | 0.78 | 4.06 | 2.16 | 5.77 | -0.53 | 2.31 | 0.20 | 2.65 | 3.77 | 181.7 | 144.9 | 29.0 | 0.2 |
| 7399 | 3.11 | 8.64 | 6.37 | 12.32 | 2.31 | 6.19 | 1.56 | 0.30 | 1.47 | 0.20 | 1.31 | 0.37 | 1.03 | 0.25 | 0.67 | 0.10 | 46.2 | 30.5 | 12.6 | 0.411 |
| 7000 | 12.07 | 15.47 | 27.02 | 50.87 | 15.08 | 24.69 | 6.05 | 0.87 | 4.88 | 0.69 | 3.39 | 1.10 | 3.72 | 0.18 | 2.01 | 0.58 | 168.7 | 129.5 | 27.1 | 0.21 |
| 7001 | 8.95 | 12.28 | 20.15 | 37.68 | 11.30 | 18.04 | 4.61 | 0.67 | 3.66 | 0.56 | 2.67 | 0.76 | 2.67 | 0.15 | 1.54 | 0.50 | 126.2 | 96.1 | 21.1 | 0.22 |
| 7004 | 8.81 | 13.73 | 20.08 | 38.03 | 12.91 | 19.93 | 5.30 | 0.66 | 3.61 | 0.67 | 3.29 | 0.83 | 1.67 | 0.22 | 1.63 | 0.55 | 131.9 | 100.5 | 22.6 | 0.225 |
| 7007 | 8.61 | 14.36 | 20.34 | 39.98 | 12.26 | 21.08 | 5.19 | 0.61 | 3.84 | 0.63 | 3.44 | 0.92 | 2.94 | 0.26 | 1.60 | 0.51 | 136.6 | 103.3 | 24.6 | 0.239 |
| 7010 | 11.49 | 17.59 | 28.89 | 55.62 | 15.21 | 27.76 | 6.84 | 0.99 | 5.43 | 0.77 | 3.81 | 1.22 | 3.88 | 0.22 | 2.11 | 0.58 | 182.4 | 140.7 | 30.2 | 0.214 |
| 7013 | 12.89 | 15.33 | 27.86 | 62.33 | 14.18 | 27.24 | 6.62 | 0.95 | 4.82 | 0.72 | 3.51 | 1.19 | 4.24 | 0.19 | 2.19 | 0.60 | 184.8 | 144.0 | 28.0 | 0.194 |
| 7014 | 2.74 | 3.60 | 1.50 | 4.47 | 1.85 | 2.85 | 0.75 | 0.17 | 0.78 | 0.21 | 0.70 | 0.21 | 0.78 | 0.15 | 0.48 | 0.11 | 21.4 | 12.4 | 6.2 | 0.505 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7368 | 0.73 | 0.80 | 0.97 | 0.96 | 1.57 | 0.98 | 1.15 | 0.74 | 1.18 | 0.92 | 1.00 | 1.70 | 2.04 | 1.16 | 1.05 | 0.81 | 0.97 | 1.01 | 0.94 | 1.07 |
| 7369 | 0.50 | 0.56 | 0.67 | 0.64 | 1.03 | 0.64 | 0.74 | 0.51 | 0.79 | 0.61 | 0.66 | 1.11 | 1.32 | 0.93 | 0.72 | 0.55 | 0.65 | 0.67 | 0.65 | 1.04 |
| 7370 | 0.55 | 0.58 | 0.69 | 0.68 | 1.18 | 0.66 | 0.79 | 0.56 | 0.83 | 0.75 | 0.73 | 1.19 | 1.40 | 0.96 | 0.79 | 0.78 | 0.69 | 0.71 | 0.68 | 1.04 |
| 7371 | 0.53 | 0.30 | 0.47 | 0.60 | 1.15 | 0.58 | 0.68 | 0.45 | 0.70 | 0.68 | 0.53 | 1.08 | 1.36 | 0.51 | 0.56 | 0.45 | 0.56 | 0.60 | 0.44 | 1.37 |
| 7372 | 0.66 | 0.60 | 0.82 | 0.90 | 1.59 | 0.86 | 1.11 | 0.72 | 1.05 | 0.89 | 0.85 | 1.37 | 1.64 | 1.06 | 0.88 | 1.07 | 0.86 | 0.92 | 0.74 | 1.25 |
| 7373 | 0.27 | 0.36 | 0.21 | 0.21 | 0.37 | 0.24 | 0.29 | 0.29 | 0.40 | 0.45 | 0.38 | 0.59 | 0.67 | 0.73 | 0.43 | 0.22 | 0.27 | 0.23 | 0.40 | 0.59 |
| 7374 | 0.61 | 0.52 | 0.68 | 0.74 | 1.03 | 0.71 | 0.74 | 0.51 | 0.79 | 0.55 | 0.65 | 1.38 | 1.62 | 0.98 | 0.76 | 0.22 | 0.71 | 0.73 | 0.64 | 1.15 |
| 7375 | 0.88 | 0.84 | 1.20 | 1.27 | 2.68 | 1.16 | 1.59 | 0.88 | 1.39 | 1.40 | 1.25 | 1.75 | 2.34 | 1.05 | 1.33 | 2.52 | 1.23 | 1.31 | 1.06 | 1.24 |
| 7382 | 0.92 | 0.87 | 1.37 | 1.31 | 2.53 | 1.37 | 1.71 | 1.01 | 1.58 | 1.49 | 1.41 | 2.07 | 2.59 | 1.46 | 1.34 | 1.76 | 1.32 | 1.42 | 1.12 | 1.27 |
| 7383 | 0.44 | 0.48 | 0.46 | 0.43 | 0.63 | 0.47 | 0.52 | 0.47 | 0.63 | 0.70 | 0.59 | 0.95 | 1.07 | 0.82 | 0.62 | 0.32 | 0.48 | 0.46 | 0.55 | 0.84 |
| 7384 | 0.74 | 0.79 | 1.02 | 1.02 | 1.36 | 1.04 | 1.10 | 0.75 | 1.19 | 0.83 | 1.06 | 2.00 | 2.16 | 1.38 | 1.02 | 0.33 | 1.00 | 1.04 | 0.95 | 1.10 |
| 7385 | 0.92 | 0.79 | 1.17 | 1.27 | 2.63 | 1.23 | 1.59 | 0.88 | 1.45 | 1.47 | 1.37 | 1.93 | 2.54 | 1.58 | 1.30 | 2.08 | 1.24 | 1.32 | 1.05 | 1.26 |
| 7386 | 0.61 | 0.66 | 0.74 | 0.68 | 1.01 | 0.71 | 0.79 | 0.63 | 0.89 | 0.85 | 0.84 | 1.36 | 1.48 | 1.15 | 0.86 | 0.62 | 0.72 | 0.72 | 0.77 | 0.94 |
| 7387 | 0.76 | 0.84 | 1.07 | 1.03 | 1.48 | 1.07 | 1.13 | 0.79 | 1.23 | 0.95 | 1.11 | 2.00 | 2.19 | 1.35 | 1.10 | 0.54 | 1.04 | 1.08 | 1.00 | 1.08 |
| 7388 | 1.01 | 0.98 | 1.46 | 1.42 | 2.50 | 1.48 | 1.75 | 1.04 | 1.67 | 1.39 | 1.44 | 2.34 | 2.85 | 1.73 | 1.43 | 1.47 | 1.42 | 1.51 | 1.23 | 1.23 |
| 7389 | 0.56 | 0.68 | 0.71 | 0.67 | 0.95 | 0.69 | 0.75 | 0.53 | 0.85 | 0.71 | 0.79 | 1.35 | 1.55 | 1.17 | 0.83 | 0.43 | 0.70 | 0.70 | 0.77 | 0.90 |
| 7390 | 0.59 | 0.39 | 0.48 | 0.59 | 0.97 | 0.71 | 0.64 | 0.36 | 0.71 | 0.70 | 0.68 | 1.50 | 1.80 | 0.95 | 0.65 | 0.00 | 0.60 | 0.61 | 0.56 | 1.09 |
| 7391 | 0.94 | 1.00 | 1.38 | 1.34 | 2.02 | 1.39 | 1.51 | 0.93 | 1.61 | 1.12 | 1.37 | 2.50 | 2.94 | 1.63 | 1.36 | 0.58 | 1.33 | 1.40 | 1.22 | 1.15 |
| 7392 | 0.39 | 0.48 | 0.46 | 0.43 | 0.90 | 0.45 | 0.58 | 0.42 | 0.64 | 0.65 | 0.55 | 0.83 | 0.99 | 0.75 | 0.60 | 0.68 | 0.48 | 0.48 | 0.54 | 0.88 |
| 7393 | 0.17 | 0.25 | 0.14 | 0.12 | 0.24 | 0.18 | 0.19 | 0.17 | 0.26 | 0.36 | 0.27 | 0.41 | 0.44 | 0.45 | 0.29 | 0.15 | 0.18 | 0.15 | 0.28 | 0.55 |
| 7394 | 0.55 | 0.40 | 0.46 | 0.58 | 0.92 | 0.58 | 0.64 | 0.44 | 0.69 | 0.61 | 0.54 | 1.19 | 1.48 | 0.84 | 0.64 | 0.22 | 0.56 | 0.57 | 0.52 | 1.10 |
| 7395 | 0.69 | 0.74 | 1.11 | 1.05 | 3.79 | 0.94 | 1.89 | 0.77 | 1.21 | 2.00 | 1.32 | 0.83 | 1.83 | 1.17 | 1.29 | 5.39 | 1.13 | 1.21 | 0.98 | 1.23 |
| 7396 | 0.26 | 0.39 | 0.26 | 0.25 | 0.42 | 0.29 | 0.33 | 0.23 | 0.40 | 0.40 | 0.41 | 0.58 | 0.59 | 0.64 | 0.38 | 0.31 | 0.30 | 0.28 | 0.41 | 0.68 |
| 7397 | 0.72 | 0.81 | 1.03 | 0.96 | 1.58 | 1.01 | 1.18 | 0.78 | 1.16 | 0.95 | 1.01 | 1.59 | 1.96 | 0.98 | 1.07 | 0.95 | 0.98 | 1.03 | 0.94 | 1.09 |
| 7398 | 0.49 | 0.53 | 0.84 | 0.77 | 5.93 | 0.56 | 2.59 | 0.60 | 1.01 | 3.32 | 1.52 | -0.67 | 1.10 | 0.61 | 1.32 | 10.77 | 0.99 | 1.08 | 0.85 | 1.27 |
| 7399 | 0.19 | 0.36 | 0.21 | 0.21 | 0.35 | 0.23 | 0.29 | 0.23 | 0.37 | 0.31 | 0.34 | 0.46 | 0.49 | 0.75 | 0.33 | 0.30 | 0.25 | 0.23 | 0.37 | 0.62 |
| 7000 | 0.75 | 0.64 | 0.90 | 0.85 | 2.25 | 0.91 | 1.14 | 0.67 | 1.22 | 1.07 | 0.89 | 1.38 | 1.77 | 0.53 | 1.01 | 1.66 | 0.92 | 0.96 | 0.80 | 1.21 |
| 7001 | 0.56 | 0.51 | 0.67 | 0.63 | 1.69 | 0.67 | 0.87 | 0.52 | 0.92 | 0.86 | 0.70 | 0.95 | 1.27 | 0.47 | 0.77 | 1.43 | 0.68 | 0.72 | 0.62 | 1.15 |
| 7004 | 0.55 | 0.57 | 0.67 | 0.63 | 1.93 | 0.74 | 1.00 | 0.51 | 0.90 | 1.03 | 0.87 | 1.03 | 0.79 | 0.65 | 0.81 | 1.58 | 0.72 | 0.75 | 0.66 | 1.13 |
| 7007 | 0.54 | 0.60 | 0.68 | 0.67 | 1.83 | 0.78 | 0.98 | 0.47 | 0.96 | 0.98 | 0.90 | 1.14 | 1.40 | 0.78 | 0.80 | 1.44 | 0.74 | 0.77 | 0.72 | 1.06 |
| 7010 | 0.72 | 0.73 | 0.96 | 0.93 | 2.27 | 1.03 | 1.29 | 0.76 | 1.36 | 1.18 | 1.00 | 1.52 | 1.85 | 0.66 | 1.06 | 1.67 | 0.99 | 1.05 | 0.89 | 1.18 |
| 7013 | 0.81 | 0.64 | 0.93 | 1.04 | 2.12 | 1.01 | 1.25 | 0.73 | 1.20 | 1.11 | 0.92 | 1.49 | 2.02 | 0.57 | 1.09 | 1.71 | 1.00 | 1.07 | 0.82 | 1.30 |
| 7014 | 0.17 | 0.15 | 0.05 | 0.07 | 0.28 | 0.11 | 0.14 | 0.13 | 0.19 | 0.33 | 0.18 | 0.27 | 0.37 | 0.45 | 0.24 | 0.33 | 0.12 | 0.09 | 0.18 | 0.50 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7368 | 1.40 | 1.52 | 1.85 | 1.83 | 2.99 | 1.86 | 2.19 | 1.41 | 2.26 | 1.76 | 1.91 | 3.24 | 3.89 | 2.20 | 2.01 | 1.55 | 1.85 | 1.92 | 1.79 | 1.07 |
| 7369 | 1.53 | 1.70 | 2.03 | 1.95 | 3.13 | 1.94 | 2.26 | 1.54 | 2.41 | 1.87 | 2.02 | 3.39 | 4.02 | 2.81 | 2.20 | 1.67 | 1.98 | 2.04 | 1.96 | 1.04 |
| 7370 | 1.56 | 1.62 | 1.93 | 1.90 | 3.32 | 1.85 | 2.23 | 1.56 | 2.33 | 2.11 | 2.06 | 3.34 | 3.94 | 2.71 | 2.23 | 2.19 | 1.94 | 1.99 | 1.92 | 1.04 |
| 7371 | 1.08 | 0.62 | 0.96 | 1.23 | 2.35 | 1.18 | 1.40 | 0.92 | 1.43 | 1.38 | 1.08 | 2.21 | 2.77 | 1.04 | 1.15 | 0.91 | 1.15 | 1.23 | 0.89 | 1.37 |
| 7372 | 1.28 | 1.16 | 1.59 | 1.75 | 3.09 | 1.67 | 2.16 | 1.40 | 2.04 | 1.73 | 1.65 | 2.65 | 3.17 | 2.05 | 1.70 | 2.07 | 1.68 | 1.78 | 1.43 | 1.25 |
| 7373 | 3.52 | 4.66 | 2.68 | 2.67 | 4.77 | 3.07 | 3.71 | 3.66 | 5.13 | 5.82 | 4.85 | 7.57 | 8.55 | 9.38 | 5.55 | 2.87 | 3.42 | 2.98 | 5.09 | 0.59 |
| 7374 | 1.53 | 1.30 | 1.70 | 1.85 | 2.59 | 1.78 | 1.84 | 1.27 | 1.98 | 1.37 | 1.62 | 3.45 | 4.06 | 2.44 | 1.90 | 0.55 | 1.77 | 1.84 | 1.59 | 1.15 |
| 7375 | 1.15 | 1.10 | 1.57 | 1.66 | 3.51 | 1.52 | 2.08 | 1.15 | 1.82 | 1.83 | 1.64 | 2.29 | 3.06 | 1.38 | 1.74 | 3.30 | 1.61 | 1.72 | 1.39 | 1.24 |
| 7382 | 1.23 | 1.16 | 1.82 | 1.75 | 3.37 | 1.82 | 2.28 | 1.35 | 2.10 | 1.98 | 1.89 | 2.76 | 3.46 | 1.95 | 1.78 | 2.34 | 1.76 | 1.89 | 1.49 | 1.27 |
| 7383 | 2.94 | 3.20 | 3.06 | 2.90 | 4.26 | 3.14 | 3.52 | 3.18 | 4.24 | 4.70 | 3.95 | 6.39 | 7.15 | 5.47 | 4.16 | 2.17 | 3.21 | 3.12 | 3.70 | 0.84 |
| 7384 | 1.81 | 1.92 | 2.47 | 2.47 | 3.31 | 2.53 | 2.69 | 1.83 | 2.91 | 2.02 | 2.57 | 4.87 | 5.25 | 3.35 | 2.48 | 0.81 | 2.43 | 2.54 | 2.30 | 1.10 |
| 7385 | 1.18 | 1.01 | 1.49 | 1.63 | 3.36 | 1.57 | 2.03 | 1.13 | 1.86 | 1.88 | 1.75 | 2.46 | 3.24 | 2.02 | 1.66 | 2.66 | 1.58 | 1.69 | 1.34 | 1.26 |
| 7386 | 2.58 | 2.79 | 3.11 | 2.84 | 4.24 | 2.96 | 3.33 | 2.65 | 3.74 | 3.56 | 3.52 | 5.69 | 6.20 | 4.84 | 3.59 | 2.61 | 3.03 | 3.04 | 3.23 | .94 |
| 7387 | 1.79 | 1.97 | 2.52 | 2.42 | 3.47 | 2.52 | 2.67 | 1.85 | 2.89 | 2.24 | 2.62 | 4.71 | 5.16 | 3.17 | 2.58 | 1.27 | 2.44 | 2.53 | 2.35 | 1.08 |
| 7388 | 1.27 | 1.24 | 1.85 | 1.80 | 3.16 | 1.87 | 2.21 | 1.31 | 2.11 | 1.76 | 1.83 | 2.95 | 3.60 | 2.18 | 1.81 | 1.86 | 1.79 | 1.91 | 1.55 | 1.23 |
| 7389 | 2.16 | 2.63 | 2.72 | 2.56 | 3.65 | 2.65 | 2.87 | 2.06 | 3.29 | 2.71 | 3.03 | 5.19 | 5.98 | 4.49 | 3.18 | 1.67 | 2.70 | 2.70 | 2.98 | 0.90 |
| 7390 | 1.35 | 0.89 | 1.09 | 1.34 | 2.22 | 1.62 | 1.47 | 0.83 | 1.63 | 1.59 | 1.56 | 3.42 | 4.10 | 2.15 | 1.48 | 0.00 | 1.37 | 1.39 | 1.28 | 1.09 |
| 7391 | 1.30 | 1.39 | 1.91 | 1.86 | 2.81 | 1.93 | 2.10 | 1.29 | 2.23 | 1.55 | 1.89 | 3.47 | 4.07 | 2.26 | 1.89 | 0.80 | 1.84 | 1.95 | 1.70 | 1.15 |
| 7392 | 2.06 | 2.52 | 2.41 | 2.25 | 4.69 | 2.38 | 3.01 | 2.22 | 3.36 | 3.39 | 2.88 | 4.36 | 5.17 | 3.95 | 3.14 | 3.58 | 2.52 | 2.49 | 2.85 | 0.88 |
| 7393 | 2.63 | 3.87 | 2.18 | 1.86 | 3.65 | 2.71 | 2.91 | 2.62 | 4.01 | 5.46 | 4.18 | 6.30 | 6.73 | 6.89 | 4.40 | 2.22 | 2.68 | 2.30 | 4.21 | 0.55 |
| 7394 | 1.43 | 1.04 | 1.19 | 1.51 | 2.41 | 1.52 | 1.67 | 1.14 | 1.81 | 1.59 | 1.42 | 3.11 | 3.87 | 2.20 | 1.67 | 0.57 | 1.47 | 1.50 | 1.36 | 1.10 |
| 7395 | 1.08 | 1.16 | 1.74 | 1.65 | 5.93 | 1.47 | 2.97 | 1.20 | 1.90 | 3.13 | 2.07 | 1.30 | 2.86 | 1.84 | 2.02 | 8.44 | 1.76 | 1.90 | 1.54 | 1.23 |
| 7396 | 3.02 | 4.49 | 3.09 | 2.96 | 4.86 | 3.35 | 3.87 | 2.72 | 4.70 | 4.63 | 4.83 | 6.72 | 6.83 | 7.50 | 4.45 | 3.63 | 3.51 | 3.25 | 4.75 | 0.68 |
| 7397 | 1.89 | 2.12 | 2.70 | 2.51 | 4.15 | 2.64 | 3.10 | 2.06 | 3.04 | 2.48 | 2.65 | 4.19 | 5.16 | 2.58 | 2.82 | 2.48 | 2.59 | 2.70 | 2.47 | 1.09 |
| 7398 | 0.75 | 0.81 | 1.30 | 1.19 | 9.15 | 0.86 | 3.99 | 0.93 | 1.56 | 5.13 | 2.34 | -1.03 | 1.69 | 0.93 | 2.04 | 16.61 | 1.52 | 1.66 | 1.31 | 1.27 |
| 7399 | 3.01 | 5.56 | 3.28 | 3.17 | 5.34 | 3.54 | 4.56 | 3.63 | 5.70 | 4.73 | 5.31 | 7.18 | 7.55 | 11.54 | 5.14 | 4.62 | 3.87 | 3.51 | 5.70 | 0.62 |
| 7000 | 1.17 | 1.00 | 1.40 | 1.32 | 3.50 | 1.42 | 1.77 | 1.04 | 1.89 | 1.66 | 1.39 | 2.14 | 2.75 | 0.83 | 1.56 | 2.58 | 1.42 | 1.50 | 1.24 | 1.21 |
| 7001 | 1.20 | 1.10 | 1.44 | 1.35 | 3.62 | 1.44 | 1.87 | 1.11 | 1.97 | 1.84 | 1.51 | 2.04 | 2.73 | 1.01 | 1.65 | 3.07 | 1.47 | 1.54 | 1.33 | 1.15 |
| 7004 | 1.22 | 1.27 | 1.49 | 1.41 | 4.28 | 1.64 | 2.22 | 1.13 | 2.00 | 2.29 | 1.93 | 2.30 | 1.77 | 1.46 | 1.81 | 3.52 | 1.59 | 1.66 | 1.48 | 1.13 |
| 7007 | 1.09 | 1.21 | 1.37 | 1.35 | 3.71 | 1.58 | 1.98 | 0.95 | 1.95 | 1.98 | 1.83 | 2.32 | 2.83 | 1.58 | 1.62 | 2.93 | 1.50 | 1.56 | 1.47 | 1.06 |
| 7010 | 0.97 | 0.99 | 1.31 | 1.26 | 3.08 | 1.40 | 1.75 | 1.04 | 1.84 | 1.61 | 1.36 | 2.06 | 2.51 | 0.89 | 1.43 | 2.26 | 1.34 | 1.42 | 1.20 | 1.18 |
| 7013 | 1.09 | 0.86 | 1.25 | 1.40 | 2.86 | 1.36 | 1.69 | 0.99 | 1.63 | 1.50 | 1.25 | 2.01 | 2.73 | 0.76 | 1.48 | 2.30 | 1.35 | 1.45 | 1.11 | 1.30 |
| 7014 | 2.72 | 2.38 | 0.79 | 1.19 | 4.40 | 1.68 | 2.25 | 2.06 | 3.09 | 5.26 | 2.91 | 4.24 | 5.88 | 7.15 | 3.81 | 5.20 | 1.84 | 1.46 | 2.92 | 0.50 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7015 | 0.5 | Plant 03 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 36.16 |
| 7016 | 35.4 | Plant 03 | Fine Reject (1mm x 100M / 1.6 x Snk SG) | 86.85 |
| 7026 | 38.6 | Plant 03 | Coarse Reject (100M x 0) | 87.07 |
| 7027 | 49.8 | Plant 03 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 11.03 |
| 7028 | 20.5 | Plant 03 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 38.3 |
| 7029 | 55.2 | Plant 03 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 88.08 |
| 7030 | 26.6 | Plant 03 | Coarse Reject (5/8" x 1mm / Flt x 1.6 SG) | 22.4 |
| 7031 | 54.9 | Plant 03 | Coarse Reject (5/8" x 1mm / 1.6 x 1.8 SG) | 40.77 |
| 7032 | 76.3 | Plant 03 | Coarse Reject (5/8" x 1mm / 1.8 x Snk SG) | 88.62 |
| 7033 | 35.4 | Plant 03 | Coarse Reject (1 1/4" x 5/8" / Flt x 1.6 SG) | 22.14 |
| 7034 | 54.5 | Plant 03 | Coarse Reject (1 1/4" x 5/8" / 1.6 x 1.8 SG) | 44.1 |
| 7035 | 68.1 | Plant 03 | Coarse Reject (1 1/4" x 5/8" / 1.8 x Snk SG) | 89.86 |
| 7036 | 42.2 | Plant 03 | Coarse Reject (+ x 1 1/4" / Flt x 1.6 SG) | 30.21 |
| 7037 | 43.7 | Plant 03 | Coarse Reject (+ x 1 1/4" / 1.6 x 1.8 SG) | 42.62 |
| 7038 | 52.8 | Plant 03 | Coarse Reject (+ x 1 1/4" / 1.8 x Snk SG) | 90.17 |
| 7039 | - | Plant 03 | Clean Coal (100M x 0) | 32.38 |
| 7040 | - | Plant 03 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 6.05 |
| 7041 | - | Plant 03 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 36.58 |
| 7042 | - | Plant 03 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 67.86 |
| 7043 | - | Plant 03 | Clean Coal (5/8" x 1mm / Flt x 1.6 SG) | 8.73 |
| 7044 | - | Plant 03 | Clean Coal (5/8" x 1mm / 1.6 x 1.8 SG) | 38.55 |
| 7045 | - | Plant 03 | Clean Coal (5/8" x 1mm / 1.8 x Snk SG) | 65.81 |
| 7046 | - | Plant 03 | Clean Coal (1 1/4" x 5/8" / Flt x 1.6 SG) | 10.08 |
| 7047 | - | Plant 03 | Clean Coal (1 1/4" x 5/8" / 1.6 x 1.8 SG) | 40.77 |
| 7048 | - | Plant 03 | Clean Coal (1 1/4" x 5/8" / 1.8 x Snk SG) | 55.55 |
| 7049 | - | Plant 03 | Clean Coal (+ x 1 1/4" / Flt x 1.6 SG) | 12.71 |
| 7050 | - | Plant 03 | Clean Coal (+ x 1 1/4" / 1.6 x 1.8 SG) | 42.48 |
| 7051 | - | Plant 03 | Clean Coal (+ x 1 1/4" / 1.8 x Snk SG) | 56.89 |
| 7780 | - | Plant 04 | Raw Coal (325M x 0) | 51.54 |
| 7781 | - | Plant 04 | Raw Coal (100M x 325M) | 31.07 |
| 7782 | - | Plant 04 | Raw Coal (1mm x 100M / Flt x 1.3 SG) | 1.21 |
| 7783 | - | Plant 04 | Raw Coal (1mm x 100M / 1.3 x 1.4 SG) | 7.5 |
| 7784 | - | Plant 04 | Raw Coal (1mm x 100M / 1.4 x 1.5 SG) | 14.48 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7015 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7016 | 15.47 | 18.95 | 35.91 | 67.19 | 24.60 | 31.33 | 8.49 | 1.12 | 6.49 | 0.96 | 4.81 | 1.25 | 4.59 | 0.23 | 2.64 | 1.22 | 225.2 | 175.1 | 34.7 | 0.20 |
| 7026 | 16.23 | 22.15 | 38.59 | 72.18 | 28.95 | 38.19 | 10.07 | 1.14 | 6.92 | 1.25 | 5.95 | 1.47 | 2.88 | 0.26 | 2.91 | 1.32 | 250.4 | 196.0 | 38.2 | 0.19 |
| 7027 | 44.06 | 87.69 | 70.36 | 136.53 | 41.74 | 74.01 | 19.49 | 3.35 | 16.65 | 3.46 | 16.87 | 4.53 | 9.21 | 2.01 | 8.76 | 1.90 | 540.6 | 362.1 | 134.4 | 0.37 |
| 7028 | 26.12 | 36.46 | 57.89 | 105.99 | 33.15 | 52.44 | 12.32 | 1.50 | 9.22 | 1.49 | 8.46 | 2.61 | 4.33 | 0.85 | 4.32 | 1.18 | 358.3 | 272.5 | 59.7 | 0.22 |
| 7029 | 16.58 | 20.23 | 38.62 | 71.41 | 29.25 | 35.76 | 9.96 | 1.12 | 6.61 | 1.24 | 5.68 | 1.27 | 2.66 | 0.25 | 2.75 | 1.33 | 244.7 | 192.7 | 35.4 | 0.18 |
| 7030 | 29.49 | 47.42 | 57.87 | 107.67 | 38.02 | 49.57 | 15.97 | 2.22 | 10.55 | 2.60 | 10.16 | 2.28 | 9.19 | 1.18 | 5.94 | 2.51 | 392.7 | 281.9 | 81.3 | 0.29 |
| 7031 | 22.26 | 31.05 | 56.58 | 103.57 | 28.63 | 45.92 | 12.03 | 1.61 | 8.27 | 1.43 | 7.15 | 2.13 | 7.81 | 0.69 | 4.13 | 1.40 | 334.7 | 256.6 | 55.8 | 0.22 |
| 7032 | 14.95 | 22.06 | 42.57 | 80.64 | 21.79 | 39.46 | 10.07 | 1.36 | 7.08 | 1.03 | 5.32 | 1.60 | 5.37 | 0.29 | 2.86 | 0.91 | 257.4 | 203.0 | 39.4 | 0.19 |
| 7033 | 28.60 | 48.17 | 64.88 | 121.45 | 28.48 | 56.08 | 14.05 | 2.21 | 11.21 | 1.86 | 9.74 | 3.11 | 10.01 | 1.11 | 5.42 | 1.24 | 407.6 | 298.4 | 80.7 | 0.27 |
| 7034 | 21.21 | 31.82 | 57.90 | 108.34 | 24.70 | 49.02 | 11.27 | 1.56 | 8.34 | 1.24 | 6.68 | 2.53 | 8.46 | 0.59 | 4.06 | 0.90 | 338.6 | 261.1 | 56.3 | 0.22 |
| 7035 | 13.57 | 19.54 | 32.01 | 64.30 | 21.07 | 34.95 | 8.41 | 0.96 | 6.29 | 1.00 | 5.27 | 1.41 | 4.52 | 0.40 | 2.31 | 0.75 | 216.8 | 168.0 | 35.2 | 0.21 |
| 7036 | 25.02 | 36.08 | 52.28 | 115.65 | 23.57 | 51.48 | 11.02 | 1.49 | 8.07 | 1.31 | 7.86 | 2.85 | 4.30 | 0.95 | 4.34 | 0.65 | 346.9 | 263.6 | 58.3 | 0.22 |
| 7037 | 21.74 | 31.45 | 57.79 | 109.67 | 32.43 | 55.19 | 13.76 | 1.48 | 8.57 | 1.53 | 8.06 | 2.32 | 3.79 | 0.60 | 3.99 | 1.21 | 353.6 | 278.9 | 53.0 | 0.19 |
| 7038 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7039 | 21.30 | 32.66 | 40.84 | 79.22 | 17.40 | 41.42 | 11.95 | 1.65 | 9.05 | 1.66 | 7.99 | 1.87 | 3.71 | 0.75 | 4.08 | 1.38 | 276.9 | 201.5 | 54.1 | 0.27 |
| 7040 | 55.01 | 121.58 | 79.98 | 160.29 | 32.69 | 88.08 | 25.11 | 4.92 | 23.80 | 4.53 | 22.86 | 5.42 | 12.15 | 3.06 | 11.76 | 2.57 | 653.8 | 414.9 | 183.9 | 0.44 |
| 7041 | 25.16 | 33.54 | 56.37 | 103.82 | 19.13 | 48.69 | 12.75 | 1.69 | 9.31 | 1.57 | 8.33 | 2.29 | 3.71 | 0.94 | 4.29 | 1.15 | 332.7 | 251.8 | 55.8 | 0.22 |
| 7042 | 18.09 | 18.14 | 37.69 | 69.92 | 19.84 | 32.40 | 10.92 | 1.16 | 7.14 | 1.39 | 5.82 | 0.92 | 2.12 | 0.39 | 2.84 | 1.60 | 230.4 | 179.1 | 33.2 | 0.19 |
| 7043 | 29.07 | 57.28 | 50.60 | 117.77 | 16.61 | 53.88 | 17.59 | 2.81 | 12.93 | 2.75 | 13.21 | 2.73 | 5.77 | 1.93 | 6.35 | 2.26 | 393.6 | 272.2 | 92.3 | 0.34 |
| 7044 | 24.82 | 31.92 | 56.82 | 105.30 | 21.95 | 47.99 | 16.52 | 1.72 | 9.24 | 2.09 | 9.24 | 1.66 | 3.35 | 0.90 | 4.60 | 2.24 | 340.4 | 259.5 | 56.0 | 0.22 |
| 7045 | 16.89 | 18.63 | 41.75 | 78.09 | 17.68 | 33.99 | 14.99 | 1.30 | 6.92 | 1.93 | 7.25 | 0.68 | 1.94 | 0.52 | 3.36 | 2.46 | 248.4 | 194.7 | 36.8 | 0.19 |
| 7046 | 40.22 | 90.64 | 69.74 | 134.90 | 30.40 | 67.57 | 23.97 | 3.47 | 18.02 | 3.70 | 18.62 | 3.48 | 8.62 | 2.42 | 9.09 | 3.25 | 528.1 | 348.1 | 139.8 | 0.40 |
| 7047 | 24.19 | 32.40 | 57.15 | 107.42 | 16.98 | 52.50 | 12.83 | 1.76 | 9.08 | 1.53 | 8.31 | 2.44 | 3.88 | 0.88 | 4.28 | 0.99 | 336.6 | 257.7 | 54.7 | 0.21 |
| 7048 | 22.26 | 24.39 | 49.07 | 90.30 | 20.61 | 43.47 | 12.71 | 1.45 | 8.15 | 1.63 | 7.36 | 1.59 | 2.96 | 0.68 | 3.75 | 1.57 | 291.9 | 225.8 | 43.9 | 0.19 |
| 7049 | 38.68 | 82.83 | 78.19 | 147.07 | 24.80 | 75.05 | 19.46 | 3.30 | 17.00 | 2.71 | 16.68 | 4.35 | 8.69 | 2.15 | 8.18 | 1.62 | 530.8 | 364.9 | 127.2 | 0.35 |
| 7050 | 26.38 | 29.54 | 51.38 | 112.81 | 11.80 | 55.30 | 10.88 | 1.96 | 8.74 | 1.22 | 7.44 | 2.84 | 4.03 | 0.81 | 3.98 | 0.14 | 329.3 | 252.9 | 50.0 | 0.20 |
| 7051 | 18.65 | 20.44 | 41.50 | 88.87 | 10.45 | 43.62 | 11.02 | 1.25 | 6.51 | 1.31 | 6.07 | 1.75 | 2.76 | 0.40 | 3.50 | 1.11 | 259.2 | 203.2 | 37.3 | 0.18 |
| 7780 | 19.74 | 24.59 | 39.30 | 93.13 | 11.61 | 41.94 | 10.94 | 1.60 | 7.74 | 1.26 | 6.78 | 2.08 | 3.73 | 0.67 | 3.39 | 0.76 | 269.2 | 206.2 | 43.3 | 0.21 |
| 7781 | 24.29 | 29.28 | 43.75 | 83.79 | 18.58 | 42.60 | 10.77 | 1.72 | 9.19 | 1.42 | 7.61 | 2.07 | 4.17 | 0.71 | 3.52 | 0.82 | 284.3 | 210.4 | 49.6 | 0.24 |
| 7782 | 129.36 | 205.15 | 96.48 | 197.80 | 42.22 | 149.26 | 27.67 | 8.01 | 35.48 | 6.79 | 31.31 | 9.18 | 20.39 | 7.70 | 17.26 | 2.03 | 986.1 | 556.9 | 299.8 | 0.54 |
| 7783 | 45.95 | 70.15 | 71.16 | 139.13 | 16.47 | 80.66 | 13.75 | 3.25 | 14.30 | 2.06 | 12.63 | 4.96 | 8.10 | 1.74 | 6.89 | 0.00 | 491.2 | 338.7 | 106.5 | 0.31 |
| 7784 | 29.73 | 45.09 | 76.95 | 140.14 | 15.91 | 70.58 | 12.16 | 2.35 | 10.80 | 1.00 | 8.88 | 3.84 | 5.50 | 1.14 | 4.69 | 0.00 | 428.8 | 328.9 | 70.1 | 0.21 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7015 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7016 | 13.44 | 16.46 | 31.19 | 58.35 | 21.36 | 27.21 | 7.37 | 0.98 | 5.64 | 0.83 | 4.18 | 1.08 | 3.99 | 0.20 | 2.29 | 1.06 | 195.6 | 152.1 | 30.1 | 0.198 |
| 7026 | 14.13 | 19.29 | 33.60 | 62.84 | 25.21 | 33.25 | 8.77 | 0.99 | 6.02 | 1.09 | 5.18 | 1.28 | 2.51 | 0.22 | 2.54 | 1.15 | 218.1 | 170.7 | 33.2 | 0.195 |
| 7027 | 4.86 | 9.67 | 7.76 | 15.06 | 4.60 | 8.16 | 2.15 | 0.37 | 1.84 | 0.38 | 1.86 | 0.50 | 1.02 | 0.22 | 0.97 | 0.21 | 59.6 | 39.9 | 14.8 | 0.371 |
| 7028 | 10.01 | 13.97 | 22.17 | 40.59 | 12.70 | 20.09 | 4.72 | 0.58 | 3.53 | 0.57 | 3.24 | 1.00 | 1.66 | 0.33 | 1.65 | 0.45 | 137.2 | 104.4 | 22.9 | 0.219 |
| 7029 | 14.61 | 17.82 | 34.02 | 62.90 | 25.76 | 31.50 | 8.78 | 0.99 | 5.82 | 1.09 | 5.01 | 1.11 | 2.34 | 0.22 | 2.42 | 1.17 | 215.6 | 169.8 | 31.2 | 0.184 |
| 7030 | 6.61 | 10.62 | 12.96 | 24.12 | 8.52 | 11.10 | 3.58 | 0.50 | 2.36 | 0.58 | 2.28 | 0.51 | 2.06 | 0.26 | 1.33 | 0.56 | 88.0 | 63.1 | 18.2 | 0.288 |
| 7031 | 9.07 | 12.66 | 23.07 | 42.23 | 11.67 | 18.72 | 4.91 | 0.66 | 3.37 | 0.58 | 2.91 | 0.87 | 3.18 | 0.28 | 1.69 | 0.57 | 136.4 | 104.6 | 22.7 | 0.217 |
| 7032 | 13.25 | 19.55 | 37.73 | 71.46 | 19.31 | 34.97 | 8.93 | 1.21 | 6.27 | 0.91 | 4.71 | 1.42 | 4.76 | 0.26 | 2.53 | 0.81 | 228.1 | 179.9 | 34.9 | 0.194 |
| 7033 | 6.33 | 10.66 | 14.36 | 26.89 | 6.31 | 12.42 | 3.11 | 0.49 | 2.48 | 0.41 | 2.16 | 0.69 | 2.22 | 0.25 | 1.20 | 0.28 | 90.2 | 66.1 | 17.9 | 0.27 |
| 7034 | 9.36 | 14.03 | 25.54 | 47.78 | 10.89 | 21.62 | 4.97 | 0.69 | 3.68 | 0.55 | 2.95 | 1.11 | 3.73 | 0.26 | 1.79 | 0.40 | 149.3 | 115.2 | 24.8 | 0.215 |
| 7035 | 12.20 | 17.56 | 28.76 | 57.78 | 18.93 | 31.41 | 7.56 | 0.86 | 5.66 | 0.90 | 4.73 | 1.27 | 4.06 | 0.36 | 2.08 | 0.67 | 194.8 | 151.0 | 31.6 | 0.21 |
| 7036 | 7.56 | 10.90 | 15.79 | 34.94 | 7.12 | 15.55 | 3.33 | 0.45 | 2.44 | 0.40 | 2.37 | 0.86 | 1.30 | 0.29 | 1.31 | 0.20 | 104.8 | 79.6 | 17.6 | 0.221 |
| 7037 | 9.27 | 13.40 | 24.63 | 46.74 | 13.82 | 23.52 | 5.87 | 0.63 | 3.65 | 0.65 | 3.43 | 0.99 | 1.62 | 0.25 | 1.70 | 0.52 | 150.7 | 118.9 | 22.6 | 0.19 |
| 7038 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7039 | 6.90 | 10.58 | 13.23 | 25.65 | 5.63 | 13.41 | 3.87 | 0.53 | 2.93 | 0.54 | 2.59 | 0.61 | 1.20 | 0.24 | 1.32 | 0.45 | 89.7 | 65.3 | 17.5 | 0.268 |
| 7040 | 3.33 | 7.36 | 4.84 | 9.70 | 1.98 | 5.33 | 1.52 | 0.30 | 1.44 | 0.27 | 1.38 | 0.33 | 0.74 | 0.18 | 0.71 | 0.16 | 39.6 | 25.1 | 11.1 | 0.443 |
| 7041 | 9.20 | 12.27 | 20.62 | 37.98 | 7.00 | 17.81 | 4.67 | 0.62 | 3.41 | 0.57 | 3.05 | 0.84 | 1.36 | 0.34 | 1.57 | 0.42 | 121.7 | 92.1 | 20.4 | 0.222 |
| 7042 | 12.27 | 12.31 | 25.58 | 47.45 | 13.47 | 21.99 | 7.41 | 0.78 | 4.85 | 0.94 | 3.95 | 0.62 | 1.44 | 0.26 | 1.93 | 1.09 | 156.3 | 121.5 | 22.5 | 0.185 |
| 7043 | 2.54 | 5.00 | 4.42 | 10.28 | 1.45 | 4.70 | 1.54 | 0.24 | 1.13 | 0.24 | 1.15 | 0.24 | 0.50 | 0.17 | 0.55 | 0.20 | 34.4 | 23.8 | 8.1 | 0.339 |
| 7044 | 9.57 | 12.31 | 21.90 | 40.59 | 8.46 | 18.50 | 6.37 | 0.66 | 3.56 | 0.81 | 3.56 | 0.64 | 1.29 | 0.35 | 1.77 | 0.86 | 131.2 | 100.1 | 21.6 | 0.216 |
| 7045 | 11.12 | 12.26 | 27.47 | 51.39 | 11.64 | 22.37 | 9.87 | 0.86 | 4.55 | 1.27 | 4.77 | 0.44 | 1.28 | 0.34 | 2.21 | 1.62 | 163.5 | 128.1 | 24.2 | 0.189 |
| 7046 | 4.05 | 9.14 | 7.03 | 13.60 | 3.06 | 6.81 | 2.42 | 0.35 | 1.82 | 0.37 | 1.88 | 0.35 | 0.87 | 0.24 | 0.92 | 0.33 | 53.2 | 35.1 | 14.1 | 0.402 |
| 7047 | 9.86 | 13.21 | 23.30 | 43.80 | 6.92 | 21.40 | 5.23 | 0.72 | 3.70 | 0.62 | 3.39 | 0.99 | 1.58 | 0.36 | 1.74 | 0.41 | 137.2 | 105.1 | 22.3 | 0.212 |
| 7048 | 12.37 | 13.55 | 27.26 | 50.16 | 11.45 | 24.15 | 7.06 | 0.80 | 4.53 | 0.91 | 4.09 | 0.88 | 1.64 | 0.38 | 2.08 | 0.87 | 162.2 | 125.4 | 24.4 | 0.195 |
| 7049 | 4.92 | 10.53 | 9.94 | 18.69 | 3.15 | 9.54 | 2.47 | 0.42 | 2.16 | 0.35 | 2.12 | 0.55 | 1.11 | 0.27 | 1.04 | 0.21 | 67.5 | 46.4 | 16.2 | 0.349 |
| 7050 | 11.21 | 12.55 | 21.83 | 47.92 | 5.01 | 23.49 | 4.62 | 0.83 | 3.71 | 0.52 | 3.16 | 1.21 | 1.71 | 0.35 | 1.69 | 0.06 | 139.9 | 107.4 | 21.2 | 0.198 |
| 7051 | 10.61 | 11.63 | 23.61 | 50.56 | 5.95 | 24.82 | 6.27 | 0.71 | 3.70 | 0.75 | 3.45 | 0.99 | 1.57 | 0.23 | 1.99 | 0.63 | 147.5 | 115.6 | 21.2 | 0.184 |
| 7780 | 10.17 | 12.67 | 20.25 | 48.00 | 5.98 | 21.62 | 5.64 | 0.82 | 3.99 | 0.65 | 3.49 | 1.07 | 1.92 | 0.34 | 1.75 | 0.39 | 138.8 | 106.3 | 22.3 | 0.21 |
| 7781 | 7.55 | 9.10 | 13.59 | 26.03 | 5.77 | 13.24 | 3.34 | 0.53 | 2.86 | 0.44 | 2.36 | 0.64 | 1.30 | 0.22 | 1.09 | 0.25 | 88.3 | 65.4 | 15.4 | 0.236 |
| 7782 | 1.57 | 2.48 | 1.17 | 2.39 | 0.51 | 1.81 | 0.33 | 0.10 | 0.43 | 0.08 | 0.38 | 0.11 | 0.25 | 0.09 | 0.21 | 0.02 | 11.9 | 6.7 | 3.6 | 0.538 |
| 7783 | 3.45 | 5.26 | 5.34 | 10.43 | 1.24 | 6.05 | 1.03 | 0.24 | 1.07 | 0.15 | 0.95 | 0.37 | 0.61 | 0.13 | 0.52 | 0.00 | 36.8 | 25.4 | 8.0 | 0.314 |
| 7784 | 4.30 | 6.53 | 11.14 | 20.29 | 2.30 | 10.22 | 1.76 | 0.34 | 1.56 | 0.14 | 1.29 | 0.56 | 0.80 | 0.17 | 0.68 | 0.00 | 62.1 | 47.6 | 10.2 | 0.213 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7015 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7016 | 0.84 | 0.69 | 1.04 | 0.97 | 3.19 | 1.01 | 1.39 | 0.75 | 1.41 | 1.28 | 1.10 | 1.36 | 1.90 | 0.61 | 1.15 | 3.02 | 1.06 | 1.13 | 0.88 | 1.28 |
| 7026 | 0.88 | 0.80 | 1.12 | 1.05 | 3.76 | 1.23 | 1.65 | 0.76 | 1.51 | 1.67 | 1.36 | 1.60 | 1.19 | 0.68 | 1.27 | 3.27 | 1.18 | 1.27 | 0.98 | 1.30 |
| 7027 | 0.30 | 0.40 | 0.26 | 0.25 | 0.69 | 0.30 | 0.41 | 0.28 | 0.46 | 0.59 | 0.49 | 0.62 | 0.48 | 0.67 | 0.48 | 0.60 | 0.32 | 0.30 | 0.44 | 0.68 |
| 7028 | 0.63 | 0.58 | 0.74 | 0.68 | 1.90 | 0.74 | 0.89 | 0.44 | 0.88 | 0.88 | 0.85 | 1.25 | 0.79 | 0.99 | 0.83 | 1.29 | 0.74 | 0.78 | 0.67 | 1.16 |
| 7029 | 0.91 | 0.74 | 1.13 | 1.05 | 3.85 | 1.17 | 1.66 | 0.76 | 1.46 | 1.68 | 1.32 | 1.39 | 1.12 | 0.66 | 1.21 | 3.36 | 1.17 | 1.26 | 0.92 | 1.38 |
| 7030 | 0.41 | 0.44 | 0.43 | 0.40 | 1.27 | 0.41 | 0.67 | 0.38 | 0.59 | 0.90 | 0.60 | 0.64 | 0.98 | 0.80 | 0.67 | 1.61 | 0.48 | 0.47 | 0.54 | 0.88 |
| 7031 | 0.57 | 0.53 | 0.77 | 0.70 | 1.74 | 0.69 | 0.93 | 0.50 | 0.84 | 0.90 | 0.77 | 1.09 | 1.52 | 0.85 | 0.84 | 1.63 | 0.74 | 0.78 | 0.67 | 1.17 |
| 7032 | 0.83 | 0.81 | 1.26 | 1.19 | 2.88 | 1.30 | 1.68 | 0.93 | 1.57 | 1.40 | 1.24 | 1.77 | 2.26 | 0.79 | 1.27 | 2.30 | 1.24 | 1.34 | 1.03 | 1.30 |
| 7033 | 0.40 | 0.44 | 0.48 | 0.45 | 0.94 | 0.46 | 0.59 | 0.38 | 0.62 | 0.63 | 0.57 | 0.86 | 1.06 | 0.74 | 0.60 | 0.79 | 0.49 | 0.49 | 0.52 | 0.94 |
| 7034 | 0.58 | 0.58 | 0.85 | 0.80 | 1.63 | 0.80 | 0.94 | 0.53 | 0.92 | 0.84 | 0.78 | 1.39 | 1.78 | 0.78 | 0.90 | 1.13 | 0.81 | 0.86 | 0.73 | 1.18 |
| 7035 | 0.76 | 0.73 | 0.96 | 0.96 | 2.83 | 1.16 | 1.43 | 0.66 | 1.41 | 1.39 | 1.25 | 1.59 | 1.93 | 1.10 | 1.04 | 1.91 | 1.06 | 1.12 | 0.93 | 1.21 |
| 7036 | 0.47 | 0.45 | 0.53 | 0.58 | 1.06 | 0.58 | 0.63 | 0.35 | 0.61 | 0.61 | 0.62 | 1.08 | 0.62 | 0.87 | 0.66 | 0.56 | 0.57 | 0.59 | 0.52 | 1.14 |
| 7037 | 0.58 | 0.56 | 0.82 | 0.78 | 2.06 | 0.87 | 1.11 | 0.49 | 0.91 | 1.00 | 0.90 | 1.24 | 0.77 | 0.77 | 0.85 | 1.48 | 0.82 | 0.89 | 0.66 | 1.33 |
| 7038 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7039 | 0.43 | 0.44 | 0.44 | 0.43 | 0.84 | 0.50 | 0.73 | 0.41 | 0.73 | 0.83 | 0.68 | 0.76 | 0.57 | 0.73 | 0.66 | 1.28 | 0.49 | 0.49 | 0.51 | 0.94 |
| 7040 | 0.21 | 0.31 | 0.16 | 0.16 | 0.30 | 0.20 | 0.29 | 0.23 | 0.36 | 0.42 | 0.36 | 0.41 | 0.35 | 0.56 | 0.36 | 0.44 | 0.21 | 0.19 | 0.33 | 0.57 |
| 7041 | 0.58 | 0.51 | 0.69 | 0.63 | 1.04 | 0.66 | 0.88 | 0.48 | 0.85 | 0.88 | 0.80 | 1.05 | 0.65 | 1.04 | 0.78 | 1.20 | 0.66 | 0.69 | 0.60 | 1.14 |
| 7042 | 0.77 | 0.51 | 0.85 | 0.79 | 2.01 | 0.81 | 1.40 | 0.60 | 1.21 | 1.45 | 1.04 | 0.78 | 0.69 | 0.79 | 0.96 | 3.10 | 0.85 | 0.90 | 0.66 | 1.37 |
| 7043 | 0.16 | 0.21 | 0.15 | 0.17 | 0.22 | 0.17 | 0.29 | 0.19 | 0.28 | 0.37 | 0.30 | 0.30 | 0.24 | 0.51 | 0.28 | 0.56 | 0.19 | 0.18 | 0.24 | 0.75 |
| 7044 | 0.60 | 0.51 | 0.73 | 0.68 | 1.26 | 0.69 | 1.20 | 0.51 | 0.89 | 1.24 | 0.94 | 0.80 | 0.62 | 1.06 | 0.89 | 2.47 | 0.71 | 0.75 | 0.63 | 1.17 |
| 7045 | 0.69 | 0.51 | 0.92 | 0.86 | 1.74 | 0.83 | 1.86 | 0.66 | 1.14 | 1.95 | 1.26 | 0.56 | 0.61 | 1.04 | 1.11 | 4.62 | 0.89 | 0.95 | 0.71 | 1.34 |
| 7046 | 0.25 | 0.38 | 0.23 | 0.23 | 0.46 | 0.25 | 0.46 | 0.27 | 0.45 | 0.57 | 0.49 | 0.44 | 0.41 | 0.74 | 0.46 | 0.94 | 0.29 | 0.26 | 0.41 | 0.63 |
| 7047 | 0.62 | 0.55 | 0.78 | 0.73 | 1.03 | 0.79 | 0.99 | 0.55 | 0.93 | 0.96 | 0.89 | 1.24 | 0.75 | 1.08 | 0.87 | 1.16 | 0.74 | 0.78 | 0.66 | 1.19 |
| 7048 | 0.77 | 0.56 | 0.91 | 0.84 | 1.71 | 0.89 | 1.33 | 0.62 | 1.13 | 1.39 | 1.08 | 1.10 | 0.78 | 1.14 | 1.04 | 2.49 | 0.88 | 0.93 | 0.72 | 1.30 |
| 7049 | 0.31 | 0.44 | 0.33 | 0.31 | 0.47 | 0.35 | 0.47 | 0.32 | 0.54 | 0.53 | 0.56 | 0.69 | 0.53 | 0.83 | 0.52 | 0.59 | 0.37 | 0.35 | 0.48 | 0.73 |
| 7050 | 0.70 | 0.52 | 0.73 | 0.80 | 0.75 | 0.87 | 0.87 | 0.64 | 0.93 | 0.80 | 0.83 | 1.51 | 0.81 | 1.05 | 0.84 | 0.17 | 0.76 | 0.80 | 0.62 | 1.28 |
| 7051 | 0.66 | 0.48 | 0.79 | 0.84 | 0.89 | 0.92 | 1.18 | 0.55 | 0.93 | 1.15 | 0.91 | 1.24 | 0.75 | 0.69 | 1.00 | 1.81 | 0.80 | 0.86 | 0.62 | 1.38 |
| 7780 | 0.64 | 0.53 | 0.68 | 0.80 | 0.89 | 0.80 | 1.06 | 0.63 | 1.00 | 1.00 | 0.92 | 1.34 | 0.91 | 1.04 | 0.87 | 1.12 | 0.75 | 0.79 | 0.66 | 1.21 |
| 7781 | 0.47 | 0.38 | 0.45 | 0.43 | 0.86 | 0.49 | 0.63 | 0.41 | 0.71 | 0.68 | 0.62 | 0.80 | 0.62 | 0.67 | 0.55 | 0.73 | 0.48 | 0.49 | 0.45 | 1.08 |
| 7782 | 0.10 | 0.10 | 0.04 | 0.04 | 0.08 | 0.07 | 0.06 | 0.07 | 0.11 | 0.13 | 0.10 | 0.14 | 0.12 | 0.28 | 0.10 | 0.07 | 0.06 | 0.05 | 0.11 | 0.47 |
| 7783 | 0.22 | 0.22 | 0.18 | 0.17 | 0.18 | 0.22 | 0.19 | 0.19 | 0.27 | 0.24 | 0.25 | 0.47 | 0.29 | 0.40 | 0.26 | 0.00 | 0.20 | 0.19 | 0.23 | 0.81 |
| 7784 | 0.27 | 0.27 | 0.37 | 0.34 | 0.34 | 0.38 | 0.33 | 0.26 | 0.39 | 0.22 | 0.34 | 0.70 | 0.38 | 0.50 | 0.34 | 0.00 | 0.34 | 0.35 | 0.30 | 1.19 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7015 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7016 | 0.97 | 0.79 | 1.20 | 1.12 | 3.67 | 1.16 | 1.60 | 0.86 | 1.62 | 1.47 | 1.27 | 1.56 | 2.19 | 0.71 | 1.32 | 3.47 | 1.22 | 1.30 | 1.02 | 1.28 |
| 7026 | 1.01 | 0.92 | 1.29 | 1.20 | 4.32 | 1.41 | 1.90 | 0.88 | 1.73 | 1.92 | 1.56 | 1.84 | 1.37 | 0.78 | 1.46 | 3.76 | 1.36 | 1.46 | 1.12 | 1.30 |
| 7027 | 2.75 | 3.65 | 2.35 | 2.28 | 6.23 | 2.74 | 3.68 | 2.58 | 4.16 | 5.33 | 4.44 | 5.66 | 4.38 | 6.08 | 4.38 | 5.44 | 2.93 | 2.70 | 3.95 | 0.68 |
| 7028 | 1.63 | 1.52 | 1.93 | 1.77 | 4.95 | 1.94 | 2.33 | 1.16 | 2.30 | 2.30 | 2.23 | 3.26 | 2.06 | 2.57 | 2.16 | 3.36 | 1.94 | 2.03 | 1.75 | 1.16 |
| 7029 | 1.04 | 0.84 | 1.29 | 1.19 | 4.37 | 1.32 | 1.88 | 0.86 | 1.65 | 1.91 | 1.50 | 1.58 | 1.27 | 0.75 | 1.38 | 3.81 | 1.33 | 1.44 | 1.04 | 1.38 |
| 7030 | 1.84 | 1.98 | 1.93 | 1.79 | 5.67 | 1.84 | 3.01 | 1.71 | 2.64 | 4.01 | 2.67 | 2.85 | 4.38 | 3.57 | 2.97 | 7.18 | 2.13 | 2.10 | 2.39 | 0.88 |
| 7031 | 1.39 | 1.29 | 1.89 | 1.73 | 4.27 | 1.70 | 2.27 | 1.24 | 2.07 | 2.21 | 1.88 | 2.66 | 3.72 | 2.08 | 2.07 | 4.00 | 1.82 | 1.91 | 1.64 | 1.17 |
| 7032 | 0.93 | 0.92 | 1.42 | 1.34 | 3.25 | 1.46 | 1.90 | 1.05 | 1.77 | 1.58 | 1.40 | 2.00 | 2.56 | 0.89 | 1.43 | 2.60 | 1.40 | 1.51 | 1.16 | 1.30 |
| 7033 | 1.79 | 2.01 | 2.16 | 2.02 | 4.25 | 2.08 | 2.65 | 1.70 | 2.80 | 2.86 | 2.56 | 3.89 | 4.77 | 3.36 | 2.71 | 3.55 | 2.21 | 2.22 | 2.37 | 0.94 |
| 7034 | 1.33 | 1.33 | 1.93 | 1.81 | 3.69 | 1.82 | 2.13 | 1.20 | 2.09 | 1.91 | 1.76 | 3.16 | 4.03 | 1.78 | 2.03 | 2.57 | 1.84 | 1.94 | 1.65 | 1.18 |
| 7035 | 0.85 | 0.81 | 1.07 | 1.07 | 3.14 | 1.29 | 1.59 | 0.74 | 1.57 | 1.54 | 1.39 | 1.77 | 2.15 | 1.22 | 1.16 | 2.13 | 1.18 | 1.25 | 1.03 | 1.21 |
| 7036 | 1.56 | 1.50 | 1.74 | 1.93 | 3.52 | 1.91 | 2.08 | 1.14 | 2.02 | 2.02 | 2.07 | 3.56 | 2.05 | 2.88 | 2.17 | 1.86 | 1.88 | 1.96 | 1.71 | 1.14 |
| 7037 | 1.36 | 1.31 | 1.93 | 1.83 | 4.84 | 2.04 | 2.60 | 1.14 | 2.14 | 2.36 | 2.12 | 2.90 | 1.81 | 1.81 | 2.00 | 3.46 | 1.92 | 2.08 | 1.56 | 1.33 |
| 7038 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7039 | 1.33 | 1.36 | 1.36 | 1.32 | 2.60 | 1.53 | 2.25 | 1.27 | 2.26 | 2.55 | 2.10 | 2.34 | 1.76 | 2.26 | 2.04 | 3.95 | 1.50 | 1.50 | 1.59 | 0.94 |
| 7040 | 3.44 | 5.07 | 2.67 | 2.67 | 4.88 | 3.26 | 4.74 | 3.78 | 5.95 | 6.98 | 6.01 | 6.77 | 5.79 | 9.26 | 5.88 | 7.34 | 3.55 | 3.09 | 5.40 | 0.57 |
| 7041 | 1.57 | 1.40 | 1.88 | 1.73 | 2.86 | 1.80 | 2.41 | 1.30 | 2.33 | 2.42 | 2.19 | 2.86 | 1.77 | 2.84 | 2.14 | 3.28 | 1.81 | 1.87 | 1.64 | 1.14 |
| 7042 | 1.13 | 0.76 | 1.26 | 1.17 | 2.96 | 1.20 | 2.06 | 0.89 | 1.79 | 2.13 | 1.53 | 1.15 | 1.01 | 1.17 | 1.42 | 4.57 | 1.25 | 1.33 | 0.98 | 1.37 |
| 7043 | 1.82 | 2.39 | 1.69 | 1.96 | 2.48 | 2.00 | 3.32 | 2.16 | 3.23 | 4.23 | 3.48 | 3.42 | 2.75 | 5.84 | 3.18 | 6.46 | 2.14 | 2.03 | 2.71 | 0.75 |
| 7044 | 1.55 | 1.33 | 1.89 | 1.75 | 3.28 | 1.78 | 3.12 | 1.32 | 2.31 | 3.21 | 2.43 | 2.08 | 1.60 | 2.74 | 2.30 | 6.41 | 1.85 | 1.93 | 1.65 | 1.17 |
| 7045 | 1.06 | 0.78 | 1.39 | 1.30 | 2.64 | 1.26 | 2.83 | 1.00 | 1.73 | 2.96 | 1.91 | 0.84 | 0.93 | 1.59 | 1.68 | 7.02 | 1.35 | 1.45 | 1.08 | 1.34 |
| 7046 | 2.51 | 3.78 | 2.32 | 2.25 | 4.54 | 2.50 | 4.52 | 2.67 | 4.50 | 5.69 | 4.90 | 4.35 | 4.11 | 7.32 | 4.54 | 9.29 | 2.87 | 2.59 | 4.11 | 0.63 |
| 7047 | 1.51 | 1.35 | 1.91 | 1.79 | 2.53 | 1.94 | 2.42 | 1.36 | 2.27 | 2.35 | 2.19 | 3.05 | 1.85 | 2.66 | 2.14 | 2.84 | 1.83 | 1.92 | 1.61 | 1.19 |
| 7048 | 1.39 | 1.02 | 1.64 | 1.51 | 3.08 | 1.61 | 2.40 | 1.11 | 2.04 | 2.51 | 1.94 | 1.99 | 1.41 | 2.06 | 1.87 | 4.49 | 1.58 | 1.68 | 1.29 | 1.30 |
| 7049 | 2.42 | 3.45 | 2.61 | 2.45 | 3.70 | 2.78 | 3.67 | 2.54 | 4.25 | 4.18 | 4.39 | 5.44 | 4.14 | 6.51 | 4.09 | 4.63 | 2.88 | 2.72 | 3.74 | 0.73 |
| 7050 | 1.65 | 1.23 | 1.71 | 1.88 | 1.76 | 2.05 | 2.05 | 1.51 | 2.19 | 1.88 | 1.96 | 3.55 | 1.92 | 2.46 | 1.99 | 0.40 | 1.79 | 1.88 | 1.47 | 1.28 |
| 7051 | 1.17 | 0.85 | 1.38 | 1.48 | 1.56 | 1.62 | 2.08 | 0.96 | 1.63 | 2.02 | 1.60 | 2.18 | 1.31 | 1.21 | 1.75 | 3.18 | 1.41 | 1.51 | 1.10 | 1.38 |
| 7780 | 1.23 | 1.02 | 1.31 | 1.55 | 1.73 | 1.55 | 2.06 | 1.23 | 1.94 | 1.94 | 1.78 | 2.60 | 1.77 | 2.02 | 1.69 | 2.17 | 1.46 | 1.54 | 1.27 | 1.21 |
| 7781 | 1.52 | 1.22 | 1.46 | 1.40 | 2.77 | 1.58 | 2.03 | 1.32 | 2.30 | 2.18 | 2.00 | 2.59 | 1.99 | 2.14 | 1.76 | 2.33 | 1.54 | 1.57 | 1.46 | 1.08 |
| 7782 | 8.08 | 8.55 | 3.22 | 3.30 | 6.30 | 5.53 | 5.22 | 6.16 | 8.87 | 10.45 | 8.24 | 11.48 | 9.71 | 23.34 | 8.63 | 5.81 | 5.35 | 4.15 | 8.81 | 0.47 |
| 7783 | 2.87 | 2.92 | 2.37 | 2.32 | 2.46 | 2.99 | 2.59 | 2.50 | 3.57 | 3.16 | 3.32 | 6.20 | 3.86 | 5.27 | 3.44 | 0.00 | 2.66 | 2.52 | 3.13 | 0.81 |
| 7784 | 1.86 | 1.88 | 2.57 | 2.34 | 2.37 | 2.61 | 2.29 | 1.81 | 2.70 | 1.54 | 2.34 | 4.81 | 2.62 | 3.46 | 2.35 | 0.00 | 2.33 | 2.45 | 2.06 | 1.19 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7785 | - | Plant 04 | Raw Coal (1mm x 100M / 1.5 x 1.6 SG) | 23.64 |
| 7786 | - | Plant 04 | Raw Coal (1mm x 100M / 1.6 x 1.7 SG) | 32.13 |
| 7787 | - | Plant 04 | Raw Coal (1mm x 100M / 1.7 x 1.8 SG) | 41.56 |
| 7788 | - | Plant 04 | Raw Coal (1mm x 100M / 1.8 x 1.9 SG) | 52.82 |
| 7789 | - | Plant 04 | Raw Coal (1mm x 100M / 1.9 x 2.2 SG) | 62.29 |
| 7790 | - | Plant 04 | Raw Coal (1mm x 100M / 2.2 x Snk SG) | 87.85 |
| 7791 | - | Plant 04 | Raw Coal (5/8" x 1mm / Flt x 1.3 SG) | 3.1 |
| 7792 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.3 x 1.4 SG) | 10.84 |
| 7793 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.4 x 1.5 SG) | 20.33 |
| 7794 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.5 x 1.6 SG) | 30.1 |
| 7795 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.6 x 1.7 SG) | 38.82 |
| 7796 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.7 x 1.8 SG) | 44.26 |
| 7797 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.8 x 1.9 SG) | 55.01 |
| 7798 | - | Plant 04 | Raw Coal (5/8" x 1mm / 1.9 x 2.2 SG) | 64.59 |
| 7799 | - | Plant 04 | Raw Coal (5/8" x 1mm / 2.2 x Snk SG) | 87.67 |
| 7800 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / Flt x 1.3 SG) | 2.48 |
| 7801 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.3 x 1.4 SG) | 8.57 |
| 7802 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.4 x 1.5 SG) | 21.24 |
| 7803 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.5 x 1.6 SG) | 30.59 |
| 7804 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.6 x 1.7 SG) | 40.42 |
| 7805 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.7 x 1.8 SG) | 47.85 |
| 7806 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.8 x 1.9 SG) | 56.03 |
| 7807 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 1.9 x 2.2 SG) | 66.62 |
| 7808 | - | Plant 04 | Raw Coal (1 1/2" x 5/8" / 2.2 x Snk SG) | 87.72 |
| 7809 | 28 | Plant 04 | Raw Coal (4" x 1 1/2" / Flt x 1.3 SG) | 4.86 |
| 7848 | 37.9 | Plant 04 | Raw Coal (4" x 1 1/2" / 1.3 x 1.4 SG) | 7.39 |
| 7849 | 21 | Plant 04 | Raw Coal (4" x 1 1/2" / 1.4 x 1.5 SG) | 16.7 |
| | | Plant 04 | Raw Coal (4" x 1 1/2" / 1.5 x 1.6 SG) | |
| 7850 | - | Plant 04 | Raw Coal (4" x 1 1/2" / 1.6 x 1.7 SG) | 41.85 |
| 7851 | - | Plant 04 | Raw Coal (4" x 1 1/2" / 1.7 x 1.8 SG) | 48.85 |
| 7852 | 76.4 | Plant 04 | Raw Coal (4" x 1 1/2" / 1.8 x 1.9 SG) | 56.18 |
| 7853 | - | Plant 04 | Raw Coal (4" x 1 1/2" / 1.9 x 2.2 SG) | 67.62 |
| 7810 | - | Plant 04 | Raw Coal (4" x 1 1/2" / 2.2 x Snk SG) | 87.79 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7785 | 25.41 | 36.77 | 73.68 | 133.96 | 15.76 | 66.30 | 11.57 | 2.10 | 9.85 | 0.78 | 7.54 | 3.43 | 4.65 | 0.93 | 4.01 | 0.00 | 396.8 | 313.2 | 58.1 | 0.19 |
| 7786 | 23.74 | 36.18 | 73.47 | 133.83 | 16.29 | 66.61 | 11.57 | 1.97 | 9.76 | 0.75 | 7.52 | 3.41 | 4.66 | 0.78 | 4.01 | 0.00 | 394.6 | 313.5 | 57.3 | 0.18 |
| 7787 | 24.08 | 34.78 | 75.90 | 140.20 | 17.09 | 68.54 | 12.10 | 2.00 | 9.92 | 0.72 | 7.98 | 3.50 | 4.67 | 0.83 | 4.04 | 0.00 | 406.3 | 325.7 | 56.5 | 0.17 |
| 7788 | 20.39 | 20.76 | 43.44 | 112.24 | 10.32 | 44.53 | 8.29 | 1.39 | 6.74 | 0.58 | 5.69 | 2.58 | 3.12 | 0.66 | 2.94 | 0.00 | 283.7 | 226.9 | 36.3 | 0.16 |
| 7789 | 20.62 | 20.43 | 45.03 | 111.79 | 10.98 | 45.36 | 8.91 | 1.43 | 6.90 | 0.72 | 6.00 | 2.48 | 3.16 | 0.69 | 2.99 | 0.04 | 287.5 | 230.4 | 36.5 | 0.16 |
| 7790 | 17.53 | 20.07 | 33.70 | 83.69 | 11.64 | 36.35 | 10.86 | 1.39 | 6.91 | 1.34 | 6.61 | 1.54 | 3.66 | 0.59 | 3.12 | 0.99 | 240.0 | 184.5 | 37.9 | 0.21 |
| 7791 | 69.05 | 132.48 | 74.31 | 140.54 | 32.40 | 80.95 | 18.83 | 3.83 | 20.01 | 3.07 | 19.69 | 5.67 | 11.84 | 3.66 | 9.86 | 1.28 | 627.5 | 370.9 | 187.5 | 0.51 |
| 7792 | 32.80 | 35.51 | 32.43 | 86.90 | 11.76 | 48.22 | 8.25 | 1.71 | 8.96 | 1.30 | 6.19 | 3.40 | 11.27 | 1.26 | 4.23 | 0.00 | 294.2 | 198.2 | 63.2 | 0.32 |
| 7793 | 22.99 | 17.43 | 25.41 | 74.50 | 9.19 | 38.91 | 5.80 | 1.04 | 6.22 | 0.70 | 3.46 | 2.82 | 9.75 | 0.74 | 2.54 | 0.00 | 221.5 | 161.1 | 37.5 | 0.23 |
| 7794 | 21.63 | 18.94 | 34.00 | 96.99 | 11.23 | 42.12 | 6.46 | 1.03 | 6.38 | 0.50 | 3.81 | 2.74 | 9.48 | 0.69 | 2.68 | 0.00 | 258.7 | 198.2 | 38.8 | 0.20 |
| 7795 | 18.65 | 14.48 | 29.37 | 83.02 | 10.35 | 39.26 | 5.94 | 0.87 | 5.84 | 0.47 | 3.26 | 2.73 | 9.30 | 0.57 | 2.14 | 0.00 | 226.2 | 174.6 | 33.0 | 0.19 |
| 7796 | 23.50 | 33.11 | 61.44 | 129.38 | 16.46 | 60.00 | 10.15 | 1.27 | 8.26 | 0.66 | 7.40 | 3.70 | 4.79 | 0.82 | 3.89 | 0.00 | 364.8 | 287.0 | 54.4 | 0.19 |
| 7797 | 20.81 | 25.77 | 35.64 | 82.39 | 14.61 | 41.53 | 8.63 | 1.20 | 7.06 | 0.90 | 6.33 | 2.61 | 3.62 | 0.72 | 3.31 | 0.00 | 255.1 | 191.1 | 43.3 | 0.23 |
| 7798 | 19.06 | 15.99 | 21.07 | 58.58 | 5.60 | 31.28 | 6.83 | 1.18 | 5.90 | 0.99 | 5.26 | 2.11 | 2.66 | 0.65 | 2.71 | 0.00 | 179.9 | 130.4 | 30.4 | 0.23 |
| 7799 | 17.45 | 24.77 | 39.53 | 84.15 | 25.30 | 41.48 | 11.36 | 1.37 | 7.09 | 1.35 | 6.64 | 1.81 | 3.94 | 0.55 | 3.31 | 1.07 | 271.2 | 210.3 | 43.4 | 0.21 |
| 7800 | 52.41 | 88.44 | 70.82 | 135.06 | 28.72 | 71.22 | 16.95 | 3.42 | 16.75 | 2.13 | 13.80 | 3.80 | 10.26 | 4.18 | 6.77 | 1.22 | 525.9 | 342.9 | 130.6 | 0.38 |
| 7801 | 39.67 | 71.43 | 69.51 | 147.70 | 20.19 | 70.95 | 14.26 | 2.81 | 14.18 | 1.69 | 11.37 | 4.58 | 14.01 | 1.71 | 6.65 | 0.00 | 490.7 | 339.6 | 111.4 | 0.33 |
| 7802 | 30.37 | 37.19 | 65.99 | 146.50 | 16.20 | 65.77 | 9.90 | 1.43 | 8.74 | 0.70 | 7.76 | 4.31 | 5.50 | 1.04 | 4.40 | 0.00 | 405.8 | 314.5 | 60.9 | 0.19 |
| 7803 | 28.17 | 39.18 | 73.64 | 141.05 | 17.26 | 70.26 | 11.04 | 1.46 | 9.14 | 0.69 | 8.04 | 4.27 | 5.61 | 0.93 | 4.50 | 0.00 | 415.2 | 323.8 | 63.2 | 0.20 |
| 7804 | 20.92 | 27.26 | 50.50 | 121.43 | 14.17 | 54.23 | 8.74 | 1.29 | 8.10 | 0.47 | 5.00 | 3.30 | 10.85 | 0.78 | 3.33 | 0.00 | 330.4 | 258.5 | 51.0 | 0.20 |
| 7805 | 23.05 | 31.42 | 60.78 | 128.46 | 17.22 | 56.80 | 9.85 | 1.28 | 7.87 | 0.61 | 7.05 | 3.45 | 4.43 | 0.78 | 3.72 | 0.00 | 356.8 | 282.3 | 51.5 | 0.18 |
| 7806 | 19.48 | 23.24 | 27.72 | 71.87 | 12.67 | 34.89 | 7.14 | 1.02 | 6.15 | 0.88 | 5.54 | 2.40 | 3.18 | 0.68 | 3.14 | 0.00 | 220.0 | 161.5 | 39.0 | 0.24 |
| 7807 | 13.44 | 5.94 | 5.81 | 24.71 | 7.47 | 13.69 | 3.04 | 0.50 | 3.17 | 0.88 | 2.07 | 1.28 | 5.51 | 0.39 | 1.39 | 0.00 | 89.3 | 58.4 | 17.4 | 0.30 |
| 7808 | 17.84 | 25.17 | 41.74 | 84.62 | 26.35 | 41.74 | 11.86 | 1.42 | 7.35 | 1.40 | 6.81 | 1.72 | 4.00 | 0.59 | 3.38 | 1.14 | 277.1 | 215.1 | 44.2 | 0.21 |
| 7809 | 27.40 | 36.44 | 74.14 | 135.08 | 23.79 | 58.58 | 13.76 | 2.43 | 10.97 | 1.21 | 7.78 | 2.44 | 6.88 | 0.88 | 3.75 | 0.70 | 406.2 | 318.7 | 60.1 | 0.19 |
| 7848 | 32.85 | 61.56 | 103.17 | 169.84 | 25.33 | 83.80 | 17.08 | 2.97 | 14.74 | 1.46 | 11.89 | 4.17 | 6.51 | 1.29 | 5.32 | 0.21 | 542.2 | 416.9 | 92.4 | 0.22 |
| 7849 | 31.39 | 40.35 | 77.39 | 148.03 | 17.57 | 75.10 | 11.71 | 1.67 | 10.15 | 0.83 | 8.48 | 4.58 | 5.91 | 0.95 | 4.83 | 0.00 | 438.9 | 341.6 | 65.9 | 0.19 |
| 0 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7850 | 22.38 | 41.03 | 73.32 | 142.12 | 18.45 | 71.40 | 11.93 | 1.41 | 9.58 | 0.65 | 8.28 | 4.04 | 5.53 | 0.88 | 4.51 | 0.00 | 415.5 | 328.2 | 64.9 | 0.20 |
| 7851 | 20.97 | 39.32 | 66.04 | 133.12 | 17.16 | 67.34 | 11.18 | 1.33 | 9.20 | 0.68 | 8.06 | 4.00 | 5.40 | 0.88 | 4.45 | 0.00 | 389.1 | 305.4 | 62.8 | 0.21 |
| 7852 | 12.81 | 6.48 | 6.37 | 19.45 | 8.95 | 14.06 | 3.75 | 0.58 | 3.36 | 0.97 | 2.47 | 1.10 | 5.10 | 0.37 | 1.64 | 0.07 | 87.5 | 56.5 | 18.2 | 0.32 |
| 7853 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7810 | 18.03 | 26.70 | 42.73 | 86.32 | 27.16 | 43.68 | 12.23 | 1.46 | 7.52 | 1.42 | 7.07 | 1.76 | 4.14 | 0.56 | 3.49 | 1.22 | 285.5 | 221.1 | 46.3 | 0.21 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7785 | 6.01 | 8.69 | 17.42 | 31.67 | 3.73 | 15.67 | 2.73 | 0.50 | 2.33 | 0.18 | 1.78 | 0.81 | 1.10 | 0.22 | 0.95 | 0.00 | 93.8 | 74.0 | 13.7 | 0.186 |
| 7786 | 7.63 | 11.63 | 23.60 | 43.00 | 5.23 | 21.40 | 3.72 | 0.63 | 3.13 | 0.24 | 2.42 | 1.10 | 1.50 | 0.25 | 1.29 | 0.00 | 126.8 | 100.7 | 18.4 | 0.183 |
| 7787 | 10.01 | 14.45 | 31.54 | 58.27 | 7.10 | 28.49 | 5.03 | 0.83 | 4.12 | 0.30 | 3.32 | 1.45 | 1.94 | 0.35 | 1.68 | 0.00 | 168.9 | 135.4 | 23.5 | 0.173 |
| 7788 | 10.77 | 10.97 | 22.95 | 59.29 | 5.45 | 23.52 | 4.38 | 0.73 | 3.56 | 0.30 | 3.01 | 1.36 | 1.65 | 0.35 | 1.55 | 0.00 | 149.8 | 119.9 | 19.2 | 0.16 |
| 7789 | 12.85 | 12.72 | 28.05 | 69.63 | 6.84 | 28.25 | 5.55 | 0.89 | 4.30 | 0.45 | 3.74 | 1.54 | 1.97 | 0.43 | 1.86 | 0.03 | 179.1 | 143.5 | 22.7 | 0.158 |
| 7790 | 15.40 | 17.63 | 29.60 | 73.52 | 10.23 | 31.94 | 9.54 | 1.22 | 6.07 | 1.18 | 5.81 | 1.35 | 3.21 | 0.52 | 2.74 | 0.87 | 210.8 | 162.1 | 33.3 | 0.205 |
| 7791 | 2.14 | 4.11 | 2.30 | 4.36 | 1.00 | 2.51 | 0.58 | 0.12 | 0.62 | 0.10 | 0.61 | 0.18 | 0.37 | 0.11 | 0.31 | 0.04 | 19.5 | 11.5 | 5.8 | 0.506 |
| 7792 | 3.56 | 3.85 | 3.52 | 9.42 | 1.28 | 5.23 | 0.89 | 0.19 | 0.97 | 0.14 | 0.67 | 0.37 | 1.22 | 0.14 | 0.46 | 0.00 | 31.9 | 21.5 | 6.8 | 0.319 |
| 7793 | 4.67 | 3.54 | 5.17 | 15.15 | 1.87 | 7.91 | 1.18 | 0.21 | 1.27 | 0.14 | 0.70 | 0.57 | 1.98 | 0.15 | 0.52 | 0.00 | 45.0 | 32.7 | 7.6 | 0.233 |
| 7794 | 6.51 | 5.70 | 10.23 | 29.19 | 3.38 | 12.68 | 1.94 | 0.31 | 1.92 | 0.15 | 1.15 | 0.83 | 2.85 | 0.21 | 0.81 | 0.00 | 77.9 | 59.7 | 11.7 | 0.196 |
| 7795 | 7.24 | 5.62 | 11.40 | 32.23 | 4.02 | 15.24 | 2.31 | 0.34 | 2.27 | 0.18 | 1.27 | 1.06 | 3.61 | 0.22 | 0.83 | 0.00 | 87.8 | 67.8 | 12.8 | 0.189 |
| 7796 | 10.40 | 14.66 | 27.19 | 57.26 | 7.28 | 26.55 | 4.49 | 0.56 | 3.66 | 0.29 | 3.28 | 1.64 | 2.12 | 0.36 | 1.72 | 0.00 | 161.5 | 127.0 | 24.1 | 0.19 |
| 7797 | 11.45 | 14.18 | 19.61 | 45.32 | 8.03 | 22.85 | 4.75 | 0.66 | 3.88 | 0.50 | 3.48 | 1.44 | 1.99 | 0.39 | 1.82 | 0.00 | 140.3 | 105.1 | 23.8 | 0.226 |
| 7798 | 12.31 | 10.33 | 13.61 | 37.84 | 3.62 | 20.20 | 4.41 | 0.76 | 3.81 | 0.64 | 3.40 | 1.36 | 1.72 | 0.42 | 1.75 | 0.00 | 116.2 | 84.3 | 19.6 | 0.233 |
| 7799 | 15.30 | 21.72 | 34.65 | 73.78 | 22.18 | 36.36 | 9.96 | 1.20 | 6.21 | 1.19 | 5.82 | 1.58 | 3.46 | 0.48 | 2.90 | 0.94 | 237.7 | 184.3 | 38.1 | 0.207 |
| 7800 | 1.30 | 2.19 | 1.76 | 3.35 | 0.71 | 1.77 | 0.42 | 0.08 | 0.42 | 0.05 | 0.34 | 0.09 | 0.25 | 0.10 | 0.17 | 0.03 | 13.0 | 8.5 | 3.2 | 0.381 |
| 7801 | 3.40 | 6.12 | 5.96 | 12.66 | 1.73 | 6.08 | 1.22 | 0.24 | 1.22 | 0.14 | 0.97 | 0.39 | 1.20 | 0.15 | 0.57 | 0.00 | 42.1 | 29.1 | 9.6 | 0.328 |
| 7802 | 6.45 | 7.90 | 14.02 | 31.12 | 3.44 | 13.97 | 2.10 | 0.30 | 1.86 | 0.15 | 1.65 | 0.92 | 1.17 | 0.22 | 0.93 | 0.00 | 86.2 | 66.8 | 12.9 | 0.194 |
| 7803 | 8.62 | 11.98 | 22.53 | 43.15 | 5.28 | 21.49 | 3.38 | 0.45 | 2.79 | 0.21 | 2.46 | 1.31 | 1.71 | 0.29 | 1.38 | 0.00 | 127.0 | 99.1 | 19.3 | 0.195 |
| 7804 | 8.46 | 11.02 | 20.41 | 49.08 | 5.73 | 21.92 | 3.53 | 0.52 | 3.27 | 0.19 | 2.02 | 1.33 | 4.38 | 0.31 | 1.35 | 0.00 | 133.5 | 104.5 | 20.6 | 0.197 |
| 7805 | 11.03 | 15.04 | 29.09 | 61.47 | 8.24 | 27.18 | 4.71 | 0.61 | 3.76 | 0.29 | 3.37 | 1.65 | 2.12 | 0.37 | 1.78 | 0.00 | 170.7 | 135.1 | 24.6 | 0.182 |
| 7806 | 10.92 | 13.02 | 15.53 | 40.27 | 7.10 | 19.55 | 4.00 | 0.57 | 3.45 | 0.49 | 3.10 | 1.35 | 1.78 | 0.38 | 1.76 | 0.00 | 123.3 | 90.5 | 21.9 | 0.242 |
| 7807 | 8.96 | 3.96 | 3.87 | 16.46 | 4.98 | 9.12 | 2.02 | 0.33 | 2.12 | 0.59 | 1.38 | 0.85 | 3.67 | 0.26 | 0.92 | 0.00 | 59.5 | 38.9 | 11.6 | 0.299 |
| 7808 | 15.65 | 22.08 | 36.62 | 74.23 | 23.11 | 36.61 | 10.40 | 1.25 | 6.44 | 1.22 | 5.97 | 1.51 | 3.51 | 0.52 | 2.96 | 1.00 | 243.1 | 188.7 | 38.8 | 0.206 |
| 7809 | 1.33 | 1.77 | 3.60 | 6.56 | 1.16 | 2.85 | 0.67 | 0.12 | 0.53 | 0.06 | 0.38 | 0.12 | 0.33 | 0.04 | 0.18 | 0.03 | 19.7 | 15.5 | 2.9 | 0.188 |
| 7848 | 2.43 | 4.55 | 7.62 | 12.55 | 1.87 | 6.19 | 1.26 | 0.22 | 1.09 | 0.11 | 0.88 | 0.31 | 0.48 | 0.10 | 0.39 | 0.02 | 40.1 | 30.8 | 6.8 | 0.222 |
| 7849 | 5.24 | 6.74 | 12.92 | 24.72 | 2.93 | 12.54 | 1.96 | 0.28 | 1.70 | 0.14 | 1.42 | 0.76 | 0.99 | 0.16 | 0.81 | 0.00 | 73.3 | 57.1 | 11.0 | 0.193 |
| 0 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7850 | 9.36 | 17.17 | 30.69 | 59.48 | 7.72 | 29.88 | 4.99 | 0.59 | 4.01 | 0.27 | 3.46 | 1.69 | 2.32 | 0.37 | 1.89 | 0.00 | 173.9 | 137.4 | 27.2 | 0.198 |
| 7851 | 10.24 | 19.21 | 32.26 | 65.03 | 8.38 | 32.90 | 5.46 | 0.65 | 4.49 | 0.33 | 3.94 | 1.96 | 2.64 | 0.43 | 2.18 | 0.00 | 190.1 | 149.2 | 30.7 | 0.206 |
| 7852 | 7.20 | 3.64 | 3.58 | 10.93 | 5.03 | 7.90 | 2.11 | 0.32 | 1.89 | 0.55 | 1.39 | 0.62 | 2.87 | 0.21 | 0.92 | 0.04 | 49.2 | 31.8 | 10.2 | 0.322 |
| 7853 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7810 | 15.83 | 23.44 | 37.51 | 75.78 | 23.84 | 38.35 | 10.74 | 1.29 | 6.60 | 1.25 | 6.20 | 1.54 | 3.63 | 0.49 | 3.07 | 1.07 | 250.6 | 194.1 | 40.7 | 0.21 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7785 | 0.38 | 0.36 | 0.58 | 0.53 | 0.56 | 0.58 | 0.52 | 0.38 | 0.58 | 0.28 | 0.47 | 1.01 | 0.52 | 0.66 | 0.47 | 0.00 | 0.51 | 0.55 | 0.40 | 1.37 |
| 7786 | 0.48 | 0.48 | 0.79 | 0.72 | 0.78 | 0.79 | 0.70 | 0.49 | 0.78 | 0.37 | 0.64 | 1.37 | 0.71 | 0.76 | 0.65 | 0.00 | 0.69 | 0.75 | 0.54 | 1.39 |
| 7787 | 0.63 | 0.60 | 1.05 | 0.97 | 1.06 | 1.06 | 0.95 | 0.64 | 1.03 | 0.46 | 0.87 | 1.82 | 0.92 | 1.05 | 0.84 | 0.00 | 0.92 | 1.01 | 0.69 | 1.46 |
| 7788 | 0.67 | 0.46 | 0.76 | 0.99 | 0.81 | 0.87 | 0.83 | 0.57 | 0.89 | 0.47 | 0.79 | 1.70 | 0.78 | 1.05 | 0.78 | 0.00 | 0.81 | 0.89 | 0.56 | 1.58 |
| 7789 | 0.80 | 0.53 | 0.94 | 1.16 | 1.02 | 1.05 | 1.05 | 0.68 | 1.07 | 0.69 | 0.98 | 1.93 | 0.94 | 1.31 | 0.93 | 0.08 | 0.97 | 1.07 | 0.67 | 1.60 |
| 7790 | 0.96 | 0.73 | 0.99 | 1.23 | 1.53 | 1.18 | 1.80 | 0.94 | 1.52 | 1.82 | 1.53 | 1.69 | 1.53 | 1.56 | 1.37 | 2.47 | 1.14 | 1.21 | 0.98 | 1.23 |
| 7791 | 0.13 | 0.17 | 0.08 | 0.07 | 0.15 | 0.09 | 0.11 | 0.09 | 0.16 | 0.15 | 0.16 | 0.22 | 0.17 | 0.34 | 0.15 | 0.11 | 0.11 | 0.09 | 0.17 | 0.50 |
| 7792 | 0.22 | 0.16 | 0.12 | 0.16 | 0.19 | 0.19 | 0.17 | 0.14 | 0.24 | 0.22 | 0.18 | 0.46 | 0.58 | 0.41 | 0.23 | 0.00 | 0.17 | 0.16 | 0.20 | 0.80 |
| 7793 | 0.29 | 0.15 | 0.17 | 0.25 | 0.28 | 0.29 | 0.22 | 0.16 | 0.32 | 0.22 | 0.19 | 0.72 | 0.94 | 0.46 | 0.26 | 0.00 | 0.24 | 0.24 | 0.22 | 1.09 |
| 7794 | 0.41 | 0.24 | 0.34 | 0.49 | 0.50 | 0.47 | 0.37 | 0.24 | 0.48 | 0.23 | 0.30 | 1.03 | 1.36 | 0.63 | 0.40 | 0.00 | 0.42 | 0.44 | 0.34 | 1.29 |
| 7795 | 0.45 | 0.23 | 0.38 | 0.54 | 0.60 | 0.56 | 0.43 | 0.26 | 0.57 | 0.28 | 0.33 | 1.32 | 1.72 | 0.68 | 0.41 | 0.00 | 0.48 | 0.50 | 0.38 | 1.34 |
| 7796 | 0.65 | 0.61 | 0.91 | 0.95 | 1.09 | 0.98 | 0.85 | 0.43 | 0.91 | 0.45 | 0.86 | 2.05 | 1.01 | 1.10 | 0.86 | 0.00 | 0.88 | 0.95 | 0.71 | 1.34 |
| 7797 | 0.72 | 0.59 | 0.65 | 0.76 | 1.20 | 0.85 | 0.90 | 0.51 | 0.97 | 0.76 | 0.92 | 1.79 | 0.95 | 1.19 | 0.91 | 0.00 | 0.76 | 0.78 | 0.70 | 1.12 |
| 7798 | 0.77 | 0.43 | 0.45 | 0.63 | 0.54 | 0.75 | 0.83 | 0.59 | 0.95 | 0.99 | 0.89 | 1.70 | 0.82 | 1.27 | 0.87 | 0.00 | 0.63 | 0.63 | 0.58 | 1.09 |
| 7799 | 0.96 | 0.90 | 1.16 | 1.23 | 3.31 | 1.35 | 1.88 | 0.92 | 1.55 | 1.83 | 1.53 | 1.98 | 1.65 | 1.45 | 1.45 | 2.67 | 1.29 | 1.37 | 1.12 | 1.23 |
| 7800 | 0.08 | 0.09 | 0.06 | 0.06 | 0.11 | 0.07 | 0.08 | 0.07 | 0.10 | 0.08 | 0.09 | 0.12 | 0.12 | 0.31 | 0.08 | 0.09 | 0.07 | 0.06 | 0.10 | 0.67 |
| 7801 | 0.21 | 0.26 | 0.20 | 0.21 | 0.26 | 0.23 | 0.23 | 0.19 | 0.30 | 0.22 | 0.26 | 0.49 | 0.57 | 0.44 | 0.28 | 0.00 | 0.23 | 0.22 | 0.28 | 0.77 |
| 7802 | 0.40 | 0.33 | 0.47 | 0.52 | 0.51 | 0.52 | 0.40 | 0.23 | 0.46 | 0.23 | 0.43 | 1.15 | 0.56 | 0.67 | 0.47 | 0.00 | 0.47 | 0.50 | 0.38 | 1.31 |
| 7803 | 0.54 | 0.50 | 0.75 | 0.72 | 0.79 | 0.80 | 0.64 | 0.34 | 0.70 | 0.32 | 0.65 | 1.63 | 0.82 | 0.86 | 0.69 | 0.00 | 0.69 | 0.74 | 0.57 | 1.30 |
| 7804 | 0.53 | 0.46 | 0.68 | 0.82 | 0.85 | 0.81 | 0.67 | 0.40 | 0.82 | 0.29 | 0.53 | 1.66 | 2.09 | 0.95 | 0.67 | 0.00 | 0.72 | 0.78 | 0.61 | 1.28 |
| 7805 | 0.69 | 0.63 | 0.97 | 1.02 | 1.23 | 1.01 | 0.89 | 0.47 | 0.94 | 0.45 | 0.89 | 2.07 | 1.01 | 1.13 | 0.89 | 0.00 | 0.93 | 1.01 | 0.72 | 1.39 |
| 7806 | 0.68 | 0.54 | 0.52 | 0.67 | 1.06 | 0.72 | 0.75 | 0.44 | 0.86 | 0.75 | 0.82 | 1.68 | 0.85 | 1.15 | 0.88 | 0.00 | 0.67 | 0.67 | 0.64 | 1.05 |
| 7807 | 0.56 | 0.16 | 0.13 | 0.27 | 0.74 | 0.34 | 0.38 | 0.25 | 0.53 | 0.90 | 0.36 | 1.06 | 1.75 | 0.78 | 0.46 | 0.00 | 0.32 | 0.29 | 0.34 | 0.85 |
| 7808 | 0.98 | 0.92 | 1.22 | 1.24 | 3.45 | 1.36 | 1.96 | 0.96 | 1.61 | 1.88 | 1.57 | 1.89 | 1.67 | 1.56 | 1.48 | 2.86 | 1.32 | 1.40 | 1.14 | 1.23 |
| 7809 | 0.08 | 0.07 | 0.12 | 0.11 | 0.17 | 0.11 | 0.13 | 0.09 | 0.13 | 0.09 | 0.10 | 0.15 | 0.16 | 0.13 | 0.09 | 0.10 | 0.11 | 0.12 | 0.09 | 1.34 |
| 7848 | 0.15 | 0.19 | 0.25 | 0.21 | 0.28 | 0.23 | 0.24 | 0.17 | 0.27 | 0.17 | 0.23 | 0.39 | 0.23 | 0.29 | 0.20 | 0.05 | 0.22 | 0.23 | 0.20 | 1.14 |
| 7849 | 0.33 | 0.28 | 0.43 | 0.41 | 0.44 | 0.46 | 0.37 | 0.21 | 0.42 | 0.21 | 0.37 | 0.96 | 0.47 | 0.48 | 0.40 | 0.00 | 0.40 | 0.42 | 0.32 | 1.31 |
| 0 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7850 | 0.59 | 0.72 | 1.02 | 0.99 | 1.15 | 1.11 | 0.94 | 0.45 | 1.00 | 0.42 | 0.91 | 2.12 | 1.10 | 1.11 | 0.94 | 0.00 | 0.94 | 1.02 | 0.80 | 1.28 |
| 7851 | 0.64 | 0.80 | 1.08 | 1.08 | 1.25 | 1.22 | 1.03 | 0.50 | 1.12 | 0.51 | 1.04 | 2.45 | 1.26 | 1.31 | 1.09 | 0.00 | 1.03 | 1.11 | 0.90 | 1.23 |
| 7852 | 0.45 | 0.15 | 0.12 | 0.18 | 0.75 | 0.29 | 0.40 | 0.25 | 0.47 | 0.84 | 0.37 | 0.77 | 1.36 | 0.63 | 0.46 | 0.11 | 0.27 | 0.24 | 0.30 | 0.79 |
| 7853 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7810 | 0.99 | 0.98 | 1.25 | 1.26 | 3.56 | 1.42 | 2.03 | 0.99 | 1.65 | 1.92 | 1.63 | 1.93 | 1.73 | 1.48 | 1.53 | 3.06 | 1.36 | 1.45 | 1.20 | 1.21 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7785 | 1.59 | 1.53 | 2.46 | 2.23 | 2.35 | 2.46 | 2.18 | 1.62 | 2.46 | 1.20 | 1.99 | 4.28 | 2.22 | 2.81 | 2.01 | 0.00 | 2.15 | 2.33 | 1.71 | 1.37 |
| 7786 | 1.48 | 1.51 | 2.45 | 2.23 | 2.43 | 2.47 | 2.18 | 1.51 | 2.44 | 1.16 | 1.98 | 4.26 | 2.22 | 2.38 | 2.01 | 0.00 | 2.14 | 2.33 | 1.68 | 1.39 |
| 7787 | 1.50 | 1.45 | 2.53 | 2.34 | 2.55 | 2.54 | 2.28 | 1.54 | 2.48 | 1.11 | 2.10 | 4.37 | 2.22 | 2.52 | 2.02 | 0.00 | 2.20 | 2.43 | 1.66 | 1.46 |
| 7788 | 1.27 | 0.87 | 1.45 | 1.87 | 1.54 | 1.65 | 1.56 | 1.07 | 1.68 | 0.89 | 1.50 | 3.22 | 1.49 | 1.99 | 1.47 | 0.00 | 1.54 | 1.69 | 1.07 | 1.58 |
| 7789 | 1.29 | 0.85 | 1.50 | 1.86 | 1.64 | 1.68 | 1.68 | 1.10 | 1.73 | 1.10 | 1.58 | 3.10 | 1.50 | 2.10 | 1.49 | 0.12 | 1.56 | 1.72 | 1.07 | 1.60 |
| 7790 | 1.10 | 0.84 | 1.12 | 1.39 | 1.74 | 1.35 | 2.05 | 1.07 | 1.73 | 2.07 | 1.74 | 1.93 | 1.74 | 1.78 | 1.56 | 2.82 | 1.30 | 1.37 | 1.11 | 1.23 |
| 7791 | 4.32 | 5.52 | 2.48 | 2.34 | 4.84 | 3.00 | 3.55 | 2.95 | 5.00 | 4.72 | 5.18 | 7.08 | 5.64 | 11.10 | 4.93 | 3.66 | 3.40 | 2.76 | 5.51 | 0.50 |
| 7792 | 2.05 | 1.48 | 1.08 | 1.45 | 1.76 | 1.79 | 1.56 | 1.32 | 2.24 | 2.00 | 1.63 | 4.25 | 5.37 | 3.82 | 2.12 | 0.00 | 1.60 | 1.48 | 1.86 | 0.80 |
| 7793 | 1.44 | 0.73 | 0.85 | 1.24 | 1.37 | 1.44 | 1.10 | 0.80 | 1.56 | 1.07 | 0.91 | 3.53 | 4.64 | 2.24 | 1.27 | 0.00 | 1.20 | 1.20 | 1.10 | 1.09 |
| 7794 | 1.35 | 0.79 | 1.13 | 1.62 | 1.68 | 1.56 | 1.22 | 0.79 | 1.59 | 0.76 | 1.00 | 3.43 | 4.51 | 2.08 | 1.34 | 0.00 | 1.40 | 1.48 | 1.14 | 1.29 |
| 7795 | 1.17 | 0.60 | 0.98 | 1.38 | 1.54 | 1.45 | 1.12 | 0.67 | 1.46 | 0.73 | 0.86 | 3.41 | 4.43 | 1.74 | 1.07 | 0.00 | 1.23 | 1.30 | 0.97 | 1.34 |
| 7796 | 1.47 | 1.38 | 2.05 | 2.16 | 2.46 | 2.22 | 1.92 | 0.98 | 2.07 | 1.01 | 1.95 | 4.63 | 2.28 | 2.50 | 1.94 | 0.00 | 1.98 | 2.14 | 1.60 | 1.34 |
| 7797 | 1.30 | 1.07 | 1.19 | 1.37 | 2.18 | 1.54 | 1.63 | 0.92 | 1.76 | 1.39 | 1.66 | 3.26 | 1.73 | 2.17 | 1.65 | 0.00 | 1.38 | 1.42 | 1.27 | 1.12 |
| 7798 | 1.19 | 0.67 | 0.70 | 0.98 | 0.84 | 1.16 | 1.29 | 0.91 | 1.47 | 1.53 | 1.38 | 2.64 | 1.27 | 1.96 | 1.35 | 0.00 | 0.98 | 0.97 | 0.89 | 1.09 |
| 7799 | 1.09 | 1.03 | 1.32 | 1.40 | 3.78 | 1.54 | 2.14 | 1.05 | 1.77 | 2.08 | 1.75 | 2.26 | 1.88 | 1.66 | 1.66 | 3.05 | 1.47 | 1.57 | 1.28 | 1.23 |
| 7800 | 3.28 | 3.69 | 2.36 | 2.25 | 4.29 | 2.64 | 3.20 | 2.63 | 4.19 | 3.27 | 3.63 | 4.75 | 4.88 | 12.67 | 3.39 | 3.49 | 2.85 | 2.55 | 3.84 | 0.67 |
| 7801 | 2.48 | 2.98 | 2.32 | 2.46 | 3.01 | 2.63 | 2.69 | 2.16 | 3.55 | 2.59 | 2.99 | 5.73 | 6.67 | 5.18 | 3.32 | 0.00 | 2.66 | 2.53 | 3.27 | 0.77 |
| 7802 | 1.90 | 1.55 | 2.20 | 2.44 | 2.42 | 2.44 | 1.87 | 1.10 | 2.18 | 1.08 | 2.04 | 5.39 | 2.62 | 3.14 | 2.20 | 0.00 | 2.20 | 2.34 | 1.79 | 1.31 |
| 7803 | 1.76 | 1.63 | 2.45 | 2.35 | 2.58 | 2.60 | 2.08 | 1.13 | 2.28 | 1.06 | 2.12 | 5.34 | 2.67 | 2.83 | 2.25 | 0.00 | 2.25 | 2.41 | 1.86 | 1.30 |
| 7804 | 1.31 | 1.14 | 1.68 | 2.02 | 2.11 | 2.01 | 1.65 | 0.99 | 2.02 | 0.72 | 1.32 | 4.12 | 5.16 | 2.36 | 1.66 | 0.00 | 1.79 | 1.92 | 1.50 | 1.28 |
| 7805 | 1.44 | 1.31 | 2.03 | 2.14 | 2.57 | 2.10 | 1.86 | 0.99 | 1.97 | 0.94 | 1.85 | 4.32 | 2.11 | 2.35 | 1.86 | 0.00 | 1.94 | 2.10 | 1.51 | 1.39 |
| 7806 | 1.22 | 0.97 | 0.92 | 1.20 | 1.89 | 1.29 | 1.35 | 0.79 | 1.54 | 1.35 | 1.46 | 3.00 | 1.51 | 2.05 | 1.57 | 0.00 | 1.19 | 1.20 | 1.15 | 1.05 |
| 7807 | 0.84 | 0.25 | 0.19 | 0.41 | 1.12 | 0.51 | 0.57 | 0.38 | 0.79 | 1.36 | 0.54 | 1.59 | 2.62 | 1.17 | 0.69 | 0.00 | 0.48 | 0.43 | 0.51 | 0.85 |
| 7808 | 1.12 | 1.05 | 1.39 | 1.41 | 3.93 | 1.55 | 2.24 | 1.09 | 1.84 | 2.15 | 1.79 | 2.15 | 1.91 | 1.78 | 1.69 | 3.26 | 1.50 | 1.60 | 1.30 | 1.23 |
| 7809 | 1.71 | 1.52 | 2.47 | 2.25 | 3.55 | 2.17 | 2.60 | 1.87 | 2.74 | 1.86 | 2.05 | 3.05 | 3.28 | 2.65 | 1.88 | 2.00 | 2.20 | 2.37 | 1.77 | 1.34 |
| 7848 | 2.05 | 2.56 | 3.44 | 2.83 | 3.78 | 3.10 | 3.22 | 2.28 | 3.69 | 2.24 | 3.13 | 5.21 | 3.10 | 3.90 | 2.66 | 0.61 | 2.94 | 3.10 | 2.72 | 1.14 |
| 7849 | 1.96 | 1.68 | 2.58 | 2.47 | 2.62 | 2.78 | 2.21 | 1.28 | 2.54 | 1.27 | 2.23 | 5.72 | 2.81 | 2.88 | 2.41 | 0.00 | 2.38 | 2.54 | 1.94 | 1.31 |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7850 | 1.40 | 1.71 | 2.44 | 2.37 | 2.75 | 2.64 | 2.25 | 1.09 | 2.39 | 0.99 | 2.18 | 5.05 | 2.63 | 2.66 | 2.25 | 0.00 | 2.25 | 2.44 | 1.91 | 1.28 |
| 7851 | 1.31 | 1.64 | 2.20 | 2.22 | 2.56 | 2.49 | 2.11 | 1.03 | 2.30 | 1.04 | 2.12 | 5.01 | 2.57 | 2.68 | 2.23 | 0.00 | 2.11 | 2.27 | 1.85 | 1.23 |
| 7852 | 0.80 | 0.27 | 0.21 | 0.32 | 1.34 | 0.52 | 0.71 | 0.44 | 0.84 | 1.50 | 0.65 | 1.37 | 2.43 | 1.13 | 0.82 | 0.19 | 0.47 | 0.42 | 0.54 | 0.79 |
| 7853 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7810 | 1.13 | 1.11 | 1.42 | 1.44 | 4.05 | 1.62 | 2.31 | 1.13 | 1.88 | 2.19 | 1.86 | 2.20 | 1.97 | 1.68 | 1.75 | 3.49 | 1.55 | 1.65 | 1.36 | 1.21 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7811 | 28 | Plant 04 | Fine Reject (100M x 0) | 57.48 |
| 7812 | 6.2 | Plant 04 | Fine Reject (1mm x 100M / Flt x 1.5 SG) | 5 |
| 7813 | - | Plant 04 | Fine Reject (1mm x 100M / 1.5 x 1.6 SG) | 25.91 |
| 7814 | 1.9 | Plant 04 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 41.02 |
| 7815 | 79.6 | Plant 04 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 84.02 |
| 7816 | 46.1 | Plant 04 | Coarse Reject (100M x 0) | 77.82 |
| 7817 | 18.9 | Plant 04 | Coarse Reject (1mm x 100M / Flt x 1.5 SG) | 6.83 |
| 7818 | 3 | Plant 04 | Coarse Reject (1mm x 100M / 1.5 x 1.6 SG) | 27.16 |
| 7819 | 10.8 | Plant 04 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 42.71 |
| 7820 | 80.6 | Plant 04 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 84.6 |
| 7821 | 27.7 | Plant 04 | Coarse Reject (5/8" x 1mm / Flt x 1.5 SG) | 12.16 |
| 7822 | 51.7 | Plant 04 | Coarse Reject (5/8" x 1mm / 1.5 x 1.6 SG) | 32.25 |
| 7823 | 51 | Plant 04 | Coarse Reject (5/8" x 1mm / 1.6 x 1.8 SG) | 44.81 |
| 7824 | 42.6 | Plant 04 | Coarse Reject (5/8" x 1mm / 1.8 x Snk SG) | 84.25 |
| 7825 | 52.5 | Plant 04 | Coarse Reject (1 1/2" x 5/8" / Flt x 1.5 SG) | 10.09 |
| 7826 | 68.1 | Plant 04 | Coarse Reject (1 1/2" x 5/8" / 1.5 x 1.6 SG) | 33.61 |
| 7827 | 45.1 | Plant 04 | Coarse Reject (1 1/2" x 5/8" / 1.6 x 1.8 SG) | 44.24 |
| 7828 | 72 | Plant 04 | Coarse Reject (1 1/2" x 5/8" / 1.8 x Snk SG) | 84.81 |
| 7829 | 0.5 | Plant 04 | Coarse Reject (4" x 1 1/2" / Flt x 1.5 SG) | 13.19 |
| 7830 | 1.7 | Plant 04 | Coarse Reject (4" x 1 1/2" / Flt x 1.6 SG) | 33.13 |
| 7831 | 63.8 | Plant 04 | Coarse Reject (4" x 1 1/2" / 1.6 x 1.8 SG) | 44.01 |
| 7832 | 71.3 | Plant 04 | Coarse Reject (4" x 1 1/2" / 1.8 x Snk SG) | 88.3 |
| 7833 | 69.4 | Plant 04 | Coarse Reject (+ x 4" / 1.8 x Snk SG) | 82.7 |
| 7834 | 41.6 | Plant 04 | Clean Coal (100M x 0) | 17.3 |
| 7835 | 22.5 | Plant 04 | Clean Coal (1mm x 100M / Flt x 1.5 SG) | 4.1 |
| 7836 | 40.5 | Plant 04 | Clean Coal (1mm x 100M / 1.5 x 1.6 SG) | 25.72 |
| 7837 | 45.1 | Plant 04 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 36.36 |
| 7838 | 76.2 | Plant 04 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 70.42 |
| 7839 | 30.3 | Plant 04 | Clean Coal (5/8" x 1mm / Flt x 1.5 SG) | 5.74 |
| 7840 | 44.2 | Plant 04 | Clean Coal (5/8" x 1mm / 1.5 x 1.6 SG) | 29.92 |
| 7841 | 14.6 | Plant 04 | Clean Coal (5/8" x 1mm / 1.6 x 1.8 SG) | 39.8 |
| 7842 | 19.3 | Plant 04 | Clean Coal (5/8" x 1mm / 1.8 x Snk SG) | 70.83 |
| 7843 | 54.9 | Plant 04 | Clean Coal (1 1/2" x 5/8" / Flt x 1.5 SG) | 6.31 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7811 | 18.70 | 21.64 | 34.48 | 88.45 | 24.33 | 33.83 | 9.32 | 1.15 | 6.32 | 1.15 | 5.90 | 1.75 | 3.35 | 0.43 | 3.11 | 0.99 | 254.9 | 197.9 | 38.3 | 0.19 |
| 7812 | 54.93 | 97.26 | 77.34 | 147.40 | 25.62 | 82.53 | 15.93 | 3.14 | 16.42 | 2.39 | 15.32 | 5.57 | 9.92 | 2.30 | 8.28 | 0.32 | 564.7 | 368.4 | 141.4 | 0.38 |
| 7813 | 28.22 | 42.85 | 75.01 | 138.05 | 18.93 | 69.16 | 11.93 | 1.63 | 9.70 | 0.83 | 8.33 | 3.99 | 5.43 | 0.92 | 4.51 | 0.00 | 419.5 | 324.4 | 66.9 | 0.21 |
| 7814 | 18.82 | 17.72 | 28.93 | 78.12 | 11.92 | 39.66 | 6.81 | 1.03 | 6.42 | 0.63 | 3.81 | 2.39 | 8.30 | 0.62 | 2.45 | 0.00 | 227.6 | 172.9 | 35.9 | 0.21 |
| 7815 | 16.09 | 16.94 | 28.35 | 75.80 | 19.94 | 31.20 | 8.63 | 1.11 | 6.05 | 1.14 | 4.74 | 1.31 | 5.53 | 0.41 | 2.59 | 0.83 | 220.7 | 171.1 | 33.5 | 0.20 |
| 7816 | 18.40 | 26.70 | 45.85 | 90.89 | 27.03 | 44.77 | 12.18 | 1.47 | 7.64 | 1.41 | 6.99 | 1.85 | 3.90 | 0.43 | 3.50 | 1.12 | 294.1 | 229.8 | 45.9 | 0.20 |
| 7817 | 50.77 | 80.94 | 71.39 | 141.74 | 21.87 | 78.39 | 14.17 | 2.81 | 14.83 | 2.29 | 13.93 | 5.65 | 9.04 | 1.95 | 7.58 | 0.00 | 517.3 | 345.2 | 121.4 | 0.35 |
| 7818 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7819 | 16.92 | 13.68 | 23.44 | 66.38 | 9.71 | 35.00 | 5.59 | 0.80 | 5.56 | 0.54 | 3.10 | 2.35 | 8.26 | 0.55 | 2.05 | 0.00 | 193.9 | 146.5 | 30.5 | 0.21 |
| 7820 | 18.42 | 26.95 | 46.26 | 91.69 | 26.76 | 45.34 | 12.35 | 1.48 | 7.73 | 1.42 | 7.16 | 1.91 | 4.15 | 0.50 | 3.52 | 1.16 | 296.8 | 231.6 | 46.8 | 0.20 |
| 7821 | 36.90 | 55.39 | 67.08 | 128.05 | 21.90 | 67.70 | 12.95 | 2.07 | 11.22 | 1.45 | 10.18 | 4.08 | 6.52 | 1.35 | 5.55 | 0.10 | 432.5 | 311.0 | 84.6 | 0.27 |
| 7822 | 25.19 | 34.14 | 63.14 | 131.50 | 16.15 | 63.82 | 10.06 | 1.26 | 8.34 | 0.62 | 7.29 | 3.95 | 5.00 | 0.82 | 4.06 | 0.00 | 375.4 | 294.3 | 55.9 | 0.19 |
| 7823 | 23.41 | 36.71 | 68.96 | 136.80 | 17.82 | 65.53 | 11.02 | 1.35 | 8.79 | 0.62 | 7.70 | 3.85 | 5.13 | 0.81 | 4.19 | 0.00 | 392.7 | 310.3 | 59.0 | 0.19 |
| 7824 | 17.48 | 23.67 | 38.80 | 80.87 | 24.00 | 39.60 | 10.90 | 1.32 | 6.93 | 1.30 | 6.58 | 1.67 | 3.82 | 0.54 | 3.26 | 0.99 | 261.7 | 202.4 | 41.8 | 0.21 |
| 7825 | 35.42 | 54.10 | 82.24 | 150.90 | 20.80 | 76.66 | 13.48 | 2.09 | 11.58 | 1.13 | 10.12 | 4.45 | 6.62 | 1.30 | 5.40 | 0.00 | 476.3 | 357.7 | 83.1 | 0.23 |
| 7826 | 25.66 | 43.45 | 77.81 | 152.70 | 18.75 | 73.99 | 11.77 | 1.40 | 9.78 | 0.65 | 8.54 | 4.55 | 6.13 | 0.96 | 4.89 | 0.00 | 441.0 | 346.2 | 69.2 | 0.20 |
| 7827 | 23.70 | 38.13 | 66.37 | 138.79 | 17.33 | 66.27 | 11.12 | 1.34 | 9.11 | 0.64 | 8.04 | 4.08 | 5.49 | 0.90 | 4.44 | 0.00 | 395.7 | 310.3 | 61.7 | 0.20 |
| 7828 | 16.72 | 22.86 | 35.35 | 80.11 | 24.38 | 37.82 | 10.92 | 1.27 | 6.82 | 1.34 | 6.27 | 1.59 | 3.65 | 0.44 | 3.20 | 1.13 | 253.8 | 196.7 | 40.5 | 0.21 |
| 7829 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7830 | 36.84 | 53.35 | 66.89 | 132.80 | 27.88 | 69.79 | 16.25 | 2.85 | 12.94 | 2.00 | 10.94 | 3.43 | 6.07 | 1.34 | 5.84 | 0.74 | 449.9 | 329.4 | 83.7 | 0.25 |
| 7831 | 20.62 | 37.67 | 59.60 | 126.44 | 18.34 | 62.75 | 11.80 | 1.51 | 9.43 | 0.83 | 7.98 | 3.53 | 5.05 | 0.83 | 4.26 | 0.00 | 370.6 | 289.9 | 60.1 | 0.21 |
| 7832 | 16.95 | 26.27 | 42.08 | 85.91 | 25.04 | 43.97 | 11.79 | 1.42 | 7.73 | 1.35 | 6.66 | 1.69 | 4.08 | 0.34 | 3.42 | 1.10 | 279.8 | 217.9 | 44.9 | 0.21 |
| 7833 | 15.00 | 17.36 | 24.85 | 60.52 | 18.76 | 30.55 | 8.50 | 1.03 | 5.58 | 1.16 | 5.17 | 1.50 | 2.67 | 0.41 | 2.81 | 0.74 | 196.6 | 149.8 | 31.8 | 0.21 |
| 7834 | 27.00 | 41.71 | 46.95 | 92.38 | 30.50 | 46.08 | 12.25 | 1.95 | 10.69 | 1.87 | 8.69 | 2.41 | 8.15 | 0.84 | 4.53 | 1.30 | 337.3 | 240.8 | 69.5 | 0.29 |
| 7835 | 64.20 | 113.80 | 76.03 | 147.08 | 27.65 | 83.59 | 17.16 | 3.59 | 18.46 | 2.91 | 17.63 | 5.99 | 11.28 | 2.76 | 9.52 | 0.55 | 602.2 | 373.6 | 164.4 | 0.44 |
| 7836 | 24.65 | 39.91 | 72.88 | 135.70 | 17.99 | 63.40 | 11.61 | 1.90 | 9.49 | 0.65 | 7.02 | 3.36 | 9.58 | 0.95 | 4.13 | 0.00 | 403.2 | 313.0 | 65.6 | 0.21 |
| 7837 | 23.15 | 37.21 | 72.00 | 134.80 | 20.22 | 62.78 | 11.72 | 1.85 | 9.69 | 0.64 | 7.03 | 3.25 | 9.40 | 0.81 | 3.96 | 0.00 | 398.5 | 313.1 | 62.3 | 0.20 |
| 7838 | 19.60 | 27.27 | 51.89 | 101.16 | 26.89 | 45.68 | 12.36 | 1.63 | 8.30 | 1.40 | 7.06 | 1.90 | 6.62 | 0.69 | 3.53 | 1.21 | 317.2 | 247.9 | 49.7 | 0.20 |
| 7839 | 47.57 | 87.66 | 76.83 | 147.31 | 23.16 | 75.73 | 15.37 | 3.11 | 15.63 | 1.95 | 13.27 | 4.88 | 13.58 | 2.29 | 7.33 | 0.38 | 536.1 | 357.1 | 131.4 | 0.37 |
| 7840 | 26.85 | 40.54 | 77.70 | 148.91 | 18.43 | 69.54 | 11.96 | 1.94 | 9.95 | 0.68 | 7.37 | 3.81 | 11.20 | 0.96 | 4.44 | 0.00 | 434.3 | 338.4 | 69.0 | 0.20 |
| 7841 | 22.39 | 35.55 | 71.35 | 142.22 | 18.37 | 63.01 | 11.02 | 1.67 | 9.01 | 0.49 | 6.71 | 3.49 | 10.27 | 0.78 | 3.98 | 0.00 | 400.3 | 316.6 | 61.3 | 0.19 |
| 7842 | 16.45 | 27.89 | 49.67 | 94.46 | 28.17 | 54.77 | 12.75 | 1.54 | 7.78 | 1.55 | 4.92 | 1.46 | 6.02 | 0.41 | 3.54 | 1.65 | 313.0 | 249.1 | 47.4 | 0.19 |
| 7843 | 50.76 | 85.01 | 92.54 | 169.28 | 23.28 | 85.72 | 15.99 | 3.13 | 15.59 | 1.66 | 12.61 | 5.13 | 14.14 | 2.30 | 7.25 | 0.21 | 584.6 | 405.5 | 128.3 | 0.32 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7811 | 10.75 | 12.44 | 19.82 | 50.84 | 13.98 | 19.45 | 5.35 | 0.66 | 3.63 | 0.66 | 3.39 | 1.00 | 1.93 | 0.25 | 1.79 | 0.57 | 146.5 | 113.7 | 22.0 | 0.194 |
| 7812 | 2.75 | 4.86 | 3.87 | 7.37 | 1.28 | 4.13 | 0.80 | 0.16 | 0.82 | 0.12 | 0.77 | 0.28 | 0.50 | 0.11 | 0.41 | 0.02 | 28.2 | 18.4 | 7.1 | 0.384 |
| 7813 | 7.31 | 11.10 | 19.44 | 35.77 | 4.90 | 17.92 | 3.09 | 0.42 | 2.51 | 0.22 | 2.16 | 1.03 | 1.41 | 0.24 | 1.17 | 0.00 | 108.7 | 84.1 | 17.3 | 0.206 |
| 7814 | 7.72 | 7.27 | 11.87 | 32.04 | 4.89 | 16.27 | 2.79 | 0.42 | 2.64 | 0.26 | 1.56 | 0.98 | 3.41 | 0.25 | 1.01 | 0.00 | 93.4 | 70.9 | 14.7 | 0.208 |
| 7815 | 13.52 | 14.23 | 23.82 | 63.68 | 16.75 | 26.21 | 7.26 | 0.93 | 5.09 | 0.96 | 3.98 | 1.10 | 4.65 | 0.34 | 2.18 | 0.70 | 185.4 | 143.7 | 28.1 | 0.196 |
| 7816 | 14.32 | 20.77 | 35.68 | 70.73 | 21.03 | 34.84 | 9.47 | 1.14 | 5.95 | 1.09 | 5.44 | 1.44 | 3.03 | 0.34 | 2.73 | 0.87 | 228.9 | 178.8 | 35.7 | 0.2 |
| 7817 | 3.47 | 5.53 | 4.88 | 9.68 | 1.49 | 5.35 | 0.97 | 0.19 | 1.01 | 0.16 | 0.95 | 0.39 | 0.62 | 0.13 | 0.52 | 0.00 | 35.3 | 23.6 | 8.3 | 0.352 |
| 7818 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7819 | 7.22 | 5.84 | 10.01 | 28.35 | 4.15 | 14.95 | 2.39 | 0.34 | 2.38 | 0.23 | 1.32 | 1.00 | 3.53 | 0.24 | 0.88 | 0.00 | 82.8 | 62.6 | 13.0 | 0.208 |
| 7820 | 15.59 | 22.80 | 39.13 | 77.57 | 22.64 | 38.35 | 10.45 | 1.26 | 6.54 | 1.21 | 6.05 | 1.62 | 3.51 | 0.43 | 2.98 | 0.98 | 251.1 | 195.9 | 39.6 | 0.202 |
| 7821 | 4.49 | 6.74 | 8.16 | 15.57 | 2.66 | 8.23 | 1.57 | 0.25 | 1.36 | 0.18 | 1.24 | 0.50 | 0.79 | 0.16 | 0.67 | 0.01 | 52.6 | 37.8 | 10.3 | 0.272 |
| 7822 | 8.12 | 11.01 | 20.36 | 42.41 | 5.21 | 20.58 | 3.25 | 0.41 | 2.69 | 0.20 | 2.35 | 1.28 | 1.61 | 0.27 | 1.31 | 0.00 | 121.1 | 94.9 | 18.0 | 0.19 |
| 7823 | 10.49 | 16.45 | 30.90 | 61.30 | 7.98 | 29.36 | 4.94 | 0.60 | 3.94 | 0.28 | 3.45 | 1.73 | 2.30 | 0.36 | 1.88 | 0.00 | 176.0 | 139.0 | 26.4 | 0.19 |
| 7824 | 14.73 | 19.95 | 32.69 | 68.14 | 20.22 | 33.37 | 9.19 | 1.11 | 5.84 | 1.10 | 5.54 | 1.40 | 3.22 | 0.45 | 2.75 | 0.83 | 220.5 | 170.5 | 35.2 | 0.207 |
| 7825 | 3.57 | 5.46 | 8.30 | 15.23 | 2.10 | 7.73 | 1.36 | 0.21 | 1.17 | 0.11 | 1.02 | 0.45 | 0.67 | 0.13 | 0.54 | 0.00 | 48.1 | 36.1 | 8.4 | 0.232 |
| 7826 | 8.62 | 14.60 | 26.15 | 51.32 | 6.30 | 24.87 | 3.95 | 0.47 | 3.29 | 0.22 | 2.87 | 1.53 | 2.06 | 0.32 | 1.64 | 0.00 | 148.2 | 116.4 | 23.2 | 0.2 |
| 7827 | 10.48 | 16.87 | 29.36 | 61.40 | 7.67 | 29.32 | 4.92 | 0.59 | 4.03 | 0.28 | 3.56 | 1.80 | 2.43 | 0.40 | 1.96 | 0.00 | 175.1 | 137.3 | 27.3 | 0.199 |
| 7828 | 14.18 | 19.39 | 29.98 | 67.94 | 20.67 | 32.07 | 9.26 | 1.08 | 5.78 | 1.14 | 5.31 | 1.34 | 3.09 | 0.37 | 2.72 | 0.95 | 215.3 | 166.8 | 34.3 | 0.206 |
| 7829 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7830 | 12.20 | 17.67 | 22.16 | 44.00 | 9.24 | 23.12 | 5.38 | 0.94 | 4.29 | 0.66 | 3.62 | 1.14 | 2.01 | 0.44 | 1.93 | 0.25 | 149.1 | 109.1 | 27.7 | 0.254 |
| 7831 | 9.07 | 16.58 | 26.23 | 55.65 | 8.07 | 27.61 | 5.19 | 0.67 | 4.15 | 0.37 | 3.51 | 1.55 | 2.22 | 0.37 | 1.88 | 0.00 | 163.1 | 127.6 | 26.5 | 0.208 |
| 7832 | 14.97 | 23.20 | 37.15 | 75.86 | 22.11 | 38.83 | 10.41 | 1.25 | 6.82 | 1.19 | 5.88 | 1.49 | 3.60 | 0.30 | 3.02 | 0.97 | 247.1 | 192.4 | 39.7 | 0.206 |
| 7833 | 12.40 | 14.35 | 20.55 | 50.05 | 15.51 | 25.26 | 7.03 | 0.85 | 4.61 | 0.96 | 4.28 | 1.24 | 2.21 | 0.34 | 2.32 | 0.62 | 162.6 | 123.9 | 26.3 | 0.212 |
| 7834 | 4.67 | 7.22 | 8.12 | 15.98 | 5.28 | 7.97 | 2.12 | 0.34 | 1.85 | 0.32 | 1.50 | 0.42 | 1.41 | 0.15 | 0.78 | 0.23 | 58.4 | 41.7 | 12.0 | 0.289 |
| 7835 | 2.63 | 4.67 | 3.12 | 6.03 | 1.13 | 3.43 | 0.70 | 0.15 | 0.76 | 0.12 | 0.72 | 0.25 | 0.46 | 0.11 | 0.39 | 0.02 | 24.7 | 15.3 | 6.7 | 0.44 |
| 7836 | 6.34 | 10.27 | 18.74 | 34.90 | 4.63 | 16.31 | 2.98 | 0.49 | 2.44 | 0.17 | 1.81 | 0.86 | 2.46 | 0.24 | 1.06 | 0.00 | 103.7 | 80.5 | 16.9 | 0.21 |
| 7837 | 8.42 | 13.53 | 26.18 | 49.01 | 7.35 | 22.83 | 4.26 | 0.67 | 3.52 | 0.23 | 2.55 | 1.18 | 3.42 | 0.29 | 1.44 | 0.00 | 144.9 | 113.8 | 22.7 | 0.199 |
| 7838 | 13.80 | 19.20 | 36.54 | 71.24 | 18.94 | 32.17 | 8.70 | 1.15 | 5.84 | 0.99 | 4.97 | 1.34 | 4.66 | 0.48 | 2.48 | 0.85 | 223.4 | 174.6 | 35.0 | 0.2 |
| 7839 | 2.73 | 5.03 | 4.41 | 8.46 | 1.33 | 4.35 | 0.88 | 0.18 | 0.90 | 0.11 | 0.76 | 0.28 | 0.78 | 0.13 | 0.42 | 0.02 | 30.8 | 20.5 | 7.5 | 0.368 |
| 7840 | 8.03 | 12.13 | 23.25 | 44.55 | 5.51 | 20.81 | 3.58 | 0.58 | 2.98 | 0.20 | 2.21 | 1.14 | 3.35 | 0.29 | 1.33 | 0.00 | 129.9 | 101.3 | 20.6 | 0.204 |
| 7841 | 8.91 | 14.15 | 28.40 | 56.60 | 7.31 | 25.08 | 4.39 | 0.67 | 3.59 | 0.20 | 2.67 | 1.39 | 4.09 | 0.31 | 1.59 | 0.00 | 159.3 | 126.0 | 24.4 | 0.194 |
| 7842 | 11.65 | 19.76 | 35.18 | 66.91 | 19.95 | 38.80 | 9.03 | 1.09 | 5.51 | 1.10 | 3.49 | 1.03 | 4.26 | 0.29 | 2.51 | 1.17 | 221.7 | 176.5 | 33.6 | 0.19 |
| 7843 | 3.20 | 5.36 | 5.84 | 10.68 | 1.47 | 5.41 | 1.01 | 0.20 | 0.98 | 0.10 | 0.80 | 0.32 | 0.89 | 0.15 | 0.46 | 0.01 | 36.9 | 25.6 | 8.1 | 0.316 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7811 | 0.67 | 0.52 | 0.66 | 0.85 | 2.09 | 0.72 | 1.01 | 0.51 | 0.91 | 1.01 | 0.89 | 1.25 | 0.92 | 0.74 | 0.89 | 1.63 | 0.79 | 0.85 | 0.65 | 1.31 |
| 7812 | 0.17 | 0.20 | 0.13 | 0.12 | 0.19 | 0.15 | 0.15 | 0.12 | 0.21 | 0.18 | 0.20 | 0.35 | 0.24 | 0.35 | 0.21 | 0.05 | 0.15 | 0.14 | 0.21 | 0.66 |
| 7813 | 0.46 | 0.46 | 0.65 | 0.60 | 0.73 | 0.66 | 0.58 | 0.33 | 0.63 | 0.33 | 0.57 | 1.29 | 0.67 | 0.72 | 0.58 | 0.00 | 0.59 | 0.63 | 0.51 | 1.23 |
| 7814 | 0.48 | 0.30 | 0.40 | 0.53 | 0.73 | 0.60 | 0.53 | 0.33 | 0.66 | 0.39 | 0.41 | 1.23 | 1.62 | 0.77 | 0.50 | 0.00 | 0.51 | 0.53 | 0.43 | 1.22 |
| 7815 | 0.84 | 0.59 | 0.79 | 1.06 | 2.50 | 0.97 | 1.37 | 0.71 | 1.27 | 1.47 | 1.05 | 1.38 | 2.21 | 1.03 | 1.09 | 1.99 | 1.01 | 1.07 | 0.83 | 1.29 |
| 7816 | 0.89 | 0.87 | 1.19 | 1.18 | 3.14 | 1.29 | 1.79 | 0.88 | 1.49 | 1.68 | 1.43 | 1.80 | 1.44 | 1.03 | 1.36 | 2.48 | 1.24 | 1.33 | 1.05 | 1.27 |
| 7817 | 0.22 | 0.23 | 0.16 | 0.16 | 0.22 | 0.20 | 0.18 | 0.15 | 0.25 | 0.24 | 0.25 | 0.48 | 0.29 | 0.40 | 0.26 | 0.00 | 0.19 | 0.18 | 0.24 | 0.72 |
| 7818 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7819 | 0.45 | 0.24 | 0.33 | 0.47 | 0.62 | 0.55 | 0.45 | 0.26 | 0.59 | 0.35 | 0.35 | 1.25 | 1.68 | 0.72 | 0.44 | 0.00 | 0.45 | 0.47 | 0.38 | 1.22 |
| 7820 | 0.97 | 0.95 | 1.30 | 1.29 | 3.38 | 1.42 | 1.97 | 0.97 | 1.63 | 1.85 | 1.59 | 2.02 | 1.67 | 1.29 | 1.49 | 2.80 | 1.36 | 1.46 | 1.16 | 1.25 |
| 7821 | 0.28 | 0.28 | 0.27 | 0.26 | 0.40 | 0.30 | 0.30 | 0.19 | 0.34 | 0.27 | 0.33 | 0.62 | 0.38 | 0.50 | 0.34 | 0.04 | 0.29 | 0.28 | 0.30 | 0.93 |
| 7822 | 0.51 | 0.46 | 0.68 | 0.71 | 0.78 | 0.76 | 0.61 | 0.31 | 0.67 | 0.31 | 0.62 | 1.59 | 0.77 | 0.81 | 0.65 | 0.00 | 0.66 | 0.71 | 0.53 | 1.33 |
| 7823 | 0.66 | 0.69 | 1.03 | 1.02 | 1.19 | 1.09 | 0.93 | 0.46 | 0.98 | 0.43 | 0.91 | 2.16 | 1.09 | 1.10 | 0.94 | 0.00 | 0.95 | 1.04 | 0.78 | 1.33 |
| 7824 | 0.92 | 0.83 | 1.09 | 1.14 | 3.02 | 1.24 | 1.73 | 0.86 | 1.46 | 1.69 | 1.46 | 1.76 | 1.53 | 1.37 | 1.38 | 2.38 | 1.20 | 1.27 | 1.04 | 1.23 |
| 7825 | 0.22 | 0.23 | 0.28 | 0.25 | 0.31 | 0.29 | 0.26 | 0.16 | 0.29 | 0.18 | 0.27 | 0.56 | 0.32 | 0.40 | 0.27 | 0.00 | 0.26 | 0.27 | 0.25 | 1.09 |
| 7826 | 0.54 | 0.61 | 0.87 | 0.86 | 0.94 | 0.92 | 0.75 | 0.36 | 0.82 | 0.34 | 0.76 | 1.91 | 0.98 | 0.97 | 0.82 | 0.00 | 0.80 | 0.87 | 0.68 | 1.27 |
| 7827 | 0.66 | 0.70 | 0.98 | 1.02 | 1.14 | 1.09 | 0.93 | 0.46 | 1.01 | 0.43 | 0.94 | 2.25 | 1.16 | 1.21 | 0.98 | 0.00 | 0.95 | 1.02 | 0.80 | 1.27 |
| 7828 | 0.89 | 0.81 | 1.00 | 1.13 | 3.09 | 1.19 | 1.75 | 0.83 | 1.45 | 1.75 | 1.40 | 1.68 | 1.47 | 1.12 | 1.36 | 2.73 | 1.17 | 1.24 | 1.01 | 1.23 |
| 7829 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7830 | 0.76 | 0.74 | 0.74 | 0.73 | 1.38 | 0.86 | 1.02 | 0.73 | 1.07 | 1.02 | 0.95 | 1.42 | 0.96 | 1.34 | 0.97 | 0.70 | 0.81 | 0.81 | 0.81 | 1.00 |
| 7831 | 0.57 | 0.69 | 0.87 | 0.93 | 1.20 | 1.02 | 0.98 | 0.51 | 1.04 | 0.56 | 0.92 | 1.94 | 1.06 | 1.11 | 0.94 | 0.00 | 0.88 | 0.95 | 0.78 | 1.22 |
| 7832 | 0.94 | 0.97 | 1.24 | 1.26 | 3.30 | 1.44 | 1.97 | 0.96 | 1.71 | 1.83 | 1.55 | 1.86 | 1.71 | 0.92 | 1.51 | 2.78 | 1.34 | 1.43 | 1.17 | 1.23 |
| 7833 | 0.78 | 0.60 | 0.69 | 0.83 | 2.32 | 0.94 | 1.33 | 0.65 | 1.15 | 1.48 | 1.13 | 1.55 | 1.05 | 1.03 | 1.16 | 1.76 | 0.88 | 0.92 | 0.77 | 1.19 |
| 7834 | 0.29 | 0.30 | 0.27 | 0.27 | 0.79 | 0.30 | 0.40 | 0.26 | 0.46 | 0.50 | 0.40 | 0.52 | 0.67 | 0.44 | 0.39 | 0.64 | 0.32 | 0.31 | 0.35 | 0.88 |
| 7835 | 0.16 | 0.19 | 0.10 | 0.10 | 0.17 | 0.13 | 0.13 | 0.11 | 0.19 | 0.18 | 0.19 | 0.31 | 0.22 | 0.34 | 0.20 | 0.06 | 0.13 | 0.11 | 0.20 | 0.58 |
| 7836 | 0.40 | 0.43 | 0.62 | 0.58 | 0.69 | 0.60 | 0.56 | 0.38 | 0.61 | 0.26 | 0.48 | 1.08 | 1.17 | 0.74 | 0.53 | 0.00 | 0.56 | 0.60 | 0.50 | 1.21 |
| 7837 | 0.53 | 0.56 | 0.87 | 0.82 | 1.10 | 0.85 | 0.80 | 0.52 | 0.88 | 0.36 | 0.67 | 1.48 | 1.63 | 0.89 | 0.72 | 0.00 | 0.79 | 0.85 | 0.67 | 1.27 |
| 7838 | 0.86 | 0.80 | 1.22 | 1.19 | 2.83 | 1.19 | 1.64 | 0.88 | 1.46 | 1.52 | 1.31 | 1.67 | 2.22 | 1.47 | 1.24 | 2.44 | 1.21 | 1.30 | 1.03 | 1.26 |
| 7839 | 0.17 | 0.21 | 0.15 | 0.14 | 0.20 | 0.16 | 0.17 | 0.14 | 0.22 | 0.17 | 0.20 | 0.35 | 0.37 | 0.40 | 0.21 | 0.06 | 0.17 | 0.15 | 0.22 | 0.69 |
| 7840 | 0.50 | 0.51 | 0.77 | 0.74 | 0.82 | 0.77 | 0.68 | 0.45 | 0.74 | 0.31 | 0.58 | 1.42 | 1.60 | 0.87 | 0.66 | 0.00 | 0.70 | 0.75 | 0.61 | 1.24 |
| 7841 | 0.56 | 0.59 | 0.95 | 0.94 | 1.09 | 0.93 | 0.83 | 0.51 | 0.90 | 0.30 | 0.70 | 1.74 | 1.95 | 0.94 | 0.79 | 0.00 | 0.86 | 0.94 | 0.72 | 1.31 |
| 7842 | 0.73 | 0.82 | 1.17 | 1.12 | 2.98 | 1.44 | 1.70 | 0.84 | 1.38 | 1.69 | 0.92 | 1.29 | 2.03 | 0.88 | 1.25 | 3.33 | 1.20 | 1.31 | 0.99 | 1.33 |
| 7843 | 0.20 | 0.22 | 0.19 | 0.18 | 0.22 | 0.20 | 0.19 | 0.15 | 0.25 | 0.16 | 0.21 | 0.40 | 0.42 | 0.44 | 0.23 | 0.04 | 0.20 | 0.19 | 0.24 | 0.80 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7811 | 1.17 | 0.90 | 1.15 | 1.47 | 3.63 | 1.25 | 1.76 | 0.89 | 1.58 | 1.76 | 1.55 | 2.18 | 1.60 | 1.30 | 1.56 | 2.84 | 1.38 | 1.47 | 1.13 | 1.31 |
| 7812 | 3.43 | 4.05 | 2.58 | 2.46 | 3.82 | 3.06 | 3.01 | 2.41 | 4.10 | 3.68 | 4.03 | 6.97 | 4.73 | 6.96 | 4.14 | 0.91 | 3.06 | 2.74 | 4.15 | 0.66 |
| 7813 | 1.76 | 1.79 | 2.50 | 2.30 | 2.83 | 2.56 | 2.25 | 1.25 | 2.43 | 1.28 | 2.19 | 4.99 | 2.59 | 2.78 | 2.25 | 0.00 | 2.28 | 2.42 | 1.96 | 1.23 |
| 7814 | 1.18 | 0.74 | 0.96 | 1.30 | 1.78 | 1.47 | 1.28 | 0.80 | 1.61 | 0.96 | 1.00 | 2.99 | 3.95 | 1.87 | 1.23 | 0.00 | 1.23 | 1.29 | 1.06 | 1.22 |
| 7815 | 1.01 | 0.71 | 0.94 | 1.26 | 2.98 | 1.16 | 1.63 | 0.85 | 1.51 | 1.75 | 1.25 | 1.64 | 2.64 | 1.23 | 1.30 | 2.37 | 1.20 | 1.27 | 0.98 | 1.29 |
| 7816 | 1.15 | 1.11 | 1.53 | 1.51 | 4.03 | 1.66 | 2.30 | 1.13 | 1.91 | 2.16 | 1.84 | 2.31 | 1.86 | 1.32 | 1.75 | 3.19 | 1.60 | 1.71 | 1.35 | 1.27 |
| 7817 | 3.17 | 3.37 | 2.38 | 2.36 | 3.26 | 2.90 | 2.67 | 2.16 | 3.71 | 3.52 | 3.66 | 7.06 | 4.30 | 5.89 | 3.79 | 0.00 | 2.81 | 2.57 | 3.57 | 0.72 |
| 7818 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7819 | 1.06 | 0.57 | 0.78 | 1.11 | 1.45 | 1.30 | 1.05 | 0.62 | 1.39 | 0.83 | 0.82 | 2.94 | 3.93 | 1.68 | 1.03 | 0.00 | 1.05 | 1.09 | 0.90 | 1.22 |
| 7820 | 1.15 | 1.12 | 1.54 | 1.53 | 3.99 | 1.68 | 2.33 | 1.14 | 1.93 | 2.19 | 1.88 | 2.39 | 1.98 | 1.52 | 1.76 | 3.31 | 1.61 | 1.72 | 1.37 | 1.25 |
| 7821 | 2.31 | 2.31 | 2.24 | 2.13 | 3.27 | 2.51 | 2.44 | 1.59 | 2.80 | 2.23 | 2.68 | 5.09 | 3.11 | 4.10 | 2.77 | 0.30 | 2.35 | 2.32 | 2.49 | 0.93 |
| 7822 | 1.57 | 1.42 | 2.10 | 2.19 | 2.41 | 2.36 | 1.90 | 0.97 | 2.08 | 0.96 | 1.92 | 4.94 | 2.38 | 2.50 | 2.03 | 0.00 | 2.04 | 2.19 | 1.64 | 1.33 |
| 7823 | 1.46 | 1.53 | 2.30 | 2.28 | 2.66 | 2.43 | 2.08 | 1.03 | 2.20 | 0.95 | 2.03 | 4.82 | 2.44 | 2.46 | 2.09 | 0.00 | 2.13 | 2.31 | 1.73 | 1.33 |
| 7824 | 1.09 | 0.99 | 1.29 | 1.35 | 3.58 | 1.47 | 2.06 | 1.02 | 1.73 | 2.00 | 1.73 | 2.08 | 1.82 | 1.63 | 1.63 | 2.83 | 1.42 | 1.51 | 1.23 | 1.23 |
| 7825 | 2.21 | 2.25 | 2.74 | 2.51 | 3.10 | 2.84 | 2.54 | 1.61 | 2.89 | 1.74 | 2.66 | 5.56 | 3.15 | 3.95 | 2.70 | 0.00 | 2.58 | 2.66 | 2.44 | 1.09 |
| 7826 | 1.60 | 1.81 | 2.59 | 2.54 | 2.80 | 2.74 | 2.22 | 1.08 | 2.45 | 1.00 | 2.25 | 5.68 | 2.92 | 2.90 | 2.44 | 0.00 | 2.39 | 2.58 | 2.03 | 1.27 |
| 7827 | 1.48 | 1.59 | 2.21 | 2.31 | 2.59 | 2.45 | 2.10 | 1.03 | 2.28 | 0.98 | 2.12 | 5.10 | 2.62 | 2.73 | 2.22 | 0.00 | 2.15 | 2.31 | 1.81 | 1.27 |
| 7828 | 1.05 | 0.95 | 1.18 | 1.34 | 3.64 | 1.40 | 2.06 | 0.98 | 1.70 | 2.06 | 1.65 | 1.98 | 1.74 | 1.32 | 1.60 | 3.21 | 1.38 | 1.46 | 1.19 | 1.23 |
| 7829 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7830 | 2.30 | 2.22 | 2.23 | 2.21 | 4.16 | 2.58 | 3.07 | 2.19 | 3.24 | 3.08 | 2.88 | 4.29 | 2.89 | 4.06 | 2.92 | 2.12 | 2.44 | 2.45 | 2.46 | 1.00 |
| 7831 | 1.29 | 1.57 | 1.99 | 2.11 | 2.74 | 2.32 | 2.23 | 1.16 | 2.36 | 1.28 | 2.10 | 4.41 | 2.40 | 2.52 | 2.13 | 0.00 | 2.01 | 2.16 | 1.77 | 1.22 |
| 7832 | 1.06 | 1.09 | 1.40 | 1.43 | 3.74 | 1.63 | 2.23 | 1.09 | 1.93 | 2.08 | 1.75 | 2.11 | 1.94 | 1.04 | 1.71 | 3.15 | 1.52 | 1.62 | 1.32 | 1.23 |
| 7833 | 0.94 | 0.72 | 0.83 | 1.01 | 2.80 | 1.13 | 1.60 | 0.79 | 1.39 | 1.79 | 1.36 | 1.87 | 1.27 | 1.24 | 1.40 | 2.13 | 1.07 | 1.12 | 0.93 | 1.19 |
| 7834 | 1.69 | 1.74 | 1.56 | 1.54 | 4.55 | 1.71 | 2.31 | 1.50 | 2.67 | 2.87 | 2.29 | 3.01 | 3.88 | 2.55 | 2.26 | 3.73 | 1.83 | 1.79 | 2.04 | 0.88 |
| 7835 | 4.01 | 4.74 | 2.53 | 2.45 | 4.13 | 3.10 | 3.24 | 2.76 | 4.62 | 4.48 | 4.64 | 7.49 | 5.37 | 8.38 | 4.76 | 1.56 | 3.27 | 2.78 | 4.83 | 0.58 |
| 7836 | 1.54 | 1.66 | 2.43 | 2.26 | 2.69 | 2.35 | 2.19 | 1.46 | 2.37 | 1.01 | 1.85 | 4.20 | 4.56 | 2.88 | 2.07 | 0.00 | 2.19 | 2.33 | 1.93 | 1.21 |
| 7837 | 1.45 | 1.55 | 2.40 | 2.25 | 3.02 | 2.33 | 2.21 | 1.42 | 2.42 | 0.99 | 1.85 | 4.06 | 4.48 | 2.45 | 1.98 | 0.00 | 2.16 | 2.33 | 1.83 | 1.27 |
| 7838 | 1.22 | 1.14 | 1.73 | 1.69 | 4.01 | 1.69 | 2.33 | 1.25 | 2.07 | 2.16 | 1.86 | 2.37 | 3.15 | 2.08 | 1.76 | 3.46 | 1.72 | 1.85 | 1.46 | 1.26 |
| 7839 | 2.97 | 3.65 | 2.56 | 2.46 | 3.46 | 2.80 | 2.90 | 2.39 | 3.91 | 3.00 | 3.49 | 6.10 | 6.47 | 6.95 | 3.66 | 1.09 | 2.91 | 2.66 | 3.86 | 0.69 |
| 7840 | 1.68 | 1.69 | 2.59 | 2.48 | 2.75 | 2.58 | 2.26 | 1.50 | 2.49 | 1.04 | 1.94 | 4.76 | 5.33 | 2.90 | 2.22 | 0.00 | 2.36 | 2.52 | 2.03 | 1.24 |
| 7841 | 1.40 | 1.48 | 2.38 | 2.37 | 2.74 | 2.33 | 2.08 | 1.29 | 2.25 | 0.76 | 1.77 | 4.36 | 4.89 | 2.36 | 1.99 | 0.00 | 2.17 | 2.36 | 1.80 | 1.31 |
| 7842 | 1.03 | 1.16 | 1.66 | 1.57 | 4.20 | 2.03 | 2.41 | 1.18 | 1.95 | 2.38 | 1.30 | 1.83 | 2.87 | 1.25 | 1.77 | 4.71 | 1.70 | 1.86 | 1.39 | 1.33 |
| 7843 | 3.17 | 3.54 | 3.08 | 2.82 | 3.48 | 3.17 | 3.02 | 2.41 | 3.90 | 2.56 | 3.32 | 6.41 | 6.73 | 6.98 | 3.63 | 0.59 | 3.17 | 3.02 | 3.77 | 0.80 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7844 | 44.3 | Plant 04 | Clean Coal (1 1/2" x 5/8" / 1.5 x 1.6 SG) | 31.46 |
| 7845 | 31.3 | Plant 04 | Clean Coal (1 1/2" x 5/8" / 1.6 x 1.8 SG) | 38.99 |
| 7846 | 1.9 | Plant 04 | Clean Coal (1 1/2" x 5/8" / 1.8 x Snk SG) | 59.06 |
| 7847 | 25.9 | Plant 04 | Clean Coal (+ x 1 1/2" / Flt x 1.5 SG) | 2.95 |
| 7248 | 28.5 | Plant 05 | Raw Coal (100M x 0) | 67.35 |
| 7249 | 67.1 | Plant 05 | Raw Coal (1mm x 100M) | 41.4 |
| 7253 | 64.4 | Plant 05 | Raw Coal (1/2" x 1mm) | 53.95 |
| 7257 | 45.3 | Plant 05 | Raw Coal (1 1/2" x 1/2") | 65.3 |
| 7261 | 59.5 | Plant 05 | Raw Coal (+ x 1 1/2") | 84.45 |
| 7265 | 12.8 | Plant 05 | Fine Reject (100M x 0) | 83.11 |
| 7266 | -0.5 | Plant 05 | Fine Reject (+ x 100M / Flt x 1.5 SG) | 6.59 |
| 7267 | -1.4 | Plant 05 | Fine Reject (+ x 100M / 1.5 x 1.6 SG) | 27.87 |
| 7268 | 0.9 | Plant 05 | Fine Reject (+ x 100M / 1.6 x 1.8 SG) | 42.06 |
| 7269 | 59.8 | Plant 05 | Fine Reject (+ x 100M / 1.8 x Snk SG) | 90.23 |
| 7282 | 37.9 | Plant 05 | Coarse Reject (100M x 0) | 86.38 |
| 7283 | 21.9 | Plant 05 | Coarse Reject (1mm x 100M / Flt x 1.5 SG) | 6.49 |
| 7284 | 0.3 | Plant 05 | Coarse Reject (1mm x 100M / 1.5 x 1.6 SG) | 26.99 |
| 7285 | 8.5 | Plant 05 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 40.25 |
| 7286 | 49.2 | Plant 05 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 89.65 |
| 7287 | 13.8 | Plant 05 | Coarse Reject (1/2" x 1mm / Flt x 1.5 SG) | 9.17 |
| 7288 | 28.1 | Plant 05 | Coarse Reject (1/2" x 1mm / 1.5 x 1.6 SG) | 33.61 |
| 7289 | 39.4 | Plant 05 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 44.01 |
| 7290 | 47.4 | Plant 05 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 90.64 |
| 7291 | 36.1 | Plant 05 | Coarse Reject (1 1/2" x 1/2" / Flt x 1.5 SG) | 7.27 |
| 7292 | 34.9 | Plant 05 | Coarse Reject (1 1/2" x 1/2" / 1.5 x 1.6 SG) | 35.55 |
| 7293 | 34.8 | Plant 05 | Coarse Reject (1 1/2" x 1/2" / 1.6 x 1.8 SG) | 47.57 |
| 7294 | 45.3 | Plant 05 | Coarse Reject (1 1/2" x 1/2" / 1.8 x Snk SG) | 91.32 |
| 7295 | -0.6 | Plant 05 | Coarse Reject (+ x 1 1/2" / Flt x 1.5 SG) | 10.02 |
| 7296 | -1.5 | Plant 05 | Coarse Reject (+ x 1 1/2" / 1.5 x 1.6 SG) | 24.61 |
| 7297 | 39.8 | Plant 05 | Coarse Reject (+ x 1 1/2" / 1.6 x 1.8 SG) | 43.71 |
| 7298 | 71.5 | Plant 05 | Coarse Reject (+ x 1 1/2" / 1.8 x Snk SG) | 89.61 |
| 7299 | 39.3 | Plant 05 | Clean Coal (100M x 0) | 18.59 |
| 7300 | 48.8 | Plant 05 | Clean Coal (1mm x 100M / Flt x 1.5 SG) | 3.91 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7844 | 25.49 | 41.68 | 78.42 | 152.11 | 17.90 | 69.43 | 11.68 | 1.85 | 9.93 | 0.64 | 7.48 | 3.99 | 11.77 | 0.99 | 4.54 | 0.00 | 437.9 | 341.3 | 71.1 | 0.21 |
| 7845 | 24.09 | 34.36 | 72.46 | 147.77 | 17.12 | 64.03 | 10.93 | 1.67 | 8.72 | 0.38 | 6.72 | 3.61 | 10.35 | 0.89 | 3.87 | 0.00 | 407.0 | 322.7 | 60.2 | 0.19 |
| 7846 | 19.63 | 27.20 | 42.02 | 101.20 | 14.31 | 42.95 | 9.16 | 1.51 | 7.52 | 0.85 | 6.06 | 2.58 | 7.76 | 0.71 | 3.45 | 0.10 | 287.0 | 218.7 | 48.7 | 0.22 |
| 7847 | 33.09 | 66.78 | 45.08 | 102.35 | 25.14 | 64.91 | 17.73 | 3.31 | 15.79 | 2.24 | 12.49 | 3.13 | 5.91 | 1.44 | 5.13 | 0.63 | 405.2 | 274.3 | 97.8 | 0.36 |
| 7248 | 17.46 | 22.37 | 34.16 | 62.01 | 19.70 | 38.54 | 8.57 | 1.04 | 6.80 | 1.01 | 5.87 | 1.69 | 5.60 | 0.38 | 2.79 | 0.48 | 228.5 | 170.8 | 40.2 | 0.24 |
| 7249 | 18.44 | 21.91 | 29.82 | 53.47 | 20.58 | 34.71 | 8.42 | 1.05 | 6.34 | 1.28 | 5.96 | 1.61 | 5.66 | 0.57 | 2.90 | 0.62 | 213.3 | 154.4 | 40.5 | 0.26 |
| 7253 | 19.72 | 27.77 | 45.08 | 89.95 | 23.23 | 45.47 | 10.91 | 1.30 | 7.71 | 1.26 | 7.16 | 1.99 | 6.24 | 0.60 | 3.30 | 0.77 | 292.5 | 223.7 | 49.1 | 0.22 |
| 7257 | 19.23 | 28.26 | 50.36 | 95.43 | 24.28 | 47.53 | 11.95 | 1.65 | 8.42 | 1.39 | 7.01 | 1.89 | 6.65 | 0.50 | 3.59 | 1.03 | 309.2 | 239.6 | 50.3 | 0.21 |
| 7261 | 18.38 | 24.74 | 46.73 | 91.03 | 21.29 | 45.13 | 11.03 | 1.59 | 7.88 | 1.25 | 6.57 | 1.95 | 6.50 | 0.52 | 3.25 | 0.74 | 288.6 | 224.7 | 45.5 | 0.20 |
| 7265 | 18.87 | 22.98 | 41.34 | 84.12 | 21.06 | 42.23 | 9.34 | 1.13 | 6.97 | 1.02 | 6.24 | 1.92 | 5.85 | 0.48 | 2.83 | 0.47 | 266.8 | 206.2 | 41.8 | 0.20 |
| 7266 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7267 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7268 | 27.86 | 38.00 | 63.11 | 117.52 | 24.98 | 57.68 | 11.70 | 2.11 | 10.16 | 1.40 | 7.83 | 2.89 | 8.41 | 1.03 | 4.40 | 0.49 | 379.6 | 287.3 | 64.5 | 0.22 |
| 7269 | 18.46 | 21.50 | 43.28 | 86.48 | 21.06 | 40.75 | 9.90 | 1.41 | 7.01 | 1.06 | 5.85 | 1.69 | 5.89 | 0.56 | 3.01 | 0.72 | 268.6 | 209.9 | 40.3 | 0.19 |
| 7282 | 19.15 | 25.31 | 52.06 | 97.47 | 21.03 | 48.46 | 10.90 | 1.60 | 7.93 | 1.17 | 6.27 | 2.14 | 6.70 | 0.45 | 3.36 | 0.71 | 304.7 | 239.4 | 46.1 | 0.19 |
| 7283 | 49.07 | 94.01 | 65.90 | 138.12 | 26.93 | 81.51 | 17.37 | 3.88 | 18.36 | 3.94 | 18.56 | 5.88 | 16.30 | 2.56 | 9.30 | 0.53 | 552.2 | 352.1 | 151.1 | 0.43 |
| 7284 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7285 | 27.08 | 33.13 | 59.89 | 112.59 | 25.15 | 55.05 | 11.16 | 1.94 | 9.61 | 1.22 | 7.26 | 2.71 | 8.14 | 0.94 | 4.05 | 0.42 | 360.4 | 275.4 | 57.9 | 0.21 |
| 7286 | 18.47 | 23.17 | 46.18 | 89.13 | 22.14 | 43.24 | 10.53 | 1.47 | 7.42 | 1.21 | 6.22 | 1.83 | 6.03 | 0.57 | 3.17 | 0.83 | 281.6 | 220.1 | 43.0 | 0.20 |
| 7287 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7288 | 24.33 | 26.62 | 37.63 | 97.16 | 16.31 | 41.80 | 7.71 | 1.18 | 6.29 | 1.05 | 6.25 | 2.51 | 7.27 | 0.88 | 3.47 | 0.18 | 280.6 | 208.1 | 48.2 | 0.23 |
| 7289 | 13.97 | 15.40 | 18.19 | 22.93 | 12.80 | 31.35 | 5.51 | 0.80 | 4.96 | 1.19 | 4.70 | 1.81 | 6.10 | 0.63 | 2.59 | 0.00 | 142.9 | 96.5 | 32.4 | 0.34 |
| 7290 | 17.13 | 21.93 | 38.51 | 80.50 | 21.59 | 40.36 | 9.80 | 1.12 | 6.62 | 1.09 | 6.39 | 1.75 | 5.61 | 0.50 | 2.82 | 0.66 | 256.4 | 198.5 | 40.8 | 0.21 |
| 7291 | 41.21 | 63.34 | 45.89 | 105.82 | 18.26 | 61.53 | 13.31 | 2.54 | 13.20 | 2.20 | 12.69 | 3.94 | 10.62 | 2.29 | 5.96 | 0.40 | 403.2 | 260.6 | 101.4 | 0.39 |
| 7292 | 21.00 | 13.27 | 13.33 | 30.03 | 8.81 | 28.59 | 4.46 | 0.66 | 4.22 | 1.04 | 4.45 | 2.03 | 6.67 | 0.67 | 2.53 | 0.00 | 141.8 | 90.1 | 30.7 | 0.34 |
| 7293 | 20.11 | 17.18 | 23.48 | 54.60 | 11.33 | 33.90 | 5.65 | 0.70 | 4.70 | 0.87 | 4.95 | 2.16 | 6.97 | 0.65 | 2.72 | 0.00 | 190.0 | 134.4 | 35.5 | 0.26 |
| 7294 | 15.35 | 16.08 | 29.02 | 68.01 | 19.16 | 34.86 | 8.37 | 0.88 | 5.64 | 0.93 | 5.38 | 1.54 | 5.27 | 0.40 | 2.33 | 0.50 | 213.7 | 165.9 | 32.4 | 0.20 |
| 7295 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7296 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7297 | 19.50 | 21.91 | 41.81 | 82.03 | 15.76 | 37.34 | 7.86 | 1.18 | 5.65 | 0.87 | 5.16 | 1.87 | 6.37 | 0.76 | 2.94 | 0.44 | 251.4 | 191.6 | 40.3 | 0.21 |
| 7298 | 17.67 | 27.28 | 48.98 | 94.13 | 22.71 | 48.27 | 11.63 | 1.64 | 8.48 | 1.21 | 6.65 | 1.96 | 6.41 | 0.48 | 3.39 | 0.88 | 301.8 | 235.8 | 48.3 | 0.20 |
| 7299 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7300 | 61.90 | 127.51 | 88.65 | 176.16 | 38.57 | 96.89 | 23.77 | 5.75 | 24.26 | 4.40 | 20.84 | 6.36 | 17.66 | 3.38 | 11.91 | 1.83 | 709.8 | 454.0 | 193.9 | 0.43 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7844 | 8.02 | 13.11 | 24.67 | 47.85 | 5.63 | 21.84 | 3.67 | 0.58 | 3.12 | 0.20 | 2.35 | 1.25 | 3.70 | 0.31 | 1.43 | 0.00 | 137.8 | 107.4 | 22.4 | 0.208 |
| 7845 | 9.39 | 13.40 | 28.25 | 57.61 | 6.67 | 24.96 | 4.26 | 0.65 | 3.40 | 0.15 | 2.62 | 1.41 | 4.04 | 0.35 | 1.51 | 0.00 | 158.7 | 125.8 | 23.5 | 0.187 |
| 7846 | 11.59 | 16.07 | 24.82 | 59.77 | 8.45 | 25.37 | 5.41 | 0.89 | 4.44 | 0.50 | 3.58 | 1.52 | 4.59 | 0.42 | 2.04 | 0.06 | 169.5 | 129.2 | 28.8 | 0.223 |
| 7847 | 0.98 | 1.97 | 1.33 | 3.02 | 0.74 | 1.91 | 0.52 | 0.10 | 0.47 | 0.07 | 0.37 | 0.09 | 0.17 | 0.04 | 0.15 | 0.02 | 12.0 | 8.1 | 2.9 | 0.356 |
| 7248 | 11.76 | 15.07 | 23.01 | 41.76 | 13.27 | 25.96 | 5.77 | 0.70 | 4.58 | 0.68 | 3.96 | 1.14 | 3.77 | 0.26 | 1.88 | 0.33 | 153.9 | 115.0 | 27.1 | 0.235 |
| 7249 | 7.63 | 9.07 | 12.34 | 22.14 | 8.52 | 14.37 | 3.49 | 0.44 | 2.62 | 0.53 | 2.47 | 0.67 | 2.34 | 0.24 | 1.20 | 0.26 | 88.3 | 63.9 | 16.8 | 0.262 |
| 7253 | 10.64 | 14.98 | 24.32 | 48.53 | 12.53 | 24.53 | 5.89 | 0.70 | 4.16 | 0.68 | 3.86 | 1.07 | 3.37 | 0.32 | 1.78 | 0.41 | 157.8 | 120.7 | 26.5 | 0.219 |
| 7257 | 12.56 | 18.46 | 32.88 | 62.32 | 15.86 | 31.04 | 7.81 | 1.08 | 5.50 | 0.91 | 4.58 | 1.24 | 4.34 | 0.33 | 2.34 | 0.67 | 201.9 | 156.5 | 32.9 | 0.21 |
| 7261 | 15.52 | 20.89 | 39.46 | 76.88 | 17.98 | 38.11 | 9.32 | 1.34 | 6.66 | 1.06 | 5.55 | 1.65 | 5.49 | 0.44 | 2.75 | 0.62 | 243.7 | 189.7 | 38.4 | 0.203 |
| 7265 | 15.68 | 19.10 | 34.36 | 69.92 | 17.50 | 35.10 | 7.76 | 0.94 | 5.79 | 0.85 | 5.19 | 1.60 | 4.86 | 0.40 | 2.35 | 0.39 | 221.8 | 171.4 | 34.7 | 0.203 |
| 7266 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7267 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7268 | 11.72 | 15.98 | 26.55 | 49.43 | 10.51 | 24.26 | 4.92 | 0.89 | 4.27 | 0.59 | 3.29 | 1.22 | 3.54 | 0.43 | 1.85 | 0.21 | 159.6 | 120.8 | 27.1 | 0.224 |
| 7269 | 16.66 | 19.40 | 39.05 | 78.03 | 19.00 | 36.77 | 8.93 | 1.27 | 6.33 | 0.95 | 5.28 | 1.53 | 5.32 | 0.51 | 2.72 | 0.65 | 242.4 | 189.4 | 36.4 | 0.192 |
| 7282 | 16.54 | 21.86 | 44.97 | 84.20 | 18.17 | 41.86 | 9.42 | 1.38 | 6.85 | 1.01 | 5.42 | 1.85 | 5.79 | 0.39 | 2.90 | 0.61 | 263.2 | 206.8 | 39.8 | 0.192 |
| 7283 | 3.18 | 6.10 | 4.28 | 8.96 | 1.75 | 5.29 | 1.13 | 0.25 | 1.19 | 0.26 | 1.20 | 0.38 | 1.06 | 0.17 | 0.60 | 0.03 | 35.8 | 22.8 | 9.8 | 0.429 |
| 7284 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7285 | 10.90 | 13.34 | 24.11 | 45.32 | 10.12 | 22.16 | 4.49 | 0.78 | 3.87 | 0.49 | 2.92 | 1.09 | 3.28 | 0.38 | 1.63 | 0.17 | 145.0 | 110.9 | 23.3 | 0.21 |
| 7286 | 16.55 | 20.77 | 41.40 | 79.90 | 19.84 | 38.76 | 9.44 | 1.32 | 6.65 | 1.08 | 5.58 | 1.64 | 5.41 | 0.51 | 2.84 | 0.75 | 252.4 | 197.3 | 38.6 | 0.196 |
| 7287 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7288 | 8.18 | 8.95 | 12.65 | 32.66 | 5.48 | 14.05 | 2.59 | 0.40 | 2.11 | 0.35 | 2.10 | 0.84 | 2.44 | 0.30 | 1.17 | 0.06 | 94.3 | 69.9 | 16.2 | 0.232 |
| 7289 | 6.15 | 6.78 | 8.00 | 10.09 | 5.63 | 13.80 | 2.43 | 0.35 | 2.18 | 0.52 | 2.07 | 0.79 | 2.68 | 0.28 | 1.14 | 0.00 | 62.9 | 42.5 | 14.3 | 0.336 |
| 7290 | 15.52 | 19.88 | 34.91 | 72.97 | 19.57 | 36.58 | 8.88 | 1.01 | 6.00 | 0.99 | 5.79 | 1.58 | 5.09 | 0.46 | 2.56 | 0.60 | 232.4 | 179.9 | 36.9 | 0.205 |
| 7291 | 3.00 | 4.60 | 3.34 | 7.69 | 1.33 | 4.47 | 0.97 | 0.18 | 0.96 | 0.16 | 0.92 | 0.29 | 0.77 | 0.17 | 0.43 | 0.03 | 29.3 | 18.9 | 7.4 | 0.389 |
| 7292 | 7.47 | 4.72 | 4.74 | 10.68 | 3.13 | 10.17 | 1.59 | 0.24 | 1.50 | 0.37 | 1.58 | 0.72 | 2.37 | 0.24 | 0.90 | 0.00 | 50.4 | 32.0 | 10.9 | 0.34 |
| 7293 | 9.57 | 8.17 | 11.17 | 25.98 | 5.39 | 16.13 | 2.69 | 0.33 | 2.24 | 0.41 | 2.35 | 1.03 | 3.31 | 0.31 | 1.29 | 0.00 | 90.4 | 63.9 | 16.9 | 0.264 |
| 7294 | 14.02 | 14.68 | 26.50 | 62.10 | 17.49 | 31.83 | 7.64 | 0.81 | 5.15 | 0.85 | 4.92 | 1.41 | 4.81 | 0.36 | 2.13 | 0.46 | 195.2 | 151.5 | 29.6 | 0.195 |
| 7295 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7296 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7297 | 8.52 | 9.58 | 18.28 | 35.85 | 6.89 | 16.32 | 3.44 | 0.52 | 2.47 | 0.38 | 2.25 | 0.82 | 2.78 | 0.33 | 1.29 | 0.19 | 109.9 | 83.8 | 17.6 | 0.21 |
| 7298 | 15.84 | 24.45 | 43.89 | 84.35 | 20.35 | 43.26 | 10.42 | 1.47 | 7.59 | 1.08 | 5.96 | 1.76 | 5.74 | 0.43 | 3.04 | 0.79 | 270.4 | 211.3 | 43.2 | 0.205 |
| 7299 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7300 | 2.42 | 4.99 | 3.47 | 6.89 | 1.51 | 3.79 | 0.93 | 0.22 | 0.95 | 0.17 | 0.81 | 0.25 | 0.69 | 0.13 | 0.47 | 0.07 | 27.8 | 17.8 | 7.6 | 0.427 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7844 | 0.50 | 0.55 | 0.82 | 0.80 | 0.84 | 0.81 | 0.69 | 0.45 | 0.78 | 0.31 | 0.62 | 1.57 | 1.76 | 0.95 | 0.71 | 0.00 | 0.75 | 0.80 | 0.66 | 1.22 |
| 7845 | 0.59 | 0.56 | 0.94 | 0.96 | 1.00 | 0.92 | 0.80 | 0.50 | 0.85 | 0.23 | 0.69 | 1.76 | 1.92 | 1.06 | 0.76 | 0.00 | 0.86 | 0.94 | 0.69 | 1.36 |
| 7846 | 0.72 | 0.67 | 0.83 | 1.00 | 1.26 | 0.94 | 1.02 | 0.69 | 1.11 | 0.77 | 0.94 | 1.90 | 2.18 | 1.28 | 1.02 | 0.18 | 0.92 | 0.96 | 0.85 | 1.14 |
| 7847 | 0.06 | 0.08 | 0.04 | 0.05 | 0.11 | 0.07 | 0.10 | 0.08 | 0.12 | 0.10 | 0.10 | 0.12 | 0.08 | 0.13 | 0.08 | 0.05 | 0.06 | 0.06 | 0.08 | 0.71 |
| 7248 | 0.73 | 0.63 | 0.77 | 0.70 | 1.98 | 0.96 | 1.09 | 0.54 | 1.15 | 1.05 | 1.04 | 1.42 | 1.80 | 0.78 | 0.94 | 0.93 | 0.83 | 0.86 | 0.80 | 1.08 |
| 7249 | 0.48 | 0.38 | 0.41 | 0.37 | 1.27 | 0.53 | 0.66 | 0.34 | 0.66 | 0.82 | 0.65 | 0.83 | 1.12 | 0.71 | 0.60 | 0.73 | 0.48 | 0.48 | 0.49 | 0.97 |
| 7253 | 0.66 | 0.62 | 0.81 | 0.81 | 1.87 | 0.91 | 1.11 | 0.54 | 1.04 | 1.05 | 1.02 | 1.34 | 1.60 | 0.98 | 0.89 | 1.18 | 0.86 | 0.90 | 0.78 | 1.15 |
| 7257 | 0.78 | 0.77 | 1.10 | 1.04 | 2.37 | 1.15 | 1.47 | 0.83 | 1.37 | 1.40 | 1.20 | 1.54 | 2.07 | 1.00 | 1.17 | 1.92 | 1.10 | 1.17 | 0.97 | 1.21 |
| 7261 | 0.97 | 0.87 | 1.32 | 1.28 | 2.68 | 1.41 | 1.76 | 1.03 | 1.66 | 1.63 | 1.46 | 2.06 | 2.61 | 1.34 | 1.37 | 1.78 | 1.32 | 1.41 | 1.13 | 1.25 |
| 7265 | 0.98 | 0.80 | 1.15 | 1.17 | 2.61 | 1.30 | 1.46 | 0.72 | 1.45 | 1.31 | 1.37 | 2.00 | 2.32 | 1.20 | 1.18 | 1.11 | 1.20 | 1.28 | 1.02 | 1.25 |
| 7266 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7267 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7268 | 0.73 | 0.67 | 0.88 | 0.82 | 1.57 | 0.90 | 0.93 | 0.68 | 1.07 | 0.91 | 0.87 | 1.52 | 1.68 | 1.32 | 0.93 | 0.59 | 0.87 | 0.90 | 0.80 | 1.13 |
| 7269 | 1.04 | 0.81 | 1.30 | 1.30 | 2.84 | 1.36 | 1.68 | 0.98 | 1.58 | 1.47 | 1.39 | 1.91 | 2.53 | 1.54 | 1.36 | 1.84 | 1.32 | 1.41 | 1.07 | 1.32 |
| 7282 | 1.03 | 0.91 | 1.50 | 1.40 | 2.71 | 1.55 | 1.78 | 1.06 | 1.71 | 1.55 | 1.43 | 2.31 | 2.76 | 1.18 | 1.45 | 1.74 | 1.43 | 1.54 | 1.17 | 1.32 |
| 7283 | 0.20 | 0.25 | 0.14 | 0.15 | 0.26 | 0.20 | 0.21 | 0.19 | 0.30 | 0.39 | 0.32 | 0.48 | 0.50 | 0.50 | 0.30 | 0.10 | 0.19 | 0.17 | 0.29 | 0.59 |
| 7284 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7285 | 0.68 | 0.56 | 0.80 | 0.76 | 1.51 | 0.82 | 0.85 | 0.60 | 0.97 | 0.75 | 0.77 | 1.37 | 1.56 | 1.15 | 0.81 | 0.48 | 0.79 | 0.83 | 0.68 | 1.21 |
| 7286 | 1.03 | 0.87 | 1.38 | 1.33 | 2.96 | 1.44 | 1.78 | 1.01 | 1.66 | 1.66 | 1.47 | 2.06 | 2.57 | 1.54 | 1.42 | 2.13 | 1.37 | 1.47 | 1.13 | 1.30 |
| 7287 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7288 | 0.51 | 0.37 | 0.42 | 0.54 | 0.82 | 0.52 | 0.49 | 0.30 | 0.53 | 0.54 | 0.55 | 1.05 | 1.16 | 0.90 | 0.58 | 0.17 | 0.51 | 0.52 | 0.48 | 1.09 |
| 7289 | 0.38 | 0.28 | 0.27 | 0.17 | 0.84 | 0.51 | 0.46 | 0.27 | 0.55 | 0.80 | 0.54 | 0.99 | 1.28 | 0.84 | 0.57 | 0.00 | 0.34 | 0.32 | 0.42 | 0.75 |
| 7290 | 0.97 | 0.83 | 1.16 | 1.22 | 2.92 | 1.35 | 1.68 | 0.78 | 1.50 | 1.52 | 1.52 | 1.98 | 2.42 | 1.38 | 1.28 | 1.71 | 1.26 | 1.34 | 1.09 | 1.23 |
| 7291 | 0.19 | 0.19 | 0.11 | 0.13 | 0.20 | 0.17 | 0.18 | 0.14 | 0.24 | 0.25 | 0.24 | 0.36 | 0.37 | 0.50 | 0.22 | 0.08 | 0.16 | 0.14 | 0.22 | 0.65 |
| 7292 | 0.47 | 0.20 | 0.16 | 0.18 | 0.47 | 0.38 | 0.30 | 0.18 | 0.38 | 0.57 | 0.42 | 0.90 | 1.13 | 0.72 | 0.45 | 0.00 | 0.27 | 0.24 | 0.32 | 0.74 |
| 7293 | 0.60 | 0.34 | 0.37 | 0.43 | 0.80 | 0.60 | 0.51 | 0.26 | 0.56 | 0.64 | 0.62 | 1.28 | 1.58 | 0.94 | 0.65 | 0.00 | 0.49 | 0.48 | 0.50 | 0.96 |
| 7294 | 0.88 | 0.61 | 0.88 | 1.04 | 2.61 | 1.18 | 1.44 | 0.62 | 1.29 | 1.31 | 1.29 | 1.76 | 2.29 | 1.09 | 1.07 | 1.30 | 1.06 | 1.13 | 0.87 | 1.30 |
| 7295 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7296 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7297 | 0.53 | 0.40 | 0.61 | 0.60 | 1.03 | 0.60 | 0.65 | 0.40 | 0.62 | 0.58 | 0.59 | 1.02 | 1.33 | 1.01 | 0.64 | 0.55 | 0.60 | 0.62 | 0.52 | 1.20 |
| 7298 | 0.99 | 1.02 | 1.46 | 1.41 | 3.04 | 1.60 | 1.97 | 1.13 | 1.90 | 1.66 | 1.57 | 2.20 | 2.73 | 1.31 | 1.52 | 2.26 | 1.47 | 1.57 | 1.27 | 1.24 |
| 7299 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7300 | 0.15 | 0.21 | 0.12 | 0.11 | 0.23 | 0.14 | 0.18 | 0.17 | 0.24 | 0.26 | 0.21 | 0.31 | 0.33 | 0.40 | 0.23 | 0.20 | 0.15 | 0.13 | 0.22 | 0.59 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7844 | 1.59 | 1.74 | 2.61 | 2.54 | 2.67 | 2.57 | 2.20 | 1.42 | 2.48 | 0.98 | 1.97 | 4.98 | 5.60 | 3.01 | 2.27 | 0.00 | 2.38 | 2.54 | 2.09 | 1.22 |
| 7845 | 1.51 | 1.43 | 2.42 | 2.46 | 2.55 | 2.37 | 2.06 | 1.28 | 2.18 | 0.58 | 1.77 | 4.51 | 4.93 | 2.71 | 1.94 | 0.00 | 2.21 | 2.40 | 1.77 | 1.36 |
| 7846 | 1.23 | 1.13 | 1.40 | 1.69 | 2.14 | 1.59 | 1.73 | 1.16 | 1.88 | 1.31 | 1.59 | 3.22 | 3.70 | 2.16 | 1.72 | 0.30 | 1.56 | 1.63 | 1.43 | 1.14 |
| 7847 | 2.07 | 2.78 | 1.50 | 1.71 | 3.75 | 2.40 | 3.35 | 2.55 | 3.95 | 3.45 | 3.29 | 3.92 | 2.82 | 4.36 | 2.56 | 1.80 | 2.20 | 2.04 | 2.87 | 0.71 |
| 7248 | 1.09 | 0.93 | 1.14 | 1.03 | 2.94 | 1.43 | 1.62 | 0.80 | 1.70 | 1.55 | 1.55 | 2.11 | 2.67 | 1.16 | 1.39 | 1.38 | 1.24 | 1.27 | 1.18 | 1.08 |
| 7249 | 1.15 | 0.91 | 0.99 | 0.89 | 3.07 | 1.29 | 1.59 | 0.81 | 1.58 | 1.97 | 1.57 | 2.02 | 2.70 | 1.72 | 1.45 | 1.77 | 1.16 | 1.15 | 1.19 | 0.97 |
| 7253 | 1.23 | 1.16 | 1.50 | 1.50 | 3.47 | 1.68 | 2.06 | 1.00 | 1.93 | 1.94 | 1.88 | 2.49 | 2.97 | 1.81 | 1.65 | 2.20 | 1.59 | 1.67 | 1.44 | 1.15 |
| 7257 | 1.20 | 1.18 | 1.68 | 1.59 | 3.62 | 1.76 | 2.26 | 1.27 | 2.11 | 2.14 | 1.84 | 2.37 | 3.17 | 1.52 | 1.79 | 2.94 | 1.68 | 1.78 | 1.48 | 1.21 |
| 7261 | 1.15 | 1.03 | 1.56 | 1.52 | 3.18 | 1.67 | 2.08 | 1.22 | 1.97 | 1.93 | 1.73 | 2.44 | 3.09 | 1.59 | 1.63 | 2.11 | 1.57 | 1.67 | 1.34 | 1.25 |
| 7265 | 1.18 | 0.96 | 1.38 | 1.40 | 3.14 | 1.56 | 1.76 | 0.87 | 1.74 | 1.57 | 1.64 | 2.40 | 2.79 | 1.45 | 1.41 | 1.34 | 1.45 | 1.54 | 1.23 | 1.25 |
| 7266 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7267 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7268 | 1.74 | 1.58 | 2.10 | 1.96 | 3.73 | 2.14 | 2.21 | 1.62 | 2.54 | 2.15 | 2.06 | 3.61 | 4.01 | 3.13 | 2.20 | 1.40 | 2.06 | 2.14 | 1.89 | 1.13 |
| 7269 | 1.15 | 0.90 | 1.44 | 1.44 | 3.14 | 1.51 | 1.87 | 1.09 | 1.75 | 1.63 | 1.54 | 2.12 | 2.81 | 1.71 | 1.51 | 2.04 | 1.46 | 1.56 | 1.18 | 1.32 |
| 7282 | 1.20 | 1.05 | 1.74 | 1.62 | 3.14 | 1.79 | 2.06 | 1.23 | 1.98 | 1.79 | 1.65 | 2.67 | 3.19 | 1.36 | 1.68 | 2.02 | 1.65 | 1.78 | 1.35 | 1.32 |
| 7283 | 3.07 | 3.92 | 2.20 | 2.30 | 4.02 | 3.02 | 3.28 | 2.98 | 4.59 | 6.06 | 4.88 | 7.35 | 7.76 | 7.77 | 4.65 | 1.52 | 3.00 | 2.62 | 4.44 | 0.59 |
| 7284 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7285 | 1.69 | 1.38 | 2.00 | 1.88 | 3.75 | 2.04 | 2.11 | 1.49 | 2.40 | 1.87 | 1.91 | 3.39 | 3.88 | 2.85 | 2.02 | 1.20 | 1.95 | 2.05 | 1.70 | 1.21 |
| 7286 | 1.15 | 0.97 | 1.54 | 1.49 | 3.30 | 1.60 | 1.99 | 1.13 | 1.85 | 1.86 | 1.64 | 2.29 | 2.87 | 1.72 | 1.59 | 2.37 | 1.53 | 1.64 | 1.26 | 1.30 |
| 7287 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7288 | 1.52 | 1.11 | 1.25 | 1.62 | 2.43 | 1.55 | 1.45 | 0.91 | 1.57 | 1.61 | 1.64 | 3.13 | 3.46 | 2.67 | 1.74 | 0.50 | 1.52 | 1.55 | 1.42 | 1.09 |
| 7289 | 0.87 | 0.64 | 0.61 | 0.38 | 1.91 | 1.16 | 1.04 | 0.61 | 1.24 | 1.82 | 1.24 | 2.26 | 2.90 | 1.90 | 1.30 | 0.00 | 0.78 | 0.72 | 0.95 | 0.75 |
| 7290 | 1.07 | 0.91 | 1.28 | 1.34 | 3.22 | 1.49 | 1.85 | 0.86 | 1.65 | 1.68 | 1.68 | 2.19 | 2.67 | 1.53 | 1.41 | 1.88 | 1.39 | 1.48 | 1.20 | 1.23 |
| 7291 | 2.58 | 2.64 | 1.53 | 1.76 | 2.73 | 2.28 | 2.51 | 1.96 | 3.30 | 3.39 | 3.34 | 4.92 | 5.06 | 6.93 | 2.98 | 1.14 | 2.19 | 1.94 | 2.98 | 0.65 |
| 7292 | 1.31 | 0.55 | 0.44 | 0.50 | 1.31 | 1.06 | 0.84 | 0.51 | 1.06 | 1.60 | 1.17 | 2.53 | 3.17 | 2.04 | 1.27 | 0.00 | 0.77 | 0.67 | 0.90 | 0.74 |
| 7293 | 1.26 | 0.72 | 0.78 | 0.91 | 1.69 | 1.26 | 1.07 | 0.54 | 1.18 | 1.34 | 1.30 | 2.70 | 3.32 | 1.97 | 1.36 | 0.00 | 1.03 | 1.00 | 1.04 | 0.96 |
| 7294 | 0.96 | 0.67 | 0.97 | 1.13 | 2.86 | 1.29 | 1.58 | 0.68 | 1.41 | 1.43 | 1.42 | 1.93 | 2.51 | 1.20 | 1.17 | 1.43 | 1.16 | 1.24 | 0.95 | 1.30 |
| 7295 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7296 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7297 | 1.22 | 0.91 | 1.39 | 1.37 | 2.35 | 1.38 | 1.48 | 0.91 | 1.41 | 1.33 | 1.36 | 2.34 | 3.03 | 2.31 | 1.47 | 1.25 | 1.36 | 1.43 | 1.18 | 1.20 |
| 7298 | 1.10 | 1.14 | 1.63 | 1.57 | 3.39 | 1.79 | 2.19 | 1.26 | 2.12 | 1.86 | 1.75 | 2.45 | 3.05 | 1.46 | 1.69 | 2.52 | 1.64 | 1.76 | 1.42 | 1.24 |
| 7299 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7300 | 3.87 | 5.31 | 2.95 | 2.94 | 5.76 | 3.59 | 4.49 | 4.42 | 6.07 | 6.78 | 5.48 | 7.95 | 8.41 | 10.26 | 5.95 | 5.24 | 3.85 | 3.38 | 5.70 | 0.59 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7301 | 16.4 | Plant 05 | Clean Coal (1mm x 100M / 1.5 x 1.6 SG) | 26.11 |
| 7302 | 41.3 | Plant 05 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 32.14 |
| 7303 | 33.3 | Plant 05 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 73 |
| 7304 | 51.2 | Plant 05 | Clean Coal (1/2" x 1mm / Flt x 1.5 SG) | 4.91 |
| 7305 | 36.3 | Plant 05 | Clean Coal (1/2" x 1mm / 1.5 x 1.6 SG) | 29.22 |
| 7306 | 31.6 | Plant 05 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 36.19 |
| 7307 | 15.9 | Plant 05 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 73.84 |
| 7308 | 42.5 | Plant 05 | Clean Coal (1 1/2" x 1/2" / Flt x 1.5 SG) | 6.06 |
| 7309 | 31.2 | Plant 05 | Clean Coal (1 1/2" x 1/2" / 1.5 x 1.6 SG) | 32.76 |
| 7310 | 47 | Plant 05 | Clean Coal (1 1/2" x 1/2" / 1.6 x 1.8 SG) | 44.21 |
| 7311 | 2.8 | Plant 05 | Clean Coal (1 1/2" x 1/2" / 1.8 x Snk SG) | 65.3 |
| 7312 | 45 | Plant 05 | Clean Coal (+ x 1 1/2" / Flt x 1.5 SG) | 7.59 |
| 7052 | 47.9 | Plant 06 | Raw Coal (100M x 0) | 57.99 |
| 7053 | 69 | Plant 06 | Raw Coal (1mm x 100M) | 36.87 |
| 7056 | 79.1 | Plant 06 | Raw Coal (1/2" x 1mm) | 45.49 |
| 7059 | 44.6 | Plant 06 | Raw Coal (1 1/4" x 1/2") | 62.64 |
| 7062 | 84.3 | Plant 06 | Raw Coal (+ x 1 1/4") | 84.06 |
| 7065 | 29.1 | Plant 06 | Fine Reject (100M x 0) | 62.72 |
| 7066 | 35.8 | Plant 06 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 2.28 |
| 7068 | 0.8 | Plant 06 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 79.6 |
| 7078 | 8.7 | Plant 06 | Coarse Reject (100M x 0) | 84.2 |
| 7079 | 45.5 | Plant 06 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 9.29 |
| 7080 | 15.4 | Plant 06 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 41.56 |
| 7081 | 41.9 | Plant 06 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 88.53 |
| 7082 | 18.8 | Plant 06 | Coarse Reject (1/2" x 1mm / Flt x 1.6 SG) | 21.85 |
| 7083 | 82.3 | Plant 06 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 45.63 |
| 7084 | 99.9 | Plant 06 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 89.46 |
| 7085 | 48.1 | Plant 06 | Coarse Reject (1 1/4" x 1/2" / Flt x 1.6 SG) | 19.03 |
| 7086 | 78.4 | Plant 06 | Coarse Reject (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 45.75 |
| 7087 | 75.3 | Plant 06 | Coarse Reject (1 1/4" x 1/2 / 1.8 x Snk SG) | 90.66 |
| 7088 | 23.6 | Plant 06 | Coarse Reject (+ x 1 1/4" / Flt x 1.6 SG) | 23.56 |
| 7089 | 57.9 | Plant 06 | Coarse Reject (+ x 1 1/4" / 1.6 x 1.8 SG) | 45.74 |
| 7090 | 86.8 | Plant 06 | Coarse Reject (+ x 1 1/4" / 1.8 x Snk SG) | 88.66 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7301 | 26.65 | 41.05 | 58.39 | 108.97 | 22.29 | 56.61 | 11.55 | 1.86 | 9.21 | 1.28 | 8.04 | 2.92 | 4.67 | 1.06 | 4.47 | 0.37 | 359.4 | 268.9 | 63.9 | 0.24 |
| 7302 | 28.38 | 36.99 | 55.23 | 102.22 | 30.41 | 53.38 | 11.10 | 1.76 | 10.02 | 1.30 | 7.56 | 2.63 | 4.33 | 0.78 | 4.02 | 0.50 | 350.6 | 264.1 | 58.1 | 0.22 |
| 7303 | 21.52 | 23.85 | 43.42 | 80.25 | 32.67 | 39.93 | 10.21 | 1.30 | 7.87 | 1.22 | 6.04 | 1.52 | 2.94 | 0.40 | 3.04 | 1.07 | 277.3 | 215.7 | 40.1 | 0.19 |
| 7304 | 48.17 | 95.14 | 60.37 | 122.61 | 11.92 | 68.71 | 17.70 | 3.94 | 18.71 | 3.10 | 15.83 | 4.59 | 13.02 | 3.47 | 8.83 | 1.33 | 497.4 | 304.0 | 145.3 | 0.48 |
| 7305 | 29.43 | 42.96 | 61.90 | 111.93 | 21.89 | 58.10 | 11.44 | 1.88 | 8.97 | 1.39 | 8.22 | 3.06 | 5.01 | 1.01 | 4.88 | 0.46 | 372.5 | 276.1 | 67.0 | 0.24 |
| 7306 | 26.38 | 32.16 | 52.04 | 97.47 | 7.61 | 49.28 | 10.18 | 1.75 | 9.20 | 1.00 | 5.82 | 2.54 | 7.67 | 0.94 | 3.80 | 0.28 | 308.1 | 227.5 | 54.2 | 0.24 |
| 7307 | 18.78 | 20.83 | 41.02 | 78.17 | 7.68 | 39.10 | 10.38 | 1.41 | 7.31 | 1.22 | 5.20 | 1.55 | 5.72 | 0.55 | 3.04 | 0.98 | 242.9 | 185.1 | 39.1 | 0.21 |
| 7308 | 45.72 | 98.77 | 65.22 | 127.93 | 13.28 | 70.72 | 18.78 | 3.83 | 18.91 | 2.99 | 16.69 | 4.52 | 12.93 | 3.52 | 8.90 | 1.61 | 514.3 | 318.7 | 149.9 | 0.47 |
| 7309 | 22.89 | 15.89 | 17.69 | 46.18 | 0.00 | 22.62 | 4.28 | 0.84 | 4.52 | 0.88 | 2.98 | 1.91 | 6.73 | 1.09 | 2.76 | -0.04 | 151.2 | 96.1 | 32.2 | 0.33 |
| 7310 | 25.63 | 27.30 | 47.63 | 87.49 | 7.00 | 46.27 | 9.76 | 1.61 | 8.02 | 0.95 | 5.42 | 2.36 | 7.29 | 0.92 | 3.54 | 0.29 | 281.5 | 207.8 | 48.1 | 0.23 |
| 7311 | 21.49 | 21.64 | 39.32 | 82.41 | 5.88 | 39.60 | 8.40 | 1.36 | 7.96 | 0.82 | 4.56 | 1.97 | 6.20 | 0.62 | 2.75 | 0.22 | 245.2 | 184.9 | 38.8 | 0.21 |
| 7312 | 30.42 | 67.43 | 50.98 | 104.29 | 9.94 | 60.49 | 14.18 | 2.74 | 13.64 | 1.82 | 10.90 | 3.48 | 10.26 | 3.09 | 5.99 | 0.77 | 390.4 | 256.3 | 103.7 | 0.40 |
| 7052 | 20.24 | 26.40 | 47.24 | 96.66 | 23.78 | 45.95 | 11.65 | 1.79 | 8.40 | 1.34 | 7.05 | 2.12 | 6.30 | 0.58 | 3.51 | 0.90 | 303.9 | 235.5 | 48.2 | 0.20 |
| 7053 | 18.70 | 18.11 | 25.13 | 65.42 | 18.16 | 31.92 | 8.81 | 1.37 | 6.31 | 1.48 | 5.01 | 1.72 | 5.74 | 0.65 | 3.00 | 0.82 | 212.3 | 157.1 | 36.5 | 0.23 |
| 7056 | 20.54 | 28.36 | 41.87 | 90.47 | 22.97 | 42.53 | 11.61 | 1.79 | 8.19 | 1.50 | 7.40 | 1.99 | 6.31 | 0.78 | 3.76 | 1.07 | 291.1 | 219.4 | 51.2 | 0.23 |
| 7059 | 18.39 | 23.32 | 35.82 | 80.57 | 21.79 | 36.98 | 10.33 | 1.51 | 7.26 | 1.39 | 6.57 | 1.85 | 5.84 | 0.63 | 3.30 | 0.99 | 256.5 | 194.3 | 43.9 | 0.23 |
| 7062 | 16.98 | 18.83 | 25.77 | 68.22 | 17.98 | 31.09 | 8.78 | 1.32 | 6.53 | 1.30 | 5.90 | 1.67 | 5.62 | 0.64 | 2.87 | 0.71 | 214.2 | 159.7 | 37.5 | 0.23 |
| 7065 | 20.12 | 22.20 | 39.23 | 89.04 | 17.41 | 40.17 | 9.62 | 1.64 | 7.22 | 1.18 | 6.07 | 2.12 | 6.02 | 0.63 | 3.22 | 0.49 | 266.4 | 204.3 | 41.9 | 0.21 |
| 7066 | 52.03 | 157.78 | 59.95 | 125.10 | 25.53 | 81.08 | 22.02 | 5.45 | 25.98 | 5.73 | 26.92 | 7.08 | 18.54 | 4.02 | 13.47 | 1.75 | 632.4 | 345.1 | 235.3 | 0.68 |
| 7068 | 15.60 | 18.24 | 44.11 | 81.36 | 54.51 | 32.89 | 4.67 | 1.41 | 7.06 | 0.00 | 5.61 | 1.06 | 3.74 | 0.32 | 3.87 | 7.75 | 282.2 | 226.0 | 40.6 | 0.18 |
| 7078 | 18.99 | 24.32 | 48.26 | 93.64 | 28.20 | 44.98 | 12.20 | 1.69 | 8.12 | 1.51 | 7.06 | 1.75 | 5.68 | 0.51 | 3.45 | 1.33 | 301.7 | 237.1 | 45.6 | 0.19 |
| 7079 | 44.64 | 93.41 | 62.27 | 149.36 | 33.38 | 69.90 | 20.09 | 4.79 | 19.33 | 4.91 | 19.21 | 5.68 | 17.67 | 2.91 | 10.83 | 1.54 | 559.9 | 359.1 | 156.1 | 0.43 |
| 7080 | 18.98 | 15.19 | 20.87 | 59.27 | 17.42 | 26.42 | 7.71 | 1.25 | 5.27 | 1.59 | 4.03 | 1.54 | 5.63 | 0.63 | 2.84 | 0.75 | 189.4 | 138.2 | 32.2 | 0.23 |
| 7081 | 14.83 | 11.76 | 14.51 | 47.43 | 14.74 | 20.41 | 6.25 | 0.91 | 4.50 | 1.21 | 3.39 | 1.21 | 4.59 | 0.40 | 2.23 | 0.65 | 149.0 | 108.7 | 25.5 | 0.23 |
| 7082 | 27.75 | 25.79 | 24.76 | 67.77 | 22.54 | 30.06 | 10.09 | 2.09 | 6.86 | 2.65 | 6.36 | 1.75 | 6.61 | 1.23 | 4.71 | 1.47 | 242.5 | 164.2 | 50.6 | 0.31 |
| 7083 | 22.53 | 20.69 | 27.28 | 70.52 | 16.52 | 29.97 | 7.99 | 1.46 | 5.82 | 1.51 | 4.70 | 1.72 | 5.77 | 0.77 | 3.58 | 0.78 | 221.6 | 159.6 | 39.5 | 0.25 |
| 7084 | 15.86 | 15.65 | 20.93 | 51.45 | 15.60 | 26.47 | 7.80 | 1.10 | 5.59 | 1.22 | 4.38 | 1.51 | 5.27 | 0.48 | 2.72 | 0.67 | 176.7 | 128.9 | 31.9 | 0.25 |
| 7085 | 35.99 | 52.12 | 32.01 | 93.32 | 16.80 | 40.19 | 10.85 | 2.40 | 9.84 | 2.28 | 9.57 | 3.20 | 9.36 | 2.37 | 6.40 | 0.83 | 327.5 | 205.4 | 86.1 | 0.42 |
| 7086 | 19.05 | 10.69 | 11.82 | 31.06 | 11.14 | 17.97 | 4.82 | 1.01 | 3.80 | 1.47 | 2.58 | 1.31 | 4.84 | 0.72 | 2.44 | 0.35 | 125.1 | 81.6 | 24.4 | 0.30 |
| 7087 | 11.66 | 7.23 | 8.83 | 25.39 | 12.98 | 15.09 | 5.08 | 0.63 | 3.66 | 1.19 | 2.72 | 1.09 | 4.56 | 0.35 | 1.78 | 0.58 | 102.8 | 71.7 | 19.5 | 0.27 |
| 7088 | 27.47 | 17.39 | 14.92 | 52.82 | 19.11 | 21.49 | 8.01 | 1.73 | 5.47 | 2.36 | 4.83 | 1.28 | 5.34 | 1.08 | 3.91 | 1.29 | 188.5 | 123.6 | 37.5 | 0.30 |
| 7089 | 21.02 | 14.63 | 12.15 | 32.72 | 11.40 | 17.73 | 5.13 | 1.10 | 3.90 | 1.60 | 3.28 | 1.38 | 5.04 | 1.16 | 3.08 | 0.53 | 135.9 | 84.1 | 30.7 | 0.37 |
| 7090 | 15.91 | 15.00 | 23.28 | 55.75 | 16.58 | 27.85 | 8.19 | 1.11 | 5.65 | 1.23 | 4.41 | 1.56 | 5.18 | 0.44 | 2.61 | 0.76 | 185.5 | 138.4 | 31.2 | 0.23 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7301 | 6.96 | 10.72 | 15.24 | 28.45 | 5.82 | 14.78 | 3.02 | 0.48 | 2.40 | 0.33 | 2.10 | 0.76 | 1.22 | 0.28 | 1.17 | 0.10 | 93.8 | 70.2 | 16.7 | 0.238 |
| 7302 | 9.12 | 11.89 | 17.75 | 32.85 | 9.78 | 17.15 | 3.57 | 0.57 | 3.22 | 0.42 | 2.43 | 0.85 | 1.39 | 0.25 | 1.29 | 0.16 | 112.7 | 84.9 | 18.7 | 0.22 |
| 7303 | 15.71 | 17.41 | 31.70 | 58.58 | 23.85 | 29.15 | 7.45 | 0.95 | 5.74 | 0.89 | 4.41 | 1.11 | 2.15 | 0.29 | 2.22 | 0.78 | 202.4 | 157.4 | 29.3 | 0.186 |
| 7304 | 2.37 | 4.67 | 2.96 | 6.02 | 0.59 | 3.37 | 0.87 | 0.19 | 0.92 | 0.15 | 0.78 | 0.23 | 0.64 | 0.17 | 0.43 | 0.07 | 24.4 | 14.9 | 7.1 | 0.478 |
| 7305 | 8.60 | 12.55 | 18.09 | 32.71 | 6.40 | 16.98 | 3.34 | 0.55 | 2.62 | 0.41 | 2.40 | 0.89 | 1.46 | 0.29 | 1.43 | 0.14 | 108.9 | 80.7 | 19.6 | 0.243 |
| 7306 | 9.55 | 11.64 | 18.83 | 35.28 | 2.75 | 17.84 | 3.68 | 0.63 | 3.33 | 0.36 | 2.11 | 0.92 | 2.78 | 0.34 | 1.38 | 0.10 | 111.5 | 82.3 | 19.6 | 0.238 |
| 7307 | 13.87 | 15.38 | 30.29 | 57.72 | 5.67 | 28.87 | 7.67 | 1.04 | 5.40 | 0.90 | 3.84 | 1.14 | 4.22 | 0.40 | 2.24 | 0.73 | 179.4 | 136.7 | 28.9 | 0.211 |
| 7308 | 2.77 | 5.99 | 3.95 | 7.75 | 0.80 | 4.29 | 1.14 | 0.23 | 1.15 | 0.18 | 1.01 | 0.27 | 0.78 | 0.21 | 0.54 | 0.10 | 31.2 | 19.3 | 9.1 | 0.47 |
| 7309 | 7.50 | 5.21 | 5.79 | 15.13 | 0.00 | 7.41 | 1.40 | 0.28 | 1.48 | 0.29 | 0.98 | 0.63 | 2.20 | 0.36 | 0.90 | -0.01 | 49.5 | 31.5 | 10.5 | 0.335 |
| 7310 | 11.33 | 12.07 | 21.06 | 38.68 | 3.09 | 20.45 | 4.32 | 0.71 | 3.54 | 0.42 | 2.40 | 1.04 | 3.22 | 0.41 | 1.57 | 0.13 | 124.4 | 91.9 | 21.3 | 0.231 |
| 7311 | 14.03 | 14.13 | 25.67 | 53.81 | 3.84 | 25.86 | 5.48 | 0.89 | 5.20 | 0.54 | 2.98 | 1.28 | 4.05 | 0.41 | 1.80 | 0.14 | 160.1 | 120.8 | 25.3 | 0.21 |
| 7312 | 2.31 | 5.12 | 3.87 | 7.92 | 0.75 | 4.59 | 1.08 | 0.21 | 1.04 | 0.14 | 0.83 | 0.26 | 0.78 | 0.23 | 0.45 | 0.06 | 29.6 | 19.5 | 7.9 | 0.405 |
| 7052 | 11.74 | 15.31 | 27.39 | 56.06 | 13.79 | 26.65 | 6.75 | 1.04 | 4.87 | 0.77 | 4.09 | 1.23 | 3.65 | 0.34 | 2.04 | 0.52 | 176.2 | 136.5 | 28.0 | 0.205 |
| 7053 | 6.90 | 6.68 | 9.26 | 24.12 | 6.69 | 11.77 | 3.25 | 0.50 | 2.33 | 0.55 | 1.85 | 0.63 | 2.12 | 0.24 | 1.11 | 0.30 | 78.3 | 57.9 | 13.5 | 0.232 |
| 7056 | 9.34 | 12.90 | 19.05 | 41.15 | 10.45 | 19.35 | 5.28 | 0.82 | 3.73 | 0.68 | 3.36 | 0.91 | 2.87 | 0.35 | 1.71 | 0.49 | 132.4 | 99.8 | 23.3 | 0.233 |
| 7059 | 11.52 | 14.60 | 22.44 | 50.47 | 13.65 | 23.16 | 6.47 | 0.95 | 4.54 | 0.87 | 4.11 | 1.16 | 3.66 | 0.40 | 2.07 | 0.62 | 160.7 | 121.7 | 27.5 | 0.226 |
| 7062 | 14.27 | 15.83 | 21.66 | 57.35 | 15.11 | 26.14 | 7.38 | 1.11 | 5.49 | 1.09 | 4.96 | 1.40 | 4.72 | 0.54 | 2.41 | 0.59 | 180.1 | 134.2 | 31.5 | 0.235 |
| 7065 | 12.62 | 13.92 | 24.61 | 55.84 | 10.92 | 25.20 | 6.04 | 1.03 | 4.53 | 0.74 | 3.81 | 1.33 | 3.78 | 0.40 | 2.02 | 0.30 | 167.1 | 128.2 | 26.3 | 0.205 |
| 7066 | 1.19 | 3.60 | 1.37 | 2.85 | 0.58 | 1.85 | 0.50 | 0.12 | 0.59 | 0.13 | 0.61 | 0.16 | 0.42 | 0.09 | 0.31 | 0.04 | 14.4 | 7.9 | 5.4 | 0.682 |
| 7068 | 12.42 | 14.52 | 35.11 | 64.77 | 43.39 | 26.18 | 3.72 | 1.12 | 5.62 | 0.00 | 4.47 | 0.84 | 2.97 | 0.26 | 3.08 | 6.17 | 224.6 | 179.9 | 32.3 | 0.18 |
| 7078 | 15.99 | 20.47 | 40.63 | 78.84 | 23.74 | 37.88 | 10.28 | 1.42 | 6.84 | 1.27 | 5.94 | 1.47 | 4.78 | 0.43 | 2.90 | 1.12 | 254.0 | 199.6 | 38.4 | 0.192 |
| 7079 | 4.15 | 8.68 | 5.79 | 13.88 | 3.10 | 6.49 | 1.87 | 0.45 | 1.80 | 0.46 | 1.78 | 0.53 | 1.64 | 0.27 | 1.01 | 0.14 | 52.0 | 33.4 | 14.5 | 0.435 |
| 7080 | 7.89 | 6.31 | 8.67 | 24.63 | 7.24 | 10.98 | 3.20 | 0.52 | 2.19 | 0.66 | 1.67 | 0.64 | 2.34 | 0.26 | 1.18 | 0.31 | 78.7 | 57.4 | 13.4 | 0.233 |
| 7081 | 13.12 | 10.41 | 12.85 | 41.99 | 13.05 | 18.07 | 5.53 | 0.80 | 3.98 | 1.08 | 3.00 | 1.08 | 4.06 | 0.35 | 1.98 | 0.57 | 131.9 | 96.3 | 22.5 | 0.234 |
| 7082 | 6.06 | 5.64 | 5.41 | 14.81 | 4.92 | 6.57 | 2.20 | 0.46 | 1.50 | 0.58 | 1.39 | 0.38 | 1.44 | 0.27 | 1.03 | 0.32 | 53.0 | 35.9 | 11.0 | 0.308 |
| 7083 | 10.28 | 9.44 | 12.45 | 32.18 | 7.54 | 13.67 | 3.65 | 0.67 | 2.66 | 0.69 | 2.14 | 0.79 | 2.63 | 0.35 | 1.63 | 0.36 | 101.1 | 72.8 | 18.0 | 0.248 |
| 7084 | 14.19 | 14.00 | 18.72 | 46.03 | 13.95 | 23.68 | 6.98 | 0.99 | 5.00 | 1.09 | 3.92 | 1.35 | 4.71 | 0.43 | 2.43 | 0.60 | 158.1 | 115.4 | 28.5 | 0.247 |
| 7085 | 6.85 | 9.92 | 6.09 | 17.76 | 3.20 | 7.65 | 2.06 | 0.46 | 1.87 | 0.43 | 1.82 | 0.61 | 1.78 | 0.45 | 1.22 | 0.16 | 62.3 | 39.1 | 16.4 | 0.419 |
| 7086 | 8.71 | 4.89 | 5.41 | 14.21 | 5.10 | 8.22 | 2.20 | 0.46 | 1.74 | 0.67 | 1.18 | 0.60 | 2.21 | 0.33 | 1.12 | 0.16 | 57.2 | 37.3 | 11.2 | 0.299 |
| 7087 | 10.57 | 6.56 | 8.01 | 23.02 | 11.77 | 13.68 | 4.60 | 0.57 | 3.31 | 1.08 | 2.47 | 0.99 | 4.13 | 0.32 | 1.61 | 0.52 | 93.2 | 65.0 | 17.7 | 0.272 |
| 7088 | 6.47 | 4.10 | 3.51 | 12.45 | 4.50 | 5.06 | 1.89 | 0.41 | 1.29 | 0.56 | 1.14 | 0.30 | 1.26 | 0.25 | 0.92 | 0.30 | 44.4 | 29.1 | 8.8 | 0.303 |
| 7089 | 9.61 | 6.69 | 5.56 | 14.97 | 5.21 | 8.11 | 2.35 | 0.50 | 1.78 | 0.73 | 1.50 | 0.63 | 2.31 | 0.53 | 1.41 | 0.24 | 62.1 | 38.5 | 14.0 | 0.365 |
| 7090 | 14.11 | 13.30 | 20.64 | 49.43 | 14.70 | 24.69 | 7.26 | 0.99 | 5.01 | 1.09 | 3.91 | 1.38 | 4.59 | 0.39 | 2.32 | 0.67 | 164.5 | 122.7 | 27.6 | 0.225 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7301 | 0.43 | 0.45 | 0.51 | 0.47 | 0.87 | 0.55 | 0.57 | 0.37 | 0.60 | 0.51 | 0.55 | 0.95 | 0.58 | 0.84 | 0.58 | 0.27 | 0.51 | 0.52 | 0.49 | 1.07 |
| 7302 | 0.57 | 0.50 | 0.59 | 0.55 | 1.46 | 0.64 | 0.67 | 0.43 | 0.81 | 0.64 | 0.64 | 1.06 | 0.66 | 0.76 | 0.65 | 0.46 | 0.61 | 0.63 | 0.55 | 1.15 |
| 7303 | 0.98 | 0.73 | 1.06 | 0.98 | 3.56 | 1.08 | 1.41 | 0.73 | 1.44 | 1.37 | 1.16 | 1.39 | 1.02 | 0.89 | 1.11 | 2.24 | 1.10 | 1.17 | 0.86 | 1.36 |
| 7304 | 0.15 | 0.19 | 0.10 | 0.10 | 0.09 | 0.12 | 0.16 | 0.15 | 0.23 | 0.23 | 0.20 | 0.28 | 0.30 | 0.52 | 0.22 | 0.19 | 0.13 | 0.11 | 0.21 | 0.53 |
| 7305 | 0.54 | 0.52 | 0.60 | 0.55 | 0.95 | 0.63 | 0.63 | 0.42 | 0.65 | 0.62 | 0.63 | 1.12 | 0.70 | 0.89 | 0.71 | 0.39 | 0.59 | 0.60 | 0.58 | 1.04 |
| 7306 | 0.60 | 0.48 | 0.63 | 0.59 | 0.41 | 0.66 | 0.69 | 0.49 | 0.83 | 0.56 | 0.55 | 1.15 | 1.32 | 1.03 | 0.69 | 0.29 | 0.60 | 0.61 | 0.58 | 1.06 |
| 7307 | 0.87 | 0.64 | 1.01 | 0.96 | 0.85 | 1.07 | 1.45 | 0.80 | 1.35 | 1.39 | 1.01 | 1.43 | 2.01 | 1.22 | 1.12 | 2.08 | 0.97 | 1.02 | 0.85 | 1.20 |
| 7308 | 0.17 | 0.25 | 0.13 | 0.13 | 0.12 | 0.16 | 0.21 | 0.18 | 0.29 | 0.28 | 0.27 | 0.34 | 0.37 | 0.65 | 0.27 | 0.28 | 0.17 | 0.14 | 0.27 | 0.54 |
| 7309 | 0.47 | 0.22 | 0.19 | 0.25 | 0.00 | 0.27 | 0.26 | 0.21 | 0.37 | 0.44 | 0.26 | 0.78 | 1.05 | 1.08 | 0.45 | -0.04 | 0.27 | 0.23 | 0.31 | 0.76 |
| 7310 | 0.71 | 0.50 | 0.70 | 0.64 | 0.46 | 0.76 | 0.81 | 0.55 | 0.89 | 0.64 | 0.63 | 1.30 | 1.53 | 1.23 | 0.78 | 0.37 | 0.68 | 0.68 | 0.62 | 1.10 |
| 7311 | 0.88 | 0.59 | 0.86 | 0.90 | 0.57 | 0.96 | 1.03 | 0.68 | 1.30 | 0.83 | 0.78 | 1.61 | 1.93 | 1.23 | 0.90 | 0.41 | 0.87 | 0.90 | 0.74 | 1.21 |
| 7312 | 0.14 | 0.21 | 0.13 | 0.13 | 0.11 | 0.17 | 0.20 | 0.16 | 0.26 | 0.21 | 0.22 | 0.33 | 0.37 | 0.71 | 0.23 | 0.17 | 0.16 | 0.14 | 0.23 | 0.63 |
| 7052 | 0.73 | 0.64 | 0.91 | 0.93 | 2.06 | 0.99 | 1.27 | 0.80 | 1.22 | 1.19 | 1.08 | 1.54 | 1.74 | 1.02 | 1.02 | 1.49 | 0.96 | 1.02 | 0.82 | 1.24 |
| 7053 | 0.43 | 0.28 | 0.31 | 0.40 | 1.00 | 0.44 | 0.61 | 0.39 | 0.58 | 0.84 | 0.49 | 0.79 | 1.01 | 0.73 | 0.55 | 0.86 | 0.42 | 0.43 | 0.40 | 1.09 |
| 7056 | 0.58 | 0.54 | 0.63 | 0.69 | 1.56 | 0.72 | 1.00 | 0.63 | 0.93 | 1.05 | 0.89 | 1.13 | 1.37 | 1.07 | 0.85 | 1.39 | 0.72 | 0.74 | 0.68 | 1.09 |
| 7059 | 0.72 | 0.61 | 0.75 | 0.84 | 2.04 | 0.86 | 1.22 | 0.73 | 1.14 | 1.34 | 1.08 | 1.45 | 1.74 | 1.20 | 1.03 | 1.78 | 0.87 | 0.91 | 0.81 | 1.12 |
| 7062 | 0.89 | 0.66 | 0.72 | 0.96 | 2.26 | 0.97 | 1.39 | 0.86 | 1.37 | 1.68 | 1.30 | 1.75 | 2.25 | 1.64 | 1.20 | 1.69 | 0.98 | 1.00 | 0.93 | 1.08 |
| 7065 | 0.79 | 0.58 | 0.82 | 0.93 | 1.63 | 0.93 | 1.14 | 0.79 | 1.13 | 1.14 | 1.00 | 1.66 | 1.80 | 1.20 | 1.01 | 0.87 | 0.91 | 0.95 | 0.77 | 1.24 |
| 7066 | 0.07 | 0.15 | 0.05 | 0.05 | 0.09 | 0.07 | 0.09 | 0.10 | 0.15 | 0.20 | 0.16 | 0.20 | 0.20 | 0.28 | 0.15 | 0.11 | 0.08 | 0.06 | 0.16 | 0.37 |
| 7068 | 0.78 | 0.60 | 1.17 | 1.08 | 6.48 | 0.97 | 0.70 | 0.86 | 1.40 | 0.00 | 1.18 | 1.05 | 1.42 | 0.78 | 1.54 | 17.63 | 1.22 | 1.34 | 0.95 | 1.41 |
| 7078 | 1.00 | 0.85 | 1.35 | 1.31 | 3.54 | 1.40 | 1.94 | 1.09 | 1.71 | 1.95 | 1.56 | 1.84 | 2.28 | 1.29 | 1.45 | 3.21 | 1.38 | 1.49 | 1.13 | 1.32 |
| 7079 | 0.26 | 0.36 | 0.19 | 0.23 | 0.46 | 0.24 | 0.35 | 0.34 | 0.45 | 0.70 | 0.47 | 0.66 | 0.78 | 0.82 | 0.50 | 0.41 | 0.28 | 0.25 | 0.43 | 0.58 |
| 7080 | 0.49 | 0.26 | 0.29 | 0.41 | 1.08 | 0.41 | 0.60 | 0.40 | 0.55 | 1.02 | 0.44 | 0.80 | 1.11 | 0.79 | 0.59 | 0.89 | 0.43 | 0.43 | 0.39 | 1.09 |
| 7081 | 0.82 | 0.43 | 0.43 | 0.70 | 1.95 | 0.67 | 1.04 | 0.62 | 1.00 | 1.65 | 0.79 | 1.34 | 1.93 | 1.07 | 0.99 | 1.64 | 0.72 | 0.72 | 0.66 | 1.08 |
| 7082 | 0.38 | 0.23 | 0.18 | 0.25 | 0.73 | 0.24 | 0.42 | 0.35 | 0.37 | 0.89 | 0.37 | 0.48 | 0.69 | 0.81 | 0.51 | 0.92 | 0.29 | 0.27 | 0.32 | 0.82 |
| 7083 | 0.64 | 0.39 | 0.41 | 0.54 | 1.13 | 0.51 | 0.69 | 0.51 | 0.66 | 1.06 | 0.56 | 0.98 | 1.25 | 1.07 | 0.82 | 1.02 | 0.55 | 0.54 | 0.53 | 1.02 |
| 7084 | 0.89 | 0.58 | 0.62 | 0.77 | 2.08 | 0.88 | 1.32 | 0.76 | 1.25 | 1.67 | 1.03 | 1.69 | 2.25 | 1.30 | 1.22 | 1.72 | 0.86 | 0.86 | 0.84 | 1.02 |
| 7085 | 0.43 | 0.41 | 0.20 | 0.30 | 0.48 | 0.28 | 0.39 | 0.35 | 0.47 | 0.67 | 0.48 | 0.76 | 0.85 | 1.37 | 0.61 | 0.45 | 0.34 | 0.29 | 0.48 | 0.60 |
| 7086 | 0.54 | 0.20 | 0.18 | 0.24 | 0.76 | 0.30 | 0.42 | 0.36 | 0.44 | 1.03 | 0.31 | 0.75 | 1.05 | 1.00 | 0.56 | 0.46 | 0.31 | 0.28 | 0.33 | 0.85 |
| 7087 | 0.66 | 0.27 | 0.27 | 0.38 | 1.76 | 0.51 | 0.87 | 0.44 | 0.83 | 1.66 | 0.65 | 1.24 | 1.97 | 0.96 | 0.81 | 1.49 | 0.51 | 0.48 | 0.52 | 0.93 |
| 7088 | 0.40 | 0.17 | 0.12 | 0.21 | 0.67 | 0.19 | 0.36 | 0.31 | 0.32 | 0.86 | 0.30 | 0.38 | 0.60 | 0.77 | 0.46 | 0.87 | 0.24 | 0.22 | 0.26 | 0.84 |
| 7089 | 0.60 | 0.28 | 0.19 | 0.25 | 0.78 | 0.30 | 0.44 | 0.39 | 0.45 | 1.13 | 0.39 | 0.79 | 1.10 | 1.61 | 0.70 | 0.69 | 0.34 | 0.29 | 0.41 | 0.69 |
| 7090 | 0.88 | 0.55 | 0.69 | 0.82 | 2.19 | 0.91 | 1.37 | 0.76 | 1.25 | 1.67 | 1.03 | 1.73 | 2.19 | 1.17 | 1.16 | 1.92 | 0.89 | 0.91 | 0.81 | 1.12 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab | 21 | 39 | 57 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | Total | Light | Heavy | H/L |
| ID | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | REE | REE | REE | Ratio |
| 7301 | 1.67 | 1.71 | 1.95 | 1.82 | 3.33 | 2.10 | 2.18 | 1.43 | 2.30 | 1.97 | 2.12 | 3.66 | 2.22 | 3.22 | 2.24 | 1.05 | 1.95 | 2.00 | 1.88 | 1.07 |
| 7302 | 1.77 | 1.54 | 1.84 | 1.70 | 4.54 | 1.98 | 2.09 | 1.35 | 2.51 | 2.01 | 1.99 | 3.29 | 2.06 | 2.37 | 2.01 | 1.42 | 1.90 | 1.97 | 1.71 | 1.15 |
| 7303 | 1.35 | 0.99 | 1.45 | 1.34 | 4.88 | 1.48 | 1.93 | 1.00 | 1.97 | 1.87 | 1.59 | 1.90 | 1.40 | 1.22 | 1.52 | 3.07 | 1.50 | 1.61 | 1.18 | 1.36 |
| 7304 | 3.01 | 3.96 | 2.01 | 2.04 | 1.78 | 2.54 | 3.34 | 3.03 | 4.68 | 4.78 | 4.16 | 5.74 | 6.20 | 10.52 | 4.42 | 3.79 | 2.70 | 2.26 | 4.27 | 0.53 |
| 7305 | 1.84 | 1.79 | 2.06 | 1.87 | 3.27 | 2.15 | 2.16 | 1.45 | 2.24 | 2.13 | 2.16 | 3.82 | 2.38 | 3.06 | 2.44 | 1.32 | 2.02 | 2.06 | 1.97 | 1.04 |
| 7306 | 1.65 | 1.34 | 1.73 | 1.62 | 1.14 | 1.83 | 1.92 | 1.35 | 2.30 | 1.54 | 1.53 | 3.17 | 3.65 | 2.85 | 1.90 | 0.79 | 1.67 | 1.69 | 1.59 | 1.06 |
| 7307 | 1.17 | 0.87 | 1.37 | 1.30 | 1.15 | 1.45 | 1.96 | 1.08 | 1.83 | 1.88 | 1.37 | 1.93 | 2.72 | 1.65 | 1.52 | 2.81 | 1.32 | 1.38 | 1.15 | 1.20 |
| 7308 | 2.86 | 4.12 | 2.17 | 2.13 | 1.98 | 2.62 | 3.54 | 2.95 | 4.73 | 4.60 | 4.39 | 5.65 | 6.16 | 10.66 | 4.45 | 4.60 | 2.79 | 2.37 | 4.41 | 0.54 |
| 7309 | 1.43 | 0.66 | 0.59 | 0.77 | 0.00 | 0.84 | 0.81 | 0.65 | 1.13 | 1.35 | 0.78 | 2.39 | 3.20 | 3.29 | 1.38 | -0.12 | 0.82 | 0.72 | 0.95 | 0.76 |
| 7310 | 1.60 | 1.14 | 1.59 | 1.46 | 1.04 | 1.71 | 1.84 | 1.24 | 2.00 | 1.46 | 1.43 | 2.95 | 3.47 | 2.79 | 1.77 | 0.83 | 1.53 | 1.55 | 1.41 | 1.10 |
| 7311 | 1.34 | 0.90 | 1.31 | 1.37 | 0.88 | 1.47 | 1.58 | 1.05 | 1.99 | 1.27 | 1.20 | 2.46 | 2.95 | 1.89 | 1.37 | 0.62 | 1.33 | 1.38 | 1.14 | 1.21 |
| 7312 | 1.90 | 2.81 | 1.70 | 1.74 | 1.48 | 2.24 | 2.68 | 2.11 | 3.41 | 2.79 | 2.87 | 4.35 | 4.88 | 9.38 | 2.99 | 2.20 | 2.12 | 1.91 | 3.05 | 0.63 |
| 7052 | 1.27 | 1.10 | 1.57 | 1.61 | 3.55 | 1.70 | 2.20 | 1.38 | 2.10 | 2.06 | 1.86 | 2.65 | 3.00 | 1.75 | 1.75 | 2.56 | 1.65 | 1.75 | 1.42 | 1.24 |
| 7053 | 1.17 | 0.75 | 0.84 | 1.09 | 2.71 | 1.18 | 1.66 | 1.05 | 1.58 | 2.28 | 1.32 | 2.15 | 2.73 | 1.97 | 1.50 | 2.33 | 1.15 | 1.17 | 1.07 | 1.09 |
| 7056 | 1.28 | 1.18 | 1.40 | 1.51 | 3.43 | 1.58 | 2.19 | 1.38 | 2.05 | 2.32 | 1.95 | 2.49 | 3.00 | 2.36 | 1.88 | 3.05 | 1.58 | 1.63 | 1.50 | 1.09 |
| 7059 | 1.15 | 0.97 | 1.19 | 1.34 | 3.25 | 1.37 | 1.95 | 1.16 | 1.81 | 2.14 | 1.73 | 2.31 | 2.78 | 1.92 | 1.65 | 2.84 | 1.39 | 1.45 | 1.29 | 1.12 |
| 7062 | 1.06 | 0.78 | 0.86 | 1.14 | 2.68 | 1.15 | 1.66 | 1.02 | 1.63 | 1.99 | 1.55 | 2.08 | 2.67 | 1.95 | 1.43 | 2.02 | 1.16 | 1.19 | 1.10 | 1.08 |
| 7065 | 1.26 | 0.92 | 1.31 | 1.48 | 2.60 | 1.49 | 1.82 | 1.26 | 1.80 | 1.81 | 1.60 | 2.65 | 2.87 | 1.91 | 1.61 | 1.39 | 1.45 | 1.52 | 1.23 | 1.24 |
| 7066 | 3.25 | 6.57 | 2.00 | 2.08 | 3.81 | 3.00 | 4.15 | 4.19 | 6.49 | 8.81 | 7.08 | 8.85 | 8.83 | 12.18 | 6.73 | 4.99 | 3.43 | 2.57 | 6.91 | 0.37 |
| 7068 | 0.98 | 0.76 | 1.47 | 1.36 | 8.14 | 1.22 | 0.88 | 1.09 | 1.76 | 0.00 | 1.48 | 1.32 | 1.78 | 0.97 | 1.94 | 22.14 | 1.53 | 1.68 | 1.19 | 1.41 |
| 7078 | 1.19 | 1.01 | 1.61 | 1.56 | 4.21 | 1.67 | 2.30 | 1.30 | 2.03 | 2.32 | 1.86 | 2.19 | 2.71 | 1.53 | 1.72 | 3.81 | 1.64 | 1.77 | 1.34 | 1.32 |
| 7079 | 2.79 | 3.89 | 2.08 | 2.49 | 4.98 | 2.59 | 3.79 | 3.69 | 4.83 | 7.55 | 5.05 | 7.09 | 8.41 | 8.82 | 5.41 | 4.39 | 3.04 | 2.67 | 4.59 | 0.58 |
| 7080 | 1.19 | 0.63 | 0.70 | 0.99 | 2.60 | 0.98 | 1.45 | 0.96 | 1.32 | 2.45 | 1.06 | 1.93 | 2.68 | 1.91 | 1.42 | 2.14 | 1.03 | 1.03 | 0.95 | 1.09 |
| 7081 | 0.93 | 0.49 | 0.48 | 0.79 | 2.20 | 0.76 | 1.18 | 0.70 | 1.12 | 1.87 | 0.89 | 1.52 | 2.19 | 1.21 | 1.12 | 1.85 | 0.81 | 0.81 | 0.75 | 1.08 |
| 7082 | 1.73 | 1.07 | 0.83 | 1.13 | 3.36 | 1.11 | 1.90 | 1.61 | 1.71 | 4.08 | 1.67 | 2.19 | 3.15 | 3.72 | 2.35 | 4.21 | 1.32 | 1.22 | 1.49 | 0.82 |
| 7083 | 1.41 | 0.86 | 0.91 | 1.18 | 2.47 | 1.11 | 1.51 | 1.12 | 1.46 | 2.32 | 1.24 | 2.16 | 2.75 | 2.34 | 1.79 | 2.23 | 1.20 | 1.19 | 1.16 | 1.02 |
| 7084 | 0.99 | 0.65 | 0.70 | 0.86 | 2.33 | 0.98 | 1.47 | 0.85 | 1.40 | 1.87 | 1.15 | 1.89 | 2.51 | 1.45 | 1.36 | 1.93 | 0.96 | 0.96 | 0.94 | 1.02 |
| 7085 | 2.25 | 2.17 | 1.07 | 1.56 | 2.51 | 1.49 | 2.05 | 1.84 | 2.46 | 3.50 | 2.52 | 4.01 | 4.46 | 7.17 | 3.20 | 2.36 | 1.78 | 1.53 | 2.53 | 0.60 |
| 7086 | 1.19 | 0.45 | 0.39 | 0.52 | 1.66 | 0.67 | 0.91 | 0.78 | 0.95 | 2.26 | 0.68 | 1.64 | 2.30 | 2.18 | 1.22 | 1.00 | 0.68 | 0.61 | 0.72 | 0.85 |
| 7087 | 0.73 | 0.30 | 0.29 | 0.42 | 1.94 | 0.56 | 0.96 | 0.48 | 0.91 | 1.83 | 0.72 | 1.37 | 2.17 | 1.05 | 0.89 | 1.65 | 0.56 | 0.53 | 0.57 | 0.93 |
| 7088 | 1.72 | 0.72 | 0.50 | 0.88 | 2.85 | 0.80 | 1.51 | 1.33 | 1.37 | 3.63 | 1.27 | 1.60 | 2.55 | 3.26 | 1.95 | 3.69 | 1.02 | 0.92 | 1.10 | 0.84 |
| 7089 | 1.31 | 0.61 | 0.40 | 0.55 | 1.70 | 0.66 | 0.97 | 0.85 | 0.98 | 2.46 | 0.86 | 1.73 | 2.40 | 3.53 | 1.54 | 1.52 | 0.74 | 0.63 | 0.90 | 0.69 |
| 7090 | 0.99 | 0.63 | 0.78 | 0.93 | 2.48 | 1.03 | 1.54 | 0.86 | 1.41 | 1.89 | 1.16 | 1.95 | 2.47 | 1.32 | 1.31 | 2.17 | 1.01 | 1.03 | 0.92 | 1.12 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7091 | 60.4 | Plant 06 | Clean Coal (100M x 0) | 25.27 |
| 7092 | 42.8 | Plant 06 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 3.22 |
| 7093 | 11.5 | Plant 06 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 40.04 |
| 7094 | 23.8 | Plant 06 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 73.78 |
| 7095 | 60.4 | Plant 06 | Clean Coal (1/2" x 1mm / Flt x 1.6 SG) | 4.6 |
| 7096 | 39.1 | Plant 06 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 40.05 |
| 7097 | 20.7 | Plant 06 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 71.06 |
| 7098 | 60.5 | Plant 06 | Clean Coal (1 1/4" x 1/2" / Flt x 1.6 SG) | 5.74 |
| 7099 | 55.9 | Plant 06 | Clean Coal (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 42.11 |
| 7100 | 2.1 | Plant 06 | Clean Coal (1 1/4" x 1/2" / 1.8 x Snk SG) | 65.49 |
| 7101 | 52.4 | Plant 06 | Clean Coal (+ x 1 1/4" / Flt x 1.6 SG) | 12.38 |
| 7102 | 2.8 | Plant 06 | Clean Coal (+ x 1 1/4" / 1.6 x 1.8 SG) | 42.78 |
| 7516 | 43.7 | Plant 07 | Raw Coal (100M x 0) | 59.35 |
| 7517 | 70 | Plant 07 | Raw Coal (1mm x 100M) | 39.09 |
| 7520 | 51.4 | Plant 07 | Raw Coal (3/4" x 1mm) | 45.3 |
| 7523 | 71.9 | Plant 07 | Raw Coal (+ x 3/4") | 54.89 |
| 7526 | 39.9 | Plant 07 | Fine Reject (100M x 0) | 65.85 |
| 7527 | 71.1 | Plant 07 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 9.27 |
| 7528 | 5.1 | Plant 07 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 38.62 |
| 7529 | 3.2 | Plant 07 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 69.5 |
| 7536 | 63.6 | Plant 07 | Coarse Reject (100M x 0) | 83.27 |
| 7537 | 70.3 | Plant 07 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 14.44 |
| 7538 | 40.7 | Plant 07 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 40.09 |
| 7539 | 107 | Plant 07 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 88.48 |
| 7540 | 10.9 | Plant 07 | Coarse Reject (3/4" x 1mm / Flt x 1.6 SG) | 25.35 |
| 7541 | 70.3 | Plant 07 | Coarse Reject (3/4" x 1mm / 1.6 x 1.8 SG) | 46.3 |
| 7542 | 97.4 | Plant 07 | Coarse Reject (3/4" x 1mm / 1.8 x Snk SG) | 88.08 |
| 7543 | 65 | Plant 07 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 28.55 |
| 7544 | 63.9 | Plant 07 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 45.72 |
| 7545 | 89.9 | Plant 07 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 85.73 |
| 7546 | 63.2 | Plant 07 | Clean Coal (100M x 0) | 15.99 |
| 7547 | 88 | Plant 07 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 9.71 |
| 7548 | 70.2 | Plant 07 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 40.64 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7091 | 22.84 | 40.14 | 43.11 | 93.08 | 27.70 | 45.14 | 12.89 | 2.08 | 10.50 | 1.97 | 8.48 | 2.28 | 7.48 | 0.99 | 4.74 | 1.44 | 324.9 | 234.5 | 67.5 | 0.29 |
| 7092 | 19.59 | 28.71 | 57.21 | 109.50 | 21.71 | 50.33 | 11.28 | 1.41 | 7.66 | 1.07 | 6.39 | 2.13 | 6.19 | 0.60 | 3.35 | 0.78 | 327.9 | 259.1 | 49.2 | 0.19 |
| 7093 | 48.67 | 114.26 | 70.90 | 154.17 | 26.05 | 86.73 | 21.98 | 3.99 | 20.62 | 3.29 | 19.42 | 5.36 | 13.62 | 3.01 | 9.56 | 1.45 | 603.1 | 384.4 | 170.0 | 0.44 |
| 7094 | 25.13 | 38.24 | 64.39 | 126.94 | 16.72 | 60.70 | 11.56 | 1.68 | 9.55 | 1.02 | 7.95 | 3.47 | 8.68 | 0.89 | 3.89 | 0.00 | 380.8 | 291.5 | 64.1 | 0.22 |
| 7095 | 19.05 | 33.22 | 58.76 | 112.14 | 17.02 | 53.31 | 10.49 | 1.41 | 7.95 | 0.95 | 6.83 | 2.77 | 7.28 | 0.71 | 3.58 | 0.30 | 335.8 | 261.1 | 55.6 | 0.21 |
| 7096 | 43.34 | 116.85 | 76.89 | 169.94 | 25.68 | 92.59 | 22.44 | 3.75 | 20.57 | 2.93 | 19.29 | 6.06 | 14.71 | 2.80 | 9.29 | 1.17 | 628.3 | 411.9 | 173.1 | 0.42 |
| 7097 | 25.76 | 42.71 | 61.39 | 127.12 | 15.84 | 62.87 | 12.07 | 1.74 | 10.45 | 1.09 | 8.56 | 3.81 | 9.49 | 0.80 | 4.06 | 0.00 | 387.8 | 291.5 | 70.5 | 0.24 |
| 7098 | 42.15 | 103.58 | 50.13 | 124.89 | 27.12 | 68.33 | 20.16 | 4.16 | 19.05 | 3.68 | 18.13 | 4.84 | 13.50 | 4.50 | 9.79 | 1.80 | 515.8 | 313.8 | 159.8 | 0.51 |
| 7099 | 16.07 | 24.13 | 45.28 | 84.45 | 36.85 | 38.85 | 14.76 | 1.63 | 7.04 | 2.38 | 7.35 | 0.83 | 5.03 | 0.19 | 3.99 | 2.68 | 291.5 | 228.9 | 46.6 | 0.20 |
| 7100 | 14.61 | 8.21 | 9.45 | 32.48 | 8.53 | 17.44 | 3.58 | 0.59 | 3.49 | 1.03 | 1.90 | 1.60 | 5.83 | 0.40 | 1.90 | 0.00 | 111.0 | 75.6 | 20.9 | 0.28 |
| 7101 | 31.57 | 57.19 | 36.57 | 99.76 | 17.13 | 47.08 | 11.40 | 2.29 | 10.89 | 2.01 | 9.73 | 3.69 | 10.76 | 4.15 | 6.27 | 0.55 | 351.0 | 225.1 | 94.3 | 0.42 |
| 7102 | 21.80 | 12.78 | 14.68 | 42.85 | 10.93 | 19.86 | 5.84 | 1.14 | 4.81 | 1.40 | 3.88 | 1.52 | 5.43 | 0.59 | 3.06 | 0.28 | 150.9 | 100.1 | 29.0 | 0.29 |
| 7516 | 21.04 | 25.96 | 49.60 | 107.18 | 16.53 | 43.00 | 10.36 | 1.65 | 8.16 | 0.90 | 5.69 | 2.36 | 6.72 | 0.50 | 3.31 | 0.21 | 303.2 | 236.5 | 45.7 | 0.19 |
| 7517 | 23.83 | 30.31 | 51.67 | 115.49 | 17.22 | 43.90 | 10.09 | 1.67 | 8.35 | 0.96 | 6.21 | 2.61 | 7.68 | 0.55 | 3.80 | 0.24 | 324.6 | 248.4 | 52.3 | 0.21 |
| 7520 | 22.34 | 30.28 | 51.99 | 110.40 | 17.06 | 45.10 | 10.33 | 1.61 | 8.33 | 0.93 | 6.22 | 2.53 | 7.60 | 0.64 | 3.72 | 0.24 | 319.3 | 244.8 | 52.2 | 0.21 |
| 7523 | 21.92 | 33.45 | 64.57 | 120.17 | 20.24 | 53.07 | 12.47 | 1.83 | 9.68 | 1.01 | 6.94 | 2.59 | 7.89 | 0.42 | 3.90 | 0.39 | 360.6 | 282.0 | 56.6 | 0.20 |
| 7526 | 20.04 | 23.51 | 45.53 | 100.09 | 15.92 | 40.26 | 9.84 | 1.54 | 7.65 | 0.83 | 5.26 | 2.21 | 6.50 | 0.47 | 3.15 | 0.22 | 283.0 | 220.8 | 42.2 | 0.19 |
| 7527 | 46.97 | 91.44 | 93.38 | 180.59 | 29.34 | 86.20 | 19.96 | 3.85 | 19.71 | 2.59 | 15.85 | 5.53 | 15.55 | 2.27 | 8.71 | 0.57 | 622.5 | 433.0 | 142.5 | 0.33 |
| 7528 | 25.10 | 32.51 | 74.14 | 138.78 | 19.95 | 59.68 | 11.94 | 1.78 | 9.12 | 0.59 | 6.29 | 2.90 | 8.30 | 0.68 | 3.99 | 0.09 | 395.9 | 315.4 | 55.4 | 0.18 |
| 7529 | 22.12 | 25.98 | 58.94 | 110.07 | 25.42 | 47.74 | 11.61 | 1.55 | 8.54 | 1.04 | 6.09 | 2.19 | 6.91 | 0.49 | 3.59 | 0.80 | 333.1 | 263.9 | 47.1 | 0.18 |
| 7536 | 18.91 | 18.85 | 34.78 | 97.99 | 14.68 | 31.72 | 7.60 | 1.19 | 6.21 | 0.68 | 4.54 | 1.97 | 6.01 | 0.43 | 2.80 | 0.22 | 248.6 | 194.2 | 35.5 | 0.18 |
| 7537 | 38.37 | 61.78 | 93.14 | 176.14 | 24.77 | 78.57 | 16.79 | 3.02 | 14.97 | 1.72 | 11.65 | 4.69 | 13.02 | 1.34 | 6.60 | 0.24 | 546.8 | 407.4 | 101.1 | 0.25 |
| 7538 | 25.50 | 33.87 | 77.84 | 144.42 | 21.72 | 61.61 | 12.31 | 1.83 | 9.58 | 0.69 | 6.67 | 3.07 | 8.86 | 0.71 | 4.14 | 0.12 | 412.9 | 329.3 | 58.1 | 0.18 |
| 7539 | 19.39 | 21.25 | 44.43 | 98.11 | 15.60 | 38.42 | 9.03 | 1.34 | 6.86 | 0.73 | 4.98 | 2.07 | 6.36 | 0.51 | 3.03 | 0.19 | 272.3 | 213.8 | 39.1 | 0.18 |
| 7540 | 30.32 | 43.23 | 85.97 | 160.82 | 22.21 | 69.16 | 13.75 | 2.26 | 11.69 | 1.03 | 8.29 | 3.85 | 10.92 | 0.90 | 4.96 | 0.00 | 469.4 | 365.9 | 73.2 | 0.20 |
| 7541 | 24.50 | 32.28 | 65.25 | 134.38 | 18.19 | 54.66 | 10.60 | 1.61 | 8.94 | 0.72 | 6.41 | 3.25 | 9.74 | 0.68 | 4.03 | 0.00 | 375.2 | 293.6 | 57.1 | 0.19 |
| 7542 | 17.75 | 18.77 | 28.23 | 78.60 | 12.76 | 29.23 | 7.34 | 1.12 | 5.99 | 0.83 | 4.56 | 1.98 | 6.25 | 0.48 | 2.83 | 0.19 | 216.9 | 163.3 | 35.9 | 0.22 |
| 7543 | 31.79 | 35.94 | 71.76 | 155.74 | 19.14 | 59.12 | 11.56 | 2.03 | 9.76 | 0.99 | 6.83 | 3.53 | 10.28 | 0.77 | 4.66 | 0.00 | 423.9 | 329.1 | 63.0 | 0.19 |
| 7544 | 21.57 | 13.40 | 20.24 | 67.19 | 8.87 | 32.38 | 4.81 | 0.69 | 5.79 | 0.68 | 3.24 | 2.97 | 10.06 | 0.41 | 2.23 | 0.00 | 194.5 | 140.0 | 33.0 | 0.24 |
| 7545 | 11.45 | 3.64 | 4.81 | 22.14 | 7.23 | 11.30 | 2.48 | 0.34 | 2.55 | 0.80 | 1.44 | 1.17 | 4.92 | 0.16 | 1.00 | 0.00 | 75.4 | 50.8 | 13.1 | 0.26 |
| 7546 | 35.13 | 57.89 | 68.96 | 137.62 | 29.67 | 62.77 | 15.77 | 2.83 | 14.93 | 2.20 | 11.52 | 3.85 | 11.60 | 1.14 | 6.16 | 0.81 | 462.9 | 332.6 | 95.2 | 0.29 |
| 7547 | 46.30 | 81.19 | 82.38 | 166.43 | 25.12 | 79.67 | 18.33 | 3.70 | 17.87 | 2.62 | 14.55 | 5.41 | 14.90 | 1.88 | 8.21 | 0.38 | 569.0 | 393.5 | 129.2 | 0.33 |
| 7548 | 25.66 | 34.34 | 77.77 | 144.71 | 21.18 | 62.13 | 12.45 | 1.90 | 9.71 | 0.66 | 6.67 | 3.12 | 8.88 | 0.72 | 4.12 | 0.03 | 414.0 | 329.8 | 58.5 | 0.18 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7091 | 5.77 | 10.14 | 10.89 | 23.52 | 7.00 | 11.41 | 3.26 | 0.53 | 2.65 | 0.50 | 2.14 | 0.58 | 1.89 | 0.25 | 1.20 | 0.36 | 82.1 | 59.3 | 17.1 | 0.288 |
| 7092 | 0.63 | 0.92 | 1.84 | 3.53 | 0.70 | 1.62 | 0.36 | 0.05 | 0.25 | 0.03 | 0.21 | 0.07 | 0.20 | 0.02 | 0.11 | 0.03 | 10.6 | 8.3 | 1.6 | 0.19 |
| 7093 | 19.49 | 45.75 | 28.39 | 61.73 | 10.43 | 34.73 | 8.80 | 1.60 | 8.26 | 1.32 | 7.77 | 2.14 | 5.45 | 1.20 | 3.83 | 0.58 | 241.5 | 153.9 | 68.0 | 0.442 |
| 7094 | 18.54 | 28.21 | 47.51 | 93.66 | 12.34 | 44.79 | 8.53 | 1.24 | 7.04 | 0.76 | 5.87 | 2.56 | 6.41 | 0.66 | 2.87 | 0.00 | 281.0 | 215.1 | 47.3 | 0.22 |
| 7095 | 0.88 | 1.53 | 2.70 | 5.16 | 0.78 | 2.45 | 0.48 | 0.06 | 0.37 | 0.04 | 0.31 | 0.13 | 0.34 | 0.03 | 0.16 | 0.01 | 15.4 | 12.0 | 2.6 | 0.213 |
| 7096 | 17.36 | 46.80 | 30.79 | 68.06 | 10.28 | 37.08 | 8.99 | 1.50 | 8.24 | 1.17 | 7.73 | 2.43 | 5.89 | 1.12 | 3.72 | 0.47 | 251.6 | 164.9 | 69.3 | 0.42 |
| 7097 | 18.30 | 30.35 | 43.62 | 90.33 | 11.26 | 44.68 | 8.57 | 1.24 | 7.42 | 0.78 | 6.09 | 2.71 | 6.75 | 0.57 | 2.89 | 0.00 | 275.5 | 207.1 | 50.1 | 0.242 |
| 7098 | 2.42 | 5.95 | 2.88 | 7.17 | 1.56 | 3.92 | 1.16 | 0.24 | 1.09 | 0.21 | 1.04 | 0.28 | 0.78 | 0.26 | 0.56 | 0.10 | 29.6 | 18.0 | 9.2 | 0.509 |
| 7099 | 6.77 | 10.16 | 19.07 | 35.56 | 15.52 | 16.36 | 6.22 | 0.68 | 2.96 | 1.00 | 3.10 | 0.35 | 2.12 | 0.08 | 1.68 | 1.13 | 122.8 | 96.4 | 19.6 | 0.204 |
| 7100 | 9.57 | 5.38 | 6.19 | 21.27 | 5.59 | 11.42 | 2.34 | 0.39 | 2.28 | 0.67 | 1.25 | 1.05 | 3.82 | 0.26 | 1.25 | 0.00 | 72.7 | 49.5 | 13.7 | 0.276 |
| 7101 | 3.91 | 7.08 | 4.53 | 12.35 | 2.12 | 5.83 | 1.41 | 0.28 | 1.35 | 0.25 | 1.20 | 0.46 | 1.33 | 0.51 | 0.78 | 0.07 | 43.5 | 27.9 | 11.7 | 0.419 |
| 7102 | 9.33 | 5.47 | 6.28 | 18.33 | 4.67 | 8.50 | 2.50 | 0.49 | 2.06 | 0.60 | 1.66 | 0.65 | 2.32 | 0.25 | 1.31 | 0.12 | 64.5 | 42.8 | 12.4 | 0.289 |
| 7516 | 12.49 | 15.41 | 29.44 | 63.61 | 9.81 | 25.52 | 6.15 | 0.98 | 4.84 | 0.53 | 3.38 | 1.40 | 3.99 | 0.30 | 1.96 | 0.12 | 179.9 | 140.4 | 27.1 | 0.193 |
| 7517 | 9.31 | 11.85 | 20.20 | 45.15 | 6.73 | 17.16 | 3.94 | 0.65 | 3.26 | 0.37 | 2.43 | 1.02 | 3.00 | 0.21 | 1.49 | 0.09 | 126.9 | 97.1 | 20.5 | 0.211 |
| 7520 | 10.12 | 13.72 | 23.55 | 50.01 | 7.73 | 20.43 | 4.68 | 0.73 | 3.77 | 0.42 | 2.82 | 1.15 | 3.44 | 0.29 | 1.69 | 0.11 | 144.7 | 110.9 | 23.6 | 0.213 |
| 7523 | 12.03 | 18.36 | 35.44 | 65.96 | 11.11 | 29.13 | 6.85 | 1.00 | 5.31 | 0.56 | 3.81 | 1.42 | 4.33 | 0.23 | 2.14 | 0.21 | 197.9 | 154.8 | 31.1 | 0.201 |
| 7526 | 13.20 | 15.48 | 29.98 | 65.91 | 10.48 | 26.51 | 6.48 | 1.01 | 5.04 | 0.55 | 3.46 | 1.46 | 4.28 | 0.31 | 2.07 | 0.14 | 186.4 | 145.4 | 27.8 | 0.191 |
| 7527 | 4.35 | 8.48 | 8.66 | 16.74 | 2.72 | 7.99 | 1.85 | 0.36 | 1.83 | 0.24 | 1.47 | 0.51 | 1.44 | 0.21 | 0.81 | 0.05 | 57.7 | 40.1 | 13.2 | 0.329 |
| 7528 | 9.69 | 12.56 | 28.63 | 53.60 | 7.71 | 23.05 | 4.61 | 0.69 | 3.52 | 0.23 | 2.43 | 1.12 | 3.21 | 0.26 | 1.54 | 0.04 | 152.9 | 121.8 | 21.4 | 0.176 |
| 7529 | 15.38 | 18.05 | 40.96 | 76.50 | 17.67 | 33.18 | 8.07 | 1.08 | 5.94 | 0.72 | 4.23 | 1.52 | 4.80 | 0.34 | 2.50 | 0.56 | 231.5 | 183.4 | 32.7 | 0.178 |
| 7536 | 15.75 | 15.69 | 28.96 | 81.60 | 12.23 | 26.41 | 6.33 | 0.99 | 5.17 | 0.57 | 3.78 | 1.64 | 5.00 | 0.36 | 2.34 | 0.18 | 207.0 | 161.7 | 29.6 | 0.183 |
| 7537 | 5.54 | 8.92 | 13.45 | 25.43 | 3.58 | 11.35 | 2.43 | 0.44 | 2.16 | 0.25 | 1.68 | 0.68 | 1.88 | 0.19 | 0.95 | 0.04 | 79.0 | 58.8 | 14.6 | 0.248 |
| 7538 | 10.22 | 13.58 | 31.21 | 57.90 | 8.71 | 24.70 | 4.94 | 0.73 | 3.84 | 0.28 | 2.67 | 1.23 | 3.55 | 0.28 | 1.66 | 0.05 | 165.5 | 132.0 | 23.3 | 0.176 |
| 7539 | 17.15 | 18.80 | 39.31 | 86.81 | 13.80 | 33.99 | 7.99 | 1.19 | 6.07 | 0.65 | 4.40 | 1.83 | 5.63 | 0.45 | 2.68 | 0.17 | 240.9 | 189.2 | 34.6 | 0.183 |
| 7540 | 7.69 | 10.96 | 21.79 | 40.77 | 5.63 | 17.53 | 3.49 | 0.57 | 2.96 | 0.26 | 2.10 | 0.98 | 2.77 | 0.23 | 1.26 | 0.00 | 119.0 | 92.7 | 18.6 | 0.2 |
| 7541 | 11.34 | 14.94 | 30.21 | 62.22 | 8.42 | 25.31 | 4.91 | 0.75 | 4.14 | 0.33 | 2.97 | 1.50 | 4.51 | 0.31 | 1.86 | 0.00 | 173.7 | 135.9 | 26.4 | 0.194 |
| 7542 | 15.63 | 16.53 | 24.87 | 69.23 | 11.24 | 25.75 | 6.47 | 0.99 | 5.27 | 0.73 | 4.01 | 1.74 | 5.50 | 0.42 | 2.50 | 0.17 | 191.1 | 143.8 | 31.6 | 0.22 |
| 7543 | 9.08 | 10.26 | 20.49 | 44.46 | 5.46 | 16.88 | 3.30 | 0.58 | 2.79 | 0.28 | 1.95 | 1.01 | 2.94 | 0.22 | 1.33 | 0.00 | 121.0 | 94.0 | 18.0 | 0.191 |
| 7544 | 9.86 | 6.13 | 9.25 | 30.72 | 4.06 | 14.80 | 2.20 | 0.32 | 2.65 | 0.31 | 1.48 | 1.36 | 4.60 | 0.19 | 1.02 | 0.00 | 88.9 | 64.0 | 15.1 | 0.236 |
| 7545 | 9.81 | 3.12 | 4.12 | 18.98 | 6.20 | 9.68 | 2.13 | 0.29 | 2.18 | 0.69 | 1.24 | 1.00 | 4.22 | 0.14 | 0.86 | 0.00 | 64.7 | 43.6 | 11.3 | 0.258 |
| 7546 | 5.62 | 9.26 | 11.03 | 22.01 | 4.74 | 10.04 | 2.52 | 0.45 | 2.39 | 0.35 | 1.84 | 0.62 | 1.85 | 0.18 | 0.99 | 0.13 | 74.0 | 53.2 | 15.2 | 0.286 |
| 7547 | 4.50 | 7.88 | 8.00 | 16.16 | 2.44 | 7.74 | 1.78 | 0.36 | 1.74 | 0.25 | 1.41 | 0.53 | 1.45 | 0.18 | 0.80 | 0.04 | 55.2 | 38.2 | 12.5 | 0.328 |
| 7548 | 10.43 | 13.95 | 31.61 | 58.81 | 8.61 | 25.25 | 5.06 | 0.77 | 3.95 | 0.27 | 2.71 | 1.27 | 3.61 | 0.29 | 1.67 | 0.01 | 168.3 | 134.1 | 23.8 | 0.177 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7091 | 0.36 | 0.42 | 0.36 | 0.39 | 1.04 | 0.42 | 0.61 | 0.40 | 0.66 | 0.76 | 0.56 | 0.72 | 0.90 | 0.76 | 0.60 | 1.04 | 0.45 | 0.44 | 0.50 | 0.88 |
| 7092 | 0.04 | 0.04 | 0.06 | 0.06 | 0.10 | 0.06 | 0.07 | 0.03 | 0.06 | 0.05 | 0.05 | 0.09 | 0.09 | 0.06 | 0.05 | 0.07 | 0.06 | 0.06 | 0.05 | 1.33 |
| 7093 | 1.22 | 1.91 | 0.95 | 1.03 | 1.56 | 1.29 | 1.66 | 1.23 | 2.06 | 2.03 | 2.05 | 2.68 | 2.60 | 3.65 | 1.91 | 1.66 | 1.31 | 1.15 | 2.00 | 0.57 |
| 7094 | 1.16 | 1.18 | 1.58 | 1.56 | 1.84 | 1.66 | 1.61 | 0.95 | 1.76 | 1.16 | 1.54 | 3.20 | 3.05 | 1.99 | 1.44 | 0.00 | 1.52 | 1.60 | 1.39 | 1.15 |
| 7095 | 0.05 | 0.06 | 0.09 | 0.09 | 0.12 | 0.09 | 0.09 | 0.05 | 0.09 | 0.07 | 0.08 | 0.16 | 0.16 | 0.10 | 0.08 | 0.04 | 0.08 | 0.09 | 0.08 | 1.19 |
| 7096 | 1.08 | 1.95 | 1.03 | 1.13 | 1.53 | 1.37 | 1.70 | 1.16 | 2.06 | 1.80 | 2.03 | 3.03 | 2.81 | 3.40 | 1.86 | 1.34 | 1.37 | 1.23 | 2.04 | 0.60 |
| 7097 | 1.14 | 1.26 | 1.45 | 1.51 | 1.68 | 1.65 | 1.62 | 0.95 | 1.86 | 1.19 | 1.60 | 3.39 | 3.21 | 1.72 | 1.44 | 0.00 | 1.49 | 1.54 | 1.47 | 1.05 |
| 7098 | 0.15 | 0.25 | 0.10 | 0.12 | 0.23 | 0.15 | 0.22 | 0.18 | 0.27 | 0.33 | 0.27 | 0.35 | 0.37 | 0.78 | 0.28 | 0.30 | 0.16 | 0.13 | 0.27 | 0.50 |
| 7099 | 0.42 | 0.42 | 0.64 | 0.59 | 2.32 | 0.61 | 1.17 | 0.53 | 0.74 | 1.54 | 0.81 | 0.44 | 1.01 | 0.25 | 0.84 | 3.22 | 0.67 | 0.72 | 0.58 | 1.24 |
| 7100 | 0.60 | 0.22 | 0.21 | 0.35 | 0.83 | 0.42 | 0.44 | 0.30 | 0.57 | 1.04 | 0.33 | 1.31 | 1.82 | 0.78 | 0.62 | 0.00 | 0.39 | 0.37 | 0.40 | 0.92 |
| 7101 | 0.24 | 0.30 | 0.15 | 0.21 | 0.32 | 0.22 | 0.27 | 0.22 | 0.34 | 0.38 | 0.32 | 0.57 | 0.63 | 1.56 | 0.39 | 0.19 | 0.24 | 0.21 | 0.34 | 0.60 |
| 7102 | 0.58 | 0.23 | 0.21 | 0.31 | 0.70 | 0.31 | 0.47 | 0.38 | 0.51 | 0.92 | 0.44 | 0.81 | 1.11 | 0.77 | 0.66 | 0.34 | 0.35 | 0.32 | 0.36 | 0.88 |
| 7516 | 0.78 | 0.64 | 0.98 | 1.06 | 1.46 | 0.95 | 1.16 | 0.75 | 1.21 | 0.82 | 0.89 | 1.75 | 1.90 | 0.91 | 0.98 | 0.36 | 0.98 | 1.05 | 0.80 | 1.31 |
| 7517 | 0.58 | 0.49 | 0.67 | 0.75 | 1.00 | 0.64 | 0.74 | 0.50 | 0.82 | 0.57 | 0.64 | 1.27 | 1.43 | 0.65 | 0.74 | 0.26 | 0.69 | 0.72 | 0.60 | 1.20 |
| 7520 | 0.63 | 0.57 | 0.79 | 0.83 | 1.15 | 0.76 | 0.88 | 0.56 | 0.94 | 0.65 | 0.74 | 1.43 | 1.64 | 0.88 | 0.84 | 0.31 | 0.78 | 0.83 | 0.69 | 1.19 |
| 7523 | 0.75 | 0.77 | 1.18 | 1.10 | 1.66 | 1.08 | 1.29 | 0.77 | 1.33 | 0.86 | 1.00 | 1.77 | 2.06 | 0.69 | 1.07 | 0.61 | 1.07 | 1.15 | 0.91 | 1.26 |
| 7526 | 0.82 | 0.64 | 1.00 | 1.10 | 1.56 | 0.98 | 1.22 | 0.78 | 1.26 | 0.84 | 0.91 | 1.82 | 2.04 | 0.95 | 1.04 | 0.41 | 1.01 | 1.08 | 0.82 | 1.33 |
| 7527 | 0.27 | 0.35 | 0.29 | 0.28 | 0.41 | 0.30 | 0.35 | 0.27 | 0.46 | 0.37 | 0.39 | 0.64 | 0.69 | 0.64 | 0.40 | 0.15 | 0.31 | 0.30 | 0.39 | 0.77 |
| 7528 | 0.61 | 0.52 | 0.95 | 0.89 | 1.15 | 0.85 | 0.87 | 0.53 | 0.88 | 0.35 | 0.64 | 1.40 | 1.53 | 0.80 | 0.77 | 0.10 | 0.83 | 0.91 | 0.63 | 1.44 |
| 7529 | 0.96 | 0.75 | 1.37 | 1.27 | 2.64 | 1.23 | 1.52 | 0.83 | 1.48 | 1.11 | 1.11 | 1.90 | 2.29 | 1.03 | 1.25 | 1.59 | 1.26 | 1.37 | 0.96 | 1.42 |
| 7536 | 0.98 | 0.65 | 0.97 | 1.36 | 1.82 | 0.98 | 1.19 | 0.76 | 1.29 | 0.88 | 0.99 | 2.05 | 2.38 | 1.10 | 1.17 | 0.52 | 1.12 | 1.20 | 0.87 | 1.39 |
| 7537 | 0.35 | 0.37 | 0.45 | 0.42 | 0.53 | 0.42 | 0.46 | 0.34 | 0.54 | 0.38 | 0.44 | 0.85 | 0.90 | 0.59 | 0.48 | 0.10 | 0.43 | 0.44 | 0.43 | 1.02 |
| 7538 | 0.64 | 0.57 | 1.04 | 0.96 | 1.30 | 0.91 | 0.93 | 0.56 | 0.96 | 0.43 | 0.70 | 1.54 | 1.69 | 0.86 | 0.83 | 0.14 | 0.90 | 0.98 | 0.68 | 1.44 |
| 7539 | 1.07 | 0.78 | 1.31 | 1.45 | 2.06 | 1.26 | 1.51 | 0.91 | 1.52 | 1.00 | 1.16 | 2.29 | 2.68 | 1.37 | 1.34 | 0.49 | 1.31 | 1.41 | 1.02 | 1.38 |
| 7540 | 0.48 | 0.46 | 0.73 | 0.68 | 0.84 | 0.65 | 0.66 | 0.44 | 0.74 | 0.40 | 0.55 | 1.22 | 1.32 | 0.69 | 0.63 | 0.00 | 0.65 | 0.69 | 0.55 | 1.27 |
| 7541 | 0.71 | 0.62 | 1.01 | 1.04 | 1.26 | 0.94 | 0.93 | 0.57 | 1.04 | 0.51 | 0.78 | 1.88 | 2.15 | 0.95 | 0.93 | 0.00 | 0.94 | 1.01 | 0.78 | 1.30 |
| 7542 | 0.98 | 0.69 | 0.83 | 1.15 | 1.68 | 0.95 | 1.22 | 0.76 | 1.32 | 1.13 | 1.06 | 2.18 | 2.62 | 1.28 | 1.25 | 0.49 | 1.04 | 1.07 | 0.93 | 1.15 |
| 7543 | 0.57 | 0.43 | 0.68 | 0.74 | 0.82 | 0.63 | 0.62 | 0.45 | 0.70 | 0.44 | 0.51 | 1.26 | 1.40 | 0.67 | 0.67 | 0.00 | 0.66 | 0.70 | 0.53 | 1.32 |
| 7544 | 0.62 | 0.26 | 0.31 | 0.51 | 0.61 | 0.55 | 0.42 | 0.24 | 0.66 | 0.48 | 0.39 | 1.69 | 2.19 | 0.57 | 0.51 | 0.00 | 0.48 | 0.48 | 0.44 | 1.07 |
| 7545 | 0.61 | 0.13 | 0.14 | 0.32 | 0.93 | 0.36 | 0.40 | 0.22 | 0.55 | 1.06 | 0.33 | 1.25 | 2.01 | 0.41 | 0.43 | 0.00 | 0.35 | 0.32 | 0.33 | 0.98 |
| 7546 | 0.35 | 0.39 | 0.37 | 0.37 | 0.71 | 0.37 | 0.48 | 0.35 | 0.60 | 0.54 | 0.48 | 0.77 | 0.88 | 0.55 | 0.49 | 0.37 | 0.40 | 0.40 | 0.45 | 0.89 |
| 7547 | 0.28 | 0.33 | 0.27 | 0.27 | 0.36 | 0.29 | 0.34 | 0.28 | 0.43 | 0.39 | 0.37 | 0.66 | 0.69 | 0.55 | 0.40 | 0.11 | 0.30 | 0.28 | 0.37 | 0.77 |
| 7548 | 0.65 | 0.58 | 1.05 | 0.98 | 1.29 | 0.94 | 0.95 | 0.59 | 0.99 | 0.41 | 0.71 | 1.58 | 1.72 | 0.89 | 0.84 | 0.04 | 0.91 | 1.00 | 0.70 | 1.43 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7091 | 1.43 | 1.67 | 1.44 | 1.55 | 4.13 | 1.67 | 2.43 | 1.60 | 2.63 | 3.02 | 2.23 | 2.85 | 3.56 | 3.01 | 2.37 | 4.12 | 1.76 | 1.75 | 1.98 | 0.88 |
| 7092 | 1.22 | 1.20 | 1.91 | 1.82 | 3.24 | 1.86 | 2.13 | 1.09 | 1.92 | 1.64 | 1.68 | 2.66 | 2.95 | 1.81 | 1.67 | 2.23 | 1.78 | 1.93 | 1.45 | 1.33 |
| 7093 | 3.04 | 4.76 | 2.36 | 2.57 | 3.89 | 3.21 | 4.15 | 3.07 | 5.16 | 5.07 | 5.11 | 6.69 | 6.48 | 9.11 | 4.78 | 4.14 | 3.27 | 2.86 | 4.99 | 0.57 |
| 7094 | 1.57 | 1.59 | 2.15 | 2.12 | 2.50 | 2.25 | 2.18 | 1.29 | 2.39 | 1.57 | 2.09 | 4.33 | 4.14 | 2.69 | 1.95 | 0.00 | 2.07 | 2.17 | 1.89 | 1.15 |
| 7095 | 1.19 | 1.38 | 1.96 | 1.87 | 2.54 | 1.97 | 1.98 | 1.09 | 1.99 | 1.47 | 1.80 | 3.46 | 3.47 | 2.15 | 1.79 | 0.85 | 1.82 | 1.94 | 1.64 | 1.19 |
| 7096 | 2.71 | 4.87 | 2.56 | 2.83 | 3.83 | 3.43 | 4.23 | 2.89 | 5.14 | 4.50 | 5.08 | 7.57 | 7.01 | 8.49 | 4.65 | 3.36 | 3.41 | 3.07 | 5.09 | 0.60 |
| 7097 | 1.61 | 1.78 | 2.05 | 2.12 | 2.36 | 2.33 | 2.28 | 1.34 | 2.61 | 1.68 | 2.25 | 4.77 | 4.52 | 2.43 | 2.03 | 0.00 | 2.10 | 2.17 | 2.07 | 1.05 |
| 7098 | 2.63 | 4.32 | 1.67 | 2.08 | 4.05 | 2.53 | 3.80 | 3.20 | 4.76 | 5.67 | 4.77 | 6.05 | 6.43 | 13.64 | 4.89 | 5.14 | 2.80 | 2.34 | 4.70 | 0.50 |
| 7099 | 1.00 | 1.01 | 1.51 | 1.41 | 5.50 | 1.44 | 2.79 | 1.25 | 1.76 | 3.66 | 1.94 | 1.04 | 2.39 | 0.59 | 1.99 | 7.66 | 1.58 | 1.70 | 1.37 | 1.24 |
| 7100 | 0.91 | 0.34 | 0.31 | 0.54 | 1.27 | 0.65 | 0.68 | 0.46 | 0.87 | 1.58 | 0.50 | 2.00 | 2.78 | 1.20 | 0.95 | 0.00 | 0.60 | 0.56 | 0.61 | 0.92 |
| 7101 | 1.97 | 2.38 | 1.22 | 1.66 | 2.56 | 1.74 | 2.15 | 1.76 | 2.72 | 3.09 | 2.56 | 4.62 | 5.12 | 12.56 | 3.14 | 1.56 | 1.90 | 1.68 | 2.77 | 0.60 |
| 7102 | 1.36 | 0.53 | 0.49 | 0.71 | 1.63 | 0.74 | 1.10 | 0.88 | 1.20 | 2.16 | 1.02 | 1.90 | 2.59 | 1.79 | 1.53 | 0.80 | 0.82 | 0.75 | 0.85 | 0.88 |
| 7516 | 1.32 | 1.08 | 1.65 | 1.79 | 2.47 | 1.59 | 1.95 | 1.27 | 2.04 | 1.38 | 1.50 | 2.95 | 3.20 | 1.53 | 1.65 | 0.60 | 1.64 | 1.76 | 1.34 | 1.31 |
| 7517 | 1.49 | 1.26 | 1.72 | 1.92 | 2.57 | 1.63 | 1.90 | 1.28 | 2.09 | 1.47 | 1.63 | 3.26 | 3.66 | 1.67 | 1.90 | 0.68 | 1.76 | 1.85 | 1.54 | 1.20 |
| 7520 | 1.40 | 1.26 | 1.73 | 1.84 | 2.55 | 1.67 | 1.95 | 1.24 | 2.08 | 1.43 | 1.64 | 3.17 | 3.62 | 1.94 | 1.86 | 0.68 | 1.73 | 1.82 | 1.53 | 1.19 |
| 7523 | 1.37 | 1.39 | 2.15 | 2.00 | 3.02 | 1.97 | 2.35 | 1.41 | 2.42 | 1.56 | 1.83 | 3.23 | 3.76 | 1.27 | 1.95 | 1.11 | 1.96 | 2.10 | 1.66 | 1.26 |
| 7526 | 1.25 | 0.98 | 1.52 | 1.67 | 2.38 | 1.49 | 1.86 | 1.19 | 1.91 | 1.28 | 1.38 | 2.76 | 3.10 | 1.44 | 1.58 | 0.63 | 1.54 | 1.64 | 1.24 | 1.33 |
| 7527 | 2.94 | 3.81 | 3.11 | 3.01 | 4.38 | 3.19 | 3.77 | 2.96 | 4.93 | 3.99 | 4.17 | 6.91 | 7.40 | 6.89 | 4.36 | 1.62 | 3.38 | 3.22 | 4.19 | 0.77 |
| 7528 | 1.57 | 1.35 | 2.47 | 2.31 | 2.98 | 2.21 | 2.25 | 1.37 | 2.28 | 0.91 | 1.66 | 3.63 | 3.95 | 2.06 | 1.99 | 0.26 | 2.15 | 2.35 | 1.63 | 1.44 |
| 7529 | 1.38 | 1.08 | 1.96 | 1.83 | 3.79 | 1.77 | 2.19 | 1.20 | 2.14 | 1.60 | 1.60 | 2.73 | 3.29 | 1.48 | 1.80 | 2.29 | 1.81 | 1.96 | 1.38 | 1.42 |
| 7536 | 1.18 | 0.79 | 1.16 | 1.63 | 2.19 | 1.17 | 1.43 | 0.91 | 1.55 | 1.05 | 1.19 | 2.46 | 2.86 | 1.32 | 1.40 | 0.62 | 1.35 | 1.45 | 1.04 | 1.39 |
| 7537 | 2.40 | 2.57 | 3.10 | 2.94 | 3.70 | 2.91 | 3.17 | 2.33 | 3.74 | 2.65 | 3.07 | 5.87 | 6.20 | 4.07 | 3.30 | 0.70 | 2.97 | 3.03 | 2.97 | 1.02 |
| 7538 | 1.59 | 1.41 | 2.59 | 2.41 | 3.24 | 2.28 | 2.32 | 1.40 | 2.40 | 1.07 | 1.75 | 3.83 | 4.22 | 2.15 | 2.07 | 0.34 | 2.24 | 2.45 | 1.71 | 1.44 |
| 7539 | 1.21 | 0.89 | 1.48 | 1.64 | 2.33 | 1.42 | 1.70 | 1.03 | 1.72 | 1.13 | 1.31 | 2.59 | 3.03 | 1.54 | 1.52 | 0.55 | 1.48 | 1.59 | 1.15 | 1.38 |
| 7540 | 1.89 | 1.80 | 2.87 | 2.68 | 3.32 | 2.56 | 2.59 | 1.74 | 2.92 | 1.58 | 2.18 | 4.81 | 5.20 | 2.74 | 2.48 | 0.00 | 2.55 | 2.72 | 2.15 | 1.27 |
| 7541 | 1.53 | 1.34 | 2.17 | 2.24 | 2.72 | 2.02 | 2.00 | 1.24 | 2.24 | 1.11 | 1.69 | 4.06 | 4.64 | 2.06 | 2.01 | 0.00 | 2.04 | 2.19 | 1.68 | 1.30 |
| 7542 | 1.11 | 0.78 | 0.94 | 1.31 | 1.90 | 1.08 | 1.39 | 0.86 | 1.50 | 1.28 | 1.20 | 2.47 | 2.98 | 1.45 | 1.42 | 0.55 | 1.18 | 1.22 | 1.05 | 1.15 |
| 7543 | 1.99 | 1.50 | 2.39 | 2.60 | 2.86 | 2.19 | 2.18 | 1.56 | 2.44 | 1.53 | 1.80 | 4.41 | 4.90 | 2.33 | 2.33 | 0.00 | 2.30 | 2.45 | 1.85 | 1.32 |
| 7544 | 1.35 | 0.56 | 0.67 | 1.12 | 1.32 | 1.20 | 0.91 | 0.53 | 1.45 | 1.05 | 0.85 | 3.71 | 4.79 | 1.25 | 1.12 | 0.00 | 1.06 | 1.04 | 0.97 | 1.07 |
| 7545 | 0.72 | 0.15 | 0.16 | 0.37 | 1.08 | 0.42 | 0.47 | 0.26 | 0.64 | 1.24 | 0.38 | 1.46 | 2.34 | 0.48 | 0.50 | 0.00 | 0.41 | 0.38 | 0.39 | 0.98 |
| 7546 | 2.20 | 2.41 | 2.30 | 2.29 | 4.43 | 2.32 | 2.98 | 2.18 | 3.73 | 3.38 | 3.03 | 4.82 | 5.52 | 3.46 | 3.08 | 2.30 | 2.51 | 2.48 | 2.80 | 0.89 |
| 7547 | 2.89 | 3.38 | 2.75 | 2.77 | 3.75 | 2.95 | 3.46 | 2.85 | 4.47 | 4.03 | 3.83 | 6.77 | 7.10 | 5.68 | 4.11 | 1.10 | 3.09 | 2.93 | 3.80 | 0.77 |
| 7548 | 1.60 | 1.43 | 2.59 | 2.41 | 3.16 | 2.30 | 2.35 | 1.46 | 2.43 | 1.01 | 1.76 | 3.90 | 4.23 | 2.19 | 2.06 | 0.10 | 2.25 | 2.46 | 1.72 | 1.43 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7549 | 25.4 | Plant 07 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 62.4 |
| 7550 | 70 | Plant 07 | Clean Coal (3/4" x 1mm / Flt x 1.6 SG) | 15.7 |
| 7551 | 48.1 | Plant 07 | Clean Coal (3/4" x 1mm / 1.6 x 1.8 SG) | 40.95 |
| 7552 | 18 | Plant 07 | Clean Coal (3/4" x 1mm / 1.8 x Snk SG) | 61.65 |
| 7553 | 74.1 | Plant 07 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 15.16 |
| 7554 | 74.3 | Plant 07 | Clean Coal (+ x 3/4" / 1.6 x 1.8 SG) | 39.36 |
| 7555 | 6 | Plant 07 | Clean Coal (+ x 3/4" / 1.8 x Snk SG) | 73.2 |
| 7408 | 47.6 | Plant 08 | Raw Coal (100M x 0) | 27.3 |
| 7409 | 56.2 | Plant 08 | Raw Coal (1mm x 100M) | 16.34 |
| 7412 | 81.5 | Plant 08 | Raw Coal (1/2" x 1mm) | 32.1 |
| 7415 | 65.3 | Plant 08 | Raw Coal (+ x 1/2") | 77.24 |
| 7418 | 46 | Plant 08 | Fine Reject (100M x 0) | 56.15 |
| 7419 | 44.1 | Plant 08 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 6.83 |
| 7420 | 3.5 | Plant 08 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 39.82 |
| 7421 | 71.4 | Plant 08 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 87.35 |
| 7428 | 43.3 | Plant 08 | Coarse Reject (100M x 0) | 76.12 |
| 7429 | 42.1 | Plant 08 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 10.43 |
| 7430 | 10.8 | Plant 08 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 39.21 |
| 7431 | 77.7 | Plant 08 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 87.96 |
| 7432 | 52.1 | Plant 08 | Coarse Reject (1/2" x 1mm / Flt x 1.6 SG) | 16.5 |
| 7433 | 64.6 | Plant 08 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 41.89 |
| 7434 | 90.7 | Plant 08 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 89.04 |
| 7435 | 59.7 | Plant 08 | Coarse Reject (+ x 1/2" / Flt x 1.6 SG) | 23.71 |
| 7436 | 74.5 | Plant 08 | Coarse Reject (+ x 1/2" / 1.6 x 1.8 SG) | 40.81 |
| 7437 | 87.8 | Plant 08 | Coarse Reject (+ x 1/2" / 1.8 x Snk SG) | 89.59 |
| 7438 | 52 | Plant 08 | Clean Coal (100M x 0) | 7 |
| 7439 | 63.6 | Plant 08 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 3.28 |
| 7440 | 32.4 | Plant 08 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 35 |
| 7441 | 31.9 | Plant 08 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 66.04 |
| 7442 | 55.7 | Plant 08 | Clean Coal (1/2" x 1mm / Flt x 1.6 SG) | 5.24 |
| 7443 | 45.2 | Plant 08 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 39.74 |
| 7444 | 21.4 | Plant 08 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 71.58 |
| 7445 | 54.6 | Plant 08 | Clean Coal (+ x 1/2" / Flt x 1.6 SG) | 8.94 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7549 | 20.38 | 25.91 | 51.75 | 97.34 | 41.72 | 39.29 | 15.09 | 1.47 | 8.65 | 2.04 | 7.60 | 1.23 | 6.30 | 0.44 | 3.99 | 2.70 | 325.9 | 255.3 | 50.2 | 0.20 |
| 7550 | 36.85 | 62.46 | 90.63 | 167.45 | 22.68 | 73.72 | 15.70 | 2.76 | 14.09 | 1.37 | 10.76 | 4.36 | 12.10 | 1.34 | 6.22 | 0.19 | 522.7 | 387.0 | 98.8 | 0.26 |
| 7551 | 26.20 | 37.62 | 77.48 | 148.15 | 20.52 | 63.29 | 12.46 | 1.91 | 10.28 | 0.75 | 7.36 | 3.61 | 10.36 | 0.70 | 4.45 | 0.00 | 425.1 | 334.1 | 64.9 | 0.19 |
| 7552 | 22.95 | 30.14 | 59.40 | 113.55 | 27.55 | 48.29 | 12.03 | 1.57 | 8.94 | 1.28 | 6.95 | 2.36 | 8.00 | 0.63 | 4.03 | 1.07 | 348.7 | 271.3 | 54.5 | 0.20 |
| 7553 | 41.03 | 72.66 | 91.42 | 171.58 | 23.37 | 75.98 | 16.21 | 2.86 | 15.43 | 1.50 | 12.63 | 4.93 | 14.10 | 1.63 | 7.10 | 0.23 | 552.6 | 396.8 | 114.8 | 0.29 |
| 7554 | 27.64 | 40.45 | 76.20 | 160.37 | 19.30 | 63.87 | 11.76 | 1.74 | 10.75 | 0.65 | 7.61 | 4.26 | 12.83 | 0.89 | 4.72 | 0.00 | 443.0 | 344.0 | 71.4 | 0.21 |
| 7555 | 29.81 | 25.05 | 52.37 | 96.97 | 35.89 | 43.18 | 10.44 | 1.66 | 10.30 | 1.35 | 5.60 | 1.80 | 5.77 | 0.38 | 3.50 | 0.96 | 325.0 | 250.8 | 44.4 | 0.18 |
| 7408 | 21.47 | 32.31 | 49.94 | 94.30 | 25.92 | 49.58 | 11.07 | 1.73 | 9.25 | 1.30 | 7.22 | 2.18 | 6.64 | 0.68 | 3.44 | 0.68 | 317.7 | 241.8 | 54.5 | 0.23 |
| 7409 | 26.96 | 53.91 | 75.53 | 136.65 | 30.76 | 71.53 | 16.28 | 2.66 | 12.98 | 1.83 | 10.99 | 3.16 | 9.07 | 1.02 | 5.19 | 1.00 | 459.5 | 346.4 | 86.2 | 0.25 |
| 7412 | 16.68 | 14.73 | 27.96 | 64.90 | 16.65 | 35.28 | 7.82 | 1.11 | 5.60 | 1.07 | 4.83 | 1.74 | 5.50 | 0.52 | 2.28 | 0.37 | 207.1 | 159.3 | 31.0 | 0.19 |
| 7415 | 16.18 | 22.23 | 38.39 | 79.84 | 17.92 | 40.72 | 9.40 | 1.33 | 6.86 | 1.01 | 5.85 | 1.83 | 5.83 | 0.41 | 2.83 | 0.54 | 251.2 | 194.5 | 40.5 | 0.21 |
| 7418 | 19.79 | 25.79 | 46.20 | 88.08 | 25.85 | 45.59 | 10.19 | 1.69 | 8.41 | 1.16 | 6.55 | 1.92 | 5.57 | 0.50 | 2.82 | 0.67 | 290.8 | 226.0 | 45.0 | 0.20 |
| 7419 | 36.18 | 86.35 | 106.74 | 192.07 | 33.59 | 99.69 | 22.11 | 3.99 | 18.37 | 2.59 | 16.09 | 4.82 | 12.06 | 2.22 | 7.47 | 1.13 | 645.5 | 476.6 | 132.7 | 0.28 |
| 7420 | 18.16 | 13.25 | 24.62 | 53.63 | 13.14 | 35.20 | 6.86 | 0.99 | 5.41 | 0.96 | 4.37 | 1.79 | 5.77 | 0.67 | 2.08 | 0.00 | 186.9 | 139.9 | 28.9 | 0.21 |
| 7421 | 19.40 | 27.87 | 52.50 | 97.88 | 25.77 | 51.02 | 11.59 | 1.60 | 8.64 | 1.20 | 6.94 | 2.12 | 6.14 | 0.47 | 3.22 | 0.79 | 317.2 | 249.0 | 48.8 | 0.20 |
| 7428 | 18.29 | 23.12 | 38.45 | 93.34 | 22.25 | 40.70 | 9.82 | 1.39 | 7.01 | 1.13 | 6.25 | 1.89 | 5.93 | 0.43 | 3.02 | 0.75 | 273.8 | 213.0 | 42.5 | 0.20 |
| 7429 | 43.03 | 54.24 | 67.03 | 132.43 | 26.56 | 76.87 | 15.95 | 3.52 | 13.68 | 3.09 | 12.85 | 4.21 | 12.33 | 1.82 | 6.86 | 0.58 | 475.1 | 336.0 | 96.0 | 0.29 |
| 7430 | 27.35 | 34.76 | 71.21 | 133.08 | 24.03 | 67.85 | 13.59 | 2.02 | 10.74 | 1.28 | 8.78 | 3.28 | 8.59 | 1.00 | 3.86 | 0.22 | 411.6 | 322.5 | 61.8 | 0.19 |
| 7431 | 16.34 | 19.78 | 36.14 | 86.55 | 19.43 | 37.20 | 8.60 | 1.17 | 6.19 | 0.92 | 5.51 | 1.79 | 5.45 | 0.41 | 2.65 | 0.61 | 248.7 | 195.3 | 37.1 | 0.19 |
| 7432 | 29.39 | 29.57 | 47.40 | 94.16 | 18.55 | 53.69 | 10.68 | 1.91 | 8.80 | 1.53 | 7.71 | 2.94 | 8.39 | 1.21 | 3.56 | 0.08 | 319.6 | 235.2 | 55.0 | 0.23 |
| 7433 | 32.87 | 46.70 | 100.25 | 176.90 | 27.05 | 85.29 | 16.30 | 2.37 | 13.12 | 1.23 | 10.96 | 4.19 | 10.67 | 1.33 | 4.75 | 0.05 | 534.0 | 421.3 | 79.9 | 0.19 |
| 7434 | 13.40 | 11.97 | 18.23 | 46.26 | 14.08 | 26.00 | 6.29 | 0.81 | 4.59 | 1.00 | 4.16 | 1.51 | 4.89 | 0.30 | 2.03 | 0.35 | 155.9 | 116.3 | 26.2 | 0.23 |
| 7435 | 34.52 | 42.13 | 78.74 | 143.93 | 21.09 | 73.15 | 14.27 | 2.38 | 11.60 | 1.47 | 10.02 | 3.83 | 9.76 | 1.51 | 4.46 | 0.00 | 452.9 | 345.2 | 73.2 | 0.21 |
| 7436 | 30.99 | 26.89 | 47.44 | 100.13 | 16.13 | 60.30 | 9.28 | 1.16 | 9.25 | 1.06 | 8.41 | 4.20 | 12.10 | 1.02 | 3.45 | 0.00 | 331.8 | 243.7 | 57.1 | 0.23 |
| 7437 | 15.75 | 21.35 | 37.05 | 76.67 | 19.28 | 39.97 | 9.56 | 1.26 | 6.67 | 1.10 | 5.89 | 1.82 | 5.77 | 0.44 | 2.82 | 0.65 | 246.0 | 190.5 | 39.8 | 0.21 |
| 7438 | 55.37 | 158.92 | 149.72 | 266.75 | 47.69 | 144.76 | 33.31 | 6.65 | 30.35 | 4.91 | 27.76 | 7.63 | 19.23 | 3.89 | 13.06 | 2.31 | 972.3 | 679.2 | 237.7 | 0.35 |
| 7439 | 38.19 | 87.66 | 87.41 | 158.12 | 39.20 | 86.81 | 20.12 | 3.79 | 18.75 | 2.99 | 16.53 | 4.60 | 12.40 | 2.11 | 7.74 | 1.43 | 587.8 | 414.2 | 135.5 | 0.33 |
| 7440 | 20.97 | 23.46 | 41.35 | 77.85 | 21.18 | 48.27 | 10.33 | 1.52 | 8.03 | 1.29 | 6.72 | 2.18 | 6.52 | 0.78 | 2.95 | 0.39 | 273.8 | 208.5 | 44.3 | 0.21 |
| 7441 | 20.86 | 27.52 | 52.37 | 96.64 | 36.94 | 50.17 | 13.61 | 1.70 | 9.34 | 1.65 | 7.72 | 1.72 | 6.01 | 0.54 | 3.35 | 1.53 | 331.7 | 260.8 | 50.1 | 0.19 |
| 7442 | 27.29 | 37.80 | 38.92 | 77.08 | 22.03 | 54.84 | 12.15 | 2.26 | 10.18 | 2.14 | 9.15 | 2.79 | 8.54 | 1.87 | 4.60 | 0.83 | 312.5 | 217.5 | 67.7 | 0.31 |
| 7443 | 21.50 | 14.63 | 26.78 | 59.82 | 15.72 | 39.99 | 7.51 | 1.09 | 6.31 | 1.15 | 5.35 | 2.35 | 7.17 | 0.65 | 2.45 | 0.00 | 212.5 | 157.2 | 33.7 | 0.21 |
| 7444 | 21.35 | 28.27 | 64.26 | 117.77 | 28.45 | 56.04 | 13.44 | 2.05 | 9.84 | 1.39 | 7.94 | 2.43 | 6.94 | 0.57 | 3.55 | 1.00 | 365.3 | 291.9 | 52.1 | 0.18 |
| 7445 | 36.16 | 78.56 | 127.98 | 216.83 | 39.19 | 103.52 | 23.43 | 4.35 | 19.66 | 2.36 | 15.99 | 4.64 | 11.32 | 2.17 | 6.83 | 1.21 | 694.2 | 534.9 | 123.1 | 0.23 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7549 | 12.72 | 16.17 | 32.29 | 60.74 | 26.04 | 24.51 | 9.42 | 0.92 | 5.40 | 1.27 | 4.74 | 0.77 | 3.93 | 0.27 | 2.49 | 1.68 | 203.4 | 159.3 | 31.3 | 0.197 |
| 7550 | 5.79 | 9.81 | 14.23 | 26.29 | 3.56 | 11.57 | 2.46 | 0.43 | 2.21 | 0.21 | 1.69 | 0.69 | 1.90 | 0.21 | 0.98 | 0.03 | 82.1 | 60.8 | 15.5 | 0.255 |
| 7551 | 10.73 | 15.41 | 31.73 | 60.67 | 8.40 | 25.92 | 5.10 | 0.78 | 4.21 | 0.31 | 3.02 | 1.48 | 4.24 | 0.29 | 1.82 | 0.00 | 174.1 | 136.8 | 26.6 | 0.194 |
| 7552 | 14.15 | 18.58 | 36.62 | 70.00 | 16.98 | 29.77 | 7.42 | 0.97 | 5.51 | 0.79 | 4.28 | 1.46 | 4.93 | 0.39 | 2.48 | 0.66 | 215.0 | 167.3 | 33.6 | 0.201 |
| 7553 | 6.22 | 11.02 | 13.86 | 26.01 | 3.54 | 11.52 | 2.46 | 0.43 | 2.34 | 0.23 | 1.91 | 0.75 | 2.14 | 0.25 | 1.08 | 0.04 | 83.8 | 60.2 | 17.4 | 0.289 |
| 7554 | 10.88 | 15.92 | 29.99 | 63.12 | 7.60 | 25.14 | 4.63 | 0.68 | 4.23 | 0.25 | 3.00 | 1.68 | 5.05 | 0.35 | 1.86 | 0.00 | 174.4 | 135.4 | 28.1 | 0.208 |
| 7555 | 21.82 | 18.34 | 38.33 | 70.99 | 26.27 | 31.61 | 7.64 | 1.22 | 7.54 | 0.99 | 4.10 | 1.32 | 4.23 | 0.28 | 2.57 | 0.70 | 237.9 | 183.6 | 32.5 | 0.177 |
| 7408 | 5.86 | 8.82 | 13.63 | 25.74 | 7.08 | 13.53 | 3.02 | 0.47 | 2.53 | 0.36 | 1.97 | 0.60 | 1.81 | 0.19 | 0.94 | 0.19 | 86.7 | 66.0 | 14.9 | 0.225 |
| 7409 | 4.40 | 8.81 | 12.34 | 22.33 | 5.03 | 11.69 | 2.66 | 0.44 | 2.12 | 0.30 | 1.80 | 0.52 | 1.48 | 0.17 | 0.85 | 0.16 | 75.1 | 56.6 | 14.1 | 0.249 |
| 7412 | 5.35 | 4.73 | 8.98 | 20.83 | 5.35 | 11.33 | 2.51 | 0.36 | 1.80 | 0.34 | 1.55 | 0.56 | 1.77 | 0.17 | 0.73 | 0.12 | 66.5 | 51.1 | 10.0 | 0.195 |
| 7415 | 12.50 | 17.17 | 29.65 | 61.67 | 13.84 | 31.45 | 7.26 | 1.03 | 5.30 | 0.78 | 4.52 | 1.41 | 4.50 | 0.31 | 2.19 | 0.42 | 194.0 | 150.2 | 31.3 | 0.208 |
| 7418 | 11.11 | 14.48 | 25.94 | 49.46 | 14.52 | 25.60 | 5.72 | 0.95 | 4.72 | 0.65 | 3.68 | 1.08 | 3.13 | 0.28 | 1.58 | 0.38 | 163.3 | 126.9 | 25.3 | 0.199 |
| 7419 | 2.47 | 5.90 | 7.29 | 13.12 | 2.29 | 6.81 | 1.51 | 0.27 | 1.25 | 0.18 | 1.10 | 0.33 | 0.82 | 0.15 | 0.51 | 0.08 | 44.1 | 32.6 | 9.1 | 0.278 |
| 7420 | 7.23 | 5.28 | 9.81 | 21.35 | 5.23 | 14.02 | 2.73 | 0.39 | 2.16 | 0.38 | 1.74 | 0.71 | 2.30 | 0.27 | 0.83 | 0.00 | 74.4 | 55.7 | 11.5 | 0.207 |
| 7421 | 16.94 | 24.35 | 45.86 | 85.50 | 22.51 | 44.56 | 10.13 | 1.40 | 7.54 | 1.05 | 6.06 | 1.85 | 5.37 | 0.41 | 2.81 | 0.69 | 277.0 | 217.5 | 42.6 | 0.196 |
| 7428 | 13.92 | 17.60 | 29.27 | 71.05 | 16.94 | 30.98 | 7.48 | 1.06 | 5.34 | 0.86 | 4.75 | 1.44 | 4.52 | 0.33 | 2.30 | 0.57 | 208.4 | 162.1 | 32.4 | 0.2 |
| 7429 | 4.49 | 5.66 | 6.99 | 13.81 | 2.77 | 8.02 | 1.66 | 0.37 | 1.43 | 0.32 | 1.34 | 0.44 | 1.29 | 0.19 | 0.72 | 0.06 | 49.5 | 35.0 | 10.0 | 0.286 |
| 7430 | 10.72 | 13.63 | 27.92 | 52.18 | 9.42 | 26.60 | 5.33 | 0.79 | 4.21 | 0.50 | 3.44 | 1.29 | 3.37 | 0.39 | 1.51 | 0.09 | 161.4 | 126.5 | 24.2 | 0.192 |
| 7431 | 14.37 | 17.40 | 31.79 | 76.13 | 17.09 | 32.72 | 7.56 | 1.03 | 5.45 | 0.81 | 4.85 | 1.58 | 4.79 | 0.36 | 2.33 | 0.54 | 218.8 | 171.8 | 32.6 | 0.19 |
| 7432 | 4.85 | 4.88 | 7.82 | 15.54 | 3.06 | 8.86 | 1.76 | 0.32 | 1.45 | 0.25 | 1.27 | 0.49 | 1.38 | 0.20 | 0.59 | 0.01 | 52.7 | 38.8 | 9.1 | 0.234 |
| 7433 | 13.77 | 19.56 | 42.00 | 74.10 | 11.33 | 35.73 | 6.83 | 0.99 | 5.50 | 0.52 | 4.59 | 1.76 | 4.47 | 0.56 | 1.99 | 0.02 | 223.7 | 176.5 | 33.5 | 0.19 |
| 7434 | 11.93 | 10.66 | 16.23 | 41.19 | 12.54 | 23.15 | 5.60 | 0.72 | 4.08 | 0.89 | 3.70 | 1.34 | 4.36 | 0.27 | 1.80 | 0.31 | 138.8 | 103.5 | 23.3 | 0.225 |
| 7435 | 8.18 | 9.99 | 18.67 | 34.13 | 5.00 | 17.34 | 3.38 | 0.56 | 2.75 | 0.35 | 2.38 | 0.91 | 2.31 | 0.36 | 1.06 | 0.00 | 107.4 | 81.8 | 17.4 | 0.212 |
| 7436 | 12.65 | 10.97 | 19.36 | 40.86 | 6.58 | 24.61 | 3.79 | 0.47 | 3.77 | 0.43 | 3.43 | 1.71 | 4.94 | 0.42 | 1.41 | 0.00 | 135.4 | 99.5 | 23.3 | 0.234 |
| 7437 | 14.11 | 19.12 | 33.19 | 68.69 | 17.27 | 35.81 | 8.57 | 1.13 | 5.97 | 0.99 | 5.28 | 1.63 | 5.17 | 0.39 | 2.53 | 0.58 | 220.4 | 170.6 | 35.7 | 0.209 |
| 7438 | 3.88 | 11.12 | 10.48 | 18.67 | 3.34 | 10.13 | 2.33 | 0.47 | 2.12 | 0.34 | 1.94 | 0.53 | 1.35 | 0.27 | 0.91 | 0.16 | 68.1 | 47.5 | 16.6 | 0.35 |
| 7439 | 1.25 | 2.88 | 2.87 | 5.19 | 1.29 | 2.85 | 0.66 | 0.12 | 0.62 | 0.10 | 0.54 | 0.15 | 0.41 | 0.07 | 0.25 | 0.05 | 19.3 | 13.6 | 4.4 | 0.327 |
| 7440 | 7.34 | 8.21 | 14.47 | 27.25 | 7.41 | 16.90 | 3.61 | 0.53 | 2.81 | 0.45 | 2.35 | 0.76 | 2.28 | 0.27 | 1.03 | 0.14 | 95.8 | 73.0 | 15.5 | 0.212 |
| 7441 | 13.77 | 18.18 | 34.59 | 63.82 | 24.40 | 33.13 | 8.99 | 1.12 | 6.17 | 1.09 | 5.10 | 1.14 | 3.97 | 0.36 | 2.21 | 1.01 | 219.0 | 172.2 | 33.1 | 0.192 |
| 7442 | 1.43 | 1.98 | 2.04 | 4.04 | 1.15 | 2.87 | 0.64 | 0.12 | 0.53 | 0.11 | 0.48 | 0.15 | 0.45 | 0.10 | 0.24 | 0.04 | 16.4 | 11.4 | 3.5 | 0.311 |
| 7443 | 8.55 | 5.81 | 10.64 | 23.77 | 6.25 | 15.89 | 2.98 | 0.43 | 2.51 | 0.46 | 2.12 | 0.93 | 2.85 | 0.26 | 0.97 | 0.00 | 84.4 | 62.5 | 13.4 | 0.215 |
| 7444 | 15.28 | 20.23 | 46.00 | 84.30 | 20.37 | 40.11 | 9.62 | 1.47 | 7.05 | 0.99 | 5.68 | 1.74 | 4.97 | 0.41 | 2.54 | 0.72 | 261.5 | 208.9 | 37.3 | 0.178 |
| 7445 | 3.23 | 7.02 | 11.44 | 19.38 | 3.50 | 9.25 | 2.09 | 0.39 | 1.76 | 0.21 | 1.43 | 0.41 | 1.01 | 0.19 | 0.61 | 0.11 | 62.1 | 47.8 | 11.0 | 0.23 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7549 | 0.79 | 0.67 | 1.08 | 1.01 | 3.89 | 0.91 | 1.78 | 0.71 | 1.35 | 1.95 | 1.25 | 0.96 | 1.87 | 0.82 | 1.24 | 4.81 | 1.10 | 1.19 | 0.92 | 1.29 |
| 7550 | 0.36 | 0.41 | 0.47 | 0.44 | 0.53 | 0.43 | 0.47 | 0.33 | 0.55 | 0.33 | 0.44 | 0.86 | 0.90 | 0.64 | 0.49 | 0.09 | 0.45 | 0.45 | 0.46 | 0.99 |
| 7551 | 0.67 | 0.64 | 1.06 | 1.01 | 1.25 | 0.96 | 0.96 | 0.60 | 1.05 | 0.47 | 0.79 | 1.85 | 2.02 | 0.87 | 0.91 | 0.00 | 0.94 | 1.02 | 0.78 | 1.30 |
| 7552 | 0.88 | 0.77 | 1.22 | 1.17 | 2.53 | 1.10 | 1.40 | 0.74 | 1.38 | 1.21 | 1.13 | 1.82 | 2.35 | 1.18 | 1.24 | 1.88 | 1.17 | 1.25 | 0.99 | 1.26 |
| 7553 | 0.39 | 0.46 | 0.46 | 0.43 | 0.53 | 0.43 | 0.46 | 0.33 | 0.58 | 0.35 | 0.50 | 0.93 | 1.02 | 0.75 | 0.54 | 0.10 | 0.45 | 0.45 | 0.51 | 0.88 |
| 7554 | 0.68 | 0.66 | 1.00 | 1.05 | 1.13 | 0.93 | 0.87 | 0.53 | 1.06 | 0.39 | 0.79 | 2.10 | 2.40 | 1.07 | 0.93 | 0.00 | 0.95 | 1.01 | 0.83 | 1.22 |
| 7555 | 1.36 | 0.76 | 1.28 | 1.18 | 3.92 | 1.17 | 1.44 | 0.94 | 1.89 | 1.52 | 1.08 | 1.65 | 2.01 | 0.84 | 1.28 | 2.00 | 1.29 | 1.37 | 0.96 | 1.43 |
| 7408 | 0.37 | 0.37 | 0.45 | 0.43 | 1.06 | 0.50 | 0.57 | 0.36 | 0.63 | 0.55 | 0.52 | 0.74 | 0.86 | 0.56 | 0.47 | 0.53 | 0.47 | 0.49 | 0.44 | 1.13 |
| 7409 | 0.28 | 0.37 | 0.41 | 0.37 | 0.75 | 0.43 | 0.50 | 0.33 | 0.53 | 0.46 | 0.47 | 0.65 | 0.71 | 0.50 | 0.42 | 0.47 | 0.41 | 0.42 | 0.41 | 1.02 |
| 7412 | 0.33 | 0.20 | 0.30 | 0.35 | 0.80 | 0.42 | 0.47 | 0.27 | 0.45 | 0.53 | 0.41 | 0.70 | 0.84 | 0.51 | 0.37 | 0.34 | 0.36 | 0.38 | 0.29 | 1.30 |
| 7415 | 0.78 | 0.72 | 0.99 | 1.03 | 2.07 | 1.16 | 1.37 | 0.79 | 1.32 | 1.20 | 1.19 | 1.77 | 2.14 | 0.95 | 1.09 | 1.19 | 1.05 | 1.12 | 0.92 | 1.22 |
| 7418 | 0.69 | 0.60 | 0.86 | 0.82 | 2.17 | 0.95 | 1.08 | 0.73 | 1.18 | 1.00 | 0.97 | 1.35 | 1.49 | 0.85 | 0.79 | 1.08 | 0.89 | 0.94 | 0.74 | 1.27 |
| 7419 | 0.15 | 0.25 | 0.24 | 0.22 | 0.34 | 0.25 | 0.28 | 0.21 | 0.31 | 0.27 | 0.29 | 0.41 | 0.39 | 0.46 | 0.26 | 0.22 | 0.24 | 0.24 | 0.27 | 0.91 |
| 7420 | 0.45 | 0.22 | 0.33 | 0.36 | 0.78 | 0.52 | 0.52 | 0.30 | 0.54 | 0.59 | 0.46 | 0.89 | 1.09 | 0.81 | 0.41 | 0.00 | 0.40 | 0.41 | 0.34 | 1.23 |
| 7421 | 1.06 | 1.01 | 1.53 | 1.42 | 3.36 | 1.65 | 1.91 | 1.08 | 1.89 | 1.62 | 1.60 | 2.31 | 2.56 | 1.26 | 1.41 | 1.97 | 1.50 | 1.62 | 1.25 | 1.29 |
| 7428 | 0.87 | 0.73 | 0.98 | 1.18 | 2.53 | 1.15 | 1.41 | 0.81 | 1.33 | 1.32 | 1.25 | 1.79 | 2.15 | 0.99 | 1.15 | 1.63 | 1.13 | 1.21 | 0.95 | 1.27 |
| 7429 | 0.28 | 0.24 | 0.23 | 0.23 | 0.41 | 0.30 | 0.31 | 0.28 | 0.36 | 0.50 | 0.35 | 0.55 | 0.61 | 0.58 | 0.36 | 0.17 | 0.27 | 0.26 | 0.29 | 0.89 |
| 7430 | 0.67 | 0.57 | 0.93 | 0.87 | 1.41 | 0.99 | 1.01 | 0.61 | 1.05 | 0.77 | 0.91 | 1.61 | 1.60 | 1.18 | 0.76 | 0.25 | 0.88 | 0.94 | 0.71 | 1.32 |
| 7431 | 0.90 | 0.72 | 1.06 | 1.27 | 2.55 | 1.21 | 1.43 | 0.79 | 1.36 | 1.24 | 1.28 | 1.97 | 2.28 | 1.09 | 1.16 | 1.53 | 1.19 | 1.28 | 0.96 | 1.33 |
| 7432 | 0.30 | 0.20 | 0.26 | 0.26 | 0.46 | 0.33 | 0.33 | 0.24 | 0.36 | 0.39 | 0.33 | 0.61 | 0.66 | 0.60 | 0.29 | 0.04 | 0.29 | 0.29 | 0.27 | 1.08 |
| 7433 | 0.86 | 0.82 | 1.40 | 1.24 | 1.69 | 1.32 | 1.29 | 0.76 | 1.37 | 0.79 | 1.21 | 2.19 | 2.13 | 1.68 | 0.99 | 0.06 | 1.21 | 1.31 | 0.98 | 1.34 |
| 7434 | 0.75 | 0.44 | 0.54 | 0.69 | 1.87 | 0.86 | 1.06 | 0.55 | 1.02 | 1.37 | 0.97 | 1.68 | 2.07 | 0.81 | 0.90 | 0.89 | 0.75 | 0.77 | 0.69 | 1.12 |
| 7435 | 0.51 | 0.42 | 0.62 | 0.57 | 0.75 | 0.64 | 0.64 | 0.43 | 0.69 | 0.53 | 0.63 | 1.14 | 1.10 | 1.09 | 0.53 | 0.00 | 0.58 | 0.61 | 0.51 | 1.19 |
| 7436 | 0.79 | 0.46 | 0.65 | 0.68 | 0.98 | 0.91 | 0.71 | 0.36 | 0.94 | 0.66 | 0.90 | 2.14 | 2.35 | 1.27 | 0.70 | 0.00 | 0.73 | 0.74 | 0.69 | 1.08 |
| 7437 | 0.88 | 0.80 | 1.11 | 1.14 | 2.58 | 1.33 | 1.62 | 0.87 | 1.49 | 1.52 | 1.39 | 2.04 | 2.46 | 1.19 | 1.26 | 1.67 | 1.20 | 1.27 | 1.05 | 1.21 |
| 7438 | 0.24 | 0.46 | 0.35 | 0.31 | 0.50 | 0.38 | 0.44 | 0.36 | 0.53 | 0.53 | 0.51 | 0.67 | 0.64 | 0.83 | 0.46 | 0.46 | 0.37 | 0.35 | 0.49 | 0.72 |
| 7439 | 0.08 | 0.12 | 0.10 | 0.09 | 0.19 | 0.11 | 0.12 | 0.10 | 0.15 | 0.15 | 0.14 | 0.19 | 0.19 | 0.21 | 0.13 | 0.13 | 0.10 | 0.10 | 0.13 | 0.77 |
| 7440 | 0.46 | 0.34 | 0.48 | 0.45 | 1.11 | 0.63 | 0.68 | 0.41 | 0.70 | 0.69 | 0.62 | 0.95 | 1.09 | 0.83 | 0.52 | 0.39 | 0.52 | 0.54 | 0.46 | 1.19 |
| 7441 | 0.86 | 0.76 | 1.15 | 1.06 | 3.64 | 1.23 | 1.70 | 0.86 | 1.54 | 1.68 | 1.34 | 1.42 | 1.89 | 1.08 | 1.11 | 2.88 | 1.19 | 1.28 | 0.97 | 1.32 |
| 7442 | 0.09 | 0.08 | 0.07 | 0.07 | 0.17 | 0.11 | 0.12 | 0.09 | 0.13 | 0.17 | 0.13 | 0.18 | 0.21 | 0.30 | 0.12 | 0.12 | 0.09 | 0.08 | 0.10 | 0.81 |
| 7443 | 0.53 | 0.24 | 0.35 | 0.40 | 0.93 | 0.59 | 0.56 | 0.33 | 0.63 | 0.70 | 0.56 | 1.17 | 1.36 | 0.79 | 0.49 | 0.00 | 0.46 | 0.47 | 0.39 | 1.18 |
| 7444 | 0.96 | 0.84 | 1.53 | 1.40 | 3.04 | 1.49 | 1.82 | 1.13 | 1.76 | 1.53 | 1.50 | 2.17 | 2.36 | 1.23 | 1.27 | 2.05 | 1.42 | 1.56 | 1.10 | 1.42 |
| 7445 | 0.20 | 0.29 | 0.38 | 0.32 | 0.52 | 0.34 | 0.40 | 0.30 | 0.44 | 0.33 | 0.38 | 0.52 | 0.48 | 0.59 | 0.31 | 0.31 | 0.34 | 0.36 | 0.32 | 1.10 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7549 | 1.27 | 1.08 | 1.73 | 1.62 | 6.23 | 1.46 | 2.85 | 1.13 | 2.16 | 3.13 | 2.00 | 1.54 | 3.00 | 1.32 | 1.99 | 7.71 | 1.77 | 1.90 | 1.47 | 1.29 |
| 7550 | 2.30 | 2.60 | 3.02 | 2.79 | 3.39 | 2.73 | 2.96 | 2.13 | 3.52 | 2.10 | 2.83 | 5.46 | 5.76 | 4.06 | 3.11 | 0.55 | 2.84 | 2.88 | 2.90 | 0.99 |
| 7551 | 1.64 | 1.57 | 2.58 | 2.47 | 3.06 | 2.34 | 2.35 | 1.47 | 2.57 | 1.15 | 1.94 | 4.52 | 4.93 | 2.13 | 2.23 | 0.00 | 2.31 | 2.49 | 1.91 | 1.30 |
| 7552 | 1.43 | 1.26 | 1.98 | 1.89 | 4.11 | 1.79 | 2.27 | 1.21 | 2.23 | 1.96 | 1.83 | 2.95 | 3.81 | 1.92 | 2.01 | 3.05 | 1.89 | 2.02 | 1.60 | 1.26 |
| 7553 | 2.56 | 3.03 | 3.05 | 2.86 | 3.49 | 2.81 | 3.06 | 2.20 | 3.86 | 2.31 | 3.32 | 6.17 | 6.71 | 4.92 | 3.55 | 0.67 | 3.00 | 2.95 | 3.37 | 0.88 |
| 7554 | 1.73 | 1.69 | 2.54 | 2.67 | 2.88 | 2.37 | 2.22 | 1.34 | 2.69 | 0.99 | 2.00 | 5.32 | 6.11 | 2.71 | 2.36 | 0.00 | 2.40 | 2.56 | 2.10 | 1.22 |
| 7555 | 1.86 | 1.04 | 1.75 | 1.62 | 5.36 | 1.60 | 1.97 | 1.28 | 2.58 | 2.08 | 1.47 | 2.25 | 2.75 | 1.15 | 1.75 | 2.74 | 1.76 | 1.87 | 1.31 | 1.43 |
| 7408 | 1.34 | 1.35 | 1.66 | 1.57 | 3.87 | 1.84 | 2.09 | 1.33 | 2.31 | 2.00 | 1.90 | 2.73 | 3.16 | 2.06 | 1.72 | 1.94 | 1.72 | 1.80 | 1.60 | 1.13 |
| 7409 | 1.68 | 2.25 | 2.52 | 2.28 | 4.59 | 2.65 | 3.07 | 2.05 | 3.25 | 2.82 | 2.89 | 3.95 | 4.32 | 3.08 | 2.60 | 2.87 | 2.49 | 2.58 | 2.53 | 1.02 |
| 7412 | 1.04 | 0.61 | 0.93 | 1.08 | 2.49 | 1.31 | 1.48 | 0.86 | 1.40 | 1.65 | 1.27 | 2.17 | 2.62 | 1.58 | 1.14 | 1.06 | 1.12 | 1.19 | 0.91 | 1.30 |
| 7415 | 1.01 | 0.93 | 1.28 | 1.33 | 2.67 | 1.51 | 1.77 | 1.03 | 1.71 | 1.55 | 1.54 | 2.29 | 2.78 | 1.23 | 1.42 | 1.54 | 1.36 | 1.45 | 1.19 | 1.22 |
| 7418 | 1.24 | 1.07 | 1.54 | 1.47 | 3.86 | 1.69 | 1.92 | 1.30 | 2.10 | 1.78 | 1.72 | 2.40 | 2.65 | 1.51 | 1.41 | 1.93 | 1.58 | 1.68 | 1.32 | 1.27 |
| 7419 | 2.26 | 3.60 | 3.56 | 3.20 | 5.01 | 3.69 | 4.17 | 3.07 | 4.59 | 3.99 | 4.23 | 6.02 | 5.74 | 6.72 | 3.74 | 3.23 | 3.50 | 3.55 | 3.90 | 0.91 |
| 7420 | 1.13 | 0.55 | 0.82 | 0.89 | 1.96 | 1.30 | 1.30 | 0.76 | 1.35 | 1.47 | 1.15 | 2.24 | 2.75 | 2.04 | 1.04 | 0.00 | 1.01 | 1.04 | 0.85 | 1.23 |
| 7421 | 1.21 | 1.16 | 1.75 | 1.63 | 3.85 | 1.89 | 2.19 | 1.23 | 2.16 | 1.85 | 1.83 | 2.65 | 2.93 | 1.44 | 1.61 | 2.25 | 1.72 | 1.85 | 1.43 | 1.29 |
| 7428 | 1.14 | 0.96 | 1.28 | 1.56 | 3.32 | 1.51 | 1.85 | 1.07 | 1.75 | 1.74 | 1.64 | 2.36 | 2.83 | 1.30 | 1.51 | 2.14 | 1.49 | 1.59 | 1.25 | 1.27 |
| 7429 | 2.69 | 2.26 | 2.23 | 2.21 | 3.96 | 2.85 | 3.01 | 2.71 | 3.42 | 4.75 | 3.38 | 5.26 | 5.87 | 5.51 | 3.43 | 1.65 | 2.58 | 2.50 | 2.82 | 0.89 |
| 7430 | 1.71 | 1.45 | 2.37 | 2.22 | 3.59 | 2.51 | 2.56 | 1.56 | 2.68 | 1.97 | 2.31 | 4.10 | 4.09 | 3.02 | 1.93 | 0.63 | 2.23 | 2.40 | 1.82 | 1.32 |
| 7431 | 1.02 | 0.82 | 1.20 | 1.44 | 2.90 | 1.38 | 1.62 | 0.90 | 1.55 | 1.41 | 1.45 | 2.24 | 2.60 | 1.24 | 1.32 | 1.74 | 1.35 | 1.45 | 1.09 | 1.33 |
| 7432 | 1.84 | 1.23 | 1.58 | 1.57 | 2.77 | 1.99 | 2.02 | 1.47 | 2.20 | 2.35 | 2.03 | 3.68 | 3.99 | 3.66 | 1.78 | 0.24 | 1.73 | 1.75 | 1.62 | 1.08 |
| 7433 | 2.05 | 1.95 | 3.34 | 2.95 | 4.04 | 3.16 | 3.07 | 1.82 | 3.28 | 1.90 | 2.88 | 5.24 | 5.08 | 4.02 | 2.37 | 0.15 | 2.90 | 3.14 | 2.35 | 1.34 |
| 7434 | 0.84 | 0.50 | 0.61 | 0.77 | 2.10 | 0.96 | 1.19 | 0.62 | 1.15 | 1.54 | 1.09 | 1.89 | 2.33 | 0.91 | 1.01 | 1.00 | 0.85 | 0.87 | 0.77 | 1.12 |
| 7435 | 2.16 | 1.76 | 2.62 | 2.40 | 3.15 | 2.71 | 2.69 | 1.83 | 2.90 | 2.26 | 2.64 | 4.79 | 4.65 | 4.58 | 2.23 | 0.00 | 2.46 | 2.57 | 2.15 | 1.19 |
| 7436 | 1.94 | 1.12 | 1.58 | 1.67 | 2.41 | 2.23 | 1.75 | 0.89 | 2.31 | 1.63 | 2.21 | 5.25 | 5.76 | 3.10 | 1.72 | 0.00 | 1.80 | 1.81 | 1.68 | 1.08 |
| 7437 | 0.98 | 0.89 | 1.23 | 1.28 | 2.88 | 1.48 | 1.80 | 0.97 | 1.67 | 1.70 | 1.55 | 2.28 | 2.75 | 1.32 | 1.41 | 1.86 | 1.33 | 1.42 | 1.17 | 1.21 |
| 7438 | 3.46 | 6.62 | 4.99 | 4.45 | 7.12 | 5.36 | 6.29 | 5.12 | 7.59 | 7.55 | 7.31 | 9.53 | 9.16 | 11.79 | 6.53 | 6.59 | 5.27 | 5.06 | 6.99 | 0.72 |
| 7439 | 2.39 | 3.65 | 2.91 | 2.64 | 5.85 | 3.22 | 3.80 | 2.92 | 4.69 | 4.60 | 4.35 | 5.75 | 5.90 | 6.40 | 3.87 | 4.09 | 3.19 | 3.08 | 3.98 | 0.77 |
| 7440 | 1.31 | 0.98 | 1.38 | 1.30 | 3.16 | 1.79 | 1.95 | 1.17 | 2.01 | 1.98 | 1.77 | 2.72 | 3.10 | 2.36 | 1.48 | 1.11 | 1.49 | 1.55 | 1.30 | 1.19 |
| 7441 | 1.30 | 1.15 | 1.75 | 1.61 | 5.51 | 1.86 | 2.57 | 1.31 | 2.34 | 2.55 | 2.03 | 2.15 | 2.86 | 1.64 | 1.68 | 4.36 | 1.80 | 1.94 | 1.47 | 1.32 |
| 7442 | 1.71 | 1.58 | 1.30 | 1.28 | 3.29 | 2.03 | 2.29 | 1.74 | 2.54 | 3.29 | 2.41 | 3.48 | 4.07 | 5.68 | 2.30 | 2.36 | 1.70 | 1.62 | 1.99 | 0.81 |
| 7443 | 1.34 | 0.61 | 0.89 | 1.00 | 2.35 | 1.48 | 1.42 | 0.84 | 1.58 | 1.77 | 1.41 | 2.93 | 3.41 | 1.98 | 1.22 | 0.00 | 1.15 | 1.17 | 0.99 | 1.18 |
| 7444 | 1.33 | 1.18 | 2.14 | 1.96 | 4.25 | 2.08 | 2.54 | 1.57 | 2.46 | 2.13 | 2.09 | 3.04 | 3.30 | 1.72 | 1.77 | 2.87 | 1.98 | 2.17 | 1.53 | 1.42 |
| 7445 | 2.26 | 3.27 | 4.27 | 3.61 | 5.85 | 3.83 | 4.42 | 3.35 | 4.91 | 3.64 | 4.21 | 5.80 | 5.39 | 6.58 | 3.41 | 3.46 | 3.77 | 3.98 | 3.62 | 1.10 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7446 | 3.9 | Plant 08 | Clean Coal (+ x 1/2" / 1.6 x 1.8 SG) | 39.13 |
| 7447 | 1 | Plant 08 | Clean Coal (+ x 1/2" / 1.8 x Snk SG) | 52.65 |
| 7448 | 39.8 | Plant 09 | Raw Coal (100M x 0) | 46.9 |
| 7449 | 74.7 | Plant 09 | Raw Coal (1mm x 100M) | 28.45 |
| 7453 | 62.3 | Plant 09 | Raw Coal (5/8" x 1mm) | 61.31 |
| 7457 | 116.8 | Plant 09 | Raw Coal (1" x 5/8") Raw | 83.52 |
| 7461 | 87.1 | Plant 09 | Coal (+ x 1") | 91.45 |
| 7465 | 36.9 | Plant 09 | Fine Reject (100M x 0) | 66.17 |
| 7466 | 9.7 | Plant 09 | Fine Reject (1mm x 100M / Flt x 1.5 SG) | 5.64 |
| 7467 | 0.6 | Plant 09 | Fine Reject (1mm x 100M / 1.5 x 1.6 SG) | 25.57 |
| 7468 | 2.2 | Plant 09 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 37.07 |
| 7469 | 76.3 | Plant 09 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 90.24 |
| 7482 | 49.7 | Plant 09 | Coarse Reject (100M x 0) | 79.97 |
| 7483 | 56.4 | Plant 09 | Coarse Reject (1mm x 100M / Flt x 1.5 SG) | 6.92 |
| 7484 | 6.1 | Plant 09 | Coarse Reject (1mm x 100M / 1.5 x 1.6 SG) | 27.46 |
| 7485 | 9.6 | Plant 09 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 39.53 |
| 7486 | 71.4 | Plant 09 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 91.4 |
| 7487 | 34.7 | Plant 09 | Coarse Reject (5/8" x 1mm / Flt x 1.5 SG) | 14.92 |
| 7488 | 46.9 | Plant 09 | Coarse Reject (5/8" x 1mm / 1.5 x 1.6 SG) | 27.65 |
| 7489 | 50.7 | Plant 09 | Coarse Reject (5/8" x 1mm / 1.6 x 1.8 SG) | 39.33 |
| 7490 | 87.5 | Plant 09 | Coarse Reject (5/8" x 1mm / 1.8 x Snk SG) | 92.06 |
| 7491 | 5.7 | Plant 09 | Coarse Reject (1" x 5/8" / Flt x 1.5 SG) | 10.2 |
| 7492 | 15.6 | Plant 09 | Coarse Reject (1" x 5/8" / 1.5 x 1.6 SG) | 29.15 |
| 7493 | 70.4 | Plant 09 | Coarse Reject (1" x 5/8" / 1.6 x 1.8 SG) | 39.88 |
| 7494 | 68.8 | Plant 09 | Coarse Reject (1" x 5/8" / 1.8 x Snk SG) | 92.33 |
| 7495 | 1.3 | Plant 09 | Coarse Reject (+ x 1" / Flt x 1.5 SG) | 9.1 |
| 7496 | 3.4 | Plant 09 | Coarse Reject (+ x 1" / - x 1.6 SG) | 28.62 |
| 7497 | 55 | Plant 09 | Coarse Reject (+ x 1" / 1.6 x 1.8 SG) | 47.05 |
| 7498 | 94.3 | Plant 09 | Coarse Reject (+ x 1" / 1.8 x Snk SG) | 91.58 |
| 7499 | 59.7 | Plant 09 | Clean Coal (100M x 0) | 13.37 |
| 7500 | 49 | Plant 09 | Clean Coal (1mm x 100M / Flt x 1.5 SG) | 3.93 |
| 7501 | 57.5 | Plant 09 | Clean Coal (1mm x 100M / 1.5 x 1.6 SG) | 25.24 |
| 7502 | 27.2 | Plant 09 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 34.81 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7446 | 27.49 | 31.62 | 65.55 | 112.15 | 30.01 | 58.44 | 11.61 | 1.99 | 9.88 | 1.29 | 7.44 | 2.43 | 6.76 | 0.66 | 3.70 | 0.48 | 371.5 | 289.6 | 54.4 | 0.19 |
| 7447 | 46.69 | 23.60 | 35.64 | 66.32 | 96.61 | 31.39 | 11.47 | 1.93 | 15.87 | 2.88 | 7.33 | 0.35 | 3.95 | 0.21 | 3.70 | 3.54 | 351.5 | 259.2 | 45.6 | 0.18 |
| 7448 | 20.83 | 29.00 | 48.81 | 99.20 | 24.82 | 47.80 | 12.25 | 1.79 | 8.66 | 1.50 | 7.64 | 2.28 | 6.71 | 0.72 | 3.78 | 1.12 | 316.9 | 243.3 | 52.8 | 0.22 |
| 7449 | 23.05 | 38.12 | 59.65 | 114.63 | 30.48 | 55.35 | 14.93 | 2.18 | 10.64 | 1.98 | 9.65 | 2.43 | 7.49 | 1.00 | 4.50 | 1.47 | 377.6 | 287.9 | 66.6 | 0.23 |
| 7453 | 17.56 | 20.47 | 34.09 | 70.75 | 23.40 | 36.53 | 10.08 | 1.23 | 6.63 | 1.40 | 6.10 | 1.54 | 5.54 | 0.48 | 2.99 | 1.01 | 239.8 | 182.7 | 39.5 | 0.22 |
| 7457 | 15.80 | 14.28 | 26.63 | 59.99 | 22.41 | 31.83 | 8.85 | 1.05 | 5.53 | 1.27 | 5.15 | 1.32 | 4.95 | 0.34 | 2.47 | 0.93 | 202.8 | 156.3 | 30.7 | 0.20 |
| 7461 | 15.82 | 17.57 | 28.61 | 61.83 | 20.77 | 33.43 | 9.07 | 1.15 | 6.15 | 1.27 | 5.69 | 1.51 | 5.38 | 0.44 | 2.71 | 0.83 | 212.2 | 161.0 | 35.4 | 0.22 |
| 7465 | 18.51 | 23.18 | 41.37 | 85.62 | 23.91 | 41.53 | 10.46 | 1.33 | 7.17 | 1.23 | 6.25 | 1.77 | 5.85 | 0.31 | 3.11 | 0.94 | 272.5 | 211.4 | 42.6 | 0.20 |
| 7466 | 49.28 | 136.64 | 137.06 | 250.73 | 40.75 | 124.59 | 28.50 | 5.30 | 26.28 | 3.79 | 24.78 | 7.32 | 18.04 | 5.33 | 11.36 | 1.44 | 871.2 | 613.2 | 208.7 | 0.34 |
| 7467 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7468 | 18.50 | 37.49 | 47.44 | 100.92 | 24.08 | 52.28 | 12.96 | 1.98 | 10.58 | 1.85 | 9.21 | 2.89 | 8.28 | 1.09 | 4.11 | 0.50 | 334.2 | 250.2 | 65.4 | 0.26 |
| 7469 | 17.62 | 21.07 | 42.50 | 85.40 | 26.35 | 40.86 | 11.68 | 1.55 | 7.43 | 1.45 | 6.69 | 1.59 | 5.59 | 0.53 | 3.17 | 1.29 | 274.8 | 215.8 | 41.4 | 0.19 |
| 7482 | 17.81 | 20.91 | 39.77 | 82.57 | 24.25 | 39.56 | 10.90 | 1.52 | 7.23 | 1.49 | 6.51 | 1.73 | 5.78 | 0.63 | 3.18 | 1.11 | 265.0 | 205.8 | 41.3 | 0.20 |
| 7483 | 47.09 | 100.21 | 113.20 | 212.26 | 38.56 | 105.37 | 24.32 | 4.66 | 21.50 | 3.81 | 20.08 | 6.24 | 16.01 | 3.91 | 9.73 | 1.22 | 728.2 | 519.9 | 161.2 | 0.31 |
| 7484 | 24.85 | 50.62 | 88.44 | 161.64 | 26.88 | 76.13 | 15.79 | 2.51 | 13.47 | 1.68 | 11.40 | 4.40 | 11.25 | 1.35 | 5.16 | 0.25 | 495.8 | 384.9 | 86.1 | 0.22 |
| 7485 | 18.30 | 40.18 | 59.11 | 116.16 | 27.36 | 58.30 | 14.41 | 2.11 | 11.27 | 1.93 | 9.39 | 2.81 | 8.12 | 0.90 | 4.33 | 0.85 | 375.5 | 288.7 | 68.5 | 0.24 |
| 7486 | 17.42 | 20.75 | 39.89 | 83.50 | 26.73 | 39.60 | 11.49 | 1.51 | 7.26 | 1.49 | 6.70 | 1.47 | 5.50 | 0.57 | 3.17 | 1.32 | 268.4 | 210.0 | 41.0 | 0.20 |
| 7487 | 33.99 | 67.39 | 111.75 | 199.65 | 29.10 | 92.47 | 18.75 | 3.18 | 16.05 | 1.97 | 14.14 | 5.08 | 12.62 | 2.44 | 6.38 | 0.28 | 615.2 | 471.0 | 110.3 | 0.23 |
| 7488 | 26.14 | 47.36 | 84.19 | 155.66 | 24.84 | 73.54 | 14.10 | 2.21 | 12.51 | 1.58 | 10.90 | 4.47 | 11.98 | 1.33 | 5.06 | 0.00 | 475.9 | 367.0 | 82.7 | 0.23 |
| 7489 | 21.79 | 36.10 | 53.14 | 111.90 | 31.93 | 56.51 | 15.25 | 2.04 | 10.52 | 2.23 | 9.28 | 2.67 | 8.27 | 1.05 | 4.56 | 1.14 | 368.4 | 281.3 | 65.3 | 0.23 |
| 7490 | 18.71 | 24.68 | 48.84 | 95.85 | 25.98 | 47.93 | 12.42 | 1.74 | 8.51 | 1.47 | 7.29 | 1.97 | 6.28 | 0.51 | 3.43 | 1.10 | 306.7 | 241.3 | 46.7 | 0.19 |
| 7491 | 32.68 | 72.04 | 124.88 | 218.45 | 31.86 | 100.21 | 20.94 | 3.54 | 17.25 | 1.70 | 14.93 | 5.02 | 12.86 | 2.68 | 6.38 | 0.56 | 666.0 | 517.1 | 116.2 | 0.22 |
| 7492 | 23.79 | 41.67 | 61.08 | 132.43 | 20.10 | 71.89 | 13.68 | 2.02 | 12.13 | 1.56 | 9.06 | 4.16 | 10.50 | 1.20 | 4.40 | 0.00 | 409.7 | 313.3 | 72.6 | 0.23 |
| 7493 | 20.36 | 34.38 | 42.93 | 93.59 | 33.16 | 48.92 | 14.28 | 1.72 | 9.75 | 2.32 | 9.17 | 2.30 | 8.13 | 0.87 | 4.50 | 1.40 | 327.8 | 244.4 | 63.1 | 0.26 |
| 7494 | 18.74 | 22.84 | 41.72 | 86.79 | 24.98 | 43.00 | 11.59 | 1.61 | 7.81 | 1.50 | 6.84 | 1.75 | 5.97 | 0.62 | 3.31 | 1.09 | 280.2 | 217.5 | 43.9 | 0.20 |
| 7495 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7496 | 38.40 | 60.98 | 93.01 | 190.53 | 24.95 | 86.64 | 15.14 | 2.43 | 14.84 | 1.45 | 14.11 | 6.25 | 16.50 | 1.69 | 6.19 | 0.00 | 573.1 | 427.5 | 107.2 | 0.25 |
| 7497 | 21.89 | 32.03 | 31.54 | 69.11 | 29.54 | 35.07 | 11.87 | 1.45 | 7.35 | 2.07 | 8.40 | 1.61 | 6.90 | 0.99 | 4.66 | 1.89 | 266.4 | 185.9 | 58.5 | 0.31 |
| 7498 | 18.25 | 21.92 | 42.62 | 87.95 | 27.16 | 42.68 | 12.16 | 1.61 | 7.91 | 1.56 | 7.20 | 1.75 | 5.80 | 0.60 | 3.28 | 1.20 | 283.6 | 222.1 | 43.3 | 0.19 |
| 7499 | 27.95 | 56.62 | 67.43 | 128.82 | 35.23 | 65.37 | 16.74 | 2.66 | 13.84 | 2.46 | 12.79 | 3.31 | 9.58 | 1.99 | 5.83 | 1.54 | 452.1 | 330.1 | 94.1 | 0.29 |
| 7500 | 59.74 | 158.55 | 146.60 | 270.99 | 45.77 | 138.32 | 32.03 | 6.15 | 30.61 | 4.71 | 29.74 | 8.18 | 20.41 | 7.49 | 13.48 | 1.91 | 974.7 | 670.5 | 244.5 | 0.36 |
| 7501 | 22.45 | 52.49 | 80.66 | 147.84 | 27.19 | 69.42 | 15.50 | 2.41 | 13.23 | 1.82 | 11.91 | 3.94 | 10.29 | 1.40 | 5.12 | 0.50 | 466.2 | 356.3 | 87.5 | 0.25 |
| 7502 | 16.91 | 43.36 | 59.40 | 116.70 | 30.03 | 56.85 | 15.65 | 2.24 | 12.09 | 2.05 | 10.44 | 2.60 | 7.58 | 0.95 | 4.41 | 1.13 | 382.4 | 293.0 | 72.5 | 0.25 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7446 | 10.76 | 12.37 | 25.65 | 43.88 | 11.74 | 22.87 | 4.54 | 0.78 | 3.86 | 0.50 | 2.91 | 0.95 | 2.64 | 0.26 | 1.45 | 0.19 | 145.4 | 113.3 | 21.3 | 0.188 |
| 7447 | 24.58 | 12.42 | 18.77 | 34.92 | 50.87 | 16.53 | 6.04 | 1.02 | 8.36 | 1.51 | 3.86 | 0.19 | 2.08 | 0.11 | 1.95 | 1.87 | 185.1 | 136.5 | 24.0 | 0.176 |
| 7448 | 9.77 | 13.60 | 22.89 | 46.53 | 11.64 | 22.42 | 5.74 | 0.84 | 4.06 | 0.71 | 3.59 | 1.07 | 3.15 | 0.34 | 1.77 | 0.52 | 148.6 | 114.1 | 24.7 | 0.217 |
| 7449 | 6.56 | 10.85 | 16.97 | 32.61 | 8.67 | 15.75 | 4.25 | 0.62 | 3.03 | 0.56 | 2.74 | 0.69 | 2.13 | 0.29 | 1.28 | 0.42 | 107.4 | 81.9 | 19.0 | 0.232 |
| 7453 | 10.77 | 12.55 | 20.90 | 43.38 | 14.35 | 22.40 | 6.18 | 0.76 | 4.07 | 0.86 | 3.74 | 0.94 | 3.39 | 0.29 | 1.83 | 0.62 | 147.0 | 112.0 | 24.2 | 0.216 |
| 7457 | 13.20 | 11.92 | 22.25 | 50.11 | 18.72 | 26.58 | 7.39 | 0.87 | 4.62 | 1.06 | 4.30 | 1.10 | 4.14 | 0.28 | 2.06 | 0.78 | 169.4 | 130.5 | 25.6 | 0.196 |
| 7461 | 14.47 | 16.07 | 26.16 | 56.55 | 19.00 | 30.57 | 8.30 | 1.05 | 5.62 | 1.16 | 5.20 | 1.38 | 4.92 | 0.40 | 2.48 | 0.76 | 194.1 | 147.2 | 32.4 | 0.22 |
| 7465 | 12.25 | 15.34 | 27.38 | 56.65 | 15.82 | 27.48 | 6.92 | 0.88 | 4.74 | 0.81 | 4.14 | 1.17 | 3.87 | 0.20 | 2.06 | 0.62 | 180.3 | 139.9 | 28.2 | 0.202 |
| 7466 | 2.78 | 7.71 | 7.73 | 14.14 | 2.30 | 7.03 | 1.61 | 0.30 | 1.48 | 0.21 | 1.40 | 0.41 | 1.02 | 0.30 | 0.64 | 0.08 | 49.1 | 34.6 | 11.8 | 0.34 |
| 7467 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7468 | 6.86 | 13.90 | 17.59 | 37.41 | 8.93 | 19.38 | 4.80 | 0.73 | 3.92 | 0.69 | 3.41 | 1.07 | 3.07 | 0.41 | 1.52 | 0.19 | 123.9 | 92.8 | 24.3 | 0.261 |
| 7469 | 15.90 | 19.01 | 38.35 | 77.06 | 23.78 | 36.87 | 10.54 | 1.40 | 6.71 | 1.31 | 6.04 | 1.43 | 5.05 | 0.48 | 2.86 | 1.17 | 247.9 | 194.7 | 37.3 | 0.192 |
| 7482 | 14.24 | 16.72 | 31.81 | 66.03 | 19.39 | 31.64 | 8.71 | 1.21 | 5.78 | 1.19 | 5.20 | 1.39 | 4.63 | 0.51 | 2.54 | 0.89 | 211.9 | 164.6 | 33.1 | 0.201 |
| 7483 | 3.26 | 6.93 | 7.83 | 14.69 | 2.67 | 7.29 | 1.68 | 0.32 | 1.49 | 0.26 | 1.39 | 0.43 | 1.11 | 0.27 | 0.67 | 0.08 | 50.4 | 36.0 | 11.2 | 0.31 |
| 7484 | 6.82 | 13.90 | 24.29 | 44.39 | 7.38 | 20.91 | 4.34 | 0.69 | 3.70 | 0.46 | 3.13 | 1.21 | 3.09 | 0.37 | 1.42 | 0.07 | 136.2 | 105.7 | 23.6 | 0.224 |
| 7485 | 7.23 | 15.88 | 23.37 | 45.92 | 10.82 | 23.04 | 5.70 | 0.84 | 4.45 | 0.76 | 3.71 | 1.11 | 3.21 | 0.36 | 1.71 | 0.33 | 148.4 | 114.1 | 27.1 | 0.237 |
| 7486 | 15.92 | 18.96 | 36.46 | 76.32 | 24.43 | 36.19 | 10.50 | 1.38 | 6.64 | 1.37 | 6.12 | 1.34 | 5.02 | 0.52 | 2.90 | 1.21 | 245.3 | 191.9 | 37.4 | 0.195 |
| 7487 | 5.07 | 10.05 | 16.67 | 29.79 | 4.34 | 13.80 | 2.80 | 0.47 | 2.40 | 0.29 | 2.11 | 0.76 | 1.88 | 0.36 | 0.95 | 0.04 | 91.8 | 70.3 | 16.5 | 0.234 |
| 7488 | 7.23 | 13.10 | 23.28 | 43.04 | 6.87 | 20.33 | 3.90 | 0.61 | 3.46 | 0.44 | 3.01 | 1.24 | 3.31 | 0.37 | 1.40 | 0.00 | 131.6 | 101.5 | 22.9 | 0.225 |
| 7489 | 8.57 | 14.20 | 20.90 | 44.01 | 12.56 | 22.22 | 6.00 | 0.80 | 4.14 | 0.88 | 3.65 | 1.05 | 3.25 | 0.41 | 1.79 | 0.45 | 144.9 | 110.6 | 25.7 | 0.232 |
| 7490 | 17.23 | 22.72 | 44.96 | 88.24 | 23.92 | 44.13 | 11.43 | 1.61 | 7.83 | 1.36 | 6.71 | 1.82 | 5.78 | 0.47 | 3.15 | 1.01 | 282.4 | 222.1 | 43.0 | 0.194 |
| 7491 | 3.33 | 7.35 | 12.74 | 22.28 | 3.25 | 10.22 | 2.14 | 0.36 | 1.76 | 0.17 | 1.52 | 0.51 | 1.31 | 0.27 | 0.65 | 0.06 | 67.9 | 52.7 | 11.8 | 0.225 |
| 7492 | 6.93 | 12.15 | 17.81 | 38.60 | 5.86 | 20.96 | 3.99 | 0.59 | 3.53 | 0.46 | 2.64 | 1.21 | 3.06 | 0.35 | 1.28 | 0.00 | 119.4 | 91.3 | 21.2 | 0.232 |
| 7493 | 8.12 | 13.71 | 17.12 | 37.32 | 13.23 | 19.51 | 5.70 | 0.68 | 3.89 | 0.93 | 3.66 | 0.92 | 3.24 | 0.35 | 1.79 | 0.56 | 130.7 | 97.4 | 25.2 | 0.258 |
| 7494 | 17.30 | 21.08 | 38.52 | 80.14 | 23.06 | 39.70 | 10.70 | 1.49 | 7.21 | 1.38 | 6.32 | 1.62 | 5.51 | 0.57 | 3.06 | 1.01 | 258.7 | 200.8 | 40.6 | 0.202 |
| 7495 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7496 | 10.99 | 17.45 | 26.62 | 54.53 | 7.14 | 24.80 | 4.33 | 0.70 | 4.25 | 0.41 | 4.04 | 1.79 | 4.72 | 0.48 | 1.77 | 0.00 | 164.0 | 122.4 | 30.7 | 0.251 |
| 7497 | 10.30 | 15.07 | 14.84 | 32.52 | 13.90 | 16.50 | 5.58 | 0.68 | 3.46 | 0.97 | 3.95 | 0.76 | 3.25 | 0.47 | 2.19 | 0.89 | 125.3 | 87.5 | 27.5 | 0.315 |
| 7498 | 16.71 | 20.07 | 39.03 | 80.55 | 24.87 | 39.08 | 11.13 | 1.48 | 7.25 | 1.42 | 6.59 | 1.60 | 5.31 | 0.55 | 3.00 | 1.10 | 259.7 | 203.4 | 39.6 | 0.195 |
| 7499 | 3.74 | 7.57 | 9.02 | 17.22 | 4.71 | 8.74 | 2.24 | 0.36 | 1.85 | 0.33 | 1.71 | 0.44 | 1.28 | 0.27 | 0.78 | 0.21 | 60.5 | 44.1 | 12.6 | 0.285 |
| 7500 | 2.35 | 6.23 | 5.76 | 10.65 | 1.80 | 5.44 | 1.26 | 0.24 | 1.20 | 0.18 | 1.17 | 0.32 | 0.80 | 0.29 | 0.53 | 0.07 | 38.3 | 26.3 | 9.6 | 0.365 |
| 7501 | 5.67 | 13.25 | 20.36 | 37.31 | 6.86 | 17.52 | 3.91 | 0.61 | 3.34 | 0.46 | 3.01 | 1.00 | 2.60 | 0.35 | 1.29 | 0.13 | 117.7 | 89.9 | 22.1 | 0.246 |
| 7502 | 5.89 | 15.09 | 20.68 | 40.62 | 10.45 | 19.79 | 5.45 | 0.78 | 4.21 | 0.71 | 3.64 | 0.91 | 2.64 | 0.33 | 1.54 | 0.39 | 133.1 | 102.0 | 25.2 | 0.248 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7446 | 0.67 | 0.52 | 0.85 | 0.73 | 1.75 | 0.85 | 0.86 | 0.60 | 0.97 | 0.78 | 0.77 | 1.19 | 1.26 | 0.78 | 0.72 | 0.54 | 0.79 | 0.84 | 0.63 | 1.35 |
| 7447 | 1.54 | 0.52 | 0.63 | 0.58 | 7.59 | 0.61 | 1.14 | 0.78 | 2.09 | 2.33 | 1.02 | 0.23 | 0.99 | 0.33 | 0.97 | 5.33 | 1.00 | 1.02 | 0.70 | 1.44 |
| 7448 | 0.61 | 0.57 | 0.76 | 0.78 | 1.74 | 0.83 | 1.08 | 0.64 | 1.02 | 1.08 | 0.94 | 1.33 | 1.50 | 1.02 | 0.89 | 1.50 | 0.81 | 0.85 | 0.73 | 1.17 |
| 7449 | 0.41 | 0.45 | 0.57 | 0.54 | 1.29 | 0.58 | 0.80 | 0.48 | 0.76 | 0.87 | 0.72 | 0.86 | 1.01 | 0.86 | 0.64 | 1.20 | 0.58 | 0.61 | 0.56 | 1.09 |
| 7453 | 0.67 | 0.52 | 0.70 | 0.72 | 2.14 | 0.83 | 1.17 | 0.58 | 1.02 | 1.32 | 0.98 | 1.18 | 1.62 | 0.89 | 0.92 | 1.77 | 0.80 | 0.83 | 0.71 | 1.17 |
| 7457 | 0.83 | 0.50 | 0.74 | 0.84 | 2.79 | 0.98 | 1.39 | 0.67 | 1.15 | 1.63 | 1.13 | 1.38 | 1.97 | 0.85 | 1.03 | 2.22 | 0.92 | 0.97 | 0.75 | 1.29 |
| 7461 | 0.90 | 0.67 | 0.87 | 0.94 | 2.84 | 1.13 | 1.57 | 0.81 | 1.41 | 1.78 | 1.37 | 1.73 | 2.34 | 1.22 | 1.24 | 2.16 | 1.05 | 1.10 | 0.95 | 1.15 |
| 7465 | 0.77 | 0.64 | 0.91 | 0.94 | 2.36 | 1.02 | 1.31 | 0.68 | 1.19 | 1.25 | 1.09 | 1.46 | 1.84 | 0.62 | 1.03 | 1.77 | 0.98 | 1.04 | 0.83 | 1.26 |
| 7466 | 0.17 | 0.32 | 0.26 | 0.24 | 0.34 | 0.26 | 0.30 | 0.23 | 0.37 | 0.33 | 0.37 | 0.52 | 0.48 | 0.91 | 0.32 | 0.23 | 0.27 | 0.26 | 0.35 | 0.74 |
| 7467 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7468 | 0.43 | 0.58 | 0.59 | 0.62 | 1.33 | 0.72 | 0.91 | 0.56 | 0.98 | 1.06 | 0.90 | 1.34 | 1.46 | 1.23 | 0.76 | 0.53 | 0.67 | 0.69 | 0.71 | 0.97 |
| 7469 | 0.99 | 0.79 | 1.28 | 1.28 | 3.55 | 1.37 | 1.99 | 1.07 | 1.68 | 2.01 | 1.59 | 1.79 | 2.40 | 1.45 | 1.43 | 3.33 | 1.35 | 1.45 | 1.10 | 1.32 |
| 7482 | 0.89 | 0.70 | 1.06 | 1.10 | 2.89 | 1.17 | 1.64 | 0.93 | 1.45 | 1.83 | 1.37 | 1.73 | 2.20 | 1.54 | 1.27 | 2.53 | 1.15 | 1.23 | 0.97 | 1.26 |
| 7483 | 0.20 | 0.29 | 0.26 | 0.24 | 0.40 | 0.27 | 0.32 | 0.25 | 0.37 | 0.41 | 0.37 | 0.54 | 0.53 | 0.82 | 0.34 | 0.24 | 0.27 | 0.27 | 0.33 | 0.82 |
| 7484 | 0.43 | 0.58 | 0.81 | 0.74 | 1.10 | 0.77 | 0.82 | 0.53 | 0.92 | 0.71 | 0.82 | 1.51 | 1.47 | 1.13 | 0.71 | 0.19 | 0.74 | 0.79 | 0.69 | 1.13 |
| 7485 | 0.45 | 0.66 | 0.78 | 0.77 | 1.61 | 0.85 | 1.07 | 0.64 | 1.11 | 1.17 | 0.98 | 1.39 | 1.53 | 1.08 | 0.86 | 0.95 | 0.81 | 0.85 | 0.80 | 1.07 |
| 7486 | 1.00 | 0.79 | 1.22 | 1.27 | 3.65 | 1.34 | 1.98 | 1.06 | 1.66 | 2.10 | 1.61 | 1.67 | 2.39 | 1.58 | 1.45 | 3.45 | 1.33 | 1.43 | 1.10 | 1.30 |
| 7487 | 0.32 | 0.42 | 0.56 | 0.50 | 0.65 | 0.51 | 0.53 | 0.37 | 0.60 | 0.45 | 0.56 | 0.95 | 0.90 | 1.10 | 0.48 | 0.12 | 0.50 | 0.52 | 0.48 | 1.08 |
| 7488 | 0.45 | 0.55 | 0.78 | 0.72 | 1.02 | 0.75 | 0.74 | 0.47 | 0.86 | 0.67 | 0.79 | 1.54 | 1.58 | 1.11 | 0.70 | 0.00 | 0.71 | 0.76 | 0.67 | 1.12 |
| 7489 | 0.54 | 0.59 | 0.70 | 0.73 | 1.87 | 0.82 | 1.13 | 0.62 | 1.03 | 1.35 | 0.96 | 1.31 | 1.55 | 1.25 | 0.90 | 1.28 | 0.79 | 0.82 | 0.75 | 1.09 |
| 7490 | 1.08 | 0.95 | 1.50 | 1.47 | 3.57 | 1.63 | 2.16 | 1.23 | 1.96 | 2.09 | 1.77 | 2.27 | 2.75 | 1.43 | 1.58 | 2.88 | 1.53 | 1.65 | 1.26 | 1.31 |
| 7491 | 0.21 | 0.31 | 0.42 | 0.37 | 0.48 | 0.38 | 0.40 | 0.28 | 0.44 | 0.27 | 0.40 | 0.64 | 0.62 | 0.83 | 0.33 | 0.16 | 0.37 | 0.39 | 0.35 | 1.13 |
| 7492 | 0.43 | 0.51 | 0.59 | 0.64 | 0.87 | 0.78 | 0.75 | 0.45 | 0.88 | 0.70 | 0.70 | 1.52 | 1.46 | 1.06 | 0.64 | 0.00 | 0.65 | 0.68 | 0.62 | 1.09 |
| 7493 | 0.51 | 0.57 | 0.57 | 0.62 | 1.97 | 0.72 | 1.07 | 0.53 | 0.97 | 1.42 | 0.96 | 1.15 | 1.54 | 1.06 | 0.90 | 1.59 | 0.71 | 0.73 | 0.74 | 0.98 |
| 7494 | 1.08 | 0.88 | 1.28 | 1.34 | 3.44 | 1.47 | 2.02 | 1.14 | 1.80 | 2.13 | 1.66 | 2.02 | 2.62 | 1.74 | 1.53 | 2.88 | 1.40 | 1.50 | 1.19 | 1.25 |
| 7495 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7496 | 0.69 | 0.73 | 0.89 | 0.91 | 1.07 | 0.92 | 0.82 | 0.54 | 1.06 | 0.64 | 1.06 | 2.24 | 2.25 | 1.46 | 0.89 | 0.00 | 0.89 | 0.91 | 0.90 | 1.01 |
| 7497 | 0.64 | 0.63 | 0.49 | 0.54 | 2.07 | 0.61 | 1.05 | 0.53 | 0.86 | 1.50 | 1.04 | 0.94 | 1.55 | 1.41 | 1.10 | 2.54 | 0.68 | 0.65 | 0.81 | 0.80 |
| 7498 | 1.04 | 0.84 | 1.30 | 1.34 | 3.71 | 1.45 | 2.10 | 1.14 | 1.81 | 2.19 | 1.74 | 2.00 | 2.53 | 1.66 | 1.50 | 3.14 | 1.41 | 1.51 | 1.17 | 1.30 |
| 7499 | 0.23 | 0.32 | 0.30 | 0.29 | 0.70 | 0.32 | 0.42 | 0.27 | 0.46 | 0.51 | 0.45 | 0.55 | 0.61 | 0.80 | 0.39 | 0.59 | 0.33 | 0.33 | 0.37 | 0.89 |
| 7500 | 0.15 | 0.26 | 0.19 | 0.18 | 0.27 | 0.20 | 0.24 | 0.19 | 0.30 | 0.28 | 0.31 | 0.40 | 0.38 | 0.89 | 0.26 | 0.21 | 0.21 | 0.20 | 0.28 | 0.69 |
| 7501 | 0.35 | 0.55 | 0.68 | 0.62 | 1.02 | 0.65 | 0.74 | 0.47 | 0.83 | 0.71 | 0.79 | 1.24 | 1.24 | 1.07 | 0.65 | 0.36 | 0.64 | 0.67 | 0.65 | 1.03 |
| 7502 | 0.37 | 0.63 | 0.69 | 0.68 | 1.56 | 0.73 | 1.03 | 0.60 | 1.05 | 1.10 | 0.96 | 1.13 | 1.26 | 1.00 | 0.77 | 1.13 | 0.72 | 0.76 | 0.74 | 1.02 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7446 | 1.72 | 1.32 | 2.18 | 1.87 | 4.48 | 2.16 | 2.19 | 1.53 | 2.47 | 1.98 | 1.96 | 3.04 | 3.22 | 2.00 | 1.85 | 1.37 | 2.02 | 2.16 | 1.60 | 1.35 |
| 7447 | 2.92 | 0.98 | 1.19 | 1.11 | 14.42 | 1.16 | 2.16 | 1.48 | 3.97 | 4.43 | 1.93 | 0.44 | 1.88 | 0.63 | 1.85 | 10.12 | 1.91 | 1.93 | 1.34 | 1.44 |
| 7448 | 1.30 | 1.21 | 1.63 | 1.65 | 3.70 | 1.77 | 2.31 | 1.37 | 2.16 | 2.31 | 2.01 | 2.85 | 3.20 | 2.18 | 1.89 | 3.19 | 1.72 | 1.81 | 1.55 | 1.17 |
| 7449 | 1.44 | 1.59 | 1.99 | 1.91 | 4.55 | 2.05 | 2.82 | 1.68 | 2.66 | 3.05 | 2.54 | 3.04 | 3.57 | 3.04 | 2.25 | 4.21 | 2.05 | 2.14 | 1.96 | 1.09 |
| 7453 | 1.10 | 0.85 | 1.14 | 1.18 | 3.49 | 1.35 | 1.90 | 0.95 | 1.66 | 2.16 | 1.61 | 1.92 | 2.64 | 1.46 | 1.49 | 2.88 | 1.30 | 1.36 | 1.16 | 1.17 |
| 7457 | 0.99 | 0.59 | 0.89 | 1.00 | 3.35 | 1.18 | 1.67 | 0.81 | 1.38 | 1.95 | 1.36 | 1.65 | 2.36 | 1.02 | 1.24 | 2.66 | 1.10 | 1.16 | 0.90 | 1.29 |
| 7461 | 0.99 | 0.73 | 0.95 | 1.03 | 3.10 | 1.24 | 1.71 | 0.88 | 1.54 | 1.95 | 1.50 | 1.89 | 2.56 | 1.33 | 1.36 | 2.37 | 1.15 | 1.20 | 1.04 | 1.15 |
| 7465 | 1.16 | 0.97 | 1.38 | 1.43 | 3.57 | 1.54 | 1.97 | 1.02 | 1.79 | 1.89 | 1.65 | 2.21 | 2.79 | 0.94 | 1.56 | 2.68 | 1.48 | 1.57 | 1.25 | 1.26 |
| 7466 | 3.08 | 5.69 | 4.57 | 4.18 | 6.08 | 4.61 | 5.38 | 4.08 | 6.57 | 5.83 | 6.52 | 9.14 | 8.59 | 16.15 | 5.68 | 4.13 | 4.73 | 4.57 | 6.13 | 0.74 |
| 7467 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7468 | 1.16 | 1.56 | 1.58 | 1.68 | 3.59 | 1.94 | 2.44 | 1.52 | 2.65 | 2.85 | 2.42 | 3.62 | 3.94 | 3.31 | 2.06 | 1.43 | 1.81 | 1.86 | 1.92 | 0.97 |
| 7469 | 1.10 | 0.88 | 1.42 | 1.42 | 3.93 | 1.51 | 2.20 | 1.19 | 1.86 | 2.22 | 1.76 | 1.99 | 2.66 | 1.60 | 1.58 | 3.70 | 1.49 | 1.61 | 1.22 | 1.32 |
| 7482 | 1.11 | 0.87 | 1.33 | 1.38 | 3.62 | 1.47 | 2.06 | 1.17 | 1.81 | 2.29 | 1.71 | 2.17 | 2.75 | 1.92 | 1.59 | 3.17 | 1.44 | 1.53 | 1.21 | 1.26 |
| 7483 | 2.94 | 4.18 | 3.77 | 3.54 | 5.76 | 3.90 | 4.59 | 3.58 | 5.37 | 5.86 | 5.29 | 7.80 | 7.63 | 11.86 | 4.86 | 3.49 | 3.95 | 3.87 | 4.74 | 0.82 |
| 7484 | 1.55 | 2.11 | 2.95 | 2.69 | 4.01 | 2.82 | 2.98 | 1.93 | 3.37 | 2.58 | 3.00 | 5.50 | 5.36 | 4.10 | 2.58 | 0.70 | 2.69 | 2.87 | 2.53 | 1.13 |
| 7485 | 1.14 | 1.67 | 1.97 | 1.94 | 4.08 | 2.16 | 2.72 | 1.63 | 2.82 | 2.97 | 2.47 | 3.51 | 3.86 | 2.73 | 2.17 | 2.41 | 2.04 | 2.15 | 2.01 | 1.07 |
| 7486 | 1.09 | 0.86 | 1.33 | 1.39 | 3.99 | 1.47 | 2.17 | 1.16 | 1.82 | 2.30 | 1.76 | 1.83 | 2.62 | 1.72 | 1.59 | 3.77 | 1.46 | 1.56 | 1.20 | 1.30 |
| 7487 | 2.12 | 2.81 | 3.73 | 3.33 | 4.34 | 3.42 | 3.54 | 2.45 | 4.01 | 3.03 | 3.72 | 6.34 | 6.01 | 7.41 | 3.19 | 0.79 | 3.34 | 3.51 | 3.24 | 1.08 |
| 7488 | 1.63 | 1.97 | 2.81 | 2.59 | 3.71 | 2.72 | 2.66 | 1.70 | 3.13 | 2.43 | 2.87 | 5.59 | 5.70 | 4.02 | 2.53 | 0.00 | 2.58 | 2.73 | 2.43 | 1.12 |
| 7489 | 1.36 | 1.50 | 1.77 | 1.87 | 4.77 | 2.09 | 2.88 | 1.57 | 2.63 | 3.43 | 2.44 | 3.34 | 3.94 | 3.18 | 2.28 | 3.25 | 2.00 | 2.09 | 1.92 | 1.09 |
| 7490 | 1.17 | 1.03 | 1.63 | 1.60 | 3.88 | 1.78 | 2.34 | 1.34 | 2.13 | 2.27 | 1.92 | 2.47 | 2.99 | 1.55 | 1.71 | 3.13 | 1.66 | 1.80 | 1.37 | 1.31 |
| 7491 | 2.04 | 3.00 | 4.16 | 3.64 | 4.75 | 3.71 | 3.95 | 2.72 | 4.31 | 2.61 | 3.93 | 6.27 | 6.12 | 8.11 | 3.19 | 1.60 | 3.61 | 3.85 | 3.41 | 1.13 |
| 7492 | 1.49 | 1.74 | 2.04 | 2.21 | 3.00 | 2.66 | 2.58 | 1.56 | 3.03 | 2.41 | 2.39 | 5.20 | 5.00 | 3.64 | 2.20 | 0.00 | 2.22 | 2.33 | 2.13 | 1.09 |
| 7493 | 1.27 | 1.43 | 1.43 | 1.56 | 4.95 | 1.81 | 2.69 | 1.32 | 2.44 | 3.57 | 2.41 | 2.87 | 3.87 | 2.65 | 2.25 | 3.99 | 1.78 | 1.82 | 1.85 | 0.98 |
| 7494 | 1.17 | 0.95 | 1.39 | 1.45 | 3.73 | 1.59 | 2.19 | 1.24 | 1.95 | 2.31 | 1.80 | 2.19 | 2.84 | 1.89 | 1.66 | 3.12 | 1.52 | 1.62 | 1.29 | 1.25 |
| 7495 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7496 | 2.40 | 2.54 | 3.10 | 3.18 | 3.72 | 3.21 | 2.86 | 1.87 | 3.71 | 2.23 | 3.71 | 7.82 | 7.86 | 5.11 | 3.10 | 0.00 | 3.11 | 3.18 | 3.15 | 1.01 |
| 7497 | 1.37 | 1.33 | 1.05 | 1.15 | 4.41 | 1.30 | 2.24 | 1.12 | 1.84 | 3.19 | 2.21 | 2.01 | 3.29 | 3.00 | 2.33 | 5.40 | 1.45 | 1.38 | 1.72 | 0.80 |
| 7498 | 1.14 | 0.91 | 1.42 | 1.47 | 4.05 | 1.58 | 2.29 | 1.24 | 1.98 | 2.39 | 1.89 | 2.19 | 2.76 | 1.82 | 1.64 | 3.42 | 1.54 | 1.65 | 1.27 | 1.30 |
| 7499 | 1.75 | 2.36 | 2.25 | 2.15 | 5.26 | 2.42 | 3.16 | 2.05 | 3.46 | 3.78 | 3.37 | 4.14 | 4.56 | 6.02 | 2.91 | 4.39 | 2.45 | 2.46 | 2.77 | 0.89 |
| 7500 | 3.73 | 6.61 | 4.89 | 4.52 | 6.83 | 5.12 | 6.04 | 4.73 | 7.65 | 7.24 | 7.83 | 10.23 | 9.72 | 22.70 | 6.74 | 5.45 | 5.29 | 4.99 | 7.18 | 0.69 |
| 7501 | 1.40 | 2.19 | 2.69 | 2.46 | 4.06 | 2.57 | 2.92 | 1.86 | 3.31 | 2.79 | 3.14 | 4.93 | 4.90 | 4.26 | 2.56 | 1.43 | 2.53 | 2.65 | 2.57 | 1.03 |
| 7502 | 1.06 | 1.81 | 1.98 | 1.95 | 4.48 | 2.11 | 2.95 | 1.72 | 3.02 | 3.15 | 2.75 | 3.25 | 3.61 | 2.87 | 2.21 | 3.24 | 2.07 | 2.18 | 2.13 | 1.02 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7503 | 14.9 | Plant 09 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 75.87 |
| 7504 | 59.6 | Plant 09 | Clean Coal (5/8" x 1mm / Flt x 1.5 SG) | 5.51 |
| 7505 | 24.5 | Plant 09 | Clean Coal (5/8" x 1mm / 1.5 x 1.6 SG) | 26.92 |
| 7506 | 17 | Plant 09 | Clean Coal (5/8" x 1mm / 1.6 x 1.8 SG) | 34.49 |
| 7507 | 4.9 | Plant 09 | Clean Coal (5/8" x 1mm / 1.8 x Snk SG) | 83.79 |
| 7508 | 61.6 | Plant 09 | Clean Coal (1" x 5/8" / Flt x 1.5 SG) | 7.42 |
| 7509 | 60.4 | Plant 09 | Clean Coal (1" x 5/8" / 1.5 x 1.6 SG) | 26.46 |
| 7510 | 3.2 | Plant 09 | Clean Coal (1" x 5/8" / 1.6 x 1.8 SG) | 45.08 |
| | | Plant 09 | Clean Coal (1" x 5/8" / 1.8 x Snk SG) | |
| 7512 | 57.8 | Plant 09 | Clean Coal (+ x 1" / Flt x 1.5 SG) | 8.3 |
| 7513 | 67.9 | Plant 09 | Clean Coal (+ x 1" / 1.5 x 1.6 SG) | 25.23 |
| 7514 | 9.3 | Plant 09 | Clean Coal (+ x 1" / 1.6 x 1.8 SG) | 36.51 |
| 7515 | 0.6 | Plant 09 | Clean Coal (+ x 1" / 1.8 x Snk SG) | 75.54 |
| 7556 | 47 | Plant 10 | Raw Coal (100M x 0) | 57.44 |
| 7557 | 61.6 | Plant 10 | Raw Coal (1mm x 100M) | 28.18 |
| 7558 | 74.3 | Plant 10 | Raw Coal (1/2" x 1mm) | 43.86 |
| 7559 | 99.8 | Plant 10 | Raw Coal (1 1/2" x 1/2") | 78.03 |
| 7560 | 107 | Plant 10 | Raw Coal (+ x 1 1/2") | 90.44 |
| 7561 | 36.9 | Plant 10 | Fine Reject (100M x 0) | 70.05 |
| 7562 | 5.1 | Plant 10 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 4.29 |
| 7564 | 0.1 | Plant 10 | Fine Reject (1mm x 100M) | 82.29 |
| 7565 | 50.2 | Plant 10 | Coarse Reject (100M x 0) | 84.62 |
| 7566 | 65.3 | Plant 10 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 9.08 |
| 7567 | 11.7 | Plant 10 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 40.86 |
| 7568 | 70.1 | Plant 10 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 89.36 |
| 7569 | 39.7 | Plant 10 | Coarse Reject (1/2" x 1mm / Flt x 1.6 SG) | 19.17 |
| 7570 | 91.3 | Plant 10 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 43.41 |
| 7571 | 79.6 | Plant 10 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 90.33 |
| 7572 | 69.6 | Plant 10 | Coarse Reject (1 1/2" x 1/2" / Flt x 1.6 SG) | 23.32 |
| 7573 | 69.4 | Plant 10 | Coarse Reject (1 1/2" x 1/2" / 1.6 x 1.8 SG) | 44.07 |
| 7574 | 82.3 | Plant 10 | Coarse Reject (1 1/2" x 1/2" / 1.8 x Snk SG) | 91.21 |
| 7575 | 14.4 | Plant 10 | Coarse Reject (+ x 1 1/2" / Flt x 1.6 SG) | 34.73 |
| 7576 | 16.4 | Plant 10 | Coarse Reject (+ x 1 1/2" / 1.6 x 1.8 SG) | 43.99 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7503 | 12.52 | 18.68 | 36.50 | 70.95 | 58.25 | 28.56 | 19.65 | 1.36 | 7.53 | 2.92 | 8.81 | -0.46 | 3.65 | 0.38 | 3.53 | 4.25 | 277.1 | 222.8 | 41.8 | 0.19 |
| 7504 | 43.04 | 123.04 | 127.64 | 237.09 | 37.05 | 118.64 | 26.20 | 4.66 | 24.10 | 3.22 | 22.45 | 6.63 | 16.18 | 5.18 | 9.95 | 1.21 | 806.3 | 575.4 | 187.9 | 0.33 |
| 7505 | 24.12 | 46.28 | 79.01 | 150.63 | 22.76 | 75.25 | 13.56 | 2.09 | 12.51 | 1.49 | 10.74 | 4.62 | 11.91 | 1.26 | 4.86 | 0.00 | 461.1 | 355.8 | 81.2 | 0.23 |
| 7506 | 19.28 | 33.56 | 48.19 | 93.56 | 42.97 | 43.69 | 17.05 | 1.77 | 9.74 | 2.78 | 10.10 | 1.56 | 7.24 | 0.98 | 4.50 | 2.47 | 339.4 | 257.0 | 63.2 | 0.25 |
| 7507 | 15.74 | 21.29 | 42.47 | 83.59 | 43.26 | 38.34 | 16.15 | 1.51 | 7.72 | 2.26 | 8.12 | 0.65 | 4.92 | 0.48 | 3.60 | 2.88 | 293.0 | 233.0 | 44.2 | 0.19 |
| 7508 | 34.34 | 83.84 | 138.72 | 242.69 | 36.17 | 112.34 | 22.93 | 3.78 | 19.86 | 2.00 | 17.29 | 5.72 | 13.64 | 3.18 | 7.04 | 0.78 | 744.3 | 576.5 | 133.5 | 0.23 |
| 7509 | 25.77 | 47.20 | 78.61 | 146.80 | 36.70 | 75.11 | 17.08 | 2.31 | 13.08 | 2.28 | 12.22 | 4.15 | 12.59 | 1.36 | 5.78 | 0.95 | 482.0 | 369.7 | 86.5 | 0.23 |
| 7510 | 28.46 | 19.95 | 17.71 | 59.47 | 12.11 | 28.42 | 6.11 | 1.27 | 5.62 | 1.31 | 5.76 | 2.20 | 7.01 | 0.99 | 3.68 | 0.26 | 200.3 | 130.7 | 41.2 | 0.31 |
| 0 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7512 | 31.99 | 82.52 | 144.60 | 256.56 | 37.43 | 117.19 | 23.13 | 3.63 | 19.67 | 1.87 | 16.91 | 5.96 | 14.30 | 3.07 | 6.81 | 0.52 | 766.2 | 602.2 | 132.0 | 0.22 |
| 7513 | 18.61 | 34.11 | 65.06 | 124.41 | 30.81 | 61.31 | 13.60 | 1.42 | 10.14 | 1.73 | 9.04 | 3.24 | 9.80 | 1.08 | 3.99 | 0.44 | 388.8 | 306.7 | 63.4 | 0.21 |
| 7514 | 14.00 | 18.37 | 17.67 | 59.46 | 7.28 | 37.10 | 4.88 | 0.69 | 6.26 | 1.03 | 4.04 | 2.89 | 7.56 | 0.95 | 2.29 | 0.00 | 184.5 | 133.3 | 37.1 | 0.28 |
| 7515 | 36.51 | 22.24 | 44.85 | 86.98 | 67.28 | 41.22 | 10.37 | 1.86 | 14.30 | 1.94 | 7.19 | 1.35 | 5.01 | 0.48 | 3.05 | 1.95 | 346.6 | 266.9 | 43.2 | 0.16 |
| 7556 | 20.43 | 25.46 | 48.44 | 95.60 | 20.06 | 42.07 | 10.84 | 1.45 | 7.86 | 1.12 | 5.90 | 2.05 | 6.69 | 0.51 | 3.42 | 0.68 | 292.6 | 226.3 | 45.8 | 0.20 |
| 7557 | 22.62 | 36.45 | 53.03 | 100.92 | 23.13 | 45.29 | 12.31 | 1.74 | 9.12 | 1.45 | 7.56 | 2.35 | 7.32 | 1.00 | 4.28 | 0.96 | 329.5 | 245.5 | 61.4 | 0.25 |
| 7558 | 21.69 | 30.67 | 51.70 | 99.44 | 21.81 | 44.27 | 11.71 | 1.61 | 8.41 | 1.28 | 6.79 | 2.14 | 6.94 | 0.78 | 3.86 | 0.84 | 314.0 | 239.0 | 53.3 | 0.22 |
| 7559 | 18.46 | 22.51 | 43.51 | 88.21 | 18.98 | 38.66 | 10.12 | 1.34 | 7.30 | 1.09 | 5.42 | 1.85 | 6.23 | 0.31 | 3.15 | 0.62 | 267.8 | 208.1 | 41.2 | 0.20 |
| 7560 | 17.04 | 19.71 | 37.46 | 78.41 | 20.82 | 33.38 | 10.02 | 1.22 | 6.69 | 1.25 | 5.34 | 1.52 | 5.32 | 0.41 | 2.92 | 0.93 | 242.5 | 188.0 | 37.4 | 0.20 |
| 7561 | 20.21 | 22.34 | 41.28 | 89.66 | 18.92 | 37.00 | 9.88 | 1.34 | 7.26 | 1.06 | 5.40 | 1.90 | 6.38 | 0.41 | 3.19 | 0.57 | 266.8 | 205.3 | 41.2 | 0.20 |
| 7562 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7564 | 40.25 | 101.66 | 82.20 | 157.19 | 32.80 | 73.48 | 19.96 | 3.58 | 18.85 | 2.89 | 17.12 | 4.89 | 13.75 | 3.91 | 9.04 | 1.63 | 583.2 | 388.1 | 154.9 | 0.40 |
| 7565 | 16.98 | 18.43 | 29.18 | 75.98 | 19.17 | 28.12 | 8.77 | 1.14 | 6.06 | 1.20 | 4.95 | 1.41 | 5.61 | 0.41 | 3.03 | 0.90 | 221.4 | 168.4 | 35.9 | 0.21 |
| 7566 | 46.27 | 96.96 | 78.27 | 158.25 | 33.51 | 70.11 | 19.93 | 4.03 | 18.65 | 4.20 | 17.93 | 5.51 | 16.94 | 3.40 | 10.38 | 1.43 | 585.8 | 382.7 | 156.7 | 0.41 |
| 7567 | 23.63 | 31.06 | 46.36 | 102.15 | 20.00 | 39.47 | 10.31 | 1.52 | 7.89 | 1.38 | 6.40 | 2.48 | 7.88 | 0.88 | 4.21 | 0.69 | 306.3 | 227.7 | 55.0 | 0.24 |
| 7568 | 17.34 | 19.96 | 39.65 | 82.20 | 20.11 | 34.61 | 9.72 | 1.23 | 6.67 | 1.10 | 5.03 | 1.61 | 5.54 | 0.20 | 2.99 | 0.90 | 248.9 | 194.2 | 37.3 | 0.19 |
| 7569 | 34.17 | 56.32 | 64.64 | 129.38 | 28.06 | 56.02 | 15.37 | 2.49 | 12.26 | 2.42 | 10.97 | 3.54 | 11.04 | 1.70 | 6.65 | 1.26 | 436.3 | 308.2 | 93.9 | 0.30 |
| 7570 | 26.11 | 34.75 | 54.19 | 111.80 | 22.57 | 46.27 | 12.14 | 1.75 | 8.95 | 1.51 | 7.32 | 2.64 | 8.46 | 0.94 | 4.72 | 0.79 | 344.9 | 257.7 | 61.1 | 0.24 |
| 7571 | 17.55 | 20.35 | 38.89 | 80.88 | 19.03 | 34.99 | 9.77 | 1.24 | 6.79 | 1.09 | 5.13 | 1.64 | 5.87 | 0.32 | 3.02 | 0.73 | 247.3 | 191.6 | 38.1 | 0.20 |
| 7572 | 33.43 | 53.95 | 70.83 | 142.65 | 25.09 | 60.37 | 14.76 | 2.12 | 12.30 | 1.87 | 10.33 | 3.68 | 11.61 | 1.02 | 6.06 | 0.69 | 450.8 | 328.1 | 89.2 | 0.27 |
| 7573 | 27.92 | 33.91 | 44.35 | 105.67 | 18.43 | 41.47 | 10.80 | 1.63 | 8.74 | 1.43 | 7.23 | 2.82 | 8.67 | 0.98 | 4.64 | 0.45 | 319.1 | 231.1 | 60.1 | 0.26 |
| 7574 | 12.75 | 9.41 | 16.04 | 43.50 | 12.96 | 19.98 | 5.70 | 0.75 | 4.38 | 0.95 | 3.49 | 1.37 | 4.83 | 0.33 | 1.85 | 0.45 | 138.7 | 103.3 | 22.7 | 0.22 |
| 7575 | 21.47 | 17.84 | 12.15 | 40.84 | 11.62 | 18.21 | 5.56 | 1.21 | 4.85 | 1.65 | 4.67 | 1.47 | 5.50 | 0.88 | 3.34 | 0.58 | 151.9 | 94.4 | 35.9 | 0.38 |
| 7576 | 18.46 | 23.69 | 25.62 | 59.46 | 16.29 | 27.78 | 8.37 | 1.32 | 6.28 | 1.49 | 5.61 | 1.63 | 5.74 | 0.98 | 3.73 | 1.00 | 207.5 | 145.1 | 43.9 | 0.30 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7503 | 9.50 | 14.17 | 27.70 | 53.83 | 44.19 | 21.67 | 14.91 | 1.03 | 5.71 | 2.22 | 6.69 | -0.35 | 2.77 | 0.29 | 2.68 | 3.23 | 210.2 | 169.0 | 31.7 | 0.187 |
| 7504 | 2.37 | 6.78 | 7.03 | 13.06 | 2.04 | 6.54 | 1.44 | 0.26 | 1.33 | 0.18 | 1.24 | 0.37 | 0.89 | 0.29 | 0.55 | 0.07 | 44.4 | 31.7 | 10.4 | 0.326 |
| 7505 | 6.49 | 12.46 | 21.27 | 40.55 | 6.13 | 20.26 | 3.65 | 0.56 | 3.37 | 0.40 | 2.89 | 1.24 | 3.21 | 0.34 | 1.31 | 0.00 | 124.1 | 95.8 | 21.8 | 0.228 |
| 7506 | 6.65 | 11.57 | 16.62 | 32.27 | 14.82 | 15.07 | 5.88 | 0.61 | 3.36 | 0.96 | 3.48 | 0.54 | 2.50 | 0.34 | 1.55 | 0.85 | 117.1 | 88.6 | 21.8 | 0.246 |
| 7507 | 13.19 | 17.84 | 35.59 | 70.04 | 36.25 | 32.12 | 13.53 | 1.27 | 6.47 | 1.90 | 6.80 | 0.54 | 4.13 | 0.40 | 3.02 | 2.41 | 245.5 | 195.3 | 37.0 | 0.19 |
| 7508 | 2.55 | 6.22 | 10.29 | 18.01 | 2.68 | 8.34 | 1.70 | 0.28 | 1.47 | 0.15 | 1.28 | 0.42 | 1.01 | 0.24 | 0.52 | 0.06 | 55.2 | 42.8 | 9.9 | 0.232 |
| 7509 | 6.82 | 12.49 | 20.80 | 38.84 | 9.71 | 19.87 | 4.52 | 0.61 | 3.46 | 0.60 | 3.23 | 1.10 | 3.33 | 0.36 | 1.53 | 0.25 | 127.5 | 97.8 | 22.9 | 0.234 |
| 7510 | 12.83 | 8.99 | 7.98 | 26.81 | 5.46 | 12.81 | 2.75 | 0.57 | 2.53 | 0.59 | 2.59 | 0.99 | 3.16 | 0.45 | 1.66 | 0.12 | 90.3 | 58.9 | 18.6 | 0.315 |
| 0 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7512 | 2.65 | 6.85 | 12.00 | 21.29 | 3.11 | 9.73 | 1.92 | 0.30 | 1.63 | 0.16 | 1.40 | 0.50 | 1.19 | 0.25 | 0.57 | 0.04 | 63.6 | 50.0 | 11.0 | 0.219 |
| 7513 | 4.69 | 8.61 | 16.41 | 31.39 | 7.77 | 15.47 | 3.43 | 0.36 | 2.56 | 0.44 | 2.28 | 0.82 | 2.47 | 0.27 | 1.01 | 0.11 | 98.1 | 77.4 | 16.0 | 0.207 |
| 7514 | 5.11 | 6.71 | 6.45 | 21.71 | 2.66 | 13.55 | 1.78 | 0.25 | 2.29 | 0.37 | 1.48 | 1.05 | 2.76 | 0.35 | 0.84 | 0.00 | 67.4 | 48.7 | 13.6 | 0.278 |
| 7515 | 27.58 | 16.80 | 33.88 | 65.71 | 50.82 | 31.14 | 7.83 | 1.40 | 10.81 | 1.47 | 5.43 | 1.02 | 3.79 | 0.36 | 2.30 | 1.48 | 261.8 | 201.6 | 32.6 | 0.162 |
| 7556 | 11.74 | 14.63 | 27.83 | 54.91 | 11.52 | 24.17 | 6.23 | 0.84 | 4.51 | 0.64 | 3.39 | 1.18 | 3.84 | 0.29 | 1.97 | 0.39 | 168.1 | 130.0 | 26.3 | 0.202 |
| 7557 | 6.37 | 10.27 | 14.94 | 28.44 | 6.52 | 12.76 | 3.47 | 0.49 | 2.57 | 0.41 | 2.13 | 0.66 | 2.06 | 0.28 | 1.21 | 0.27 | 92.9 | 69.2 | 17.3 | 0.25 |
| 7558 | 9.51 | 13.45 | 22.68 | 43.61 | 9.57 | 19.42 | 5.14 | 0.71 | 3.69 | 0.56 | 2.98 | 0.94 | 3.04 | 0.34 | 1.69 | 0.37 | 137.7 | 104.8 | 23.4 | 0.223 |
| 7559 | 14.41 | 17.57 | 33.95 | 68.83 | 14.81 | 30.17 | 7.90 | 1.04 | 5.70 | 0.85 | 4.23 | 1.44 | 4.86 | 0.24 | 2.46 | 0.48 | 208.9 | 162.4 | 32.1 | 0.198 |
| 7560 | 15.41 | 17.83 | 33.88 | 70.92 | 18.83 | 30.19 | 9.06 | 1.11 | 6.05 | 1.13 | 4.83 | 1.37 | 4.81 | 0.37 | 2.64 | 0.84 | 219.3 | 170.0 | 33.8 | 0.199 |
| 7561 | 14.16 | 15.65 | 28.92 | 62.80 | 13.26 | 25.92 | 6.92 | 0.94 | 5.09 | 0.74 | 3.78 | 1.33 | 4.47 | 0.29 | 2.23 | 0.40 | 186.9 | 143.8 | 28.9 | 0.201 |
| 7562 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7564 | 33.12 | 83.65 | 67.64 | 129.35 | 27.00 | 60.47 | 16.43 | 2.95 | 15.51 | 2.38 | 14.09 | 4.02 | 11.32 | 3.22 | 7.44 | 1.34 | 479.9 | 319.3 | 127.5 | 0.399 |
| 7565 | 14.37 | 15.60 | 24.69 | 64.29 | 16.22 | 23.79 | 7.42 | 0.96 | 5.13 | 1.02 | 4.19 | 1.20 | 4.75 | 0.35 | 2.56 | 0.77 | 187.3 | 142.5 | 30.4 | 0.213 |
| 7566 | 4.20 | 8.80 | 7.11 | 14.37 | 3.04 | 6.37 | 1.81 | 0.37 | 1.69 | 0.38 | 1.63 | 0.50 | 1.54 | 0.31 | 0.94 | 0.13 | 53.2 | 34.8 | 14.2 | 0.41 |
| 7567 | 9.66 | 12.69 | 18.94 | 41.74 | 8.17 | 16.13 | 4.21 | 0.62 | 3.23 | 0.57 | 2.62 | 1.01 | 3.22 | 0.36 | 1.72 | 0.28 | 125.2 | 93.0 | 22.5 | 0.241 |
| 7568 | 15.49 | 17.84 | 35.43 | 73.46 | 17.97 | 30.93 | 8.69 | 1.10 | 5.96 | 0.98 | 4.49 | 1.44 | 4.95 | 0.18 | 2.67 | 0.80 | 222.4 | 173.5 | 33.4 | 0.192 |
| 7569 | 6.55 | 10.80 | 12.39 | 24.80 | 5.38 | 10.74 | 2.95 | 0.48 | 2.35 | 0.46 | 2.10 | 0.68 | 2.12 | 0.33 | 1.27 | 0.24 | 83.6 | 59.1 | 18.0 | 0.305 |
| 7570 | 11.33 | 15.08 | 23.52 | 48.53 | 9.80 | 20.08 | 5.27 | 0.76 | 3.89 | 0.66 | 3.18 | 1.15 | 3.67 | 0.41 | 2.05 | 0.34 | 149.7 | 111.9 | 26.5 | 0.237 |
| 7571 | 15.85 | 18.38 | 35.13 | 73.06 | 17.19 | 31.61 | 8.83 | 1.12 | 6.13 | 0.98 | 4.63 | 1.48 | 5.30 | 0.29 | 2.72 | 0.66 | 223.4 | 173.1 | 34.5 | 0.199 |
| 7572 | 7.80 | 12.58 | 16.52 | 33.27 | 5.85 | 14.08 | 3.44 | 0.50 | 2.87 | 0.44 | 2.41 | 0.86 | 2.71 | 0.24 | 1.41 | 0.16 | 105.1 | 76.5 | 20.8 | 0.272 |
| 7573 | 12.30 | 14.94 | 19.55 | 46.57 | 8.12 | 18.27 | 4.76 | 0.72 | 3.85 | 0.63 | 3.18 | 1.24 | 3.82 | 0.43 | 2.04 | 0.20 | 140.6 | 101.8 | 26.5 | 0.26 |
| 7574 | 11.63 | 8.58 | 14.63 | 39.68 | 11.82 | 18.22 | 5.20 | 0.68 | 3.99 | 0.87 | 3.19 | 1.25 | 4.40 | 0.30 | 1.68 | 0.41 | 126.5 | 94.2 | 20.7 | 0.219 |
| 7575 | 7.46 | 6.20 | 4.22 | 14.18 | 4.04 | 6.32 | 1.93 | 0.42 | 1.69 | 0.57 | 1.62 | 0.51 | 1.91 | 0.31 | 1.16 | 0.20 | 52.7 | 32.8 | 12.5 | 0.381 |
| 7576 | 8.12 | 10.42 | 11.27 | 26.16 | 7.17 | 12.22 | 3.68 | 0.58 | 2.76 | 0.66 | 2.47 | 0.72 | 2.52 | 0.43 | 1.64 | 0.44 | 91.3 | 63.8 | 19.3 | 0.302 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7503 | 0.59 | 0.59 | 0.92 | 0.90 | 6.60 | 0.80 | 2.81 | 0.79 | 1.43 | 3.41 | 1.76 | -0.44 | 1.32 | 0.87 | 1.34 | 9.21 | 1.14 | 1.26 | 0.93 | 1.35 |
| 7504 | 0.15 | 0.28 | 0.23 | 0.22 | 0.30 | 0.24 | 0.27 | 0.20 | 0.33 | 0.27 | 0.33 | 0.46 | 0.42 | 0.86 | 0.27 | 0.19 | 0.24 | 0.24 | 0.30 | 0.78 |
| 7505 | 0.41 | 0.52 | 0.71 | 0.68 | 0.91 | 0.75 | 0.69 | 0.43 | 0.84 | 0.62 | 0.76 | 1.55 | 1.53 | 1.02 | 0.65 | 0.00 | 0.67 | 0.71 | 0.64 | 1.11 |
| 7506 | 0.42 | 0.48 | 0.55 | 0.54 | 2.21 | 0.56 | 1.11 | 0.47 | 0.84 | 1.47 | 0.92 | 0.67 | 1.19 | 1.03 | 0.78 | 2.43 | 0.64 | 0.66 | 0.64 | 1.03 |
| 7507 | 0.82 | 0.74 | 1.19 | 1.17 | 5.41 | 1.19 | 2.55 | 0.97 | 1.62 | 2.92 | 1.79 | 0.68 | 1.96 | 1.22 | 1.51 | 6.89 | 1.33 | 1.45 | 1.09 | 1.34 |
| 7508 | 0.16 | 0.26 | 0.34 | 0.30 | 0.40 | 0.31 | 0.32 | 0.22 | 0.37 | 0.23 | 0.34 | 0.53 | 0.48 | 0.71 | 0.26 | 0.16 | 0.30 | 0.32 | 0.29 | 1.09 |
| 7509 | 0.43 | 0.52 | 0.69 | 0.65 | 1.45 | 0.74 | 0.85 | 0.47 | 0.87 | 0.93 | 0.85 | 1.37 | 1.59 | 1.09 | 0.76 | 0.72 | 0.69 | 0.73 | 0.67 | 1.08 |
| 7510 | 0.80 | 0.37 | 0.27 | 0.45 | 0.81 | 0.47 | 0.52 | 0.44 | 0.63 | 0.91 | 0.68 | 1.24 | 1.51 | 1.35 | 0.83 | 0.33 | 0.49 | 0.44 | 0.55 | 0.80 |
| 0 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7512 | 0.17 | 0.29 | 0.40 | 0.35 | 0.46 | 0.36 | 0.36 | 0.23 | 0.41 | 0.24 | 0.37 | 0.62 | 0.57 | 0.77 | 0.28 | 0.12 | 0.34 | 0.37 | 0.32 | 1.16 |
| 7513 | 0.29 | 0.36 | 0.55 | 0.52 | 1.16 | 0.57 | 0.65 | 0.27 | 0.64 | 0.67 | 0.60 | 1.02 | 1.18 | 0.83 | 0.50 | 0.32 | 0.53 | 0.58 | 0.47 | 1.23 |
| 7514 | 0.32 | 0.28 | 0.22 | 0.36 | 0.40 | 0.50 | 0.34 | 0.19 | 0.57 | 0.58 | 0.39 | 1.32 | 1.31 | 1.05 | 0.42 | 0.00 | 0.37 | 0.36 | 0.40 | 0.91 |
| 7515 | 1.72 | 0.70 | 1.13 | 1.10 | 7.59 | 1.15 | 1.48 | 1.08 | 2.70 | 2.26 | 1.43 | 1.27 | 1.80 | 1.10 | 1.15 | 4.21 | 1.42 | 1.50 | 0.96 | 1.56 |
| 7556 | 0.73 | 0.61 | 0.93 | 0.92 | 1.72 | 0.90 | 1.17 | 0.64 | 1.13 | 0.99 | 0.89 | 1.47 | 1.83 | 0.88 | 0.98 | 1.11 | 0.91 | 0.97 | 0.77 | 1.25 |
| 7557 | 0.40 | 0.43 | 0.50 | 0.47 | 0.97 | 0.47 | 0.65 | 0.38 | 0.64 | 0.63 | 0.56 | 0.83 | 0.98 | 0.86 | 0.60 | 0.77 | 0.50 | 0.52 | 0.51 | 1.01 |
| 7558 | 0.59 | 0.56 | 0.76 | 0.73 | 1.43 | 0.72 | 0.97 | 0.54 | 0.92 | 0.86 | 0.78 | 1.17 | 1.45 | 1.04 | 0.85 | 1.06 | 0.75 | 0.78 | 0.69 | 1.14 |
| 7559 | 0.90 | 0.73 | 1.13 | 1.15 | 2.21 | 1.12 | 1.49 | 0.80 | 1.42 | 1.31 | 1.11 | 1.80 | 2.31 | 0.73 | 1.23 | 1.38 | 1.13 | 1.21 | 0.94 | 1.28 |
| 7560 | 0.96 | 0.74 | 1.13 | 1.18 | 2.81 | 1.12 | 1.71 | 0.85 | 1.51 | 1.74 | 1.27 | 1.72 | 2.29 | 1.13 | 1.32 | 2.40 | 1.19 | 1.27 | 0.99 | 1.27 |
| 7561 | 0.88 | 0.65 | 0.96 | 1.05 | 1.98 | 0.96 | 1.31 | 0.72 | 1.27 | 1.15 | 0.99 | 1.66 | 2.13 | 0.87 | 1.12 | 1.14 | 1.01 | 1.07 | 0.85 | 1.26 |
| 7562 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7564 | 2.07 | 3.49 | 2.25 | 2.16 | 4.03 | 2.24 | 3.10 | 2.27 | 3.88 | 3.66 | 3.71 | 5.03 | 5.39 | 9.76 | 3.72 | 3.82 | 2.60 | 2.38 | 3.75 | 0.63 |
| 7565 | 0.90 | 0.65 | 0.82 | 1.07 | 2.42 | 0.88 | 1.40 | 0.74 | 1.28 | 1.56 | 1.10 | 1.50 | 2.26 | 1.06 | 1.28 | 2.19 | 1.02 | 1.06 | 0.89 | 1.19 |
| 7566 | 0.26 | 0.37 | 0.24 | 0.24 | 0.45 | 0.24 | 0.34 | 0.28 | 0.42 | 0.59 | 0.43 | 0.62 | 0.73 | 0.94 | 0.47 | 0.37 | 0.29 | 0.26 | 0.42 | 0.62 |
| 7567 | 0.60 | 0.53 | 0.63 | 0.70 | 1.22 | 0.60 | 0.79 | 0.48 | 0.81 | 0.87 | 0.69 | 1.26 | 1.53 | 1.09 | 0.86 | 0.80 | 0.68 | 0.69 | 0.66 | 1.05 |
| 7568 | 0.97 | 0.74 | 1.18 | 1.22 | 2.68 | 1.15 | 1.64 | 0.85 | 1.49 | 1.51 | 1.18 | 1.80 | 2.36 | 0.53 | 1.34 | 2.29 | 1.21 | 1.29 | 0.98 | 1.32 |
| 7569 | 0.41 | 0.45 | 0.41 | 0.41 | 0.80 | 0.40 | 0.56 | 0.37 | 0.59 | 0.71 | 0.55 | 0.85 | 1.01 | 0.99 | 0.64 | 0.69 | 0.45 | 0.44 | 0.53 | 0.83 |
| 7570 | 0.71 | 0.63 | 0.78 | 0.81 | 1.46 | 0.74 | 0.99 | 0.58 | 0.97 | 1.01 | 0.84 | 1.43 | 1.75 | 1.23 | 1.02 | 0.98 | 0.81 | 0.83 | 0.78 | 1.07 |
| 7571 | 0.99 | 0.77 | 1.17 | 1.22 | 2.57 | 1.17 | 1.67 | 0.86 | 1.53 | 1.51 | 1.22 | 1.85 | 2.53 | 0.88 | 1.36 | 1.89 | 1.21 | 1.29 | 1.01 | 1.27 |
| 7572 | 0.49 | 0.52 | 0.55 | 0.55 | 0.87 | 0.52 | 0.65 | 0.38 | 0.72 | 0.67 | 0.63 | 1.07 | 1.29 | 0.72 | 0.71 | 0.46 | 0.57 | 0.57 | 0.61 | 0.93 |
| 7573 | 0.77 | 0.62 | 0.65 | 0.78 | 1.21 | 0.68 | 0.90 | 0.55 | 0.96 | 0.97 | 0.84 | 1.55 | 1.82 | 1.31 | 1.02 | 0.56 | 0.76 | 0.76 | 0.78 | 0.97 |
| 7574 | 0.73 | 0.36 | 0.49 | 0.66 | 1.76 | 0.67 | 0.98 | 0.53 | 1.00 | 1.33 | 0.84 | 1.56 | 2.10 | 0.92 | 0.84 | 1.17 | 0.69 | 0.70 | 0.61 | 1.15 |
| 7575 | 0.47 | 0.26 | 0.14 | 0.24 | 0.60 | 0.23 | 0.36 | 0.32 | 0.42 | 0.88 | 0.43 | 0.64 | 0.91 | 0.93 | 0.58 | 0.58 | 0.29 | 0.24 | 0.37 | 0.67 |
| 7576 | 0.51 | 0.43 | 0.38 | 0.44 | 1.07 | 0.45 | 0.69 | 0.45 | 0.69 | 1.01 | 0.65 | 0.90 | 1.20 | 1.31 | 0.82 | 1.26 | 0.50 | 0.48 | 0.57 | 0.84 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7503 | 0.78 | 0.78 | 1.22 | 1.18 | 8.69 | 1.06 | 3.71 | 1.04 | 1.88 | 4.50 | 2.32 | -0.58 | 1.74 | 1.14 | 1.77 | 12.15 | 1.50 | 1.66 | 1.23 | 1.35 |
| 7504 | 2.69 | 5.13 | 4.25 | 3.95 | 5.53 | 4.39 | 4.94 | 3.58 | 6.02 | 4.95 | 5.91 | 8.28 | 7.71 | 15.69 | 4.97 | 3.46 | 4.37 | 4.28 | 5.52 | 0.78 |
| 7505 | 1.51 | 1.93 | 2.63 | 2.51 | 3.40 | 2.79 | 2.56 | 1.61 | 3.13 | 2.30 | 2.83 | 5.77 | 5.67 | 3.80 | 2.43 | 0.00 | 2.50 | 2.65 | 2.38 | 1.11 |
| 7506 | 1.21 | 1.40 | 1.61 | 1.56 | 6.41 | 1.62 | 3.22 | 1.36 | 2.43 | 4.27 | 2.66 | 1.95 | 3.45 | 2.98 | 2.25 | 7.05 | 1.84 | 1.91 | 1.86 | 1.03 |
| 7507 | 0.98 | 0.89 | 1.42 | 1.39 | 6.46 | 1.42 | 3.05 | 1.16 | 1.93 | 3.48 | 2.14 | 0.81 | 2.34 | 1.45 | 1.80 | 8.23 | 1.59 | 1.74 | 1.30 | 1.34 |
| 7508 | 2.15 | 3.49 | 4.62 | 4.04 | 5.40 | 4.16 | 4.33 | 2.90 | 4.97 | 3.07 | 4.55 | 7.15 | 6.50 | 9.62 | 3.52 | 2.22 | 4.04 | 4.29 | 3.92 | 1.09 |
| 7509 | 1.61 | 1.97 | 2.62 | 2.45 | 5.48 | 2.78 | 3.22 | 1.78 | 3.27 | 3.51 | 3.22 | 5.19 | 5.99 | 4.12 | 2.89 | 2.72 | 2.61 | 2.75 | 2.54 | 1.08 |
| 7510 | 1.78 | 0.83 | 0.59 | 0.99 | 1.81 | 1.05 | 1.15 | 0.98 | 1.41 | 2.02 | 1.51 | 2.75 | 3.34 | 3.00 | 1.84 | 0.74 | 1.09 | 0.97 | 1.21 | 0.80 |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7512 | 2.00 | 3.44 | 4.82 | 4.28 | 5.59 | 4.34 | 4.37 | 2.79 | 4.92 | 2.88 | 4.45 | 7.46 | 6.81 | 9.29 | 3.41 | 1.49 | 4.16 | 4.48 | 3.88 | 1.16 |
| 7513 | 1.16 | 1.42 | 2.17 | 2.07 | 4.60 | 2.27 | 2.57 | 1.09 | 2.54 | 2.66 | 2.38 | 4.05 | 4.67 | 3.27 | 1.99 | 1.26 | 2.11 | 2.28 | 1.86 | 1.23 |
| 7514 | 0.88 | 0.77 | 0.59 | 0.99 | 1.09 | 1.37 | 0.92 | 0.53 | 1.57 | 1.58 | 1.06 | 3.61 | 3.60 | 2.88 | 1.15 | 0.00 | 1.00 | 0.99 | 1.09 | 0.91 |
| 7515 | 2.28 | 0.93 | 1.49 | 1.45 | 10.04 | 1.53 | 1.96 | 1.43 | 3.58 | 2.99 | 1.89 | 1.68 | 2.39 | 1.46 | 1.52 | 5.58 | 1.88 | 1.99 | 1.27 | 1.56 |
| 7556 | 1.28 | 1.06 | 1.61 | 1.59 | 2.99 | 1.56 | 2.04 | 1.12 | 1.96 | 1.72 | 1.55 | 2.56 | 3.18 | 1.53 | 1.71 | 1.93 | 1.59 | 1.69 | 1.35 | 1.25 |
| 7557 | 1.41 | 1.52 | 1.77 | 1.68 | 3.45 | 1.68 | 2.32 | 1.34 | 2.28 | 2.23 | 1.99 | 2.94 | 3.48 | 3.04 | 2.14 | 2.74 | 1.79 | 1.83 | 1.80 | 1.01 |
| 7558 | 1.36 | 1.28 | 1.72 | 1.66 | 3.26 | 1.64 | 2.21 | 1.24 | 2.10 | 1.97 | 1.79 | 2.68 | 3.31 | 2.37 | 1.93 | 2.41 | 1.70 | 1.78 | 1.57 | 1.14 |
| 7559 | 1.15 | 0.94 | 1.45 | 1.47 | 2.83 | 1.43 | 1.91 | 1.03 | 1.83 | 1.68 | 1.43 | 2.31 | 2.97 | 0.94 | 1.57 | 1.77 | 1.45 | 1.55 | 1.21 | 1.28 |
| 7560 | 1.06 | 0.82 | 1.25 | 1.31 | 3.11 | 1.24 | 1.89 | 0.94 | 1.67 | 1.93 | 1.40 | 1.90 | 2.53 | 1.25 | 1.46 | 2.66 | 1.32 | 1.40 | 1.10 | 1.27 |
| 7561 | 1.26 | 0.93 | 1.38 | 1.49 | 2.82 | 1.37 | 1.86 | 1.03 | 1.82 | 1.64 | 1.42 | 2.37 | 3.04 | 1.25 | 1.59 | 1.63 | 1.45 | 1.53 | 1.21 | 1.26 |
| 7562 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7564 | 2.52 | 4.24 | 2.74 | 2.62 | 4.90 | 2.72 | 3.77 | 2.76 | 4.71 | 4.44 | 4.50 | 6.11 | 6.55 | 11.86 | 4.52 | 4.64 | 3.16 | 2.89 | 4.55 | 0.63 |
| 7565 | 1.06 | 0.77 | 0.97 | 1.27 | 2.86 | 1.04 | 1.66 | 0.87 | 1.52 | 1.85 | 1.30 | 1.77 | 2.67 | 1.25 | 1.51 | 2.58 | 1.20 | 1.25 | 1.06 | 1.19 |
| 7566 | 2.89 | 4.04 | 2.61 | 2.64 | 5.00 | 2.60 | 3.76 | 3.10 | 4.66 | 6.46 | 4.72 | 6.88 | 8.07 | 10.31 | 5.19 | 4.09 | 3.18 | 2.85 | 4.61 | 0.62 |
| 7567 | 1.48 | 1.29 | 1.55 | 1.70 | 2.99 | 1.46 | 1.95 | 1.17 | 1.97 | 2.13 | 1.69 | 3.10 | 3.75 | 2.67 | 2.10 | 1.96 | 1.66 | 1.70 | 1.62 | 1.05 |
| 7568 | 1.08 | 0.83 | 1.32 | 1.37 | 3.00 | 1.28 | 1.83 | 0.95 | 1.67 | 1.69 | 1.32 | 2.01 | 2.64 | 0.60 | 1.50 | 2.57 | 1.35 | 1.45 | 1.10 | 1.32 |
| 7569 | 2.14 | 2.35 | 2.15 | 2.16 | 4.19 | 2.07 | 2.90 | 1.92 | 3.06 | 3.73 | 2.89 | 4.42 | 5.26 | 5.16 | 3.32 | 3.61 | 2.37 | 2.30 | 2.76 | 0.83 |
| 7570 | 1.63 | 1.45 | 1.81 | 1.86 | 3.37 | 1.71 | 2.29 | 1.35 | 2.24 | 2.33 | 1.93 | 3.30 | 4.03 | 2.84 | 2.36 | 2.27 | 1.87 | 1.92 | 1.80 | 1.07 |
| 7571 | 1.10 | 0.85 | 1.30 | 1.35 | 2.84 | 1.30 | 1.84 | 0.95 | 1.70 | 1.67 | 1.35 | 2.05 | 2.80 | 0.97 | 1.51 | 2.10 | 1.34 | 1.43 | 1.12 | 1.27 |
| 7572 | 2.09 | 2.25 | 2.36 | 2.38 | 3.75 | 2.24 | 2.78 | 1.63 | 3.08 | 2.87 | 2.72 | 4.60 | 5.53 | 3.10 | 3.03 | 1.97 | 2.45 | 2.44 | 2.62 | 0.93 |
| 7573 | 1.75 | 1.41 | 1.48 | 1.76 | 2.75 | 1.54 | 2.04 | 1.25 | 2.18 | 2.20 | 1.90 | 3.52 | 4.13 | 2.97 | 2.32 | 1.28 | 1.73 | 1.72 | 1.77 | 0.97 |
| 7574 | 0.80 | 0.39 | 0.53 | 0.73 | 1.93 | 0.74 | 1.08 | 0.58 | 1.09 | 1.46 | 0.92 | 1.71 | 2.30 | 1.01 | 0.92 | 1.28 | 0.75 | 0.77 | 0.67 | 1.15 |
| 7575 | 1.34 | 0.74 | 0.40 | 0.68 | 1.73 | 0.67 | 1.05 | 0.93 | 1.21 | 2.54 | 1.23 | 1.83 | 2.62 | 2.67 | 1.67 | 1.67 | 0.82 | 0.70 | 1.06 | 0.67 |
| 7576 | 1.15 | 0.99 | 0.85 | 0.99 | 2.43 | 1.03 | 1.58 | 1.01 | 1.57 | 2.30 | 1.48 | 2.04 | 2.73 | 2.97 | 1.87 | 2.86 | 1.13 | 1.08 | 1.29 | 0.84 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7577 | 83.5 | Plant 10 | Coarse Reject (+ x 1 1/2" / 1.8 x Snk SG) | 90.56 |
| 7578 | 59.2 | Plant 10 | Clean Coal (100M x 0) | 14.63 |
| 7579 | 75.7 | Plant 10 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 3.7 |
| 7580 | 18.5 | Plant 10 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 37.23 |
| 7581 | 22.8 | Plant 10 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 75.86 |
| 7582 | 41.2 | Plant 10 | Clean Coal (1/2" x 1mm / Flt x 1.6 SG) | 5.44 |
| 7583 | 5.8 | Plant 10 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 34.69 |
| 7584 | 3.7 | Plant 10 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 81.8 |
| 7585 | 72.5 | Plant 10 | Clean Coal (1 1/2" x 1/2" / Flt x 1.6 SG) | 9.74 |
| 7586 | 24.6 | Plant 10 | Clean Coal (1 1/2" x 1/2" / 1.6 x 1.8 SG) | 41.12 |
| 7588 | 57.8 | Plant 10 | Clean Coal (+ x 1 1/2" / Flt x 1.6 SG) | 14.21 |
| 7591 | 45.6 | Plant 10 | Stoker (100M x 0) | 36.72 |
| 7592 | 76.3 | Plant 10 | Stoker (1mm x 100M / Flt x 1.6 SG) | 13.68 |
| 7593 | 28.4 | Plant 10 | Stoker (1mm x 100M / 1.6 x 1.8 SG) | 37.89 |
| 7594 | 38.5 | Plant 10 | Stoker (1mm x 100M / 1.8 x Snk SG) | 76.58 |
| 7595 | 62.7 | Plant 10 | Stoker (1/2" x 1mm / Flt x 1.6 SG) | 26.79 |
| 7596 | 57.7 | Plant 10 | Stoker (1/2" x 1mm / 1.6 x 1.8 SG) | 37.57 |
| 7597 | 89.9 | Plant 10 | Stoker (1/2" x 1mm / 1.8 x Snk SG) | 74.71 |
| 7598 | 60.5 | Plant 10 | Stoker (1 1/2" x 1/2" / Flt x 1.6 SG) | 29.03 |
| 7599 | 81.6 | Plant 10 | Stoker (1 1/2" x 1/2" / 1.6 x 1.8 SG) | 36.35 |
| 7600 | 13.4 | Plant 10 | Stoker (1 1/2" x 1/2" / 1.8 x Snk SG) | 62.53 |
| 7601 | 88.6 | Plant 10 | Stoker (+ x 1 1/2" / 1.6 x 1.8 SG) | 40.32 |
| 7660 | 50.6 | Plant 11 | Raw Coal (100M x 0) | 66.29 |
| 7661 | 79.5 | Plant 11 | Raw Coal (1mm x 100M) | 46.36 |
| 7664 | 64.1 | Plant 11 | Raw Coal (3/8" x 1mm) | 50.93 |
| 7667 | 73.6 | Plant 11 | Raw Coal (1 1/4" x 3/8") | 55.71 |
| 7670 | 68.3 | Plant 11 | Raw Coal (+ x 1 1/4") | 77.42 |
| 7673 | 25.7 | Plant 11 | Fine Reject (100M x 0) | 71.06 |
| 7674 | 74.9 | Plant 11 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 7.18 |
| 7675 | 18.5 | Plant 11 | Fine Reject (1mm x 100M / 1.6 x 1.9 SG) | 44.07 |
| 7676 | 79.5 | Plant 11 | Fine Reject (1mm x 100M / 1.9 x Snk SG) | 88.13 |
| 7699 | 53.1 | Plant 11 | Coarse Reject (100M x 0) | 86.43 |
| 7700 | 66.2 | Plant 11 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 8.37 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7577 | 13.95 | 11.80 | 21.38 | 53.82 | 15.34 | 23.83 | 7.01 | 0.88 | 5.22 | 1.18 | 4.05 | 1.41 | 5.04 | 0.35 | 2.13 | 0.58 | 168.0 | 127.5 | 26.5 | 0.21 |
| 7578 | 25.92 | 44.12 | 47.14 | 103.25 | 25.66 | 48.72 | 13.66 | 2.10 | 11.63 | 2.09 | 10.55 | 2.99 | 9.17 | 1.62 | 5.17 | 1.19 | 355.0 | 252.2 | 76.9 | 0.30 |
| 7579 | 42.92 | 87.56 | 48.83 | 115.76 | 28.01 | 62.96 | 18.67 | 3.75 | 19.05 | 4.18 | 18.94 | 5.08 | 14.88 | 6.17 | 9.43 | 1.62 | 487.8 | 297.0 | 147.9 | 0.50 |
| 7580 | 13.40 | 10.96 | 15.88 | 46.09 | 14.65 | 19.71 | 5.70 | 0.74 | 4.25 | 1.18 | 3.47 | 1.32 | 5.04 | 0.52 | 2.00 | 0.51 | 145.4 | 107.0 | 25.0 | 0.23 |
| 7581 | 14.42 | 16.44 | 34.03 | 71.22 | 21.95 | 30.21 | 9.33 | 1.09 | 6.11 | 1.21 | 5.06 | 1.20 | 4.40 | 0.35 | 2.60 | 1.23 | 220.9 | 173.9 | 32.5 | 0.19 |
| 7582 | 38.86 | 81.25 | 61.19 | 138.20 | 29.04 | 67.61 | 19.17 | 3.28 | 17.99 | 3.18 | 17.11 | 4.62 | 12.96 | 4.53 | 8.13 | 1.60 | 508.7 | 336.5 | 133.4 | 0.40 |
| 7583 | 14.76 | 13.31 | 19.41 | 53.68 | 20.14 | 23.96 | 7.69 | 0.95 | 5.14 | 1.54 | 4.54 | 1.38 | 5.59 | 0.67 | 2.43 | 1.01 | 176.2 | 131.0 | 30.5 | 0.23 |
| 7584 | 11.61 | 10.18 | 17.79 | 50.04 | 22.13 | 19.38 | 8.15 | 0.77 | 4.59 | 1.39 | 4.09 | 0.61 | 3.69 | 0.21 | 2.12 | 1.57 | 158.3 | 122.9 | 23.9 | 0.19 |
| 7585 | 32.56 | 79.83 | 92.81 | 169.58 | 25.67 | 81.36 | 17.36 | 2.75 | 15.50 | 1.83 | 13.17 | 4.58 | 12.43 | 2.17 | 6.78 | 0.63 | 559.0 | 405.0 | 121.4 | 0.30 |
| 7586 | 14.90 | 21.71 | 42.66 | 95.71 | 15.13 | 41.04 | 9.28 | 1.11 | 7.83 | 0.78 | 5.58 | 2.37 | 6.97 | 0.47 | 2.71 | 0.10 | 268.3 | 212.7 | 40.7 | 0.19 |
| 7588 | 23.81 | 26.26 | 41.52 | 102.41 | 12.86 | 48.21 | 8.78 | 1.28 | 8.79 | 0.89 | 6.42 | 3.52 | 10.04 | 0.85 | 3.32 | 0.00 | 299.0 | 223.9 | 51.3 | 0.23 |
| 7591 | 17.55 | 16.62 | 24.09 | 60.22 | 26.31 | 26.61 | 10.14 | 1.27 | 6.37 | 2.10 | 6.01 | 1.26 | 5.75 | 0.59 | 3.15 | 1.59 | 209.6 | 155.0 | 37.1 | 0.24 |
| 7592 | 36.01 | 55.52 | 54.91 | 122.11 | 27.16 | 56.78 | 15.42 | 2.71 | 13.73 | 2.86 | 12.86 | 3.91 | 11.63 | 2.00 | 6.72 | 1.15 | 425.5 | 292.8 | 96.6 | 0.33 |
| 7593 | 17.26 | 16.14 | 23.85 | 65.09 | 17.17 | 27.24 | 7.55 | 1.01 | 5.62 | 1.30 | 4.78 | 1.75 | 6.15 | 0.62 | 2.64 | 0.59 | 198.8 | 147.5 | 34.0 | 0.23 |
| 7594 | 12.42 | 9.45 | 13.96 | 43.88 | 16.50 | 17.20 | 6.35 | 0.72 | 4.21 | 1.22 | 3.65 | 0.91 | 4.27 | 0.29 | 1.96 | 0.91 | 137.9 | 102.8 | 22.7 | 0.22 |
| 7595 | 22.12 | 7.06 | 6.38 | 40.27 | 17.72 | 22.47 | 4.79 | 0.72 | 4.55 | 1.92 | 3.21 | 2.12 | 9.00 | 0.98 | 2.18 | 0.26 | 145.8 | 96.9 | 26.7 | 0.28 |
| 7596 | 17.81 | 9.84 | 11.00 | 49.69 | 14.03 | 18.04 | 4.97 | 0.71 | 4.09 | 1.24 | 3.54 | 1.61 | 6.02 | 0.57 | 2.14 | 0.39 | 145.7 | 102.5 | 25.3 | 0.25 |
| 7597 | 11.69 | 8.06 | 12.75 | 39.95 | 13.15 | 17.23 | 5.16 | 0.68 | 3.86 | 1.06 | 3.09 | 1.19 | 4.63 | 0.34 | 1.72 | 0.45 | 125.0 | 92.8 | 20.5 | 0.22 |
| 7598 | 23.01 | 15.57 | 20.18 | 68.96 | 10.75 | 29.86 | 5.68 | 0.89 | 5.93 | 0.99 | 4.48 | 2.66 | 8.12 | 0.74 | 2.60 | 0.00 | 200.4 | 142.3 | 35.2 | 0.25 |
| 7599 | 23.00 | 15.38 | 16.46 | 68.44 | 14.19 | 24.17 | 6.25 | 0.96 | 5.52 | 1.27 | 4.79 | 2.12 | 6.99 | 0.76 | 2.84 | 0.36 | 193.5 | 136.0 | 34.5 | 0.25 |
| 7600 | 17.65 | 16.98 | 35.98 | 87.48 | 29.42 | 35.08 | 12.25 | 1.31 | 7.39 | 1.72 | 6.27 | 1.29 | 5.69 | 0.34 | 3.08 | 1.85 | 263.8 | 208.9 | 37.2 | 0.18 |
| 7601 | 31.30 | 41.52 | 36.24 | 94.61 | 20.36 | 42.25 | 10.09 | 1.28 | 8.85 | 1.69 | 9.78 | 3.18 | 9.88 | 1.17 | 5.16 | 0.54 | 317.9 | 213.7 | 72.9 | 0.34 |
| 7660 | 19.18 | 27.55 | 53.38 | 99.80 | 17.70 | 49.58 | 10.35 | 1.35 | 7.56 | 1.04 | 6.04 | 2.32 | 6.33 | 0.46 | 3.26 | 0.47 | 306.4 | 239.7 | 47.5 | 0.20 |
| 7661 | 22.00 | 33.14 | 54.29 | 103.10 | 19.08 | 51.75 | 11.34 | 1.58 | 8.38 | 1.22 | 7.28 | 2.54 | 6.94 | 0.65 | 3.77 | 0.61 | 327.7 | 249.5 | 56.1 | 0.23 |
| 7664 | 21.25 | 31.60 | 52.28 | 100.88 | 17.11 | 50.33 | 10.75 | 1.47 | 8.00 | 1.15 | 6.91 | 2.50 | 6.81 | 0.75 | 3.55 | 0.37 | 315.7 | 240.8 | 53.6 | 0.22 |
| 7667 | 20.32 | 30.70 | 52.45 | 99.67 | 16.76 | 50.31 | 10.50 | 1.42 | 7.91 | 1.04 | 6.55 | 2.51 | 6.72 | 0.65 | 3.42 | 0.40 | 311.3 | 239.0 | 52.0 | 0.22 |
| 7670 | 18.10 | 26.03 | 48.55 | 94.36 | 16.71 | 47.14 | 10.36 | 1.34 | 7.51 | 0.98 | 6.07 | 2.13 | 5.87 | 0.49 | 3.01 | 0.40 | 289.0 | 226.0 | 45.0 | 0.20 |
| 7673 | 19.38 | 27.28 | 52.37 | 98.46 | 21.67 | 48.76 | 11.20 | 1.42 | 7.56 | 1.29 | 6.59 | 2.09 | 6.25 | 0.60 | 3.46 | 0.81 | 309.2 | 241.4 | 48.4 | 0.20 |
| 7674 | 56.76 | 119.96 | 73.32 | 161.44 | 28.94 | 94.55 | 23.55 | 4.99 | 23.19 | 4.65 | 22.03 | 6.34 | 16.54 | 3.17 | 11.29 | 1.36 | 652.1 | 410.0 | 185.3 | 0.45 |
| 7675 | 25.96 | 38.14 | 66.58 | 124.75 | 21.05 | 61.99 | 12.67 | 1.85 | 9.90 | 1.33 | 7.89 | 3.12 | 8.23 | 0.91 | 4.13 | 0.37 | 388.9 | 298.8 | 64.1 | 0.21 |
| 7676 | 18.05 | 24.76 | 52.17 | 96.83 | 17.20 | 47.15 | 9.84 | 1.23 | 6.86 | 0.90 | 5.76 | 2.19 | 5.83 | 0.56 | 2.98 | 0.40 | 292.7 | 231.3 | 43.4 | 0.19 |
| 7699 | 17.03 | 20.18 | 40.75 | 79.69 | 39.12 | 35.75 | 14.54 | 1.53 | 6.22 | 2.32 | 7.53 | 0.55 | 4.99 | 0.52 | 3.62 | 2.36 | 276.7 | 217.6 | 42.1 | 0.19 |
| 7700 | 48.45 | 91.52 | 68.09 | 147.46 | 28.53 | 83.58 | 20.35 | 4.27 | 19.15 | 4.12 | 18.05 | 5.56 | 14.92 | 2.49 | 9.41 | 1.17 | 567.1 | 371.4 | 147.3 | 0.40 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7577 | 12.63 | 10.69 | 19.37 | 48.74 | 13.89 | 21.58 | 6.35 | 0.79 | 4.73 | 1.07 | 3.66 | 1.27 | 4.56 | 0.32 | 1.93 | 0.53 | 152.1 | 115.4 | 24.0 | 0.208 |
| 7578 | 3.79 | 6.46 | 6.90 | 15.10 | 3.75 | 7.13 | 2.00 | 0.31 | 1.70 | 0.31 | 1.54 | 0.44 | 1.34 | 0.24 | 0.76 | 0.17 | 51.9 | 36.9 | 11.3 | 0.305 |
| 7579 | 1.59 | 3.24 | 1.81 | 4.28 | 1.04 | 2.33 | 0.69 | 0.14 | 0.70 | 0.15 | 0.70 | 0.19 | 0.55 | 0.23 | 0.35 | 0.06 | 18.0 | 11.0 | 5.5 | 0.498 |
| 7580 | 4.99 | 4.08 | 5.91 | 17.16 | 5.46 | 7.34 | 2.12 | 0.28 | 1.58 | 0.44 | 1.29 | 0.49 | 1.88 | 0.19 | 0.74 | 0.19 | 54.1 | 39.8 | 9.3 | 0.234 |
| 7581 | 10.94 | 12.47 | 25.81 | 54.03 | 16.65 | 22.91 | 7.08 | 0.83 | 4.63 | 0.92 | 3.84 | 0.91 | 3.34 | 0.26 | 1.97 | 0.93 | 167.5 | 131.9 | 24.6 | 0.187 |
| 7582 | 2.11 | 4.42 | 3.33 | 7.52 | 1.58 | 3.68 | 1.04 | 0.18 | 0.98 | 0.17 | 0.93 | 0.25 | 0.71 | 0.25 | 0.44 | 0.09 | 27.7 | 18.3 | 7.3 | 0.396 |
| 7583 | 5.12 | 4.62 | 6.73 | 18.62 | 6.99 | 8.31 | 2.67 | 0.33 | 1.78 | 0.53 | 1.58 | 0.48 | 1.94 | 0.23 | 0.84 | 0.35 | 61.1 | 45.4 | 10.6 | 0.233 |
| 7584 | 9.50 | 8.32 | 14.55 | 40.93 | 18.10 | 15.86 | 6.67 | 0.63 | 3.76 | 1.14 | 3.35 | 0.50 | 3.02 | 0.17 | 1.73 | 1.28 | 129.5 | 100.5 | 19.5 | 0.194 |
| 7585 | 3.17 | 7.78 | 9.04 | 16.52 | 2.50 | 7.92 | 1.69 | 0.27 | 1.51 | 0.18 | 1.28 | 0.45 | 1.21 | 0.21 | 0.66 | 0.06 | 54.4 | 39.5 | 11.8 | 0.3 |
| 7586 | 6.13 | 8.93 | 17.54 | 39.36 | 6.22 | 16.87 | 3.81 | 0.46 | 3.22 | 0.32 | 2.29 | 0.97 | 2.87 | 0.19 | 1.11 | 0.04 | 110.3 | 87.5 | 16.7 | 0.191 |
| 7588 | 3.38 | 3.73 | 5.90 | 14.55 | 1.83 | 6.85 | 1.25 | 0.18 | 1.25 | 0.13 | 0.91 | 0.50 | 1.43 | 0.12 | 0.47 | 0.00 | 42.5 | 31.8 | 7.3 | 0.229 |
| 7591 | 6.44 | 6.10 | 8.85 | 22.11 | 9.66 | 9.77 | 3.73 | 0.47 | 2.34 | 0.77 | 2.21 | 0.46 | 2.11 | 0.22 | 1.16 | 0.58 | 77.0 | 56.9 | 13.6 | 0.239 |
| 7592 | 4.93 | 7.59 | 7.51 | 16.70 | 3.72 | 7.77 | 2.11 | 0.37 | 1.88 | 0.39 | 1.76 | 0.53 | 1.59 | 0.27 | 0.92 | 0.16 | 58.2 | 40.1 | 13.2 | 0.33 |
| 7593 | 6.54 | 6.11 | 9.04 | 24.66 | 6.51 | 10.32 | 2.86 | 0.38 | 2.13 | 0.49 | 1.81 | 0.66 | 2.33 | 0.23 | 1.00 | 0.23 | 75.3 | 55.9 | 12.9 | 0.23 |
| 7594 | 9.51 | 7.24 | 10.69 | 33.60 | 12.64 | 13.17 | 4.86 | 0.55 | 3.23 | 0.94 | 2.80 | 0.70 | 3.27 | 0.22 | 1.50 | 0.70 | 105.6 | 78.7 | 17.4 | 0.221 |
| 7595 | 5.92 | 1.89 | 1.71 | 10.79 | 4.75 | 6.02 | 1.28 | 0.19 | 1.22 | 0.51 | 0.86 | 0.57 | 2.41 | 0.26 | 0.58 | 0.07 | 39.1 | 26.0 | 7.2 | 0.276 |
| 7596 | 6.69 | 3.70 | 4.13 | 18.67 | 5.27 | 6.78 | 1.87 | 0.27 | 1.54 | 0.47 | 1.33 | 0.61 | 2.26 | 0.21 | 0.80 | 0.15 | 54.7 | 38.5 | 9.5 | 0.247 |
| 7597 | 8.74 | 6.02 | 9.52 | 29.85 | 9.82 | 12.88 | 3.86 | 0.51 | 2.88 | 0.79 | 2.31 | 0.89 | 3.46 | 0.26 | 1.28 | 0.34 | 93.4 | 69.3 | 15.3 | 0.221 |
| 7598 | 6.68 | 4.52 | 5.86 | 20.02 | 3.12 | 8.67 | 1.65 | 0.26 | 1.72 | 0.29 | 1.30 | 0.77 | 2.36 | 0.22 | 0.76 | 0.00 | 58.2 | 41.3 | 10.2 | 0.247 |
| 7599 | 8.36 | 5.59 | 5.98 | 24.88 | 5.16 | 8.79 | 2.27 | 0.35 | 2.01 | 0.46 | 1.74 | 0.77 | 2.54 | 0.28 | 1.03 | 0.13 | 70.3 | 49.4 | 12.5 | 0.254 |
| 7600 | 11.04 | 10.62 | 22.50 | 54.70 | 18.39 | 21.93 | 7.66 | 0.82 | 4.62 | 1.08 | 3.92 | 0.80 | 3.56 | 0.21 | 1.92 | 1.16 | 164.9 | 130.6 | 23.3 | 0.178 |
| 7601 | 12.62 | 16.74 | 14.61 | 38.15 | 8.21 | 17.03 | 4.07 | 0.52 | 3.57 | 0.68 | 3.94 | 1.28 | 3.98 | 0.47 | 2.08 | 0.22 | 128.2 | 86.2 | 29.4 | 0.341 |
| 7660 | 12.71 | 18.26 | 35.38 | 66.16 | 11.73 | 32.87 | 6.86 | 0.90 | 5.01 | 0.69 | 4.01 | 1.54 | 4.20 | 0.30 | 2.16 | 0.31 | 203.1 | 158.9 | 31.5 | 0.198 |
| 7661 | 10.20 | 15.36 | 25.17 | 47.80 | 8.85 | 23.99 | 5.26 | 0.73 | 3.88 | 0.56 | 3.37 | 1.18 | 3.22 | 0.30 | 1.75 | 0.28 | 151.9 | 115.7 | 26.0 | 0.225 |
| 7664 | 10.82 | 16.09 | 26.63 | 51.38 | 8.71 | 25.63 | 5.48 | 0.75 | 4.07 | 0.59 | 3.52 | 1.27 | 3.47 | 0.38 | 1.81 | 0.19 | 160.8 | 122.6 | 27.3 | 0.223 |
| 7667 | 11.32 | 17.10 | 29.22 | 55.53 | 9.34 | 28.03 | 5.85 | 0.79 | 4.41 | 0.58 | 3.65 | 1.40 | 3.74 | 0.36 | 1.91 | 0.22 | 173.4 | 133.2 | 29.0 | 0.218 |
| 7670 | 14.01 | 20.15 | 37.59 | 73.05 | 12.93 | 36.50 | 8.02 | 1.03 | 5.81 | 0.76 | 4.70 | 1.65 | 4.54 | 0.38 | 2.33 | 0.31 | 223.8 | 174.9 | 34.8 | 0.199 |
| 7673 | 13.77 | 19.39 | 37.21 | 69.97 | 15.40 | 34.65 | 7.96 | 1.01 | 5.37 | 0.92 | 4.68 | 1.49 | 4.44 | 0.43 | 2.46 | 0.58 | 219.7 | 171.6 | 34.4 | 0.2 |
| 7674 | 4.08 | 8.61 | 5.26 | 11.59 | 2.08 | 6.79 | 1.69 | 0.36 | 1.67 | 0.33 | 1.58 | 0.46 | 1.19 | 0.23 | 0.81 | 0.10 | 46.8 | 29.4 | 13.3 | 0.452 |
| 7675 | 11.44 | 16.81 | 29.34 | 54.98 | 9.28 | 27.32 | 5.58 | 0.81 | 4.36 | 0.59 | 3.48 | 1.37 | 3.63 | 0.40 | 1.82 | 0.16 | 171.4 | 131.7 | 28.3 | 0.215 |
| 7676 | 15.91 | 21.82 | 45.98 | 85.34 | 15.15 | 41.55 | 8.67 | 1.08 | 6.04 | 0.79 | 5.07 | 1.93 | 5.14 | 0.50 | 2.63 | 0.35 | 258.0 | 203.8 | 38.2 | 0.188 |
| 7699 | 14.72 | 17.44 | 35.22 | 68.88 | 33.81 | 30.90 | 12.57 | 1.33 | 5.37 | 2.00 | 6.50 | 0.48 | 4.32 | 0.45 | 3.13 | 2.04 | 239.2 | 188.1 | 36.4 | 0.193 |
| 7700 | 4.06 | 7.66 | 5.70 | 12.34 | 2.39 | 7.00 | 1.70 | 0.36 | 1.60 | 0.35 | 1.51 | 0.47 | 1.25 | 0.21 | 0.79 | 0.10 | 47.5 | 31.1 | 12.3 | 0.396 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7577 | 0.79 | 0.45 | 0.65 | 0.81 | 2.07 | 0.80 | 1.20 | 0.61 | 1.18 | 1.65 | 0.96 | 1.59 | 2.17 | 0.97 | 0.96 | 1.50 | 0.83 | 0.86 | 0.71 | 1.22 |
| 7578 | 0.24 | 0.27 | 0.23 | 0.25 | 0.56 | 0.26 | 0.38 | 0.24 | 0.43 | 0.47 | 0.41 | 0.55 | 0.64 | 0.72 | 0.38 | 0.50 | 0.28 | 0.27 | 0.33 | 0.83 |
| 7579 | 0.10 | 0.13 | 0.06 | 0.07 | 0.15 | 0.09 | 0.13 | 0.11 | 0.18 | 0.24 | 0.18 | 0.23 | 0.26 | 0.69 | 0.17 | 0.17 | 0.10 | 0.08 | 0.16 | 0.51 |
| 7580 | 0.31 | 0.17 | 0.20 | 0.29 | 0.81 | 0.27 | 0.40 | 0.21 | 0.40 | 0.68 | 0.34 | 0.62 | 0.89 | 0.59 | 0.37 | 0.55 | 0.29 | 0.30 | 0.27 | 1.08 |
| 7581 | 0.68 | 0.52 | 0.86 | 0.90 | 2.49 | 0.85 | 1.34 | 0.64 | 1.16 | 1.42 | 1.01 | 1.14 | 1.59 | 0.79 | 0.99 | 2.66 | 0.91 | 0.98 | 0.72 | 1.36 |
| 7582 | 0.13 | 0.18 | 0.11 | 0.13 | 0.24 | 0.14 | 0.20 | 0.14 | 0.24 | 0.27 | 0.24 | 0.31 | 0.34 | 0.75 | 0.22 | 0.25 | 0.15 | 0.14 | 0.21 | 0.64 |
| 7583 | 0.32 | 0.19 | 0.22 | 0.31 | 1.04 | 0.31 | 0.50 | 0.25 | 0.45 | 0.82 | 0.41 | 0.60 | 0.92 | 0.70 | 0.42 | 1.01 | 0.33 | 0.34 | 0.31 | 1.09 |
| 7584 | 0.59 | 0.35 | 0.49 | 0.68 | 2.70 | 0.59 | 1.26 | 0.48 | 0.94 | 1.75 | 0.88 | 0.62 | 1.44 | 0.52 | 0.87 | 3.66 | 0.70 | 0.75 | 0.57 | 1.31 |
| 7585 | 0.20 | 0.32 | 0.30 | 0.28 | 0.37 | 0.29 | 0.32 | 0.21 | 0.38 | 0.27 | 0.34 | 0.56 | 0.58 | 0.64 | 0.33 | 0.18 | 0.30 | 0.29 | 0.35 | 0.85 |
| 7586 | 0.38 | 0.37 | 0.58 | 0.66 | 0.93 | 0.62 | 0.72 | 0.35 | 0.80 | 0.49 | 0.60 | 1.22 | 1.36 | 0.59 | 0.56 | 0.12 | 0.60 | 0.65 | 0.49 | 1.33 |
| 7588 | 0.21 | 0.16 | 0.20 | 0.24 | 0.27 | 0.25 | 0.24 | 0.14 | 0.31 | 0.20 | 0.24 | 0.63 | 0.68 | 0.37 | 0.24 | 0.00 | 0.23 | 0.24 | 0.21 | 1.11 |
| 7591 | 0.40 | 0.25 | 0.29 | 0.37 | 1.44 | 0.36 | 0.70 | 0.36 | 0.58 | 1.18 | 0.58 | 0.58 | 1.01 | 0.66 | 0.58 | 1.67 | 0.42 | 0.42 | 0.40 | 1.06 |
| 7592 | 0.31 | 0.32 | 0.25 | 0.28 | 0.55 | 0.29 | 0.40 | 0.29 | 0.47 | 0.60 | 0.46 | 0.67 | 0.76 | 0.83 | 0.46 | 0.45 | 0.32 | 0.30 | 0.39 | 0.77 |
| 7593 | 0.41 | 0.25 | 0.30 | 0.41 | 0.97 | 0.38 | 0.54 | 0.30 | 0.53 | 0.76 | 0.48 | 0.83 | 1.11 | 0.71 | 0.50 | 0.64 | 0.41 | 0.42 | 0.38 | 1.10 |
| 7594 | 0.59 | 0.30 | 0.36 | 0.56 | 1.89 | 0.49 | 0.92 | 0.42 | 0.81 | 1.44 | 0.74 | 0.87 | 1.56 | 0.68 | 0.75 | 2.00 | 0.57 | 0.59 | 0.51 | 1.15 |
| 7595 | 0.37 | 0.08 | 0.06 | 0.18 | 0.71 | 0.22 | 0.24 | 0.15 | 0.30 | 0.79 | 0.23 | 0.71 | 1.15 | 0.80 | 0.29 | 0.20 | 0.21 | 0.19 | 0.21 | 0.92 |
| 7596 | 0.42 | 0.15 | 0.14 | 0.31 | 0.79 | 0.25 | 0.35 | 0.21 | 0.38 | 0.72 | 0.35 | 0.76 | 1.08 | 0.65 | 0.40 | 0.42 | 0.30 | 0.29 | 0.28 | 1.03 |
| 7597 | 0.55 | 0.25 | 0.32 | 0.50 | 1.47 | 0.48 | 0.73 | 0.39 | 0.72 | 1.22 | 0.61 | 1.11 | 1.65 | 0.78 | 0.64 | 0.96 | 0.51 | 0.52 | 0.45 | 1.14 |
| 7598 | 0.42 | 0.19 | 0.20 | 0.33 | 0.47 | 0.32 | 0.31 | 0.20 | 0.43 | 0.44 | 0.34 | 0.96 | 1.12 | 0.65 | 0.38 | 0.00 | 0.32 | 0.31 | 0.30 | 1.02 |
| 7599 | 0.52 | 0.23 | 0.20 | 0.41 | 0.77 | 0.33 | 0.43 | 0.27 | 0.50 | 0.71 | 0.46 | 0.96 | 1.21 | 0.84 | 0.52 | 0.37 | 0.38 | 0.37 | 0.37 | 1.00 |
| 7600 | 0.69 | 0.44 | 0.75 | 0.91 | 2.75 | 0.81 | 1.45 | 0.63 | 1.16 | 1.66 | 1.03 | 1.01 | 1.69 | 0.64 | 0.96 | 3.31 | 0.89 | 0.97 | 0.68 | 1.42 |
| 7601 | 0.79 | 0.70 | 0.49 | 0.64 | 1.23 | 0.63 | 0.77 | 0.40 | 0.89 | 1.05 | 1.04 | 1.60 | 1.90 | 1.43 | 1.04 | 0.62 | 0.70 | 0.64 | 0.86 | 0.74 |
| 7660 | 0.79 | 0.76 | 1.18 | 1.10 | 1.75 | 1.22 | 1.30 | 0.69 | 1.25 | 1.06 | 1.05 | 1.92 | 2.00 | 0.92 | 1.08 | 0.89 | 1.10 | 1.18 | 0.92 | 1.28 |
| 7661 | 0.64 | 0.64 | 0.84 | 0.80 | 1.32 | 0.89 | 0.99 | 0.56 | 0.97 | 0.87 | 0.89 | 1.47 | 1.53 | 0.91 | 0.87 | 0.81 | 0.82 | 0.86 | 0.76 | 1.13 |
| 7664 | 0.68 | 0.67 | 0.89 | 0.86 | 1.30 | 0.95 | 1.03 | 0.57 | 1.02 | 0.90 | 0.93 | 1.59 | 1.65 | 1.16 | 0.90 | 0.54 | 0.87 | 0.91 | 0.80 | 1.14 |
| 7667 | 0.71 | 0.71 | 0.97 | 0.93 | 1.39 | 1.04 | 1.10 | 0.61 | 1.10 | 0.89 | 0.96 | 1.75 | 1.78 | 1.09 | 0.95 | 0.64 | 0.94 | 0.99 | 0.85 | 1.16 |
| 7670 | 0.88 | 0.84 | 1.25 | 1.22 | 1.93 | 1.35 | 1.51 | 0.80 | 1.45 | 1.17 | 1.24 | 2.06 | 2.16 | 1.15 | 1.16 | 0.89 | 1.21 | 1.30 | 1.02 | 1.27 |
| 7673 | 0.86 | 0.81 | 1.24 | 1.17 | 2.30 | 1.28 | 1.50 | 0.78 | 1.34 | 1.41 | 1.23 | 1.86 | 2.12 | 1.29 | 1.23 | 1.65 | 1.19 | 1.28 | 1.01 | 1.26 |
| 7674 | 0.25 | 0.36 | 0.18 | 0.19 | 0.31 | 0.25 | 0.32 | 0.28 | 0.42 | 0.51 | 0.42 | 0.57 | 0.57 | 0.69 | 0.41 | 0.28 | 0.25 | 0.22 | 0.39 | 0.56 |
| 7675 | 0.71 | 0.70 | 0.98 | 0.92 | 1.38 | 1.01 | 1.05 | 0.63 | 1.09 | 0.90 | 0.91 | 1.72 | 1.73 | 1.22 | 0.91 | 0.47 | 0.93 | 0.98 | 0.83 | 1.18 |
| 7676 | 0.99 | 0.91 | 1.53 | 1.42 | 2.26 | 1.54 | 1.64 | 0.83 | 1.51 | 1.22 | 1.33 | 2.41 | 2.45 | 1.51 | 1.31 | 1.00 | 1.40 | 1.52 | 1.12 | 1.35 |
| 7699 | 0.92 | 0.73 | 1.17 | 1.15 | 5.05 | 1.14 | 2.37 | 1.02 | 1.34 | 3.08 | 1.71 | 0.60 | 2.06 | 1.36 | 1.57 | 5.82 | 1.30 | 1.40 | 1.07 | 1.31 |
| 7700 | 0.25 | 0.32 | 0.19 | 0.21 | 0.36 | 0.26 | 0.32 | 0.27 | 0.40 | 0.53 | 0.40 | 0.58 | 0.59 | 0.63 | 0.39 | 0.28 | 0.26 | 0.23 | 0.36 | 0.64 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7577 | 0.87 | 0.49 | 0.71 | 0.90 | 2.29 | 0.88 | 1.32 | 0.67 | 1.30 | 1.82 | 1.06 | 1.76 | 2.40 | 1.07 | 1.06 | 1.66 | 0.91 | 0.95 | 0.78 | 1.22 |
| 7578 | 1.62 | 1.84 | 1.57 | 1.72 | 3.83 | 1.80 | 2.58 | 1.62 | 2.91 | 3.22 | 2.78 | 3.74 | 4.37 | 4.91 | 2.58 | 3.39 | 1.93 | 1.88 | 2.26 | 0.83 |
| 7579 | 2.68 | 3.65 | 1.63 | 1.93 | 4.18 | 2.33 | 3.52 | 2.89 | 4.76 | 6.43 | 4.98 | 6.35 | 7.09 | 18.70 | 4.72 | 4.63 | 2.65 | 2.21 | 4.35 | 0.51 |
| 7580 | 0.84 | 0.46 | 0.53 | 0.77 | 2.19 | 0.73 | 1.08 | 0.57 | 1.06 | 1.82 | 0.91 | 1.65 | 2.40 | 1.59 | 1.00 | 1.47 | 0.79 | 0.80 | 0.74 | 1.08 |
| 7581 | 0.90 | 0.69 | 1.13 | 1.19 | 3.28 | 1.12 | 1.76 | 0.84 | 1.53 | 1.87 | 1.33 | 1.51 | 2.09 | 1.05 | 1.30 | 3.50 | 1.20 | 1.30 | 0.95 | 1.36 |
| 7582 | 2.43 | 3.39 | 2.04 | 2.30 | 4.33 | 2.50 | 3.62 | 2.52 | 4.50 | 4.89 | 4.50 | 5.78 | 6.17 | 13.73 | 4.06 | 4.57 | 2.76 | 2.51 | 3.92 | 0.64 |
| 7583 | 0.92 | 0.55 | 0.65 | 0.89 | 3.01 | 0.89 | 1.45 | 0.73 | 1.29 | 2.37 | 1.20 | 1.72 | 2.66 | 2.03 | 1.22 | 2.90 | 0.96 | 0.98 | 0.90 | 1.09 |
| 7584 | 0.73 | 0.42 | 0.59 | 0.83 | 3.30 | 0.72 | 1.54 | 0.59 | 1.15 | 2.14 | 1.08 | 0.76 | 1.76 | 0.63 | 1.06 | 4.48 | 0.86 | 0.91 | 0.70 | 1.31 |
| 7585 | 2.04 | 3.33 | 3.09 | 2.83 | 3.83 | 3.01 | 3.28 | 2.11 | 3.88 | 2.81 | 3.47 | 5.73 | 5.92 | 6.56 | 3.39 | 1.81 | 3.03 | 3.02 | 3.57 | 0.85 |
| 7586 | 0.93 | 0.90 | 1.42 | 1.60 | 2.26 | 1.52 | 1.75 | 0.85 | 1.96 | 1.20 | 1.47 | 2.96 | 3.32 | 1.43 | 1.35 | 0.29 | 1.46 | 1.58 | 1.20 | 1.33 |
| 7588 | 1.49 | 1.09 | 1.38 | 1.71 | 1.92 | 1.79 | 1.66 | 0.98 | 2.20 | 1.37 | 1.69 | 4.40 | 4.78 | 2.58 | 1.66 | 0.00 | 1.62 | 1.67 | 1.51 | 1.11 |
| 7591 | 1.10 | 0.69 | 0.80 | 1.00 | 3.93 | 0.99 | 1.91 | 0.98 | 1.59 | 3.23 | 1.58 | 1.57 | 2.74 | 1.79 | 1.58 | 4.54 | 1.14 | 1.15 | 1.09 | 1.06 |
| 7592 | 2.25 | 2.31 | 1.83 | 2.04 | 4.05 | 2.10 | 2.91 | 2.08 | 3.43 | 4.40 | 3.39 | 4.88 | 5.54 | 6.05 | 3.36 | 3.30 | 2.31 | 2.18 | 2.84 | 0.77 |
| 7593 | 1.08 | 0.67 | 0.80 | 1.08 | 2.56 | 1.01 | 1.42 | 0.78 | 1.41 | 2.00 | 1.26 | 2.19 | 2.93 | 1.88 | 1.32 | 1.70 | 1.08 | 1.10 | 1.00 | 1.10 |
| 7594 | 0.78 | 0.39 | 0.47 | 0.73 | 2.46 | 0.64 | 1.20 | 0.55 | 1.05 | 1.88 | 0.96 | 1.14 | 2.03 | 0.89 | 0.98 | 2.61 | 0.75 | 0.77 | 0.67 | 1.15 |
| 7595 | 1.38 | 0.29 | 0.21 | 0.67 | 2.65 | 0.83 | 0.90 | 0.56 | 1.14 | 2.95 | 0.84 | 2.65 | 4.29 | 2.98 | 1.09 | 0.75 | 0.79 | 0.72 | 0.79 | 0.92 |
| 7596 | 1.11 | 0.41 | 0.37 | 0.83 | 2.09 | 0.67 | 0.94 | 0.55 | 1.02 | 1.91 | 0.93 | 2.02 | 2.86 | 1.72 | 1.07 | 1.12 | 0.79 | 0.76 | 0.74 | 1.03 |
| 7597 | 0.73 | 0.34 | 0.42 | 0.67 | 1.96 | 0.64 | 0.97 | 0.52 | 0.96 | 1.64 | 0.81 | 1.49 | 2.20 | 1.04 | 0.86 | 1.29 | 0.68 | 0.69 | 0.60 | 1.14 |
| 7598 | 1.44 | 0.65 | 0.67 | 1.15 | 1.60 | 1.11 | 1.07 | 0.69 | 1.48 | 1.52 | 1.18 | 3.32 | 3.87 | 2.25 | 1.30 | 0.00 | 1.09 | 1.06 | 1.03 | 1.02 |
| 7599 | 1.44 | 0.64 | 0.55 | 1.14 | 2.12 | 0.90 | 1.18 | 0.74 | 1.38 | 1.95 | 1.26 | 2.65 | 3.33 | 2.31 | 1.42 | 1.01 | 1.05 | 1.01 | 1.01 | 1.00 |
| 7600 | 1.10 | 0.71 | 1.20 | 1.46 | 4.39 | 1.30 | 2.31 | 1.01 | 1.85 | 2.65 | 1.65 | 1.61 | 2.71 | 1.03 | 1.54 | 5.29 | 1.43 | 1.56 | 1.09 | 1.42 |
| 7601 | 1.96 | 1.73 | 1.21 | 1.58 | 3.04 | 1.56 | 1.90 | 0.99 | 2.21 | 2.60 | 2.57 | 3.98 | 4.71 | 3.55 | 2.58 | 1.54 | 1.72 | 1.59 | 2.14 | 0.74 |
| 7660 | 1.20 | 1.15 | 1.78 | 1.66 | 2.64 | 1.84 | 1.95 | 1.04 | 1.89 | 1.60 | 1.59 | 2.90 | 3.02 | 1.39 | 1.63 | 1.34 | 1.66 | 1.79 | 1.40 | 1.28 |
| 7661 | 1.37 | 1.38 | 1.81 | 1.72 | 2.85 | 1.92 | 2.14 | 1.22 | 2.09 | 1.87 | 1.91 | 3.17 | 3.31 | 1.97 | 1.89 | 1.74 | 1.78 | 1.86 | 1.65 | 1.13 |
| 7664 | 1.33 | 1.32 | 1.74 | 1.68 | 2.55 | 1.86 | 2.03 | 1.13 | 2.00 | 1.78 | 1.82 | 3.12 | 3.24 | 2.28 | 1.78 | 1.06 | 1.71 | 1.79 | 1.58 | 1.14 |
| 7667 | 1.27 | 1.28 | 1.75 | 1.66 | 2.50 | 1.86 | 1.98 | 1.09 | 1.98 | 1.60 | 1.72 | 3.14 | 3.20 | 1.96 | 1.71 | 1.15 | 1.69 | 1.78 | 1.53 | 1.16 |
| 7670 | 1.13 | 1.08 | 1.62 | 1.57 | 2.49 | 1.75 | 1.95 | 1.03 | 1.88 | 1.51 | 1.60 | 2.67 | 2.79 | 1.49 | 1.50 | 1.15 | 1.57 | 1.68 | 1.32 | 1.27 |
| 7673 | 1.21 | 1.14 | 1.75 | 1.64 | 3.23 | 1.81 | 2.11 | 1.09 | 1.89 | 1.99 | 1.73 | 2.62 | 2.98 | 1.82 | 1.73 | 2.32 | 1.68 | 1.80 | 1.42 | 1.26 |
| 7674 | 3.55 | 5.00 | 2.44 | 2.69 | 4.32 | 3.50 | 4.44 | 3.84 | 5.80 | 7.15 | 5.80 | 7.93 | 7.88 | 9.59 | 5.64 | 3.89 | 3.54 | 3.05 | 5.45 | 0.56 |
| 7675 | 1.62 | 1.59 | 2.22 | 2.08 | 3.14 | 2.30 | 2.39 | 1.42 | 2.47 | 2.05 | 2.08 | 3.90 | 3.92 | 2.77 | 2.07 | 1.06 | 2.11 | 2.22 | 1.88 | 1.18 |
| 7676 | 1.13 | 1.03 | 1.74 | 1.61 | 2.57 | 1.75 | 1.86 | 0.94 | 1.71 | 1.39 | 1.51 | 2.74 | 2.78 | 1.71 | 1.49 | 1.13 | 1.59 | 1.72 | 1.27 | 1.35 |
| 7699 | 1.06 | 0.84 | 1.36 | 1.33 | 5.84 | 1.32 | 2.74 | 1.18 | 1.55 | 3.56 | 1.98 | 0.69 | 2.38 | 1.58 | 1.81 | 6.74 | 1.50 | 1.62 | 1.24 | 1.31 |
| 7700 | 3.03 | 3.81 | 2.27 | 2.46 | 4.26 | 3.10 | 3.84 | 3.28 | 4.79 | 6.34 | 4.75 | 6.95 | 7.11 | 7.55 | 4.70 | 3.36 | 3.08 | 2.77 | 4.33 | 0.64 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7701 | 34.2 | Plant 11 | Coarse Reject (1mm x 100M / 1.6 x 1.9 SG) | 45.17 |
| 7702 | 75.1 | Plant 11 | Coarse Reject (1mm x 100M / 1.9 x Snk SG) | 88.12 |
| 7703 | 14.9 | Plant 11 | Coarse Reject (3/8" x 1mm / Flt x 1.6 SG) | 10.19 |
| 7704 | 79.3 | Plant 11 | Coarse Reject (3/8" x 1mm / 1.6 x 1.9 SG) | 51.12 |
| 7705 | 89.6 | Plant 11 | Coarse Reject (3/8" x 1mm / 1.9 x Snk SG) | 88.71 |
| 7706 | 66.4 | Plant 11 | Coarse Reject (1 1/4" x 3/8" / Flt x 1.6 SG) | 14.38 |
| 7707 | 57.6 | Plant 11 | Coarse Reject (1 1/4" x 3/8" / 1.6 x 1.9 SG) | 52.03 |
| 7708 | 75 | Plant 11 | Coarse Reject (1 1/4" x 3/8" / 1.9 x Snk SG) | 89.24 |
| 7709 | 34.4 | Plant 11 | Coarse Reject (+ x 1 1/4" / Flt x 1.6 SG) | 32.29 |
| 7710 | 74.6 | Plant 11 | Coarse Reject (+ x 1 1/4" / 1.6 x 1.9 SG) | 52.97 |
| 7711 | 74.9 | Plant 11 | Coarse Reject (+ x 1 1/4" / 1.9 x Snk SG) | 91.12 |
| 7712 | 44.4 | Plant 11 | Clean Coal (100M x 0) | 32.74 |
| 7713 | 44.6 | Plant 11 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 6.56 |
| 7714 | 46.9 | Plant 11 | Clean Coal (1mm x 100M / 1.6 x 1.9 SG) | 42.08 |
| 7715 | 43.4 | Plant 11 | Clean Coal (1mm x 100M / 1.9 x Snk SG) | 70.39 |
| 7716 | 44.7 | Plant 11 | Clean Coal (3/8" x 1mm / Flt x 1.6 SG) | 8.3 |
| 7717 | 50.3 | Plant 11 | Clean Coal (3/8" x 1mm / 1.6 x 1.9 SG) | 44.41 |
| 7718 | 23.8 | Plant 11 | Clean Coal (3/8" x 1mm / 1.9 x Snk SG) | 67.96 |
| 7719 | 49 | Plant 11 | Clean Coal (+ x 3/8" / Flt x 1.6 SG) | 9.25 |
| 7720 | 25.4 | Plant 11 | Clean Coal (+ x 3/8" / 1.6 x 1.9 SG) | 42.71 |
| 7686 | 58.7 | Plant 11 | Middlings (100M x 0) | 13.83 |
| 7687 | 64.8 | Plant 11 | Middlings (1mm x 100M / Flt x 1.6 SG) | 6.16 |
| 7688 | 16.7 | Plant 11 | Middlings (1mm x 100M / 1.6 x 1.9 SG) | 42.38 |
| 7689 | 15.8 | Plant 11 | Middlings (1mm x 100M / 1.9 x Snk SG) | 70.62 |
| 7690 | 33.1 | Plant 11 | Middlings (3/8" x 1mm / Flt x 1.6 SG) | 7.86 |
| 7691 | 75.7 | Plant 11 | Middlings (3/8" x 1mm / 1.6 x 1.9 SG) | 45.99 |
| 7692 | 33.3 | Plant 11 | Middlings (3/8" x 1mm / 1.9 x Snk SG) | 69.32 |
| 7693 | 63.6 | Plant 11 | Middlings (1 1/4" x 3/8" / Flt x 1.6 SG) | 9.23 |
| 7694 | 68.3 | Plant 11 | Middlings (1 1/4" x 3/8" / 1.6 x 1.9 SG) | 44.05 |
| 7695 | 58.5 | Plant 11 | Middlings (1 1/4" x 3/8" / 1.9 x Snk SG) | 71.74 |
| 7696 | 72.6 | Plant 11 | Middlings (+ x 1 1/4" / Flt x 1.6 SG) | 10.69 |
| 7697 | 63.1 | Plant 11 | Middlings (+ x 1 1/4" / 1.6 x 1.9 SG) | 40.3 |
| 7316 | 51.3 | Plant 12 | Raw Coal (100M x 1 1/4") | 24.55 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7701 | 23.97 | 34.17 | 62.37 | 116.96 | 19.21 | 57.20 | 11.44 | 1.66 | 8.91 | 1.17 | 7.21 | 2.90 | 7.52 | 0.77 | 3.78 | 0.30 | 359.5 | 277.8 | 57.8 | 0.21 |
| 7702 | 17.29 | 22.08 | 43.61 | 86.84 | 16.79 | 40.72 | 9.00 | 1.11 | 6.20 | 0.92 | 5.41 | 1.98 | 5.65 | 0.45 | 2.84 | 0.50 | 261.4 | 204.3 | 39.8 | 0.19 |
| 7703 | 47.78 | 92.71 | 72.75 | 148.69 | 26.55 | 82.82 | 19.63 | 4.12 | 18.24 | 3.82 | 16.86 | 4.99 | 13.31 | 2.43 | 9.27 | 1.22 | 565.2 | 372.8 | 144.6 | 0.39 |
| 7704 | 23.53 | 32.44 | 59.53 | 115.76 | 17.23 | 55.02 | 10.78 | 1.57 | 8.25 | 1.08 | 6.98 | 2.85 | 7.48 | 0.75 | 3.71 | 0.23 | 347.2 | 268.1 | 55.5 | 0.21 |
| 7705 | 17.33 | 22.48 | 42.37 | 85.28 | 15.30 | 41.66 | 8.91 | 1.12 | 6.34 | 0.88 | 5.51 | 2.16 | 5.83 | 0.50 | 2.83 | 0.35 | 258.8 | 201.0 | 40.5 | 0.20 |
| 7706 | 41.93 | 73.93 | 69.26 | 135.90 | 20.79 | 70.91 | 16.30 | 2.89 | 14.42 | 2.29 | 13.19 | 4.22 | 10.53 | 1.82 | 6.81 | 0.80 | 486.0 | 330.5 | 113.6 | 0.34 |
| 7707 | 23.78 | 34.05 | 64.17 | 121.16 | 18.58 | 57.67 | 11.51 | 1.63 | 8.72 | 1.11 | 7.34 | 3.00 | 7.82 | 0.76 | 3.79 | 0.30 | 365.4 | 283.4 | 58.2 | 0.21 |
| 7708 | 17.30 | 22.32 | 42.00 | 84.67 | 14.66 | 41.49 | 8.52 | 1.09 | 6.36 | 0.88 | 5.34 | 2.12 | 6.01 | 0.50 | 2.81 | 0.27 | 256.3 | 198.8 | 40.2 | 0.20 |
| 7709 | 24.47 | 45.23 | 56.18 | 107.77 | 20.25 | 54.20 | 11.28 | 1.74 | 10.01 | 1.66 | 9.92 | 3.49 | 9.83 | 1.00 | 4.31 | 0.10 | 361.4 | 261.4 | 75.5 | 0.29 |
| 7710 | 24.41 | 31.09 | 57.98 | 111.01 | 15.34 | 53.95 | 10.15 | 1.51 | 8.21 | 1.01 | 6.72 | 3.02 | 7.67 | 0.68 | 3.48 | 0.00 | 336.2 | 258.1 | 53.7 | 0.21 |
| 7711 | 15.03 | 20.94 | 40.81 | 80.49 | 14.20 | 41.63 | 8.44 | 1.04 | 6.09 | 0.76 | 4.85 | 1.98 | 5.59 | 0.33 | 2.61 | 0.30 | 245.1 | 192.7 | 37.4 | 0.19 |
| 7712 | 23.26 | 37.86 | 49.02 | 95.54 | 29.91 | 48.67 | 13.70 | 1.96 | 9.44 | 2.21 | 8.75 | 2.15 | 7.00 | 0.73 | 4.65 | 1.68 | 336.5 | 248.2 | 65.0 | 0.26 |
| 7713 | 59.82 | 128.49 | 71.01 | 159.13 | 28.17 | 95.48 | 24.32 | 5.32 | 24.32 | 4.91 | 23.04 | 6.58 | 16.99 | 3.47 | 12.00 | 1.49 | 664.5 | 407.7 | 197.0 | 0.48 |
| 7714 | 24.86 | 36.00 | 62.45 | 117.78 | 19.78 | 58.75 | 12.04 | 1.76 | 9.30 | 1.24 | 7.53 | 2.88 | 7.60 | 0.80 | 3.86 | 0.34 | 367.0 | 281.9 | 60.2 | 0.21 |
| 7715 | 21.41 | 25.64 | 56.54 | 109.43 | 19.97 | 48.71 | 10.33 | 1.60 | 7.71 | 0.93 | 5.76 | 2.21 | 6.64 | 0.57 | 3.32 | 0.49 | 321.3 | 254.3 | 45.6 | 0.18 |
| 7716 | 51.89 | 113.32 | 76.70 | 164.22 | 27.64 | 92.45 | 23.07 | 4.48 | 21.38 | 3.84 | 19.85 | 5.60 | 14.10 | 3.01 | 10.04 | 1.46 | 633.1 | 409.9 | 171.2 | 0.42 |
| 7717 | 27.10 | 39.99 | 71.79 | 135.42 | 21.45 | 63.85 | 13.11 | 2.23 | 10.50 | 1.28 | 7.88 | 3.17 | 9.01 | 0.88 | 4.39 | 0.29 | 412.4 | 318.4 | 66.9 | 0.21 |
| 7718 | 22.64 | 30.16 | 63.58 | 117.73 | 21.34 | 54.03 | 11.44 | 1.78 | 8.38 | 1.05 | 6.37 | 2.47 | 7.19 | 0.66 | 3.69 | 0.51 | 353.0 | 278.3 | 52.1 | 0.19 |
| 7719 | 49.74 | 106.77 | 73.27 | 157.52 | 27.49 | 86.66 | 22.42 | 4.60 | 21.03 | 3.51 | 18.72 | 5.23 | 13.91 | 3.09 | 9.68 | 1.39 | 605.0 | 393.0 | 162.3 | 0.41 |
| 7720 | 25.89 | 36.60 | 61.65 | 122.98 | 17.94 | 56.94 | 11.68 | 2.04 | 9.62 | 1.27 | 7.10 | 3.00 | 8.73 | 0.90 | 4.09 | 0.13 | 370.6 | 282.9 | 61.8 | 0.22 |
| 7686 | 36.84 | 74.65 | 60.63 | 125.51 | 33.86 | 67.29 | 18.97 | 3.10 | 15.12 | 3.04 | 14.31 | 3.43 | 9.77 | 1.87 | 7.21 | 2.07 | 477.7 | 324.5 | 116.3 | 0.36 |
| 7687 | 68.70 | 162.12 | 82.33 | 185.48 | 31.69 | 108.04 | 28.83 | 5.83 | 28.42 | 5.19 | 27.41 | 7.41 | 18.51 | 4.29 | 13.88 | 2.06 | 780.2 | 470.6 | 240.9 | 0.51 |
| 7688 | 25.32 | 42.69 | 67.76 | 130.73 | 20.16 | 65.31 | 13.70 | 1.92 | 10.46 | 1.18 | 8.31 | 3.23 | 8.32 | 1.00 | 4.20 | 0.32 | 404.6 | 310.0 | 69.2 | 0.22 |
| 7689 | 19.32 | 27.28 | 50.89 | 96.44 | 38.44 | 42.98 | 14.22 | 1.46 | 7.95 | 1.83 | 7.46 | 1.10 | 4.99 | 0.50 | 3.55 | 2.38 | 320.8 | 252.4 | 49.1 | 0.19 |
| 7690 | 56.43 | 126.82 | 74.58 | 162.04 | 28.38 | 91.77 | 24.13 | 4.58 | 22.84 | 3.87 | 21.76 | 5.86 | 14.84 | 3.45 | 11.06 | 1.74 | 654.2 | 408.3 | 189.4 | 0.46 |
| 7691 | 24.92 | 40.60 | 68.30 | 131.99 | 19.60 | 64.81 | 13.27 | 1.83 | 10.30 | 1.10 | 8.30 | 3.40 | 8.78 | 0.78 | 4.15 | 0.25 | 402.4 | 310.1 | 67.4 | 0.22 |
| 7692 | 19.74 | 23.81 | 48.83 | 105.99 | 21.34 | 45.52 | 10.02 | 1.23 | 6.73 | 0.90 | 6.26 | 2.06 | 6.06 | 0.59 | 2.93 | 0.52 | 302.5 | 239.7 | 43.1 | 0.18 |
| 7693 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7694 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7695 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7696 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7697 | 27.02 | 37.28 | 56.70 | 123.69 | 14.91 | 62.78 | 11.19 | 1.61 | 10.19 | 0.99 | 8.92 | 3.77 | 9.79 | 0.91 | 3.70 | 0.00 | 373.4 | 281.1 | 65.4 | 0.23 |
| 7316 | 26.67 | 20.03 | 34.65 | 73.58 | 40.45 | 32.05 | 9.19 | 1.30 | 9.14 | 1.55 | 5.85 | 1.24 | 5.07 | 0.34 | 2.85 | 1.55 | 265.5 | 200.4 | 38.5 | 0.19 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7701 | 10.83 | 15.43 | 28.17 | 52.83 | 8.68 | 25.84 | 5.17 | 0.75 | 4.02 | 0.53 | 3.26 | 1.31 | 3.40 | 0.35 | 1.71 | 0.13 | 162.4 | 125.5 | 26.1 | 0.208 |
| 7702 | 15.24 | 19.45 | 38.43 | 76.52 | 14.79 | 35.88 | 7.93 | 0.98 | 5.47 | 0.81 | 4.77 | 1.74 | 4.98 | 0.39 | 2.50 | 0.44 | 230.3 | 180.0 | 35.1 | 0.195 |
| 7703 | 4.87 | 9.45 | 7.41 | 15.15 | 2.71 | 8.44 | 2.00 | 0.42 | 1.86 | 0.39 | 1.72 | 0.51 | 1.36 | 0.25 | 0.94 | 0.12 | 57.6 | 38.0 | 14.7 | 0.388 |
| 7704 | 12.03 | 16.58 | 30.43 | 59.17 | 8.81 | 28.12 | 5.51 | 0.80 | 4.22 | 0.55 | 3.57 | 1.45 | 3.83 | 0.39 | 1.90 | 0.12 | 177.5 | 137.1 | 28.4 | 0.207 |
| 7705 | 15.38 | 19.94 | 37.59 | 75.65 | 13.57 | 36.95 | 7.90 | 0.99 | 5.62 | 0.78 | 4.88 | 1.91 | 5.17 | 0.44 | 2.51 | 0.31 | 229.6 | 178.3 | 36.0 | 0.202 |
| 7706 | 6.03 | 10.63 | 9.96 | 19.54 | 2.99 | 10.20 | 2.34 | 0.42 | 2.07 | 0.33 | 1.90 | 0.61 | 1.51 | 0.26 | 0.98 | 0.12 | 69.9 | 47.5 | 16.3 | 0.344 |
| 7707 | 12.37 | 17.71 | 33.39 | 63.04 | 9.67 | 30.00 | 5.99 | 0.85 | 4.54 | 0.58 | 3.82 | 1.56 | 4.07 | 0.40 | 1.97 | 0.16 | 190.1 | 147.5 | 30.3 | 0.205 |
| 7708 | 15.44 | 19.91 | 37.48 | 75.56 | 13.08 | 37.02 | 7.60 | 0.97 | 5.67 | 0.78 | 4.76 | 1.89 | 5.37 | 0.44 | 2.51 | 0.24 | 228.7 | 177.4 | 35.9 | 0.202 |
| 7709 | 7.90 | 14.60 | 18.14 | 34.80 | 6.54 | 17.50 | 3.64 | 0.56 | 3.23 | 0.54 | 3.20 | 1.13 | 3.18 | 0.32 | 1.39 | 0.03 | 116.7 | 84.4 | 24.4 | 0.289 |
| 7710 | 12.93 | 16.47 | 30.71 | 58.80 | 8.12 | 28.58 | 5.37 | 0.80 | 4.35 | 0.54 | 3.56 | 1.60 | 4.06 | 0.36 | 1.84 | 0.00 | 178.1 | 136.7 | 28.4 | 0.208 |
| 7711 | 13.70 | 19.08 | 37.18 | 73.34 | 12.94 | 37.93 | 7.69 | 0.95 | 5.55 | 0.69 | 4.42 | 1.81 | 5.10 | 0.30 | 2.37 | 0.27 | 223.3 | 175.6 | 34.0 | 0.194 |
| 7712 | 7.61 | 12.40 | 16.05 | 31.28 | 9.79 | 15.94 | 4.49 | 0.64 | 3.09 | 0.72 | 2.87 | 0.70 | 2.29 | 0.24 | 1.52 | 0.55 | 110.2 | 81.3 | 21.3 | 0.262 |
| 7713 | 3.92 | 8.43 | 4.66 | 10.44 | 1.85 | 6.26 | 1.60 | 0.35 | 1.60 | 0.32 | 1.51 | 0.43 | 1.11 | 0.23 | 0.79 | 0.10 | 43.6 | 26.7 | 12.9 | 0.483 |
| 7714 | 10.46 | 15.15 | 26.28 | 49.56 | 8.32 | 24.72 | 5.07 | 0.74 | 3.91 | 0.52 | 3.17 | 1.21 | 3.20 | 0.34 | 1.63 | 0.14 | 154.4 | 118.6 | 25.3 | 0.214 |
| 7715 | 15.07 | 18.05 | 39.80 | 77.03 | 14.05 | 34.29 | 7.27 | 1.13 | 5.42 | 0.65 | 4.05 | 1.56 | 4.68 | 0.40 | 2.33 | 0.35 | 226.1 | 179.0 | 32.1 | 0.179 |
| 7716 | 4.31 | 9.41 | 6.37 | 13.63 | 2.29 | 7.67 | 1.91 | 0.37 | 1.77 | 0.32 | 1.65 | 0.46 | 1.17 | 0.25 | 0.83 | 0.12 | 52.5 | 34.0 | 14.2 | 0.418 |
| 7717 | 12.04 | 17.76 | 31.88 | 60.14 | 9.53 | 28.36 | 5.82 | 0.99 | 4.66 | 0.57 | 3.50 | 1.41 | 4.00 | 0.39 | 1.95 | 0.13 | 183.1 | 141.4 | 29.7 | 0.21 |
| 7718 | 15.39 | 20.49 | 43.21 | 80.01 | 14.51 | 36.72 | 7.77 | 1.21 | 5.69 | 0.72 | 4.33 | 1.68 | 4.89 | 0.45 | 2.51 | 0.34 | 239.9 | 189.1 | 35.4 | 0.187 |
| 7719 | 4.60 | 9.88 | 6.78 | 14.57 | 2.54 | 8.02 | 2.07 | 0.43 | 1.95 | 0.32 | 1.73 | 0.48 | 1.29 | 0.29 | 0.90 | 0.13 | 56.0 | 36.4 | 15.0 | 0.413 |
| 7720 | 11.06 | 15.63 | 26.33 | 52.53 | 7.66 | 24.32 | 4.99 | 0.87 | 4.11 | 0.54 | 3.03 | 1.28 | 3.73 | 0.38 | 1.75 | 0.05 | 158.3 | 120.8 | 26.4 | 0.219 |
| 7686 | 5.09 | 10.32 | 8.39 | 17.36 | 4.68 | 9.31 | 2.62 | 0.43 | 2.09 | 0.42 | 1.98 | 0.47 | 1.35 | 0.26 | 1.00 | 0.29 | 66.1 | 44.9 | 16.1 | 0.359 |
| 7687 | 4.23 | 9.99 | 5.07 | 11.43 | 1.95 | 6.66 | 1.78 | 0.36 | 1.75 | 0.32 | 1.69 | 0.46 | 1.14 | 0.26 | 0.86 | 0.13 | 48.1 | 29.0 | 14.8 | 0.512 |
| 7688 | 10.73 | 18.09 | 28.72 | 55.40 | 8.54 | 27.68 | 5.81 | 0.81 | 4.43 | 0.50 | 3.52 | 1.37 | 3.52 | 0.42 | 1.78 | 0.13 | 171.5 | 131.4 | 29.3 | 0.223 |
| 7689 | 13.64 | 19.27 | 35.94 | 68.11 | 27.15 | 30.35 | 10.04 | 1.03 | 5.61 | 1.29 | 5.27 | 0.78 | 3.53 | 0.35 | 2.50 | 1.68 | 226.5 | 178.2 | 34.7 | 0.195 |
| 7690 | 4.44 | 9.97 | 5.86 | 12.74 | 2.23 | 7.21 | 1.90 | 0.36 | 1.80 | 0.30 | 1.71 | 0.46 | 1.17 | 0.27 | 0.87 | 0.14 | 51.4 | 32.1 | 14.9 | 0.464 |
| 7691 | 11.46 | 18.67 | 31.41 | 60.70 | 9.02 | 29.81 | 6.10 | 0.84 | 4.74 | 0.51 | 3.82 | 1.56 | 4.04 | 0.36 | 1.91 | 0.12 | 185.1 | 142.6 | 31.0 | 0.217 |
| 7692 | 13.69 | 16.50 | 33.85 | 73.47 | 14.79 | 31.56 | 6.95 | 0.85 | 4.66 | 0.62 | 4.34 | 1.43 | 4.20 | 0.41 | 2.03 | 0.36 | 209.7 | 166.1 | 29.9 | 0.18 |
| 7693 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7694 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7695 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7696 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7697 | 10.89 | 15.02 | 22.85 | 49.85 | 6.01 | 25.30 | 4.51 | 0.65 | 4.11 | 0.40 | 3.59 | 1.52 | 3.94 | 0.37 | 1.49 | 0.00 | 150.5 | 113.3 | 26.3 | 0.233 |
| 7316 | 6.55 | 4.92 | 8.51 | 18.06 | 9.93 | 7.87 | 2.26 | 0.32 | 2.24 | 0.38 | 1.44 | 0.31 | 1.24 | 0.08 | 0.70 | 0.38 | 65.2 | 49.2 | 9.4 | 0.192 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7701 | 0.68 | 0.64 | 0.94 | 0.88 | 1.29 | 0.96 | 0.98 | 0.58 | 1.01 | 0.82 | 0.86 | 1.64 | 1.62 | 1.05 | 0.85 | 0.38 | 0.88 | 0.93 | 0.77 | 1.22 |
| 7702 | 0.95 | 0.81 | 1.28 | 1.28 | 2.21 | 1.33 | 1.50 | 0.75 | 1.37 | 1.25 | 1.26 | 2.18 | 2.37 | 1.19 | 1.25 | 1.25 | 1.25 | 1.34 | 1.03 | 1.30 |
| 7703 | 0.30 | 0.39 | 0.25 | 0.25 | 0.40 | 0.31 | 0.38 | 0.32 | 0.46 | 0.60 | 0.45 | 0.64 | 0.65 | 0.75 | 0.47 | 0.36 | 0.31 | 0.28 | 0.43 | 0.65 |
| 7704 | 0.75 | 0.69 | 1.01 | 0.99 | 1.31 | 1.04 | 1.04 | 0.62 | 1.05 | 0.85 | 0.94 | 1.82 | 1.82 | 1.17 | 0.95 | 0.33 | 0.96 | 1.02 | 0.83 | 1.22 |
| 7705 | 0.96 | 0.83 | 1.25 | 1.26 | 2.03 | 1.37 | 1.49 | 0.76 | 1.41 | 1.20 | 1.29 | 2.39 | 2.46 | 1.33 | 1.25 | 0.89 | 1.25 | 1.33 | 1.06 | 1.26 |
| 7706 | 0.38 | 0.44 | 0.33 | 0.33 | 0.45 | 0.38 | 0.44 | 0.32 | 0.52 | 0.51 | 0.50 | 0.76 | 0.72 | 0.79 | 0.49 | 0.33 | 0.38 | 0.35 | 0.48 | 0.74 |
| 7707 | 0.77 | 0.74 | 1.11 | 1.05 | 1.44 | 1.11 | 1.13 | 0.65 | 1.13 | 0.89 | 1.01 | 1.95 | 1.94 | 1.20 | 0.99 | 0.45 | 1.03 | 1.10 | 0.89 | 1.23 |
| 7708 | 0.96 | 0.83 | 1.25 | 1.26 | 1.95 | 1.37 | 1.43 | 0.75 | 1.42 | 1.20 | 1.25 | 2.36 | 2.56 | 1.35 | 1.25 | 0.69 | 1.24 | 1.32 | 1.06 | 1.25 |
| 7709 | 0.49 | 0.61 | 0.60 | 0.58 | 0.98 | 0.65 | 0.69 | 0.43 | 0.81 | 0.83 | 0.84 | 1.41 | 1.51 | 0.98 | 0.70 | 0.09 | 0.63 | 0.63 | 0.72 | 0.88 |
| 7710 | 0.81 | 0.69 | 1.02 | 0.98 | 1.21 | 1.06 | 1.01 | 0.61 | 1.09 | 0.83 | 0.94 | 2.00 | 1.94 | 1.09 | 0.92 | 0.00 | 0.97 | 1.02 | 0.84 | 1.22 |
| 7711 | 0.86 | 0.80 | 1.24 | 1.22 | 1.93 | 1.40 | 1.45 | 0.73 | 1.39 | 1.06 | 1.16 | 2.26 | 2.43 | 0.92 | 1.19 | 0.78 | 1.21 | 1.31 | 1.00 | 1.31 |
| 7712 | 0.48 | 0.52 | 0.53 | 0.52 | 1.46 | 0.59 | 0.85 | 0.49 | 0.77 | 1.11 | 0.75 | 0.88 | 1.09 | 0.73 | 0.76 | 1.57 | 0.60 | 0.61 | 0.63 | 0.97 |
| 7713 | 0.25 | 0.35 | 0.16 | 0.17 | 0.28 | 0.23 | 0.30 | 0.27 | 0.40 | 0.50 | 0.40 | 0.54 | 0.53 | 0.69 | 0.39 | 0.28 | 0.24 | 0.20 | 0.38 | 0.52 |
| 7714 | 0.65 | 0.63 | 0.88 | 0.83 | 1.24 | 0.92 | 0.96 | 0.57 | 0.98 | 0.80 | 0.83 | 1.51 | 1.52 | 1.02 | 0.81 | 0.40 | 0.84 | 0.88 | 0.74 | 1.19 |
| 7715 | 0.94 | 0.75 | 1.33 | 1.28 | 2.10 | 1.27 | 1.37 | 0.87 | 1.36 | 1.00 | 1.07 | 1.95 | 2.23 | 1.22 | 1.17 | 0.99 | 1.23 | 1.33 | 0.94 | 1.41 |
| 7716 | 0.27 | 0.39 | 0.21 | 0.23 | 0.34 | 0.28 | 0.36 | 0.29 | 0.44 | 0.49 | 0.43 | 0.58 | 0.56 | 0.76 | 0.42 | 0.35 | 0.29 | 0.25 | 0.42 | 0.61 |
| 7717 | 0.75 | 0.74 | 1.06 | 1.00 | 1.42 | 1.05 | 1.10 | 0.76 | 1.17 | 0.88 | 0.92 | 1.76 | 1.91 | 1.18 | 0.97 | 0.37 | 0.99 | 1.05 | 0.87 | 1.21 |
| 7718 | 0.96 | 0.85 | 1.44 | 1.33 | 2.17 | 1.36 | 1.47 | 0.93 | 1.42 | 1.10 | 1.14 | 2.10 | 2.33 | 1.36 | 1.25 | 0.98 | 1.30 | 1.41 | 1.04 | 1.35 |
| 7719 | 0.29 | 0.41 | 0.23 | 0.24 | 0.38 | 0.30 | 0.39 | 0.33 | 0.49 | 0.50 | 0.46 | 0.60 | 0.61 | 0.87 | 0.45 | 0.37 | 0.30 | 0.27 | 0.44 | 0.61 |
| 7720 | 0.69 | 0.65 | 0.88 | 0.88 | 1.14 | 0.90 | 0.94 | 0.67 | 1.03 | 0.83 | 0.80 | 1.60 | 1.78 | 1.16 | 0.87 | 0.15 | 0.86 | 0.90 | 0.78 | 1.16 |
| 7686 | 0.32 | 0.43 | 0.28 | 0.29 | 0.70 | 0.34 | 0.49 | 0.33 | 0.52 | 0.65 | 0.52 | 0.59 | 0.64 | 0.78 | 0.50 | 0.82 | 0.36 | 0.33 | 0.47 | 0.71 |
| 7687 | 0.26 | 0.42 | 0.17 | 0.19 | 0.29 | 0.25 | 0.34 | 0.28 | 0.44 | 0.49 | 0.44 | 0.57 | 0.54 | 0.80 | 0.43 | 0.36 | 0.26 | 0.22 | 0.44 | 0.50 |
| 7688 | 0.67 | 0.75 | 0.96 | 0.92 | 1.28 | 1.03 | 1.10 | 0.63 | 1.11 | 0.77 | 0.93 | 1.71 | 1.68 | 1.28 | 0.89 | 0.38 | 0.93 | 0.98 | 0.86 | 1.13 |
| 7689 | 0.85 | 0.80 | 1.20 | 1.14 | 4.05 | 1.12 | 1.89 | 0.79 | 1.40 | 1.99 | 1.39 | 0.97 | 1.68 | 1.07 | 1.25 | 4.81 | 1.23 | 1.33 | 1.02 | 1.30 |
| 7690 | 0.28 | 0.42 | 0.20 | 0.21 | 0.33 | 0.27 | 0.36 | 0.28 | 0.45 | 0.47 | 0.45 | 0.58 | 0.56 | 0.82 | 0.43 | 0.39 | 0.28 | 0.24 | 0.44 | 0.55 |
| 7691 | 0.72 | 0.78 | 1.05 | 1.01 | 1.35 | 1.10 | 1.15 | 0.65 | 1.18 | 0.78 | 1.00 | 1.95 | 1.92 | 1.08 | 0.95 | 0.33 | 1.00 | 1.06 | 0.91 | 1.17 |
| 7692 | 0.86 | 0.69 | 1.13 | 1.22 | 2.21 | 1.17 | 1.31 | 0.65 | 1.17 | 0.96 | 1.14 | 1.78 | 2.00 | 1.23 | 1.02 | 1.03 | 1.14 | 1.24 | 0.88 | 1.41 |
| 7693 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7694 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7695 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7696 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7697 | 0.68 | 0.63 | 0.76 | 0.83 | 0.90 | 0.94 | 0.85 | 0.50 | 1.03 | 0.61 | 0.95 | 1.90 | 1.88 | 1.11 | 0.74 | 0.00 | 0.82 | 0.84 | 0.77 | 1.09 |
| 7316 | 0.41 | 0.20 | 0.28 | 0.30 | 1.48 | 0.29 | 0.43 | 0.25 | 0.56 | 0.59 | 0.38 | 0.38 | 0.59 | 0.26 | 0.35 | 1.08 | 0.35 | 0.37 | 0.28 | 1.32 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab | 21 | 39 | 57 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | Total | Light | Heavy | H/L |
| ID | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | REE | REE | REE | Ratio |
| 7701 | 1.50 | 1.42 | 2.08 | 1.95 | 2.87 | 2.12 | 2.16 | 1.28 | 2.23 | 1.81 | 1.90 | 3.62 | 3.58 | 2.33 | 1.89 | 0.85 | 1.95 | 2.07 | 1.70 | 1.22 |
| 7702 | 1.08 | 0.92 | 1.45 | 1.45 | 2.51 | 1.51 | 1.70 | 0.85 | 1.55 | 1.42 | 1.42 | 2.47 | 2.69 | 1.35 | 1.42 | 1.42 | 1.42 | 1.52 | 1.17 | 1.30 |
| 7703 | 2.99 | 3.86 | 2.43 | 2.48 | 3.96 | 3.07 | 3.70 | 3.17 | 4.56 | 5.88 | 4.44 | 6.24 | 6.34 | 7.38 | 4.64 | 3.49 | 3.07 | 2.78 | 4.25 | 0.65 |
| 7704 | 1.47 | 1.35 | 1.98 | 1.93 | 2.57 | 2.04 | 2.03 | 1.21 | 2.06 | 1.66 | 1.84 | 3.56 | 3.56 | 2.28 | 1.85 | 0.65 | 1.88 | 2.00 | 1.63 | 1.22 |
| 7705 | 1.08 | 0.94 | 1.41 | 1.42 | 2.28 | 1.54 | 1.68 | 0.86 | 1.58 | 1.36 | 1.45 | 2.70 | 2.78 | 1.50 | 1.41 | 1.01 | 1.40 | 1.50 | 1.19 | 1.26 |
| 7706 | 2.62 | 3.08 | 2.31 | 2.26 | 3.10 | 2.63 | 3.07 | 2.22 | 3.61 | 3.53 | 3.47 | 5.28 | 5.01 | 5.52 | 3.41 | 2.29 | 2.64 | 2.46 | 3.34 | 0.74 |
| 7707 | 1.49 | 1.42 | 2.14 | 2.02 | 2.77 | 2.14 | 2.17 | 1.26 | 2.18 | 1.71 | 1.93 | 3.75 | 3.72 | 2.31 | 1.90 | 0.86 | 1.98 | 2.11 | 1.71 | 1.23 |
| 7708 | 1.08 | 0.93 | 1.40 | 1.41 | 2.19 | 1.54 | 1.61 | 0.84 | 1.59 | 1.35 | 1.40 | 2.65 | 2.86 | 1.51 | 1.40 | 0.77 | 1.39 | 1.48 | 1.18 | 1.25 |
| 7709 | 1.53 | 1.88 | 1.87 | 1.80 | 3.02 | 2.01 | 2.13 | 1.34 | 2.50 | 2.56 | 2.61 | 4.36 | 4.68 | 3.05 | 2.15 | 0.29 | 1.96 | 1.95 | 2.22 | 0.88 |
| 7710 | 1.53 | 1.30 | 1.93 | 1.85 | 2.29 | 2.00 | 1.91 | 1.16 | 2.05 | 1.56 | 1.77 | 3.77 | 3.65 | 2.07 | 1.74 | 0.00 | 1.82 | 1.92 | 1.58 | 1.22 |
| 7711 | 0.94 | 0.87 | 1.36 | 1.34 | 2.12 | 1.54 | 1.59 | 0.80 | 1.52 | 1.16 | 1.28 | 2.48 | 2.66 | 1.01 | 1.30 | 0.85 | 1.33 | 1.43 | 1.10 | 1.31 |
| 7712 | 1.45 | 1.58 | 1.63 | 1.59 | 4.46 | 1.80 | 2.59 | 1.51 | 2.36 | 3.40 | 2.30 | 2.68 | 3.33 | 2.23 | 2.32 | 4.80 | 1.83 | 1.85 | 1.91 | 0.97 |
| 7713 | 3.74 | 5.35 | 2.37 | 2.65 | 4.20 | 3.54 | 4.59 | 4.09 | 6.08 | 7.55 | 6.06 | 8.22 | 8.09 | 10.52 | 6.00 | 4.26 | 3.61 | 3.04 | 5.79 | 0.52 |
| 7714 | 1.55 | 1.50 | 2.08 | 1.96 | 2.95 | 2.18 | 2.27 | 1.35 | 2.32 | 1.91 | 1.98 | 3.59 | 3.62 | 2.41 | 1.93 | 0.96 | 1.99 | 2.10 | 1.77 | 1.19 |
| 7715 | 1.34 | 1.07 | 1.88 | 1.82 | 2.98 | 1.80 | 1.95 | 1.23 | 1.93 | 1.42 | 1.51 | 2.77 | 3.16 | 1.73 | 1.66 | 1.41 | 1.74 | 1.89 | 1.34 | 1.41 |
| 7716 | 3.24 | 4.72 | 2.56 | 2.74 | 4.12 | 3.42 | 4.35 | 3.45 | 5.35 | 5.91 | 5.22 | 7.00 | 6.71 | 9.12 | 5.02 | 4.18 | 3.43 | 3.05 | 5.03 | 0.61 |
| 7717 | 1.69 | 1.67 | 2.39 | 2.26 | 3.20 | 2.36 | 2.47 | 1.72 | 2.63 | 1.97 | 2.07 | 3.97 | 4.29 | 2.66 | 2.19 | 0.84 | 2.24 | 2.37 | 1.97 | 1.21 |
| 7718 | 1.42 | 1.26 | 2.12 | 1.96 | 3.19 | 2.00 | 2.16 | 1.37 | 2.09 | 1.62 | 1.68 | 3.09 | 3.42 | 2.00 | 1.85 | 1.45 | 1.92 | 2.07 | 1.53 | 1.35 |
| 7719 | 3.11 | 4.45 | 2.44 | 2.63 | 4.10 | 3.21 | 4.23 | 3.54 | 5.26 | 5.40 | 4.93 | 6.54 | 6.62 | 9.36 | 4.84 | 3.97 | 3.28 | 2.93 | 4.77 | 0.61 |
| 7720 | 1.62 | 1.53 | 2.05 | 2.05 | 2.68 | 2.11 | 2.20 | 1.57 | 2.41 | 1.95 | 1.87 | 3.75 | 4.16 | 2.72 | 2.04 | 0.36 | 2.01 | 2.11 | 1.82 | 1.16 |
| 7686 | 2.30 | 3.11 | 2.02 | 2.09 | 5.05 | 2.49 | 3.58 | 2.39 | 3.78 | 4.68 | 3.76 | 4.29 | 4.65 | 5.66 | 3.61 | 5.92 | 2.59 | 2.42 | 3.42 | 0.71 |
| 7687 | 4.29 | 6.75 | 2.74 | 3.09 | 4.73 | 4.00 | 5.44 | 4.49 | 7.11 | 7.99 | 7.21 | 9.26 | 8.82 | 13.01 | 6.94 | 5.89 | 4.23 | 3.50 | 7.08 | 0.50 |
| 7688 | 1.58 | 1.78 | 2.26 | 2.18 | 3.01 | 2.42 | 2.59 | 1.48 | 2.61 | 1.81 | 2.19 | 4.04 | 3.96 | 3.02 | 2.10 | 0.90 | 2.19 | 2.31 | 2.03 | 1.13 |
| 7689 | 1.21 | 1.14 | 1.70 | 1.61 | 5.74 | 1.59 | 2.68 | 1.12 | 1.99 | 2.82 | 1.96 | 1.38 | 2.38 | 1.51 | 1.77 | 6.81 | 1.74 | 1.88 | 1.44 | 1.30 |
| 7690 | 3.53 | 5.28 | 2.49 | 2.70 | 4.24 | 3.40 | 4.55 | 3.52 | 5.71 | 5.96 | 5.73 | 7.33 | 7.07 | 10.46 | 5.53 | 4.96 | 3.55 | 3.04 | 5.57 | 0.55 |
| 7691 | 1.56 | 1.69 | 2.28 | 2.20 | 2.93 | 2.40 | 2.50 | 1.41 | 2.57 | 1.70 | 2.18 | 4.25 | 4.18 | 2.35 | 2.07 | 0.73 | 2.18 | 2.31 | 1.98 | 1.17 |
| 7692 | 1.23 | 0.99 | 1.63 | 1.77 | 3.19 | 1.69 | 1.89 | 0.94 | 1.68 | 1.38 | 1.65 | 2.57 | 2.88 | 1.77 | 1.46 | 1.48 | 1.64 | 1.78 | 1.27 | 1.41 |
| 7693 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7694 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7695 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7696 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7697 | 1.69 | 1.55 | 1.89 | 2.06 | 2.23 | 2.33 | 2.11 | 1.24 | 2.55 | 1.52 | 2.35 | 4.71 | 4.66 | 2.75 | 1.85 | 0.00 | 2.03 | 2.09 | 1.92 | 1.09 |
| 7316 | 1.67 | 0.83 | 1.16 | 1.23 | 6.04 | 1.19 | 1.73 | 1.00 | 2.29 | 2.39 | 1.54 | 1.56 | 2.41 | 1.04 | 1.43 | 4.42 | 1.44 | 1.49 | 1.13 | 1.32 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7317 | 42.5 | Plant 12 | Raw Coal (1mm x 100M) | 18.06 |
| 7320 | 68.2 | Plant 12 | Raw Coal (1/2" x 1mm) | 22.66 |
| 7323 | 73.1 | Plant 12 | Raw Coal (1 1/4" x 1/2") | 31.54 |
| 7326 | 39.1 | Plant 12 | Raw Coal (+ x 1 1/4") | 28.83 |
| 7329 | 30 | Plant 12 | Fine Reject (100M x 0) | 42.52 |
| 7330 | 16.9 | Plant 12 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 8.19 |
| 7331 | 0.2 | Plant 12 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 34.51 |
| 7332 | 85 | Plant 12 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 78.95 |
| 7342 | 70.4 | Plant 12 | Coarse Reject (100M x 0) | 78.34 |
| 7343 | 43.5 | Plant 12 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 18.09 |
| 7344 | 12.1 | Plant 12 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 38.62 |
| 7345 | 62.2 | Plant 12 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 81.21 |
| 7346 | 33.3 | Plant 12 | Coarse Reject (1/2" x 1mm / Flt x 1.6 SG) | 17.7 |
| 7347 | 71 | Plant 12 | Coarse Reject (1/2" x 1mm / 1.6 x 1.8 SG) | 41.21 |
| 7348 | 73.7 | Plant 12 | Coarse Reject (1/2" x 1mm / 1.8 x Snk SG) | 85.18 |
| 7349 | 69.5 | Plant 12 | Coarse Reject (1 1/4" x 1/2" / Flt x 1.6 SG) | 22.77 |
| 7350 | 68.1 | Plant 12 | Coarse Reject (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 43.35 |
| 7351 | 74.7 | Plant 12 | Coarse Reject (1 1/4" x 1/2" / 1.8 x Snk SG) | 86.18 |
| 7352 | 1.9 | Plant 12 | Coarse Reject (+ x 1 1/4" / Flt x 1.6 SG) | 16.78 |
| 7353 | 66 | Plant 12 | Coarse Reject (+ x 1 1/4" / 1.6 x 1.8 SG) | 42.59 |
| 7354 | 83.9 | Plant 12 | Coarse Reject (+ x 1 1/4" / 1.8 x Snk SG) | 79.85 |
| 7355 | 66.7 | Plant 12 | Clean Coal (100M x 0) | 12.4 |
| 7356 | 52.2 | Plant 12 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 5.4 |
| 7357 | 19.9 | Plant 12 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 32.91 |
| 7358 | 30.4 | Plant 12 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 61.99 |
| 7359 | 46.4 | Plant 12 | Clean Coal (1/2" x 1mm / Flt x 1.6 SG) | 6.76 |
| 7360 | 51.1 | Plant 12 | Clean Coal (1/2" x 1mm / 1.6 x 1.8 SG) | 35.9 |
| 7361 | 6.4 | Plant 12 | Clean Coal (1/2" x 1mm / 1.8 x Snk SG) | 70.03 |
| 7362 | 62.4 | Plant 12 | Clean Coal (1 1/4" x 1/2" / Flt x 1.6 SG) | 8.6 |
| 7363 | 73.1 | Plant 12 | Clean Coal (1 1/4" x 1/2" / 1.6 x 1.8 SG) | 36.97 |
| 7364 | 92.9 | Plant 12 | Clean Coal (1 1/4" x 1/2" / 1.8 x Snk SG) | 72.35 |
| 7365 | 48.7 | Plant 12 | Clean Coal (+ x 1 1/4" / Flt x 1.6 SG) | 8.97 |
| 7366 | 66.8 | Plant 12 | Clean Coal (+ x 1 1/4" / 1.6 x 1.8 SG) | 37.53 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7317 | 30.88 | 27.73 | 45.26 | 88.50 | 43.11 | 41.88 | 11.28 | 1.73 | 10.84 | 1.75 | 7.14 | 1.67 | 5.89 | 0.59 | 3.57 | 1.62 | 323.4 | 242.6 | 50.0 | 0.21 |
| 7320 | 25.21 | 28.37 | 50.00 | 96.73 | 31.09 | 45.43 | 11.60 | 1.76 | 9.38 | 1.53 | 7.30 | 1.94 | 6.68 | 0.71 | 3.60 | 1.16 | 322.5 | 246.0 | 51.3 | 0.21 |
| 7323 | 23.99 | 28.07 | 52.75 | 101.54 | 30.12 | 47.92 | 11.71 | 1.73 | 9.30 | 1.42 | 7.26 | 2.09 | 7.09 | 0.58 | 3.60 | 1.07 | 330.2 | 255.1 | 51.2 | 0.20 |
| 7326 | 28.05 | 32.36 | 53.57 | 100.90 | 35.40 | 47.22 | 11.76 | 1.84 | 10.50 | 1.49 | 7.36 | 2.11 | 7.03 | 0.63 | 3.90 | 1.24 | 345.4 | 261.2 | 56.1 | 0.21 |
| 7329 | 24.34 | 23.69 | 42.96 | 83.76 | 26.33 | 38.22 | 8.52 | 1.41 | 8.32 | 0.99 | 5.22 | 1.92 | 6.21 | 0.46 | 2.98 | 0.53 | 275.9 | 209.5 | 42.0 | 0.20 |
| 7330 | 36.60 | 47.78 | 58.01 | 111.27 | 47.91 | 55.98 | 18.52 | 2.81 | 12.68 | 2.99 | 10.14 | 1.73 | 7.38 | 1.12 | 5.91 | 3.10 | 423.9 | 307.2 | 80.2 | 0.26 |
| 7331 | 35.21 | 25.14 | 41.47 | 81.41 | 67.77 | 38.01 | 14.41 | 1.72 | 12.92 | 2.45 | 7.23 | 0.56 | 4.33 | 0.48 | 3.64 | 3.24 | 340.0 | 257.7 | 47.1 | 0.18 |
| 7332 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7342 | 22.03 | 20.74 | 42.55 | 81.01 | 27.39 | 36.09 | 8.56 | 1.25 | 7.68 | 1.05 | 5.21 | 1.79 | 5.95 | 0.47 | 2.79 | 0.73 | 265.3 | 204.5 | 38.7 | 0.19 |
| 7343 | 38.19 | 39.35 | 53.00 | 103.11 | 30.13 | 57.70 | 12.40 | 2.96 | 10.58 | 2.74 | 6.56 | 2.52 | 8.52 | 0.80 | 5.60 | 1.21 | 375.4 | 269.9 | 67.3 | 0.25 |
| 7344 | 30.58 | 28.28 | 47.94 | 93.28 | 41.44 | 46.69 | 12.54 | 1.93 | 10.32 | 1.98 | 6.41 | 1.64 | 6.52 | 0.58 | 3.93 | 1.79 | 335.8 | 254.1 | 51.1 | 0.20 |
| 7345 | 25.46 | 21.50 | 42.84 | 81.18 | 36.58 | 36.03 | 8.96 | 1.29 | 9.14 | 1.17 | 5.63 | 1.66 | 5.68 | 0.42 | 2.83 | 1.07 | 281.4 | 216.0 | 40.0 | 0.18 |
| 7346 | 57.90 | 49.17 | 60.20 | 120.88 | 50.67 | 72.12 | 19.11 | 4.30 | 14.28 | 4.56 | 9.27 | 2.31 | 9.02 | 1.00 | 7.62 | 2.94 | 485.4 | 341.6 | 85.9 | 0.25 |
| 7347 | 39.63 | 33.79 | 55.25 | 110.41 | 57.24 | 55.85 | 15.07 | 2.37 | 14.47 | 2.12 | 8.02 | 1.70 | 6.22 | 0.63 | 4.20 | 2.14 | 409.1 | 310.7 | 58.8 | 0.19 |
| 7348 | 20.68 | 23.54 | 48.06 | 91.66 | 22.16 | 41.00 | 9.06 | 1.38 | 7.60 | 0.83 | 5.33 | 2.02 | 6.54 | 0.50 | 2.92 | 0.41 | 283.7 | 220.9 | 42.1 | 0.19 |
| 7349 | 64.20 | 50.10 | 68.58 | 139.20 | 56.57 | 72.67 | 18.64 | 4.09 | 16.73 | 3.71 | 10.15 | 2.63 | 8.58 | 1.04 | 7.00 | 2.50 | 526.4 | 376.5 | 85.7 | 0.23 |
| 7350 | 37.53 | 33.97 | 60.89 | 133.81 | 48.54 | 66.81 | 15.68 | 2.42 | 13.14 | 1.92 | 8.68 | 2.29 | 6.94 | 0.62 | 4.19 | 1.62 | 439.0 | 341.3 | 60.2 | 0.18 |
| 7351 | 19.97 | 23.65 | 50.50 | 96.53 | 21.03 | 47.82 | 9.29 | 1.27 | 7.67 | 0.84 | 6.14 | 2.37 | 6.99 | 0.53 | 2.92 | 0.15 | 297.7 | 234.1 | 43.6 | 0.19 |
| 7352 | 80.93 | 28.11 | 30.24 | 61.90 | 113.60 | 40.40 | 4.33 | 2.41 | 23.82 | 3.11 | 5.47 | 1.47 | 5.31 | 0.58 | 4.47 | 2.11 | 408.2 | 276.7 | 50.6 | 0.18 |
| 7353 | 46.00 | 50.33 | 96.16 | 187.01 | 52.46 | 91.97 | 21.93 | 3.94 | 18.07 | 2.34 | 11.41 | 3.27 | 9.27 | 0.93 | 6.05 | 1.80 | 602.9 | 471.5 | 85.4 | 0.18 |
| 7354 | 26.21 | 22.39 | 44.66 | 84.01 | 48.24 | 36.18 | 11.17 | 1.33 | 10.17 | 1.59 | 6.55 | 1.37 | 5.55 | 0.43 | 3.12 | 1.98 | 304.9 | 235.8 | 43.0 | 0.18 |
| 7355 | 41.98 | 35.49 | 45.76 | 87.52 | 68.24 | 41.22 | 14.16 | 2.06 | 14.51 | 2.73 | 8.76 | 1.34 | 6.03 | 0.71 | 4.68 | 3.08 | 378.3 | 273.5 | 62.8 | 0.23 |
| 7356 | 44.94 | 63.17 | 66.85 | 127.61 | 48.63 | 65.94 | 19.64 | 3.47 | 15.32 | 3.31 | 12.29 | 2.62 | 9.15 | 1.51 | 7.23 | 2.90 | 494.6 | 347.5 | 102.2 | 0.29 |
| 7357 | 37.40 | 24.79 | 38.84 | 76.22 | 72.95 | 35.43 | 13.95 | 1.65 | 13.54 | 2.59 | 7.30 | 0.59 | 4.12 | 0.45 | 3.64 | 3.39 | 336.8 | 252.6 | 46.9 | 0.19 |
| 7358 | 36.95 | 19.60 | 38.35 | 74.63 | 69.37 | 33.27 | 10.90 | 1.30 | 13.43 | 1.91 | 6.54 | 0.83 | 4.37 | 0.38 | 2.83 | 2.33 | 317.0 | 241.3 | 38.8 | 0.16 |
| 7359 | 37.57 | 50.71 | 60.76 | 115.20 | 51.18 | 56.03 | 19.01 | 2.86 | 13.46 | 3.09 | 11.19 | 1.85 | 7.65 | 1.16 | 6.11 | 3.26 | 441.1 | 318.5 | 85.0 | 0.27 |
| 7360 | 38.76 | 28.03 | 43.98 | 86.18 | 66.33 | 42.23 | 13.16 | 1.90 | 13.96 | 2.32 | 7.32 | 1.09 | 5.25 | 0.47 | 3.81 | 2.72 | 357.5 | 267.7 | 51.0 | 0.19 |
| 7361 | 25.00 | 17.46 | 32.28 | 64.09 | 10.31 | 27.71 | 14.52 | 1.20 | 10.35 | 2.44 | 7.18 | 0.34 | 4.31 | 0.24 | 3.21 | 3.53 | 224.2 | 160.5 | 38.7 | 0.24 |
| 7362 | 25.57 | 26.40 | 32.95 | 94.07 | 43.40 | 31.49 | 14.37 | 1.71 | 8.60 | 2.49 | 7.27 | 0.79 | 5.34 | 0.68 | 3.93 | 3.12 | 302.2 | 226.6 | 50.0 | 0.22 |
| 7363 | 25.89 | 16.05 | 27.34 | 80.73 | 46.36 | 28.20 | 10.43 | 1.24 | 8.83 | 1.86 | 5.17 | 0.72 | 4.59 | 0.35 | 2.75 | 2.36 | 262.9 | 203.1 | 33.9 | 0.17 |
| 7364 | 27.03 | 29.29 | 53.42 | 106.03 | 35.44 | 51.74 | 12.06 | 1.92 | 11.43 | 1.34 | 7.67 | 2.29 | 6.97 | 0.60 | 3.40 | 0.89 | 351.5 | 272.0 | 52.4 | 0.19 |
| 7365 | 36.15 | 49.67 | 59.26 | 107.62 | 13.85 | 51.98 | 20.28 | 2.68 | 14.38 | 3.24 | 12.06 | 1.75 | 7.86 | 1.05 | 6.18 | 3.80 | 391.8 | 270.1 | 85.6 | 0.32 |
| 7366 | 53.51 | 74.55 | 103.09 | 193.59 | 50.70 | 97.55 | 25.08 | 4.66 | 19.56 | 3.79 | 16.32 | 3.95 | 11.83 | 1.45 | 8.79 | 2.79 | 671.2 | 494.2 | 123.5 | 0.25 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7317 | 5.58 | 5.01 | 8.17 | 15.98 | 7.79 | 7.56 | 2.04 | 0.31 | 1.96 | 0.32 | 1.29 | 0.30 | 1.06 | 0.11 | 0.64 | 0.29 | 58.4 | 43.8 | 9.0 | 0.206 |
| 7320 | 5.71 | 6.43 | 11.33 | 21.92 | 7.05 | 10.30 | 2.63 | 0.40 | 2.12 | 0.35 | 1.65 | 0.44 | 1.51 | 0.16 | 0.81 | 0.26 | 73.1 | 55.7 | 11.6 | 0.208 |
| 7323 | 7.57 | 8.85 | 16.64 | 32.03 | 9.50 | 15.11 | 3.69 | 0.55 | 2.93 | 0.45 | 2.29 | 0.66 | 2.24 | 0.18 | 1.14 | 0.34 | 104.2 | 80.4 | 16.1 | 0.201 |
| 7326 | 8.09 | 9.33 | 15.44 | 29.09 | 10.21 | 13.61 | 3.39 | 0.53 | 3.03 | 0.43 | 2.12 | 0.61 | 2.03 | 0.18 | 1.13 | 0.36 | 99.6 | 75.3 | 16.2 | 0.215 |
| 7329 | 10.35 | 10.07 | 18.27 | 35.62 | 11.20 | 16.25 | 3.62 | 0.60 | 3.54 | 0.42 | 2.22 | 0.82 | 2.64 | 0.19 | 1.27 | 0.23 | 117.3 | 89.1 | 17.9 | 0.201 |
| 7330 | 3.00 | 3.91 | 4.75 | 9.11 | 3.92 | 4.58 | 1.52 | 0.23 | 1.04 | 0.24 | 0.83 | 0.14 | 0.60 | 0.09 | 0.48 | 0.25 | 34.7 | 25.2 | 6.6 | 0.261 |
| 7331 | 12.15 | 8.67 | 14.31 | 28.09 | 23.39 | 13.12 | 4.97 | 0.59 | 4.46 | 0.85 | 2.50 | 0.19 | 1.49 | 0.17 | 1.26 | 1.12 | 117.3 | 88.9 | 16.2 | 0.183 |
| 7332 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7342 | 17.26 | 16.25 | 33.33 | 63.46 | 21.46 | 28.27 | 6.71 | 0.98 | 6.02 | 0.82 | 4.08 | 1.40 | 4.66 | 0.37 | 2.18 | 0.57 | 207.8 | 160.2 | 30.3 | 0.189 |
| 7343 | 6.91 | 7.12 | 9.59 | 18.65 | 5.45 | 10.44 | 2.24 | 0.54 | 1.91 | 0.50 | 1.19 | 0.46 | 1.54 | 0.14 | 1.01 | 0.22 | 67.9 | 48.8 | 12.2 | 0.249 |
| 7344 | 11.81 | 10.92 | 18.51 | 36.02 | 16.00 | 18.03 | 4.84 | 0.74 | 3.99 | 0.77 | 2.47 | 0.63 | 2.52 | 0.22 | 1.52 | 0.69 | 129.7 | 98.1 | 19.7 | 0.201 |
| 7345 | 20.68 | 17.46 | 34.79 | 65.92 | 29.71 | 29.26 | 7.27 | 1.05 | 7.42 | 0.95 | 4.58 | 1.35 | 4.61 | 0.34 | 2.30 | 0.87 | 228.6 | 175.4 | 32.5 | 0.185 |
| 7346 | 10.25 | 8.70 | 10.66 | 21.40 | 8.97 | 12.77 | 3.38 | 0.76 | 2.53 | 0.81 | 1.64 | 0.41 | 1.60 | 0.18 | 1.35 | 0.52 | 85.9 | 60.5 | 15.2 | 0.251 |
| 7347 | 16.33 | 13.93 | 22.77 | 45.50 | 23.59 | 23.02 | 6.21 | 0.98 | 5.96 | 0.87 | 3.30 | 0.70 | 2.56 | 0.26 | 1.73 | 0.88 | 168.6 | 128.0 | 24.2 | 0.189 |
| 7348 | 17.61 | 20.05 | 40.94 | 78.08 | 18.87 | 34.92 | 7.71 | 1.17 | 6.47 | 0.70 | 4.54 | 1.72 | 5.57 | 0.42 | 2.49 | 0.35 | 241.6 | 188.2 | 35.8 | 0.191 |
| 7349 | 14.62 | 11.41 | 15.62 | 31.70 | 12.88 | 16.55 | 4.24 | 0.93 | 3.81 | 0.84 | 2.31 | 0.60 | 1.95 | 0.24 | 1.59 | 0.57 | 119.9 | 85.7 | 19.5 | 0.228 |
| 7350 | 16.27 | 14.73 | 26.40 | 58.01 | 21.04 | 28.96 | 6.80 | 1.05 | 5.69 | 0.83 | 3.76 | 0.99 | 3.01 | 0.27 | 1.82 | 0.70 | 190.3 | 147.9 | 26.1 | 0.176 |
| 7351 | 17.21 | 20.38 | 43.52 | 83.19 | 18.13 | 41.21 | 8.00 | 1.10 | 6.61 | 0.72 | 5.29 | 2.04 | 6.03 | 0.46 | 2.52 | 0.13 | 256.6 | 201.8 | 37.6 | 0.186 |
| 7352 | 13.58 | 4.72 | 5.07 | 10.39 | 19.06 | 6.78 | 0.73 | 0.40 | 4.00 | 0.52 | 0.92 | 0.25 | 0.89 | 0.10 | 0.75 | 0.35 | 68.5 | 46.4 | 8.5 | 0.183 |
| 7353 | 19.59 | 21.44 | 40.96 | 79.65 | 22.34 | 39.17 | 9.34 | 1.68 | 7.70 | 1.00 | 4.86 | 1.39 | 3.95 | 0.39 | 2.58 | 0.77 | 256.8 | 200.8 | 36.4 | 0.181 |
| 7354 | 20.92 | 17.88 | 35.66 | 67.08 | 38.52 | 28.89 | 8.92 | 1.06 | 8.12 | 1.27 | 5.23 | 1.09 | 4.43 | 0.34 | 2.49 | 1.58 | 243.5 | 188.3 | 34.3 | 0.182 |
| 7355 | 5.21 | 4.40 | 5.67 | 10.85 | 8.46 | 5.11 | 1.76 | 0.26 | 1.80 | 0.34 | 1.09 | 0.17 | 0.75 | 0.09 | 0.58 | 0.38 | 46.9 | 33.9 | 7.8 | 0.23 |
| 7356 | 2.43 | 3.41 | 3.61 | 6.89 | 2.63 | 3.56 | 1.06 | 0.19 | 0.83 | 0.18 | 0.66 | 0.14 | 0.49 | 0.08 | 0.39 | 0.16 | 26.7 | 18.8 | 5.5 | 0.294 |
| 7357 | 12.31 | 8.16 | 12.78 | 25.08 | 24.01 | 11.66 | 4.59 | 0.54 | 4.45 | 0.85 | 2.40 | 0.19 | 1.36 | 0.15 | 1.20 | 1.12 | 110.9 | 83.1 | 15.4 | 0.186 |
| 7358 | 22.90 | 12.15 | 23.77 | 46.26 | 43.00 | 20.62 | 6.76 | 0.81 | 8.33 | 1.18 | 4.05 | 0.51 | 2.71 | 0.23 | 1.76 | 1.44 | 196.5 | 149.6 | 24.0 | 0.161 |
| 7359 | 2.54 | 3.43 | 4.11 | 7.79 | 3.46 | 3.79 | 1.29 | 0.19 | 0.91 | 0.21 | 0.76 | 0.13 | 0.52 | 0.08 | 0.41 | 0.22 | 29.8 | 21.5 | 5.7 | 0.267 |
| 7360 | 13.92 | 10.06 | 15.79 | 30.94 | 23.81 | 15.16 | 4.73 | 0.68 | 5.01 | 0.83 | 2.63 | 0.39 | 1.88 | 0.17 | 1.37 | 0.98 | 128.3 | 96.1 | 18.3 | 0.191 |
| 7361 | 17.50 | 12.23 | 22.61 | 44.88 | 7.22 | 19.40 | 10.17 | 0.84 | 7.25 | 1.71 | 5.03 | 0.24 | 3.02 | 0.17 | 2.25 | 2.47 | 157.0 | 112.4 | 27.1 | 0.241 |
| 7362 | 2.20 | 2.27 | 2.83 | 8.09 | 3.73 | 2.71 | 1.24 | 0.15 | 0.74 | 0.21 | 0.63 | 0.07 | 0.46 | 0.06 | 0.34 | 0.27 | 26.0 | 19.5 | 4.3 | 0.221 |
| 7363 | 9.57 | 5.94 | 10.11 | 29.84 | 17.14 | 10.43 | 3.86 | 0.46 | 3.27 | 0.69 | 1.91 | 0.27 | 1.70 | 0.13 | 1.02 | 0.87 | 97.2 | 75.1 | 12.5 | 0.167 |
| 7364 | 19.56 | 21.19 | 38.65 | 76.71 | 25.64 | 37.43 | 8.72 | 1.39 | 8.27 | 0.97 | 5.55 | 1.66 | 5.04 | 0.43 | 2.46 | 0.64 | 254.3 | 196.8 | 37.9 | 0.193 |
| 7365 | 3.24 | 4.46 | 5.32 | 9.65 | 1.24 | 4.66 | 1.82 | 0.24 | 1.29 | 0.29 | 1.08 | 0.16 | 0.71 | 0.09 | 0.55 | 0.34 | 35.1 | 24.2 | 7.7 | 0.317 |
| 7366 | 20.08 | 27.98 | 38.69 | 72.65 | 19.03 | 36.61 | 9.41 | 1.75 | 7.34 | 1.42 | 6.12 | 1.48 | 4.44 | 0.54 | 3.30 | 1.05 | 251.9 | 185.5 | 46.3 | 0.25 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7317 | 0.35 | 0.21 | 0.27 | 0.27 | 1.16 | 0.28 | 0.38 | 0.24 | 0.49 | 0.49 | 0.34 | 0.38 | 0.51 | 0.32 | 0.32 | 0.83 | 0.32 | 0.33 | 0.27 | 1.23 |
| 7320 | 0.36 | 0.27 | 0.38 | 0.37 | 1.05 | 0.38 | 0.50 | 0.31 | 0.53 | 0.53 | 0.44 | 0.55 | 0.72 | 0.49 | 0.41 | 0.75 | 0.40 | 0.42 | 0.34 | 1.22 |
| 7323 | 0.47 | 0.37 | 0.55 | 0.53 | 1.42 | 0.56 | 0.70 | 0.42 | 0.73 | 0.69 | 0.60 | 0.82 | 1.07 | 0.55 | 0.57 | 0.97 | 0.57 | 0.60 | 0.47 | 1.26 |
| 7326 | 0.51 | 0.39 | 0.51 | 0.48 | 1.52 | 0.50 | 0.64 | 0.41 | 0.76 | 0.66 | 0.56 | 0.76 | 0.97 | 0.55 | 0.56 | 1.02 | 0.54 | 0.56 | 0.48 | 1.18 |
| 7329 | 0.65 | 0.42 | 0.61 | 0.59 | 1.67 | 0.60 | 0.68 | 0.46 | 0.88 | 0.65 | 0.58 | 1.02 | 1.26 | 0.59 | 0.63 | 0.65 | 0.64 | 0.66 | 0.52 | 1.26 |
| 7330 | 0.19 | 0.16 | 0.16 | 0.15 | 0.59 | 0.17 | 0.29 | 0.18 | 0.26 | 0.38 | 0.22 | 0.18 | 0.29 | 0.28 | 0.24 | 0.73 | 0.19 | 0.19 | 0.19 | 0.97 |
| 7331 | 0.76 | 0.36 | 0.48 | 0.47 | 3.49 | 0.49 | 0.94 | 0.46 | 1.11 | 1.30 | 0.66 | 0.24 | 0.71 | 0.50 | 0.63 | 3.19 | 0.64 | 0.66 | 0.48 | 1.39 |
| 7332 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7342 | 1.08 | 0.68 | 1.11 | 1.06 | 3.20 | 1.05 | 1.27 | 0.75 | 1.50 | 1.27 | 1.07 | 1.75 | 2.22 | 1.11 | 1.09 | 1.63 | 1.13 | 1.19 | 0.89 | 1.34 |
| 7343 | 0.43 | 0.30 | 0.32 | 0.31 | 0.81 | 0.39 | 0.42 | 0.41 | 0.48 | 0.76 | 0.31 | 0.57 | 0.73 | 0.44 | 0.51 | 0.63 | 0.37 | 0.36 | 0.36 | 1.02 |
| 7344 | 0.74 | 0.46 | 0.62 | 0.60 | 2.39 | 0.67 | 0.91 | 0.57 | 1.00 | 1.18 | 0.65 | 0.79 | 1.20 | 0.68 | 0.76 | 1.98 | 0.70 | 0.73 | 0.58 | 1.26 |
| 7345 | 1.29 | 0.73 | 1.16 | 1.10 | 4.43 | 1.08 | 1.37 | 0.81 | 1.86 | 1.47 | 1.20 | 1.68 | 2.20 | 1.02 | 1.15 | 2.49 | 1.24 | 1.31 | 0.95 | 1.37 |
| 7346 | 0.64 | 0.36 | 0.36 | 0.36 | 1.34 | 0.47 | 0.64 | 0.59 | 0.63 | 1.24 | 0.43 | 0.51 | 0.76 | 0.54 | 0.67 | 1.49 | 0.47 | 0.45 | 0.45 | 1.01 |
| 7347 | 1.02 | 0.58 | 0.76 | 0.76 | 3.52 | 0.85 | 1.17 | 0.75 | 1.49 | 1.34 | 0.87 | 0.88 | 1.22 | 0.79 | 0.86 | 2.52 | 0.91 | 0.95 | 0.71 | 1.34 |
| 7348 | 1.10 | 0.84 | 1.36 | 1.30 | 2.82 | 1.29 | 1.46 | 0.90 | 1.62 | 1.08 | 1.20 | 2.15 | 2.65 | 1.29 | 1.24 | 0.99 | 1.31 | 1.40 | 1.05 | 1.33 |
| 7349 | 0.91 | 0.48 | 0.52 | 0.53 | 1.92 | 0.61 | 0.80 | 0.72 | 0.95 | 1.30 | 0.61 | 0.75 | 0.93 | 0.71 | 0.80 | 1.63 | 0.65 | 0.64 | 0.57 | 1.11 |
| 7350 | 1.02 | 0.61 | 0.88 | 0.97 | 3.14 | 1.07 | 1.28 | 0.81 | 1.42 | 1.28 | 0.99 | 1.24 | 1.43 | 0.82 | 0.91 | 2.01 | 1.03 | 1.10 | 0.77 | 1.44 |
| 7351 | 1.08 | 0.85 | 1.45 | 1.39 | 2.71 | 1.53 | 1.51 | 0.84 | 1.65 | 1.11 | 1.39 | 2.56 | 2.87 | 1.39 | 1.26 | 0.38 | 1.39 | 1.50 | 1.10 | 1.36 |
| 7352 | 0.85 | 0.20 | 0.17 | 0.17 | 2.85 | 0.25 | 0.14 | 0.31 | 1.00 | 0.80 | 0.24 | 0.31 | 0.42 | 0.29 | 0.38 | 1.01 | 0.37 | 0.35 | 0.25 | 1.38 |
| 7353 | 1.22 | 0.89 | 1.37 | 1.33 | 3.33 | 1.45 | 1.76 | 1.29 | 1.92 | 1.53 | 1.28 | 1.74 | 1.88 | 1.19 | 1.29 | 2.19 | 1.39 | 1.50 | 1.07 | 1.40 |
| 7354 | 1.31 | 0.74 | 1.19 | 1.12 | 5.75 | 1.07 | 1.68 | 0.81 | 2.03 | 1.95 | 1.38 | 1.36 | 2.11 | 1.04 | 1.25 | 4.53 | 1.32 | 1.40 | 1.01 | 1.39 |
| 7355 | 0.33 | 0.18 | 0.19 | 0.18 | 1.26 | 0.19 | 0.33 | 0.20 | 0.45 | 0.52 | 0.29 | 0.21 | 0.36 | 0.27 | 0.29 | 1.09 | 0.25 | 0.25 | 0.23 | 1.10 |
| 7356 | 0.15 | 0.14 | 0.12 | 0.11 | 0.39 | 0.13 | 0.20 | 0.14 | 0.21 | 0.28 | 0.17 | 0.18 | 0.24 | 0.25 | 0.20 | 0.45 | 0.14 | 0.14 | 0.16 | 0.86 |
| 7357 | 0.77 | 0.34 | 0.43 | 0.42 | 3.58 | 0.43 | 0.87 | 0.42 | 1.11 | 1.31 | 0.63 | 0.24 | 0.65 | 0.45 | 0.60 | 3.19 | 0.60 | 0.62 | 0.45 | 1.37 |
| 7358 | 1.43 | 0.51 | 0.79 | 0.77 | 6.42 | 0.76 | 1.28 | 0.62 | 2.08 | 1.82 | 1.07 | 0.64 | 1.29 | 0.71 | 0.88 | 4.13 | 1.07 | 1.11 | 0.71 | 1.58 |
| 7359 | 0.16 | 0.14 | 0.14 | 0.13 | 0.52 | 0.14 | 0.24 | 0.15 | 0.23 | 0.32 | 0.20 | 0.16 | 0.25 | 0.24 | 0.21 | 0.63 | 0.16 | 0.16 | 0.17 | 0.95 |
| 7360 | 0.87 | 0.42 | 0.53 | 0.52 | 3.55 | 0.56 | 0.89 | 0.52 | 1.25 | 1.28 | 0.69 | 0.49 | 0.90 | 0.52 | 0.68 | 2.79 | 0.70 | 0.72 | 0.54 | 1.33 |
| 7361 | 1.09 | 0.51 | 0.75 | 0.75 | 1.08 | 0.72 | 1.92 | 0.65 | 1.81 | 2.63 | 1.32 | 0.30 | 1.44 | 0.52 | 1.12 | 7.07 | 0.85 | 0.84 | 0.80 | 1.05 |
| 7362 | 0.14 | 0.09 | 0.09 | 0.13 | 0.56 | 0.10 | 0.23 | 0.11 | 0.18 | 0.33 | 0.16 | 0.09 | 0.22 | 0.18 | 0.17 | 0.77 | 0.14 | 0.15 | 0.13 | 1.15 |
| 7363 | 0.60 | 0.25 | 0.34 | 0.50 | 2.56 | 0.39 | 0.73 | 0.35 | 0.82 | 1.06 | 0.50 | 0.33 | 0.81 | 0.40 | 0.51 | 2.49 | 0.53 | 0.56 | 0.37 | 1.52 |
| 7364 | 1.22 | 0.88 | 1.29 | 1.28 | 3.83 | 1.39 | 1.65 | 1.07 | 2.07 | 1.49 | 1.46 | 2.07 | 2.40 | 1.32 | 1.23 | 1.84 | 1.38 | 1.47 | 1.11 | 1.31 |
| 7365 | 0.20 | 0.19 | 0.18 | 0.16 | 0.19 | 0.17 | 0.34 | 0.19 | 0.32 | 0.45 | 0.28 | 0.20 | 0.34 | 0.29 | 0.28 | 0.97 | 0.19 | 0.18 | 0.23 | 0.80 |
| 7366 | 1.26 | 1.17 | 1.29 | 1.21 | 2.84 | 1.36 | 1.78 | 1.35 | 1.84 | 2.19 | 1.61 | 1.85 | 2.11 | 1.65 | 1.65 | 2.99 | 1.37 | 1.38 | 1.36 | 1.01 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7317 | 1.93 | 1.16 | 1.51 | 1.48 | 6.43 | 1.55 | 2.13 | 1.33 | 2.71 | 2.70 | 1.88 | 2.08 | 2.81 | 1.80 | 1.78 | 4.62 | 1.75 | 1.81 | 1.47 | 1.23 |
| 7320 | 1.58 | 1.18 | 1.67 | 1.61 | 4.64 | 1.68 | 2.19 | 1.36 | 2.34 | 2.35 | 1.92 | 2.43 | 3.18 | 2.14 | 1.80 | 3.31 | 1.75 | 1.83 | 1.51 | 1.22 |
| 7323 | 1.50 | 1.17 | 1.76 | 1.69 | 4.49 | 1.77 | 2.21 | 1.33 | 2.33 | 2.19 | 1.91 | 2.61 | 3.38 | 1.76 | 1.80 | 3.06 | 1.79 | 1.90 | 1.50 | 1.26 |
| 7326 | 1.75 | 1.35 | 1.79 | 1.68 | 5.28 | 1.75 | 2.22 | 1.41 | 2.63 | 2.29 | 1.94 | 2.64 | 3.35 | 1.92 | 1.95 | 3.54 | 1.87 | 1.94 | 1.65 | 1.18 |
| 7329 | 1.52 | 0.99 | 1.43 | 1.40 | 3.93 | 1.42 | 1.61 | 1.08 | 2.08 | 1.53 | 1.37 | 2.40 | 2.96 | 1.39 | 1.49 | 1.53 | 1.50 | 1.56 | 1.23 | 1.26 |
| 7330 | 2.29 | 1.99 | 1.93 | 1.85 | 7.15 | 2.07 | 3.49 | 2.16 | 3.17 | 4.60 | 2.67 | 2.17 | 3.52 | 3.41 | 2.95 | 8.86 | 2.30 | 2.29 | 2.36 | 0.97 |
| 7331 | 2.20 | 1.05 | 1.38 | 1.36 | 10.12 | 1.41 | 2.72 | 1.32 | 3.23 | 3.78 | 1.90 | 0.70 | 2.06 | 1.46 | 1.82 | 9.24 | 1.84 | 1.92 | 1.38 | 1.39 |
| 7332 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7342 | 1.38 | 0.86 | 1.42 | 1.35 | 4.09 | 1.34 | 1.62 | 0.96 | 1.92 | 1.62 | 1.37 | 2.23 | 2.83 | 1.42 | 1.39 | 2.07 | 1.44 | 1.52 | 1.14 | 1.34 |
| 7343 | 2.39 | 1.64 | 1.77 | 1.72 | 4.50 | 2.14 | 2.34 | 2.28 | 2.64 | 4.21 | 1.73 | 3.16 | 4.06 | 2.42 | 2.80 | 3.46 | 2.04 | 2.01 | 1.98 | 1.02 |
| 7344 | 1.91 | 1.18 | 1.60 | 1.55 | 6.18 | 1.73 | 2.37 | 1.48 | 2.58 | 3.05 | 1.69 | 2.05 | 3.11 | 1.75 | 1.96 | 5.12 | 1.82 | 1.89 | 1.50 | 1.26 |
| 7345 | 1.59 | 0.90 | 1.43 | 1.35 | 5.46 | 1.33 | 1.69 | 0.99 | 2.28 | 1.81 | 1.48 | 2.07 | 2.70 | 1.26 | 1.41 | 3.07 | 1.53 | 1.61 | 1.17 | 1.37 |
| 7346 | 3.62 | 2.05 | 2.01 | 2.01 | 7.56 | 2.67 | 3.61 | 3.31 | 3.57 | 7.01 | 2.44 | 2.89 | 4.30 | 3.04 | 3.81 | 8.39 | 2.63 | 2.54 | 2.52 | 1.01 |
| 7347 | 2.48 | 1.41 | 1.84 | 1.84 | 8.54 | 2.07 | 2.84 | 1.83 | 3.62 | 3.26 | 2.11 | 2.13 | 2.96 | 1.91 | 2.10 | 6.10 | 2.22 | 2.31 | 1.73 | 1.34 |
| 7348 | 1.29 | 0.98 | 1.60 | 1.53 | 3.31 | 1.52 | 1.71 | 1.06 | 1.90 | 1.27 | 1.40 | 2.52 | 3.11 | 1.51 | 1.46 | 1.16 | 1.54 | 1.64 | 1.24 | 1.33 |
| 7349 | 4.01 | 2.09 | 2.29 | 2.32 | 8.44 | 2.69 | 3.52 | 3.15 | 4.18 | 5.70 | 2.67 | 3.29 | 4.08 | 3.14 | 3.50 | 7.14 | 2.86 | 2.80 | 2.52 | 1.11 |
| 7350 | 2.35 | 1.42 | 2.03 | 2.23 | 7.24 | 2.47 | 2.96 | 1.86 | 3.28 | 2.95 | 2.28 | 2.86 | 3.30 | 1.89 | 2.10 | 4.63 | 2.38 | 2.54 | 1.77 | 1.44 |
| 7351 | 1.25 | 0.99 | 1.68 | 1.61 | 3.14 | 1.77 | 1.75 | 0.98 | 1.92 | 1.29 | 1.62 | 2.97 | 3.33 | 1.62 | 1.46 | 0.44 | 1.62 | 1.74 | 1.28 | 1.36 |
| 7352 | 5.06 | 1.17 | 1.01 | 1.03 | 16.96 | 1.50 | 0.82 | 1.85 | 5.95 | 4.78 | 1.44 | 1.84 | 2.53 | 1.75 | 2.24 | 6.03 | 2.21 | 2.06 | 1.49 | 1.38 |
| 7353 | 2.88 | 2.10 | 3.21 | 3.12 | 7.83 | 3.41 | 4.14 | 3.03 | 4.52 | 3.60 | 3.00 | 4.09 | 4.41 | 2.80 | 3.03 | 5.15 | 3.27 | 3.51 | 2.51 | 1.40 |
| 7354 | 1.64 | 0.93 | 1.49 | 1.40 | 7.20 | 1.34 | 2.11 | 1.02 | 2.54 | 2.44 | 1.72 | 1.71 | 2.64 | 1.30 | 1.56 | 5.67 | 1.65 | 1.76 | 1.26 | 1.39 |
| 7355 | 2.62 | 1.48 | 1.53 | 1.46 | 10.19 | 1.53 | 2.67 | 1.59 | 3.63 | 4.20 | 2.31 | 1.67 | 2.87 | 2.17 | 2.34 | 8.81 | 2.05 | 2.04 | 1.85 | 1.10 |
| 7356 | 2.81 | 2.63 | 2.23 | 2.13 | 7.26 | 2.44 | 3.71 | 2.67 | 3.83 | 5.10 | 3.23 | 3.27 | 4.35 | 4.58 | 3.62 | 8.29 | 2.68 | 2.59 | 3.00 | 0.86 |
| 7357 | 2.34 | 1.03 | 1.29 | 1.27 | 10.89 | 1.31 | 2.63 | 1.27 | 3.38 | 3.98 | 1.92 | 0.74 | 1.96 | 1.36 | 1.82 | 9.68 | 1.83 | 1.88 | 1.38 | 1.37 |
| 7358 | 2.31 | 0.82 | 1.28 | 1.24 | 10.35 | 1.23 | 2.06 | 1.00 | 3.36 | 2.93 | 1.72 | 1.03 | 2.08 | 1.14 | 1.42 | 6.66 | 1.72 | 1.80 | 1.14 | 1.58 |
| 7359 | 2.35 | 2.11 | 2.03 | 1.92 | 7.64 | 2.08 | 3.59 | 2.20 | 3.36 | 4.75 | 2.94 | 2.32 | 3.64 | 3.52 | 3.06 | 9.33 | 2.39 | 2.37 | 2.50 | 0.95 |
| 7360 | 2.42 | 1.17 | 1.47 | 1.44 | 9.90 | 1.56 | 2.48 | 1.46 | 3.49 | 3.57 | 1.93 | 1.37 | 2.50 | 1.44 | 1.91 | 7.78 | 1.94 | 1.99 | 1.50 | 1.33 |
| 7361 | 1.56 | 0.73 | 1.08 | 1.07 | 1.54 | 1.03 | 2.74 | 0.92 | 2.59 | 3.76 | 1.89 | 0.43 | 2.05 | 0.74 | 1.60 | 10.10 | 1.22 | 1.19 | 1.14 | 1.05 |
| 7362 | 1.60 | 1.10 | 1.10 | 1.57 | 6.48 | 1.17 | 2.71 | 1.32 | 2.15 | 3.83 | 1.91 | 0.99 | 2.54 | 2.05 | 1.97 | 8.93 | 1.64 | 1.69 | 1.47 | 1.15 |
| 7363 | 1.62 | 0.67 | 0.91 | 1.35 | 6.92 | 1.04 | 1.97 | 0.96 | 2.21 | 2.85 | 1.36 | 0.90 | 2.19 | 1.07 | 1.37 | 6.74 | 1.43 | 1.51 | 0.99 | 1.52 |
| 7364 | 1.69 | 1.22 | 1.78 | 1.77 | 5.29 | 1.92 | 2.28 | 1.48 | 2.86 | 2.06 | 2.02 | 2.86 | 3.32 | 1.82 | 1.70 | 2.55 | 1.91 | 2.03 | 1.54 | 1.31 |
| 7365 | 2.26 | 2.07 | 1.98 | 1.79 | 2.07 | 1.93 | 3.83 | 2.06 | 3.60 | 4.99 | 3.17 | 2.19 | 3.74 | 3.18 | 3.09 | 10.85 | 2.13 | 2.01 | 2.52 | 0.80 |
| 7366 | 3.34 | 3.11 | 3.44 | 3.23 | 7.57 | 3.61 | 4.73 | 3.59 | 4.89 | 5.82 | 4.29 | 4.93 | 5.63 | 4.39 | 4.39 | 7.97 | 3.64 | 3.68 | 3.63 | 1.01 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7367 | 75.2 | Plant 12 | Clean Coal (+ x 1 1/4" / 1.8 x Snk SG) | 58.32 |
| 7144 | 58 | Plant 13 | Raw Coal (100M x 0) | 15.06 |
| 7145 | 47.8 | Plant 13 | Raw Coal (1mm x 100M) | 10.51 |
| 7148 | 46.8 | Plant 13 | Raw Coal (1/4" x 1mm) | 14.81 |
| 7151 | 69 | Plant 13 | Raw Coal (3/4" x 1/4) | 33.85 |
| 7154 | 69.4 | Plant 13 | Raw Coal (+ x 3/4) | 58.9 |
| 7157 | 35.3 | Plant 13 | Fine Reject (100M x 0) | 22.65 |
| 7158 | 1.9 | Plant 13 | Fine Reject (1mm x 100M) | 6.31 |
| 7170 | 80.1 | Plant 13 | Coarse Reject (100M x 0) | 61.57 |
| 7171 | 69.3 | Plant 13 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 11.08 |
| 7172 | 60.9 | Plant 13 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 37.2 |
| 7173 | 85.8 | Plant 13 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 76.48 |
| 7174 | 44.6 | Plant 13 | Coarse Reject (1/4" x 1mm / Flt x 1.6 SG) | 18.29 |
| 7175 | 55.2 | Plant 13 | Coarse Reject (1/4" x 1mm / 1.6 x 1.8 SG) | 42.54 |
| 7176 | 81.4 | Plant 13 | Coarse Reject (1/4" x 1mm / 1.8 x Snk SG) | 81.21 |
| 7177 | 70.2 | Plant 13 | Coarse Reject (3/4" x 1/4" / Flt x 1.6 SG) | 29.28 |
| 7178 | 75.5 | Plant 13 | Coarse Reject (3/4" x 1/4" / 1.6 x 1.8 SG) | 41.85 |
| 7179 | 79.9 | Plant 13 | Coarse Reject (3/4" x 1/4" / 1.8 x Snk SG) | 85.03 |
| 7180 | 80.7 | Plant 13 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 32.93 |
| 7181 | 80.5 | Plant 13 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 42.27 |
| 7182 | 83.5 | Plant 13 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 87.99 |
| 7183 | 70.4 | Plant 13 | Clean Coal (100M x 0) | 5.86 |
| 7184 | 68.6 | Plant 13 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 4 |
| 7185 | 6.8 | Plant 13 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 38.5 |
| 7186 | 8 | Plant 13 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 57.98 |
| 7187 | 49.3 | Plant 13 | Clean Coal (1/4" x 1mm / Flt x 1.6 SG) | 6.03 |
| 7188 | 19.4 | Plant 13 | Clean Coal (1/4" x 1mm / 1.6 x 1.8 SG) | 37.96 |
| 7189 | 16.1 | Plant 13 | Clean Coal (1/4" x 1mm / 1.8 x Snk SG) | 55.61 |
| 7190 | 65.2 | Plant 13 | Clean Coal (3/4" x 1/4" / Flt x 1.6 SG) | 8.23 |
| 7191 | 50.6 | Plant 13 | Clean Coal (3/4" x 1/4" / 1.6 x 1.8 SG) | 39.17 |
| 7192 | 15.8 | Plant 13 | Clean Coal (3/4" x 1/4" / 1.8 x Snk SG) | 49.77 |
| 7193 | 55.5 | Plant 13 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 11.21 |
| 7194 | 2.5 | Plant 13 | Clean Coal (+ x 3/4" / 1.6 x 1.8 SG) | 36.21 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7367 | 24.77 | 30.44 | 53.02 | 124.62 | 34.23 | 56.80 | 15.82 | 2.19 | 11.00 | 1.71 | 7.93 | 1.93 | 7.23 | 0.52 | 3.82 | 1.72 | 377.8 | 297.7 | 55.3 | 0.19 |
| 7144 | 37.03 | 37.41 | 43.90 | 85.45 | 57.53 | 39.41 | 12.87 | 1.88 | 13.54 | 2.21 | 8.70 | 1.61 | 6.56 | 0.78 | 4.27 | 2.41 | 355.6 | 254.6 | 64.0 | 0.25 |
| 7145 | 38.04 | 51.49 | 53.95 | 106.58 | 53.18 | 50.53 | 15.41 | 2.46 | 14.62 | 2.52 | 10.88 | 2.32 | 8.32 | 1.14 | 5.35 | 2.38 | 419.2 | 296.7 | 84.4 | 0.28 |
| 7148 | 26.44 | 45.01 | 55.81 | 107.80 | 34.57 | 50.21 | 15.22 | 2.17 | 10.69 | 2.07 | 9.55 | 2.27 | 8.14 | 1.03 | 4.92 | 1.98 | 377.9 | 276.5 | 75.0 | 0.27 |
| 7151 | 22.08 | 30.52 | 54.16 | 102.65 | 28.05 | 46.62 | 12.64 | 1.75 | 8.27 | 1.48 | 7.02 | 2.02 | 7.30 | 0.67 | 3.94 | 1.40 | 330.6 | 254.1 | 54.4 | 0.21 |
| 7154 | 19.52 | 24.86 | 52.09 | 100.34 | 25.79 | 44.77 | 11.92 | 1.58 | 7.60 | 1.22 | 6.12 | 1.80 | 6.72 | 0.34 | 3.49 | 1.25 | 309.4 | 244.1 | 45.8 | 0.19 |
| 7157 | 23.23 | 33.75 | 50.74 | 101.66 | 27.03 | 46.07 | 12.79 | 1.88 | 8.70 | 1.54 | 7.42 | 2.06 | 7.33 | 0.74 | 4.14 | 1.41 | 330.5 | 248.9 | 58.4 | 0.23 |
| 7158 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 7170 | 31.74 | 13.28 | 26.58 | 48.77 | 82.07 | 16.35 | 14.11 | 0.93 | 11.16 | 2.79 | 6.84 | -0.51 | 2.85 | 0.24 | 3.05 | 4.55 | 264.8 | 200.0 | 33.1 | 0.17 |
| 7171 | 34.40 | 61.59 | 59.04 | 117.35 | 38.17 | 56.00 | 16.66 | 2.86 | 12.88 | 2.94 | 11.93 | 2.88 | 10.41 | 1.46 | 6.59 | 2.19 | 437.3 | 303.0 | 100.0 | 0.33 |
| 7172 | 22.99 | 28.36 | 46.66 | 83.34 | 25.87 | 35.29 | 10.49 | 1.42 | 6.52 | 1.51 | 6.18 | 1.55 | 6.21 | 0.74 | 3.85 | 1.58 | 282.5 | 209.6 | 50.0 | 0.24 |
| 7173 | 25.72 | 18.00 | 39.33 | 75.87 | 48.67 | 31.10 | 11.12 | 1.20 | 9.08 | 1.67 | 5.93 | 0.90 | 4.72 | 0.31 | 2.94 | 2.30 | 278.9 | 216.4 | 36.8 | 0.17 |
| 7174 | 29.92 | 45.43 | 56.72 | 105.38 | 29.83 | 47.63 | 13.53 | 2.18 | 9.58 | 2.08 | 8.93 | 2.41 | 8.60 | 1.16 | 5.30 | 1.68 | 370.3 | 264.8 | 75.6 | 0.29 |
| 7175 | 27.79 | 30.44 | 45.83 | 94.87 | 25.92 | 36.89 | 10.56 | 1.47 | 6.87 | 1.50 | 6.73 | 1.89 | 7.50 | 0.84 | 4.32 | 1.50 | 304.9 | 222.4 | 54.7 | 0.25 |
| 7176 | 18.26 | 21.13 | 47.94 | 92.54 | 37.20 | 41.62 | 14.36 | 1.38 | 6.81 | 1.68 | 7.09 | 1.23 | 2.49 | 0.42 | 3.34 | 2.02 | 299.5 | 241.8 | 39.4 | 0.16 |
| 7177 | 29.72 | 36.48 | 48.04 | 101.46 | 24.52 | 43.14 | 10.11 | 1.37 | 7.28 | 1.47 | 8.20 | 2.69 | 4.44 | 1.08 | 4.72 | 0.86 | 325.6 | 235.9 | 59.9 | 0.25 |
| 7178 | 31.36 | 33.47 | 48.88 | 94.93 | 27.97 | 42.24 | 11.05 | 1.37 | 7.13 | 1.58 | 8.08 | 2.38 | 4.05 | 0.93 | 4.58 | 1.15 | 321.2 | 233.6 | 56.2 | 0.24 |
| 7179 | 19.58 | 23.58 | 52.70 | 98.98 | 30.85 | 48.07 | 13.19 | 1.49 | 7.40 | 1.43 | 6.99 | 1.81 | 3.17 | 0.46 | 3.37 | 1.32 | 314.4 | 252.7 | 42.1 | 0.17 |
| 7180 | 29.83 | 37.97 | 48.48 | 95.11 | 26.13 | 41.58 | 10.63 | 1.43 | 7.28 | 1.60 | 8.45 | 2.55 | 4.53 | 1.02 | 4.91 | 1.12 | 322.6 | 230.6 | 62.2 | 0.27 |
| 7181 | 32.19 | 33.20 | 48.83 | 92.11 | 24.47 | 41.29 | 9.92 | 1.36 | 6.94 | 1.52 | 7.76 | 2.49 | 4.15 | 0.95 | 4.56 | 0.96 | 312.7 | 224.9 | 55.6 | 0.25 |
| 7182 | 19.36 | 22.94 | 48.08 | 104.70 | 20.29 | 45.23 | 10.69 | 1.51 | 7.45 | 0.96 | 5.44 | 1.91 | 6.93 | 0.54 | 3.14 | 0.63 | 299.8 | 238.0 | 42.5 | 0.18 |
| 7183 | 44.25 | 73.26 | 55.38 | 124.96 | 57.72 | 61.91 | 20.16 | 3.36 | 18.62 | 3.49 | 14.61 | 2.89 | 10.62 | 1.60 | 6.98 | 2.94 | 502.7 | 342.1 | 116.4 | 0.34 |
| 7184 | 51.48 | 104.96 | 68.21 | 156.60 | 42.19 | 81.33 | 21.29 | 4.43 | 22.36 | 3.48 | 18.12 | 4.85 | 14.21 | 2.47 | 8.79 | 1.68 | 606.4 | 396.4 | 158.6 | 0.40 |
| 7185 | 18.46 | 23.84 | 36.31 | 74.03 | 28.12 | 29.32 | 10.62 | 1.20 | 5.97 | 1.65 | 5.94 | 0.94 | 5.07 | 0.56 | 3.41 | 1.96 | 247.4 | 185.6 | 43.4 | 0.23 |
| 7186 | 19.58 | 26.41 | 40.97 | 73.97 | 34.68 | 33.40 | 11.95 | 1.28 | 6.02 | 1.82 | 6.71 | 0.96 | 2.34 | 0.61 | 3.67 | 2.04 | 266.4 | 202.3 | 44.6 | 0.22 |
| 7187 | 44.96 | 96.16 | 71.49 | 145.16 | 40.14 | 82.32 | 19.98 | 3.54 | 18.47 | 2.95 | 17.25 | 4.95 | 9.32 | 2.12 | 8.19 | 1.44 | 568.4 | 381.1 | 142.4 | 0.37 |
| 7188 | 25.91 | 30.56 | 44.66 | 84.54 | 32.02 | 37.50 | 12.06 | 1.36 | 6.52 | 1.74 | 7.61 | 1.62 | 3.31 | 0.82 | 4.23 | 1.74 | 296.2 | 218.6 | 51.6 | 0.24 |
| 7189 | 18.84 | 22.15 | 39.72 | 74.61 | 47.85 | 32.00 | 16.71 | 1.34 | 5.98 | 2.30 | 7.60 | 0.30 | 1.82 | 0.53 | 3.76 | 3.33 | 278.9 | 218.2 | 41.8 | 0.19 |
| 7190 | 37.07 | 72.28 | 63.55 | 128.66 | 34.45 | 69.91 | 16.77 | 2.71 | 14.47 | 2.38 | 13.93 | 4.15 | 7.52 | 1.62 | 6.81 | 1.18 | 477.5 | 330.5 | 109.9 | 0.33 |
| 7191 | 33.20 | 37.91 | 60.49 | 110.03 | 32.41 | 51.87 | 12.95 | 1.70 | 8.46 | 1.92 | 9.03 | 2.51 | 4.46 | 0.79 | 5.07 | 1.43 | 374.3 | 277.9 | 63.1 | 0.23 |
| 7192 | 20.94 | 23.72 | 52.92 | 97.16 | 75.87 | 34.95 | 23.78 | 1.82 | 7.94 | 3.59 | 10.07 | 0.00 | 1.45 | 0.00 | 4.95 | 5.68 | 364.8 | 294.4 | 49.5 | 0.17 |
| 7193 | 33.67 | 56.35 | 70.18 | 135.76 | 33.20 | 69.84 | 15.29 | 2.16 | 12.10 | 1.90 | 11.78 | 3.97 | 6.65 | 1.40 | 6.14 | 0.92 | 461.3 | 338.5 | 89.1 | 0.26 |
| 7194 | 19.12 | 31.96 | 36.83 | 95.43 | 19.70 | 51.47 | 11.95 | 1.80 | 9.23 | 1.23 | 6.67 | 2.69 | 8.85 | 0.84 | 3.61 | 0.28 | 301.6 | 226.4 | 56.1 | 0.25 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7367 | 14.44 | 17.75 | 30.92 | 72.68 | 19.96 | 33.13 | 9.23 | 1.28 | 6.42 | 1.00 | 4.62 | 1.13 | 4.22 | 0.31 | 2.23 | 1.01 | 220.3 | 173.6 | 32.3 | 0.186 |
| 7144 | 5.58 | 5.63 | 6.61 | 12.87 | 8.66 | 5.93 | 1.94 | 0.28 | 2.04 | 0.33 | 1.31 | 0.24 | 0.99 | 0.12 | 0.64 | 0.36 | 53.5 | 38.3 | 9.6 | 0.251 |
| 7145 | 4.00 | 5.41 | 5.67 | 11.20 | 5.59 | 5.31 | 1.62 | 0.26 | 1.54 | 0.27 | 1.14 | 0.24 | 0.87 | 0.12 | 0.56 | 0.25 | 44.1 | 31.2 | 8.9 | 0.284 |
| 7148 | 3.92 | 6.67 | 8.27 | 15.97 | 5.12 | 7.44 | 2.25 | 0.32 | 1.58 | 0.31 | 1.41 | 0.34 | 1.21 | 0.15 | 0.73 | 0.29 | 56.0 | 40.9 | 11.1 | 0.271 |
| 7151 | 7.47 | 10.33 | 18.33 | 34.75 | 9.50 | 15.78 | 4.28 | 0.59 | 2.80 | 0.50 | 2.38 | 0.69 | 2.47 | 0.23 | 1.33 | 0.47 | 111.9 | 86.0 | 18.4 | 0.214 |
| 7154 | 11.49 | 14.64 | 30.68 | 59.10 | 15.19 | 26.37 | 7.02 | 0.93 | 4.48 | 0.72 | 3.60 | 1.06 | 3.96 | 0.20 | 2.05 | 0.73 | 182.2 | 143.8 | 27.0 | 0.188 |
| 7157 | 5.26 | 7.64 | 11.49 | 23.03 | 6.12 | 10.44 | 2.90 | 0.43 | 1.97 | 0.35 | 1.68 | 0.47 | 1.66 | 0.17 | 0.94 | 0.32 | 74.9 | 56.4 | 13.2 | 0.235 |
| 7158 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7170 | 19.55 | 8.18 | 16.37 | 30.03 | 50.53 | 10.07 | 8.69 | 0.57 | 6.87 | 1.72 | 4.21 | -0.31 | 1.75 | 0.15 | 1.88 | 2.80 | 163.0 | 123.1 | 20.4 | 0.166 |
| 7171 | 3.81 | 6.82 | 6.54 | 13.00 | 4.23 | 6.20 | 1.85 | 0.32 | 1.43 | 0.33 | 1.32 | 0.32 | 1.15 | 0.16 | 0.73 | 0.24 | 48.5 | 33.6 | 11.1 | 0.33 |
| 7172 | 8.55 | 10.55 | 17.36 | 31.00 | 9.63 | 13.13 | 3.90 | 0.53 | 2.42 | 0.56 | 2.30 | 0.58 | 2.31 | 0.27 | 1.43 | 0.59 | 105.1 | 78.0 | 18.6 | 0.238 |
| 7173 | 19.67 | 13.76 | 30.08 | 58.02 | 37.23 | 23.78 | 8.50 | 0.92 | 6.94 | 1.28 | 4.54 | 0.69 | 3.61 | 0.24 | 2.25 | 1.76 | 213.3 | 165.5 | 28.1 | 0.17 |
| 7174 | 5.47 | 8.31 | 10.37 | 19.27 | 5.46 | 8.71 | 2.47 | 0.40 | 1.75 | 0.38 | 1.63 | 0.44 | 1.57 | 0.21 | 0.97 | 0.31 | 67.7 | 48.4 | 13.8 | 0.285 |
| 7175 | 11.82 | 12.95 | 19.50 | 40.36 | 11.03 | 15.69 | 4.49 | 0.62 | 2.92 | 0.64 | 2.86 | 0.80 | 3.19 | 0.36 | 1.84 | 0.64 | 129.7 | 94.6 | 23.3 | 0.246 |
| 7176 | 14.83 | 17.16 | 38.93 | 75.15 | 30.21 | 33.80 | 11.67 | 1.12 | 5.53 | 1.37 | 5.76 | 1.00 | 2.02 | 0.34 | 2.71 | 1.64 | 243.2 | 196.4 | 32.0 | 0.163 |
| 7177 | 8.70 | 10.68 | 14.07 | 29.71 | 7.18 | 12.63 | 2.96 | 0.40 | 2.13 | 0.43 | 2.40 | 0.79 | 1.30 | 0.32 | 1.38 | 0.25 | 95.3 | 69.1 | 17.5 | 0.254 |
| 7178 | 13.12 | 14.01 | 20.46 | 39.73 | 11.71 | 17.68 | 4.63 | 0.57 | 2.98 | 0.66 | 3.38 | 0.99 | 1.70 | 0.39 | 1.92 | 0.48 | 134.4 | 97.7 | 23.5 | 0.241 |
| 7179 | 16.65 | 20.05 | 44.81 | 84.16 | 26.23 | 40.88 | 11.22 | 1.26 | 6.30 | 1.21 | 5.94 | 1.54 | 2.69 | 0.39 | 2.87 | 1.12 | 267.3 | 214.9 | 35.8 | 0.167 |
| 7180 | 9.82 | 12.51 | 15.96 | 31.32 | 8.60 | 13.69 | 3.50 | 0.47 | 2.40 | 0.53 | 2.78 | 0.84 | 1.49 | 0.34 | 1.62 | 0.37 | 106.2 | 75.9 | 20.5 | 0.27 |
| 7181 | 13.61 | 14.04 | 20.64 | 38.94 | 10.34 | 17.45 | 4.19 | 0.57 | 2.93 | 0.64 | 3.28 | 1.05 | 1.75 | 0.40 | 1.93 | 0.40 | 132.2 | 95.1 | 23.5 | 0.247 |
| 7182 | 17.03 | 20.18 | 42.31 | 92.13 | 17.86 | 39.80 | 9.41 | 1.32 | 6.56 | 0.85 | 4.79 | 1.68 | 6.10 | 0.48 | 2.76 | 0.55 | 263.8 | 209.4 | 37.4 | 0.179 |
| 7183 | 2.59 | 4.29 | 3.25 | 7.32 | 3.38 | 3.63 | 1.18 | 0.20 | 1.09 | 0.20 | 0.86 | 0.17 | 0.62 | 0.09 | 0.41 | 0.17 | 29.5 | 20.0 | 6.8 | 0.34 |
| 7184 | 2.06 | 4.20 | 2.73 | 6.26 | 1.69 | 3.25 | 0.85 | 0.18 | 0.89 | 0.14 | 0.72 | 0.19 | 0.57 | 0.10 | 0.35 | 0.07 | 24.3 | 15.9 | 6.3 | 0.4 |
| 7185 | 7.11 | 9.18 | 13.98 | 28.50 | 10.83 | 11.29 | 4.09 | 0.46 | 2.30 | 0.64 | 2.29 | 0.36 | 1.95 | 0.21 | 1.31 | 0.75 | 95.2 | 71.4 | 16.7 | 0.234 |
| 7186 | 11.35 | 15.31 | 23.76 | 42.89 | 20.11 | 19.37 | 6.93 | 0.74 | 3.49 | 1.05 | 3.89 | 0.56 | 1.36 | 0.35 | 2.13 | 1.18 | 154.5 | 117.3 | 25.8 | 0.22 |
| 7187 | 2.71 | 5.80 | 4.31 | 8.75 | 2.42 | 4.96 | 1.20 | 0.21 | 1.11 | 0.18 | 1.04 | 0.30 | 0.56 | 0.13 | 0.49 | 0.09 | 34.3 | 23.0 | 8.6 | 0.374 |
| 7188 | 9.83 | 11.60 | 16.95 | 32.09 | 12.16 | 14.23 | 4.58 | 0.52 | 2.47 | 0.66 | 2.89 | 0.61 | 1.26 | 0.31 | 1.60 | 0.66 | 112.4 | 83.0 | 19.6 | 0.236 |
| 7189 | 10.48 | 12.32 | 22.09 | 41.49 | 26.61 | 17.80 | 9.29 | 0.74 | 3.33 | 1.28 | 4.23 | 0.17 | 1.01 | 0.29 | 2.09 | 1.85 | 155.1 | 121.3 | 23.2 | 0.192 |
| 7190 | 3.05 | 5.95 | 5.23 | 10.59 | 2.84 | 5.75 | 1.38 | 0.22 | 1.19 | 0.20 | 1.15 | 0.34 | 0.62 | 0.13 | 0.56 | 0.10 | 39.3 | 27.2 | 9.0 | 0.332 |
| 7191 | 13.01 | 14.85 | 23.69 | 43.10 | 12.70 | 20.32 | 5.07 | 0.67 | 3.31 | 0.75 | 3.54 | 0.98 | 1.75 | 0.31 | 1.99 | 0.56 | 146.6 | 108.9 | 24.7 | 0.227 |
| 7192 | 10.42 | 11.81 | 26.34 | 48.35 | 37.76 | 17.39 | 11.84 | 0.90 | 3.95 | 1.79 | 5.01 | 0.00 | 0.72 | 0.00 | 2.46 | 2.83 | 181.6 | 146.5 | 24.6 | 0.168 |
| 7193 | 3.77 | 6.32 | 7.87 | 15.22 | 3.72 | 7.83 | 1.71 | 0.24 | 1.36 | 0.21 | 1.32 | 0.45 | 0.75 | 0.16 | 0.69 | 0.10 | 51.7 | 37.9 | 10.0 | 0.263 |
| 7194 | 6.92 | 11.57 | 13.34 | 34.56 | 7.13 | 18.64 | 4.33 | 0.65 | 3.34 | 0.44 | 2.41 | 0.97 | 3.20 | 0.30 | 1.31 | 0.10 | 109.2 | 82.0 | 20.3 | 0.248 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7367 | 0.90 | 0.74 | 1.03 | 1.21 | 2.98 | 1.23 | 1.74 | 0.98 | 1.60 | 1.53 | 1.22 | 1.41 | 2.01 | 0.93 | 1.11 | 2.87 | 1.20 | 1.29 | 0.95 | 1.36 |
| 7144 | 0.35 | 0.23 | 0.22 | 0.21 | 1.29 | 0.22 | 0.37 | 0.22 | 0.51 | 0.51 | 0.34 | 0.30 | 0.47 | 0.36 | 0.32 | 1.04 | 0.29 | 0.29 | 0.28 | 1.01 |
| 7145 | 0.25 | 0.23 | 0.19 | 0.19 | 0.83 | 0.20 | 0.31 | 0.20 | 0.38 | 0.41 | 0.30 | 0.31 | 0.42 | 0.36 | 0.28 | 0.71 | 0.24 | 0.23 | 0.26 | 0.89 |
| 7148 | 0.24 | 0.28 | 0.28 | 0.27 | 0.76 | 0.28 | 0.43 | 0.25 | 0.40 | 0.47 | 0.37 | 0.42 | 0.57 | 0.46 | 0.36 | 0.84 | 0.30 | 0.30 | 0.33 | 0.93 |
| 7151 | 0.47 | 0.43 | 0.61 | 0.58 | 1.42 | 0.58 | 0.81 | 0.46 | 0.70 | 0.77 | 0.63 | 0.86 | 1.18 | 0.69 | 0.67 | 1.35 | 0.61 | 0.64 | 0.54 | 1.18 |
| 7154 | 0.72 | 0.61 | 1.02 | 0.98 | 2.27 | 0.98 | 1.33 | 0.71 | 1.12 | 1.11 | 0.95 | 1.32 | 1.88 | 0.61 | 1.03 | 2.10 | 0.99 | 1.07 | 0.79 | 1.35 |
| 7157 | 0.33 | 0.32 | 0.38 | 0.38 | 0.91 | 0.39 | 0.55 | 0.33 | 0.49 | 0.54 | 0.44 | 0.58 | 0.79 | 0.51 | 0.47 | 0.91 | 0.41 | 0.42 | 0.39 | 1.08 |
| 7158 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 7170 | 1.22 | 0.34 | 0.55 | 0.50 | 7.54 | 0.37 | 1.64 | 0.44 | 1.72 | 2.64 | 1.11 | -0.39 | 0.83 | 0.46 | 0.94 | 8.01 | 0.88 | 0.92 | 0.60 | 1.53 |
| 7171 | 0.24 | 0.28 | 0.22 | 0.22 | 0.63 | 0.23 | 0.35 | 0.24 | 0.36 | 0.50 | 0.35 | 0.40 | 0.55 | 0.49 | 0.37 | 0.69 | 0.26 | 0.25 | 0.33 | 0.77 |
| 7172 | 0.53 | 0.44 | 0.58 | 0.52 | 1.44 | 0.49 | 0.74 | 0.41 | 0.61 | 0.86 | 0.60 | 0.72 | 1.10 | 0.83 | 0.72 | 1.67 | 0.57 | 0.58 | 0.55 | 1.06 |
| 7173 | 1.23 | 0.57 | 1.00 | 0.97 | 5.56 | 0.88 | 1.60 | 0.70 | 1.74 | 1.97 | 1.19 | 0.86 | 1.72 | 0.72 | 1.12 | 5.03 | 1.16 | 1.23 | 0.83 | 1.49 |
| 7174 | 0.34 | 0.35 | 0.35 | 0.32 | 0.81 | 0.32 | 0.47 | 0.31 | 0.44 | 0.59 | 0.43 | 0.55 | 0.75 | 0.64 | 0.48 | 0.88 | 0.37 | 0.36 | 0.41 | 0.89 |
| 7175 | 0.74 | 0.54 | 0.65 | 0.67 | 1.65 | 0.58 | 0.85 | 0.48 | 0.73 | 0.98 | 0.75 | 1.01 | 1.52 | 1.08 | 0.92 | 1.83 | 0.70 | 0.70 | 0.68 | 1.03 |
| 7176 | 0.93 | 0.72 | 1.30 | 1.25 | 4.51 | 1.25 | 2.20 | 0.86 | 1.38 | 2.10 | 1.52 | 1.24 | 0.96 | 1.03 | 1.36 | 4.68 | 1.32 | 1.46 | 0.94 | 1.56 |
| 7177 | 0.54 | 0.45 | 0.47 | 0.50 | 1.07 | 0.47 | 0.56 | 0.31 | 0.53 | 0.66 | 0.63 | 0.98 | 0.62 | 0.96 | 0.69 | 0.72 | 0.52 | 0.51 | 0.52 | 1.00 |
| 7178 | 0.82 | 0.58 | 0.68 | 0.66 | 1.75 | 0.65 | 0.87 | 0.44 | 0.75 | 1.02 | 0.89 | 1.24 | 0.81 | 1.18 | 0.96 | 1.38 | 0.73 | 0.73 | 0.69 | 1.05 |
| 7179 | 1.04 | 0.84 | 1.49 | 1.40 | 3.91 | 1.51 | 2.12 | 0.97 | 1.57 | 1.87 | 1.56 | 1.92 | 1.28 | 1.19 | 1.43 | 3.20 | 1.45 | 1.60 | 1.05 | 1.52 |
| 7180 | 0.61 | 0.52 | 0.53 | 0.52 | 1.28 | 0.51 | 0.66 | 0.36 | 0.60 | 0.81 | 0.73 | 1.05 | 0.71 | 1.02 | 0.81 | 1.05 | 0.58 | 0.57 | 0.60 | 0.94 |
| 7181 | 0.85 | 0.58 | 0.69 | 0.65 | 1.54 | 0.65 | 0.79 | 0.44 | 0.73 | 0.99 | 0.86 | 1.32 | 0.84 | 1.21 | 0.96 | 1.15 | 0.72 | 0.71 | 0.69 | 1.03 |
| 7182 | 1.06 | 0.84 | 1.41 | 1.54 | 2.67 | 1.47 | 1.77 | 1.02 | 1.64 | 1.30 | 1.26 | 2.10 | 2.90 | 1.45 | 1.38 | 1.58 | 1.43 | 1.56 | 1.10 | 1.42 |
| 7183 | 0.16 | 0.18 | 0.11 | 0.12 | 0.50 | 0.13 | 0.22 | 0.15 | 0.27 | 0.31 | 0.23 | 0.21 | 0.30 | 0.28 | 0.20 | 0.49 | 0.16 | 0.15 | 0.20 | 0.74 |
| 7184 | 0.13 | 0.17 | 0.09 | 0.10 | 0.25 | 0.12 | 0.16 | 0.14 | 0.22 | 0.21 | 0.19 | 0.24 | 0.27 | 0.30 | 0.18 | 0.19 | 0.13 | 0.12 | 0.19 | 0.63 |
| 7185 | 0.44 | 0.38 | 0.47 | 0.48 | 1.62 | 0.42 | 0.77 | 0.35 | 0.57 | 0.98 | 0.60 | 0.45 | 0.93 | 0.65 | 0.66 | 2.16 | 0.52 | 0.53 | 0.49 | 1.08 |
| 7186 | 0.71 | 0.64 | 0.79 | 0.71 | 3.00 | 0.72 | 1.31 | 0.57 | 0.87 | 1.62 | 1.02 | 0.70 | 0.65 | 1.06 | 1.06 | 3.38 | 0.84 | 0.87 | 0.76 | 1.15 |
| 7187 | 0.17 | 0.24 | 0.14 | 0.15 | 0.36 | 0.18 | 0.23 | 0.16 | 0.28 | 0.27 | 0.27 | 0.37 | 0.27 | 0.39 | 0.25 | 0.25 | 0.19 | 0.17 | 0.25 | 0.68 |
| 7188 | 0.61 | 0.48 | 0.57 | 0.53 | 1.81 | 0.53 | 0.86 | 0.40 | 0.62 | 1.01 | 0.76 | 0.77 | 0.60 | 0.94 | 0.80 | 1.89 | 0.61 | 0.62 | 0.58 | 1.07 |
| 7189 | 0.65 | 0.51 | 0.74 | 0.69 | 3.97 | 0.66 | 1.75 | 0.57 | 0.83 | 1.97 | 1.11 | 0.21 | 0.48 | 0.89 | 1.05 | 5.30 | 0.84 | 0.90 | 0.68 | 1.32 |
| 7190 | 0.19 | 0.25 | 0.17 | 0.18 | 0.42 | 0.21 | 0.26 | 0.17 | 0.30 | 0.30 | 0.30 | 0.43 | 0.29 | 0.40 | 0.28 | 0.28 | 0.21 | 0.20 | 0.27 | 0.76 |
| 7191 | 0.81 | 0.62 | 0.79 | 0.72 | 1.89 | 0.75 | 0.96 | 0.51 | 0.83 | 1.16 | 0.93 | 1.23 | 0.83 | 0.94 | 0.99 | 1.60 | 0.80 | 0.81 | 0.73 | 1.12 |
| 7192 | 0.65 | 0.49 | 0.88 | 0.81 | 5.64 | 0.64 | 2.23 | 0.70 | 0.99 | 2.75 | 1.32 | 0.00 | 0.34 | 0.00 | 1.23 | 8.08 | 0.99 | 1.09 | 0.72 | 1.51 |
| 7193 | 0.24 | 0.26 | 0.26 | 0.25 | 0.56 | 0.29 | 0.32 | 0.19 | 0.34 | 0.33 | 0.35 | 0.56 | 0.35 | 0.47 | 0.34 | 0.29 | 0.28 | 0.28 | 0.29 | 0.96 |
| 7194 | 0.43 | 0.48 | 0.44 | 0.58 | 1.06 | 0.69 | 0.82 | 0.50 | 0.84 | 0.68 | 0.64 | 1.22 | 1.53 | 0.92 | 0.65 | 0.29 | 0.59 | 0.61 | 0.60 | 1.02 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7367 | 1.55 | 1.27 | 1.77 | 2.08 | 5.11 | 2.10 | 2.98 | 1.69 | 2.75 | 2.63 | 2.09 | 2.42 | 3.44 | 1.59 | 1.91 | 4.93 | 2.05 | 2.22 | 1.63 | 1.36 |
| 7144 | 2.31 | 1.56 | 1.46 | 1.42 | 8.59 | 1.46 | 2.43 | 1.45 | 3.38 | 3.40 | 2.29 | 2.02 | 3.12 | 2.36 | 2.14 | 6.89 | 1.93 | 1.90 | 1.88 | 1.01 |
| 7145 | 2.38 | 2.15 | 1.80 | 1.78 | 7.94 | 1.87 | 2.91 | 1.89 | 3.65 | 3.88 | 2.86 | 2.90 | 3.96 | 3.47 | 2.68 | 6.79 | 2.27 | 2.21 | 2.48 | 0.89 |
| 7148 | 1.65 | 1.88 | 1.86 | 1.80 | 5.16 | 1.86 | 2.87 | 1.67 | 2.67 | 3.18 | 2.51 | 2.84 | 3.88 | 3.11 | 2.46 | 5.67 | 2.05 | 2.06 | 2.20 | 0.93 |
| 7151 | 1.38 | 1.27 | 1.81 | 1.71 | 4.19 | 1.73 | 2.38 | 1.35 | 2.07 | 2.27 | 1.85 | 2.53 | 3.48 | 2.04 | 1.97 | 4.00 | 1.79 | 1.89 | 1.60 | 1.18 |
| 7154 | 1.22 | 1.04 | 1.74 | 1.67 | 3.85 | 1.66 | 2.25 | 1.21 | 1.90 | 1.88 | 1.61 | 2.25 | 3.20 | 1.03 | 1.74 | 3.56 | 1.68 | 1.82 | 1.35 | 1.35 |
| 7157 | 1.45 | 1.41 | 1.69 | 1.69 | 4.03 | 1.71 | 2.41 | 1.45 | 2.18 | 2.37 | 1.95 | 2.58 | 3.49 | 2.25 | 2.07 | 4.03 | 1.79 | 1.85 | 1.72 | 1.08 |
| 7158 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 7170 | 1.98 | 0.55 | 0.89 | 0.81 | 12.25 | 0.61 | 2.66 | 0.71 | 2.79 | 4.29 | 1.80 | -0.63 | 1.36 | 0.74 | 1.52 | 13.01 | 1.44 | 1.49 | 0.97 | 1.53 |
| 7171 | 2.15 | 2.57 | 1.97 | 1.96 | 5.70 | 2.07 | 3.14 | 2.20 | 3.22 | 4.52 | 3.14 | 3.60 | 4.96 | 4.42 | 3.30 | 6.27 | 2.37 | 2.26 | 2.94 | 0.77 |
| 7172 | 1.44 | 1.18 | 1.56 | 1.39 | 3.86 | 1.31 | 1.98 | 1.09 | 1.63 | 2.32 | 1.63 | 1.94 | 2.96 | 2.23 | 1.93 | 4.50 | 1.53 | 1.56 | 1.47 | 1.06 |
| 7173 | 1.61 | 0.75 | 1.31 | 1.26 | 7.26 | 1.15 | 2.10 | 0.92 | 2.27 | 2.57 | 1.56 | 1.13 | 2.25 | 0.95 | 1.47 | 6.58 | 1.51 | 1.61 | 1.08 | 1.49 |
| 7174 | 1.87 | 1.89 | 1.89 | 1.76 | 4.45 | 1.76 | 2.55 | 1.68 | 2.40 | 3.20 | 2.35 | 3.02 | 4.10 | 3.51 | 2.65 | 4.79 | 2.01 | 1.97 | 2.22 | 0.89 |
| 7175 | 1.74 | 1.27 | 1.53 | 1.58 | 3.87 | 1.37 | 1.99 | 1.13 | 1.72 | 2.31 | 1.77 | 2.36 | 3.57 | 2.53 | 2.16 | 4.29 | 1.65 | 1.66 | 1.61 | 1.03 |
| 7176 | 1.14 | 0.88 | 1.60 | 1.54 | 5.55 | 1.54 | 2.71 | 1.06 | 1.70 | 2.59 | 1.87 | 1.53 | 1.19 | 1.26 | 1.67 | 5.76 | 1.62 | 1.80 | 1.16 | 1.56 |
| 7177 | 1.86 | 1.52 | 1.60 | 1.69 | 3.66 | 1.60 | 1.91 | 1.06 | 1.82 | 2.25 | 2.16 | 3.36 | 2.11 | 3.27 | 2.36 | 2.45 | 1.77 | 1.76 | 1.76 | 1.00 |
| 7178 | 1.96 | 1.39 | 1.63 | 1.58 | 4.17 | 1.56 | 2.09 | 1.05 | 1.78 | 2.43 | 2.13 | 2.97 | 1.93 | 2.81 | 2.29 | 3.30 | 1.74 | 1.74 | 1.65 | 1.05 |
| 7179 | 1.22 | 0.98 | 1.76 | 1.65 | 4.60 | 1.78 | 2.49 | 1.14 | 1.85 | 2.19 | 1.84 | 2.26 | 1.51 | 1.40 | 1.69 | 3.76 | 1.71 | 1.88 | 1.24 | 1.52 |
| 7180 | 1.86 | 1.58 | 1.62 | 1.59 | 3.90 | 1.54 | 2.01 | 1.10 | 1.82 | 2.47 | 2.22 | 3.18 | 2.16 | 3.09 | 2.45 | 3.20 | 1.75 | 1.72 | 1.83 | 0.94 |
| 7181 | 2.01 | 1.38 | 1.63 | 1.54 | 3.65 | 1.53 | 1.87 | 1.04 | 1.74 | 2.34 | 2.04 | 3.12 | 1.98 | 2.87 | 2.28 | 2.73 | 1.70 | 1.67 | 1.63 | 1.03 |
| 7182 | 1.21 | 0.96 | 1.60 | 1.75 | 3.03 | 1.68 | 2.02 | 1.16 | 1.86 | 1.48 | 1.43 | 2.39 | 3.30 | 1.65 | 1.57 | 1.80 | 1.63 | 1.77 | 1.25 | 1.42 |
| 7183 | 2.77 | 3.05 | 1.85 | 2.08 | 8.61 | 2.29 | 3.80 | 2.58 | 4.65 | 5.37 | 3.84 | 3.61 | 5.06 | 4.85 | 3.49 | 8.41 | 2.73 | 2.55 | 3.42 | 0.74 |
| 7184 | 3.22 | 4.37 | 2.27 | 2.61 | 6.30 | 3.01 | 4.02 | 3.40 | 5.59 | 5.35 | 4.77 | 6.07 | 6.77 | 7.49 | 4.39 | 4.79 | 3.29 | 2.95 | 4.66 | 0.63 |
| 7185 | 1.15 | 0.99 | 1.21 | 1.23 | 4.20 | 1.09 | 2.00 | 0.92 | 1.49 | 2.54 | 1.56 | 1.17 | 2.42 | 1.69 | 1.71 | 5.60 | 1.34 | 1.38 | 1.27 | 1.08 |
| 7186 | 1.22 | 1.10 | 1.37 | 1.23 | 5.18 | 1.24 | 2.26 | 0.98 | 1.50 | 2.80 | 1.77 | 1.20 | 1.12 | 1.84 | 1.84 | 5.83 | 1.45 | 1.51 | 1.31 | 1.15 |
| 7187 | 2.81 | 4.01 | 2.38 | 2.42 | 5.99 | 3.05 | 3.77 | 2.72 | 4.62 | 4.53 | 4.54 | 6.18 | 4.44 | 6.42 | 4.10 | 4.12 | 3.08 | 2.84 | 4.18 | 0.68 |
| 7188 | 1.62 | 1.27 | 1.49 | 1.41 | 4.78 | 1.39 | 2.27 | 1.04 | 1.63 | 2.67 | 2.00 | 2.02 | 1.58 | 2.48 | 2.11 | 4.98 | 1.61 | 1.63 | 1.52 | 1.07 |
| 7189 | 1.18 | 0.92 | 1.32 | 1.24 | 7.14 | 1.19 | 3.15 | 1.03 | 1.50 | 3.54 | 2.00 | 0.37 | 0.87 | 1.60 | 1.88 | 9.53 | 1.51 | 1.62 | 1.23 | 1.32 |
| 7190 | 2.32 | 3.01 | 2.12 | 2.14 | 5.14 | 2.59 | 3.16 | 2.09 | 3.62 | 3.66 | 3.67 | 5.18 | 3.58 | 4.90 | 3.41 | 3.37 | 2.59 | 2.46 | 3.23 | 0.76 |
| 7191 | 2.08 | 1.58 | 2.02 | 1.83 | 4.84 | 1.92 | 2.44 | 1.31 | 2.11 | 2.95 | 2.38 | 3.14 | 2.12 | 2.39 | 2.54 | 4.10 | 2.03 | 2.07 | 1.85 | 1.12 |
| 7192 | 1.31 | 0.99 | 1.76 | 1.62 | 11.32 | 1.29 | 4.49 | 1.40 | 1.99 | 5.53 | 2.65 | 0.00 | 0.69 | 0.00 | 2.47 | 16.23 | 1.98 | 2.19 | 1.45 | 1.51 |
| 7193 | 2.10 | 2.35 | 2.34 | 2.26 | 4.95 | 2.59 | 2.88 | 1.66 | 3.02 | 2.92 | 3.10 | 4.96 | 3.16 | 4.23 | 3.07 | 2.63 | 2.50 | 2.52 | 2.62 | 0.96 |
| 7194 | 1.19 | 1.33 | 1.23 | 1.59 | 2.94 | 1.91 | 2.25 | 1.38 | 2.31 | 1.89 | 1.75 | 3.36 | 4.21 | 2.53 | 1.81 | 0.79 | 1.64 | 1.69 | 1.65 | 1.02 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7195 | 0.8 | Plant 13 | Clean Coal (+ x 3/4" / 1.8 x Snk SG) | 62.24 |
| 7104 | 45.9 | Plant 14 | Raw Coal (100M x 0) | 34.25 |
| 7105 | 54.4 | Plant 14 | Raw Coal (1mm x 100M) | 26.71 |
| 7108 | 65.3 | Plant 14 | Raw Coal (3/4" x 1mm) | 27.01 |
| 7111 | 58.4 | Plant 14 | Raw Coal (+ x 3/4") | 32.59 |
| 7114 | 38.1 | Plant 14 | Fine Reject (100M x 0) | 54.75 |
| 7115 | 36.2 | Plant 14 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 5.89 |
| 7116 | -1.6 | Plant 14 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 37.67 |
| 7117 | 97.4 | Plant 14 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 82.47 |
| 7124 | 40.2 | Plant 14 | Coarse Reject (100M x 0) | 78.54 |
| 7125 | 54.4 | Plant 14 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 12.3 |
| 7126 | 2.8 | Plant 14 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 37.08 |
| 7127 | 90.9 | Plant 14 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 83.42 |
| 7128 | 15.2 | Plant 14 | Coarse Reject (3/4" x 1mm / Flt x 1.6 SG) | 14.08 |
| 7129 | 68.7 | Plant 14 | Coarse Reject (3/4" x 1mm / 1.6 x 1.8 SG) | 43.82 |
| 7130 | 67.7 | Plant 14 | Coarse Reject (3/4" x 1mm / 1.8 x Snk SG) | 85.94 |
| 7131 | 16.5 | Plant 14 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 20.07 |
| 7132 | 65.1 | Plant 14 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 45.1 |
| 7133 | 83.6 | Plant 14 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 85.42 |
| 7134 | 48.4 | Plant 14 | Clean Coal (100M x 0) | 12.87 |
| 7135 | 41.7 | Plant 14 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 5.56 |
| 7136 | 15 | Plant 14 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 34.87 |
| 7137 | 34.7 | Plant 14 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 67.11 |
| 7138 | 43.6 | Plant 14 | Clean Coal (3/4" x 1mm / Flt x 1.6 SG) | 6.99 |
| 7139 | 39.8 | Plant 14 | Clean Coal (3/4" x 1mm / 1.6 x 1.8 SG) | 36.57 |
| 7140 | 10.9 | Plant 14 | Clean Coal (3/4" x 1mm / 1.8 x Snk SG) | 67.19 |
| 7141 | 49.9 | Plant 14 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 8.2 |
| 7142 | 51.2 | Plant 14 | Clean Coal (+ x 3/4" / 1.6 x 1.8 SG) | 39.5 |
| 7143 | 23.1 | Plant 14 | Clean Coal (+ x 3/4" / 1.8 x Snk SG) | 60.28 |
| 7608 | 44.3 | Plant 15 | Raw Coal (100M x 0) | 20.74 |
| 7609 | 64.1 | Plant 15 | Raw Coal (1mm x 100M) | 18.02 |
| 7612 | 44.8 | Plant 15 | Raw Coal (3/8" x 1mm) | 30.07 |
| 7615 | 67.7 | Plant 15 | Raw Coal (3/4" x 3/8") | 56.09 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7195 | 17.93 | 20.16 | 32.59 | 72.58 | 52.46 | 27.50 | 17.39 | 1.55 | 8.45 | 2.84 | 7.78 | -0.08 | 3.94 | 0.23 | 3.56 | 4.03 | 272.9 | 212.5 | 42.5 | 0.20 |
| 7104 | 17.36 | 11.23 | 21.64 | 63.27 | 20.67 | 21.41 | 5.16 | 0.82 | 5.24 | 0.81 | 3.14 | 1.24 | 4.53 | 0.21 | 1.83 | 0.65 | 179.2 | 138.2 | 23.6 | 0.17 |
| 7105 | 26.43 | 23.56 | 40.04 | 85.90 | 30.19 | 35.99 | 8.39 | 1.39 | 8.53 | 1.08 | 5.20 | 1.74 | 5.86 | 0.43 | 3.02 | 0.92 | 278.7 | 210.4 | 41.8 | 0.20 |
| 7108 | 25.97 | 29.13 | 47.68 | 92.32 | 27.71 | 43.98 | 10.07 | 1.68 | 9.27 | 1.17 | 6.34 | 2.20 | 6.76 | 0.60 | 3.52 | 0.77 | 309.2 | 232.7 | 50.5 | 0.22 |
| 7111 | 28.36 | 33.16 | 53.53 | 104.00 | 28.45 | 50.19 | 10.99 | 1.89 | 10.64 | 1.12 | 6.92 | 2.50 | 7.35 | 0.68 | 3.74 | 0.52 | 344.1 | 259.7 | 56.0 | 0.22 |
| 7114 | 23.14 | 24.60 | 48.29 | 90.43 | 22.42 | 41.45 | 8.56 | 1.45 | 8.00 | 0.82 | 5.30 | 2.16 | 6.38 | 0.53 | 3.01 | 0.27 | 286.8 | 220.6 | 43.1 | 0.20 |
| 7115 | 42.26 | 58.83 | 58.59 | 112.62 | 42.38 | 59.82 | 17.44 | 3.15 | 13.72 | 3.03 | 10.74 | 2.34 | 9.00 | 1.34 | 6.94 | 2.81 | 445.0 | 307.7 | 95.0 | 0.31 |
| 7116 | 21.50 | 14.29 | 27.99 | 69.11 | 30.09 | 24.13 | 6.49 | 0.88 | 6.67 | 1.02 | 4.14 | 1.26 | 4.72 | 0.34 | 2.10 | 1.04 | 215.8 | 165.4 | 28.9 | 0.17 |
| 7117 | 21.50 | 14.29 | 27.99 | 69.11 | 30.09 | 24.13 | 6.49 | 0.88 | 6.67 | 1.02 | 4.14 | 1.26 | 4.72 | 0.34 | 2.10 | 1.04 | 215.8 | 165.4 | 28.9 | 0.17 |
| 7124 | 21.84 | 21.97 | 43.08 | 80.69 | 36.38 | 34.29 | 11.04 | 1.47 | 7.96 | 1.73 | 6.16 | 1.28 | 5.60 | 0.47 | 3.38 | 1.81 | 279.1 | 214.9 | 42.4 | 0.20 |
| 7125 | 31.76 | 41.31 | 53.61 | 102.27 | 34.76 | 53.36 | 14.51 | 2.55 | 10.82 | 2.67 | 8.96 | 2.20 | 7.94 | 1.02 | 5.28 | 1.87 | 374.9 | 271.9 | 71.3 | 0.26 |
| 7126 | 19.92 | 12.45 | 21.34 | 64.53 | 34.94 | 21.33 | 8.29 | 0.97 | 5.82 | 1.60 | 3.84 | 0.63 | 4.42 | 0.30 | 2.46 | 2.03 | 204.9 | 157.2 | 27.7 | 0.18 |
| 7127 | 22.73 | 17.08 | 33.97 | 81.14 | 28.69 | 30.12 | 6.92 | 1.05 | 7.43 | 0.85 | 4.47 | 1.54 | 5.39 | 0.36 | 2.31 | 0.70 | 244.8 | 189.3 | 32.7 | 0.17 |
| 7128 | 33.99 | 36.73 | 49.25 | 94.09 | 35.09 | 48.43 | 12.48 | 2.38 | 9.97 | 2.44 | 7.00 | 1.97 | 7.56 | 0.86 | 5.11 | 1.77 | 349.1 | 251.7 | 63.4 | 0.25 |
| 7129 | 29.89 | 24.61 | 42.14 | 85.60 | 42.66 | 39.15 | 10.16 | 1.54 | 10.07 | 1.59 | 5.83 | 1.55 | 6.01 | 0.45 | 3.48 | 1.55 | 306.3 | 231.3 | 45.1 | 0.19 |
| 7130 | 22.35 | 24.64 | 47.91 | 91.96 | 22.11 | 43.11 | 8.80 | 1.45 | 8.25 | 0.81 | 5.54 | 2.20 | 6.81 | 0.56 | 2.99 | 0.21 | 289.7 | 223.6 | 43.8 | 0.20 |
| 7131 | 35.75 | 39.55 | 43.69 | 88.41 | 44.68 | 43.72 | 16.28 | 2.33 | 10.83 | 2.94 | 9.39 | 1.69 | 7.32 | 0.90 | 5.43 | 2.92 | 355.8 | 249.9 | 70.1 | 0.28 |
| 7132 | 27.27 | 24.82 | 35.70 | 77.46 | 21.94 | 40.92 | 8.17 | 1.57 | 8.40 | 1.19 | 5.35 | 2.37 | 7.58 | 0.58 | 3.53 | 0.24 | 267.1 | 194.2 | 45.7 | 0.24 |
| 7133 | 24.76 | 27.86 | 54.85 | 105.51 | 23.66 | 49.69 | 10.08 | 1.69 | 9.35 | 0.77 | 5.88 | 2.50 | 7.13 | 0.63 | 3.15 | 0.09 | 327.6 | 254.8 | 48.0 | 0.19 |
| 7134 | 33.77 | 31.77 | 41.24 | 83.05 | 48.96 | 37.44 | 12.54 | 1.81 | 11.10 | 2.27 | 7.52 | 1.36 | 5.96 | 0.81 | 4.22 | 2.44 | 326.3 | 236.1 | 56.3 | 0.24 |
| 7135 | 44.23 | 62.87 | 60.41 | 115.86 | 45.87 | 60.91 | 18.55 | 3.32 | 14.36 | 3.36 | 11.56 | 2.47 | 9.11 | 1.58 | 7.25 | 2.98 | 464.7 | 319.3 | 101.2 | 0.32 |
| 7136 | 31.45 | 21.78 | 33.47 | 67.40 | 52.96 | 29.48 | 9.68 | 1.29 | 10.28 | 1.83 | 5.41 | 0.85 | 4.54 | 0.41 | 3.15 | 2.26 | 276.2 | 204.6 | 40.2 | 0.20 |
| 7137 | 26.99 | 15.82 | 29.39 | 70.70 | 42.35 | 25.70 | 6.59 | 0.94 | 8.96 | 1.11 | 4.34 | 1.15 | 4.46 | 0.29 | 2.20 | 1.22 | 242.2 | 184.6 | 30.6 | 0.17 |
| 7138 | 34.16 | 48.28 | 49.86 | 100.05 | 40.16 | 48.47 | 15.04 | 2.47 | 11.67 | 2.58 | 9.85 | 2.03 | 7.71 | 1.23 | 5.59 | 2.46 | 381.6 | 267.7 | 79.7 | 0.30 |
| 7139 | 26.50 | 17.46 | 27.67 | 65.98 | 45.34 | 26.00 | 9.63 | 1.23 | 8.40 | 1.94 | 5.01 | 0.61 | 4.42 | 0.29 | 2.92 | 2.26 | 245.7 | 184.2 | 34.9 | 0.19 |
| 7140 | 26.77 | 19.97 | 37.13 | 81.88 | 37.17 | 33.48 | 8.01 | 1.20 | 9.09 | 1.04 | 5.00 | 1.60 | 5.39 | 0.36 | 2.59 | 1.02 | 271.7 | 207.9 | 37.0 | 0.18 |
| 7141 | 37.03 | 60.24 | 59.39 | 113.41 | 43.58 | 59.97 | 17.60 | 2.89 | 14.29 | 3.00 | 12.31 | 2.60 | 9.12 | 1.43 | 6.54 | 2.46 | 445.9 | 311.1 | 97.7 | 0.31 |
| 7142 | 28.71 | 30.86 | 56.60 | 102.08 | 28.12 | 47.86 | 10.62 | 1.88 | 8.84 | 1.49 | 6.03 | 2.21 | 7.50 | 0.62 | 4.22 | 1.01 | 338.7 | 256.0 | 53.9 | 0.21 |
| 7143 | 23.76 | 28.34 | 52.07 | 103.04 | 25.12 | 48.87 | 11.92 | 1.80 | 8.84 | 1.26 | 6.41 | 2.19 | 7.03 | 0.45 | 3.63 | 0.95 | 325.7 | 251.7 | 50.2 | 0.20 |
| 7608 | 34.44 | 34.24 | 43.82 | 84.74 | 9.43 | 42.92 | 13.11 | 2.17 | 13.04 | 2.11 | 8.19 | 1.75 | 6.35 | 0.76 | 4.14 | 1.85 | 303.1 | 209.2 | 59.4 | 0.28 |
| 7609 | 21.79 | 27.45 | 36.38 | 67.31 | 8.28 | 34.90 | 11.15 | 1.76 | 8.71 | 1.73 | 6.58 | 1.40 | 4.98 | 0.63 | 3.40 | 1.55 | 238.0 | 168.5 | 47.7 | 0.28 |
| 7612 | 24.75 | 30.46 | 50.67 | 94.26 | 10.83 | 49.17 | 14.95 | 2.17 | 10.15 | 1.79 | 7.69 | 1.67 | 6.40 | 0.69 | 4.04 | 1.71 | 311.4 | 232.2 | 54.5 | 0.23 |
| 7615 | 21.32 | 26.15 | 47.56 | 89.77 | 9.88 | 47.33 | 14.12 | 2.12 | 9.67 | 1.63 | 6.99 | 1.62 | 5.93 | 0.57 | 3.53 | 1.35 | 289.6 | 220.5 | 47.8 | 0.22 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7195 | 11.16 | 12.55 | 20.29 | 45.18 | 32.65 | 17.12 | 10.82 | 0.96 | 5.26 | 1.77 | 4.84 | -0.05 | 2.45 | 0.14 | 2.22 | 2.51 | 169.9 | 132.3 | 26.4 | 0.2 |
| 7104 | 5.95 | 3.85 | 7.41 | 21.67 | 7.08 | 7.33 | 1.77 | 0.28 | 1.80 | 0.28 | 1.08 | 0.42 | 1.55 | 0.07 | 0.63 | 0.22 | 61.4 | 47.3 | 8.1 | 0.171 |
| 7105 | 7.06 | 6.29 | 10.70 | 22.95 | 8.06 | 9.61 | 2.24 | 0.37 | 2.28 | 0.29 | 1.39 | 0.46 | 1.57 | 0.12 | 0.81 | 0.25 | 74.4 | 56.2 | 11.2 | 0.199 |
| 7108 | 7.01 | 7.87 | 12.88 | 24.94 | 7.49 | 11.88 | 2.72 | 0.45 | 2.50 | 0.32 | 1.71 | 0.60 | 1.83 | 0.16 | 0.95 | 0.21 | 83.5 | 62.9 | 13.6 | 0.217 |
| 7111 | 9.24 | 10.81 | 17.45 | 33.89 | 9.27 | 16.36 | 3.58 | 0.62 | 3.47 | 0.36 | 2.26 | 0.81 | 2.40 | 0.22 | 1.22 | 0.17 | 112.1 | 84.6 | 18.2 | 0.216 |
| 7114 | 12.67 | 13.47 | 26.44 | 49.51 | 12.27 | 22.69 | 4.69 | 0.80 | 4.38 | 0.45 | 2.90 | 1.18 | 3.49 | 0.29 | 1.65 | 0.15 | 157.0 | 120.8 | 23.6 | 0.195 |
| 7115 | 2.49 | 3.47 | 3.45 | 6.63 | 2.50 | 3.52 | 1.03 | 0.19 | 0.81 | 0.18 | 0.63 | 0.14 | 0.53 | 0.08 | 0.41 | 0.17 | 26.2 | 18.1 | 5.6 | 0.309 |
| 7116 | 8.10 | 5.38 | 10.54 | 26.03 | 11.33 | 9.09 | 2.44 | 0.33 | 2.51 | 0.38 | 1.56 | 0.48 | 1.78 | 0.13 | 0.79 | 0.39 | 81.3 | 62.3 | 10.9 | 0.175 |
| 7117 | 17.73 | 11.79 | 23.08 | 57.00 | 24.81 | 19.90 | 5.35 | 0.73 | 5.50 | 0.84 | 3.42 | 1.04 | 3.90 | 0.28 | 1.73 | 0.86 | 177.9 | 136.4 | 23.9 | 0.175 |
| 7124 | 17.15 | 17.25 | 33.83 | 63.38 | 28.57 | 26.93 | 8.67 | 1.16 | 6.25 | 1.36 | 4.84 | 1.01 | 4.40 | 0.37 | 2.66 | 1.42 | 219.2 | 168.8 | 33.3 | 0.197 |
| 7125 | 3.91 | 5.08 | 6.59 | 12.58 | 4.28 | 6.56 | 1.79 | 0.31 | 1.33 | 0.33 | 1.10 | 0.27 | 0.98 | 0.13 | 0.65 | 0.23 | 46.1 | 33.4 | 8.8 | 0.262 |
| 7126 | 7.39 | 4.62 | 7.91 | 23.93 | 12.96 | 7.91 | 3.07 | 0.36 | 2.16 | 0.59 | 1.42 | 0.23 | 1.64 | 0.11 | 0.91 | 0.75 | 76.0 | 58.3 | 10.3 | 0.176 |
| 7127 | 18.97 | 14.25 | 28.34 | 67.68 | 23.94 | 25.12 | 5.77 | 0.88 | 6.20 | 0.71 | 3.73 | 1.29 | 4.49 | 0.30 | 1.92 | 0.59 | 204.2 | 157.9 | 27.3 | 0.173 |
| 7128 | 4.79 | 5.17 | 6.93 | 13.25 | 4.94 | 6.82 | 1.76 | 0.33 | 1.40 | 0.34 | 0.99 | 0.28 | 1.06 | 0.12 | 0.72 | 0.25 | 49.2 | 35.4 | 8.9 | 0.252 |
| 7129 | 13.10 | 10.78 | 18.47 | 37.51 | 18.70 | 17.16 | 4.45 | 0.67 | 4.41 | 0.70 | 2.55 | 0.68 | 2.63 | 0.20 | 1.52 | 0.68 | 134.2 | 101.4 | 19.7 | 0.195 |
| 7130 | 19.21 | 21.17 | 41.17 | 79.03 | 19.00 | 37.05 | 7.56 | 1.24 | 7.09 | 0.69 | 4.76 | 1.89 | 5.85 | 0.48 | 2.57 | 0.18 | 249.0 | 192.1 | 37.6 | 0.196 |
| 7131 | 7.18 | 7.94 | 8.77 | 17.74 | 8.97 | 8.78 | 3.27 | 0.47 | 2.17 | 0.59 | 1.88 | 0.34 | 1.47 | 0.18 | 1.09 | 0.59 | 71.4 | 50.2 | 14.1 | 0.281 |
| 7132 | 12.30 | 11.19 | 16.10 | 34.94 | 9.90 | 18.46 | 3.69 | 0.71 | 3.79 | 0.54 | 2.41 | 1.07 | 3.42 | 0.26 | 1.59 | 0.11 | 120.5 | 87.6 | 20.6 | 0.235 |
| 7133 | 21.15 | 23.80 | 46.85 | 90.13 | 20.21 | 42.45 | 8.61 | 1.44 | 7.99 | 0.66 | 5.03 | 2.13 | 6.09 | 0.53 | 2.69 | 0.08 | 279.8 | 217.7 | 41.0 | 0.188 |
| 7134 | 4.35 | 4.09 | 5.31 | 10.69 | 6.30 | 4.82 | 1.61 | 0.23 | 1.43 | 0.29 | 0.97 | 0.17 | 0.77 | 0.10 | 0.54 | 0.31 | 42.0 | 30.4 | 7.3 | 0.239 |
| 7135 | 2.46 | 3.50 | 3.36 | 6.44 | 2.55 | 3.39 | 1.03 | 0.18 | 0.80 | 0.19 | 0.64 | 0.14 | 0.51 | 0.09 | 0.40 | 0.17 | 25.8 | 17.8 | 5.6 | 0.317 |
| 7136 | 10.97 | 7.59 | 11.67 | 23.50 | 18.47 | 10.28 | 3.38 | 0.45 | 3.58 | 0.64 | 1.89 | 0.29 | 1.58 | 0.14 | 1.10 | 0.79 | 96.3 | 71.3 | 14.0 | 0.197 |
| 7137 | 18.11 | 10.61 | 19.72 | 47.45 | 28.42 | 17.24 | 4.42 | 0.63 | 6.01 | 0.75 | 2.91 | 0.77 | 2.99 | 0.20 | 1.47 | 0.82 | 162.5 | 123.9 | 20.5 | 0.166 |
| 7138 | 2.39 | 3.37 | 3.48 | 6.99 | 2.81 | 3.39 | 1.05 | 0.17 | 0.82 | 0.18 | 0.69 | 0.14 | 0.54 | 0.09 | 0.39 | 0.17 | 26.7 | 18.7 | 5.6 | 0.298 |
| 7139 | 9.69 | 6.38 | 10.12 | 24.13 | 16.58 | 9.51 | 3.52 | 0.45 | 3.07 | 0.71 | 1.83 | 0.22 | 1.62 | 0.10 | 1.07 | 0.82 | 89.8 | 67.4 | 12.8 | 0.189 |
| 7140 | 17.99 | 13.42 | 24.95 | 55.01 | 24.97 | 22.49 | 5.38 | 0.81 | 6.10 | 0.70 | 3.36 | 1.08 | 3.62 | 0.24 | 1.74 | 0.68 | 182.6 | 139.7 | 24.9 | 0.178 |
| 7141 | 3.04 | 4.94 | 4.87 | 9.30 | 3.57 | 4.92 | 1.44 | 0.24 | 1.17 | 0.25 | 1.01 | 0.21 | 0.75 | 0.12 | 0.54 | 0.20 | 36.6 | 25.5 | 8.0 | 0.314 |
| 7142 | 11.34 | 12.19 | 22.36 | 40.32 | 11.11 | 18.91 | 4.20 | 0.74 | 3.49 | 0.59 | 2.38 | 0.87 | 2.96 | 0.24 | 1.67 | 0.40 | 133.8 | 101.1 | 21.3 | 0.211 |
| 7143 | 14.32 | 17.08 | 31.39 | 62.11 | 15.14 | 29.46 | 7.18 | 1.08 | 5.33 | 0.76 | 3.86 | 1.32 | 4.24 | 0.27 | 2.19 | 0.57 | 196.3 | 151.7 | 30.3 | 0.2 |
| 7608 | 7.14 | 7.10 | 9.09 | 17.57 | 1.96 | 8.90 | 2.72 | 0.45 | 2.70 | 0.44 | 1.70 | 0.36 | 1.32 | 0.16 | 0.86 | 0.38 | 62.9 | 43.4 | 12.3 | 0.284 |
| 7609 | 3.93 | 4.95 | 6.56 | 12.13 | 1.49 | 6.29 | 2.01 | 0.32 | 1.57 | 0.31 | 1.19 | 0.25 | 0.90 | 0.11 | 0.61 | 0.28 | 42.9 | 30.4 | 8.6 | 0.283 |
| 7612 | 7.44 | 9.16 | 15.24 | 28.34 | 3.26 | 14.79 | 4.50 | 0.65 | 3.05 | 0.54 | 2.31 | 0.50 | 1.93 | 0.21 | 1.21 | 0.51 | 93.6 | 69.8 | 16.4 | 0.235 |
| 7615 | 11.96 | 14.67 | 26.68 | 50.35 | 5.54 | 26.55 | 7.92 | 1.19 | 5.43 | 0.91 | 3.92 | 0.91 | 3.33 | 0.32 | 1.98 | 0.76 | 162.4 | 123.7 | 26.8 | 0.217 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7195 | 0.70 | 0.52 | 0.68 | 0.75 | 4.87 | 0.63 | 2.04 | 0.74 | 1.32 | 2.72 | 1.27 | -0.06 | 1.17 | 0.43 | 1.11 | 7.16 | 0.92 | 0.98 | 0.78 | 1.27 |
| 7104 | 0.37 | 0.16 | 0.25 | 0.36 | 1.06 | 0.27 | 0.33 | 0.21 | 0.45 | 0.43 | 0.28 | 0.53 | 0.74 | 0.22 | 0.31 | 0.63 | 0.33 | 0.35 | 0.24 | 1.48 |
| 7105 | 0.44 | 0.26 | 0.36 | 0.38 | 1.20 | 0.36 | 0.42 | 0.29 | 0.57 | 0.44 | 0.37 | 0.58 | 0.75 | 0.35 | 0.40 | 0.70 | 0.40 | 0.42 | 0.33 | 1.28 |
| 7108 | 0.44 | 0.33 | 0.43 | 0.42 | 1.12 | 0.44 | 0.51 | 0.35 | 0.63 | 0.49 | 0.45 | 0.74 | 0.87 | 0.49 | 0.48 | 0.60 | 0.45 | 0.47 | 0.40 | 1.17 |
| 7111 | 0.58 | 0.45 | 0.58 | 0.56 | 1.38 | 0.61 | 0.68 | 0.47 | 0.87 | 0.56 | 0.59 | 1.02 | 1.14 | 0.67 | 0.61 | 0.49 | 0.61 | 0.63 | 0.54 | 1.18 |
| 7114 | 0.79 | 0.56 | 0.88 | 0.83 | 1.83 | 0.84 | 0.88 | 0.61 | 1.10 | 0.69 | 0.76 | 1.48 | 1.66 | 0.88 | 0.83 | 0.43 | 0.85 | 0.90 | 0.69 | 1.30 |
| 7115 | 0.16 | 0.14 | 0.12 | 0.11 | 0.37 | 0.13 | 0.19 | 0.14 | 0.20 | 0.27 | 0.17 | 0.17 | 0.25 | 0.24 | 0.20 | 0.47 | 0.14 | 0.13 | 0.16 | 0.82 |
| 7116 | 0.51 | 0.22 | 0.35 | 0.43 | 1.69 | 0.34 | 0.46 | 0.26 | 0.63 | 0.59 | 0.41 | 0.59 | 0.85 | 0.39 | 0.40 | 1.12 | 0.44 | 0.46 | 0.32 | 1.45 |
| 7117 | 1.11 | 0.49 | 0.77 | 0.95 | 3.70 | 0.74 | 1.01 | 0.56 | 1.37 | 1.29 | 0.90 | 1.30 | 1.86 | 0.86 | 0.87 | 2.46 | 0.97 | 1.02 | 0.70 | 1.45 |
| 7124 | 1.07 | 0.72 | 1.13 | 1.06 | 4.26 | 1.00 | 1.64 | 0.89 | 1.56 | 2.09 | 1.27 | 1.26 | 2.10 | 1.11 | 1.33 | 4.05 | 1.19 | 1.26 | 0.98 | 1.28 |
| 7125 | 0.24 | 0.21 | 0.22 | 0.21 | 0.64 | 0.24 | 0.34 | 0.24 | 0.33 | 0.51 | 0.29 | 0.34 | 0.47 | 0.38 | 0.32 | 0.66 | 0.25 | 0.25 | 0.26 | 0.97 |
| 7126 | 0.46 | 0.19 | 0.26 | 0.40 | 1.93 | 0.29 | 0.58 | 0.28 | 0.54 | 0.91 | 0.37 | 0.29 | 0.78 | 0.33 | 0.46 | 2.15 | 0.41 | 0.43 | 0.30 | 1.44 |
| 7127 | 1.19 | 0.59 | 0.94 | 1.13 | 3.57 | 0.93 | 1.09 | 0.67 | 1.55 | 1.09 | 0.98 | 1.61 | 2.14 | 0.92 | 0.96 | 1.67 | 1.11 | 1.18 | 0.80 | 1.47 |
| 7128 | 0.30 | 0.22 | 0.23 | 0.22 | 0.74 | 0.25 | 0.33 | 0.26 | 0.35 | 0.53 | 0.26 | 0.35 | 0.51 | 0.37 | 0.36 | 0.71 | 0.27 | 0.26 | 0.26 | 1.01 |
| 7129 | 0.82 | 0.45 | 0.62 | 0.63 | 2.79 | 0.64 | 0.84 | 0.52 | 1.10 | 1.07 | 0.67 | 0.85 | 1.25 | 0.60 | 0.76 | 1.94 | 0.73 | 0.75 | 0.58 | 1.30 |
| 7130 | 1.20 | 0.88 | 1.37 | 1.32 | 2.84 | 1.37 | 1.43 | 0.96 | 1.77 | 1.07 | 1.25 | 2.36 | 2.79 | 1.45 | 1.29 | 0.51 | 1.35 | 1.43 | 1.10 | 1.29 |
| 7131 | 0.45 | 0.33 | 0.29 | 0.30 | 1.34 | 0.33 | 0.62 | 0.36 | 0.54 | 0.91 | 0.50 | 0.42 | 0.70 | 0.55 | 0.54 | 1.68 | 0.39 | 0.37 | 0.41 | 0.90 |
| 7132 | 0.77 | 0.47 | 0.54 | 0.58 | 1.48 | 0.68 | 0.70 | 0.54 | 0.95 | 0.83 | 0.64 | 1.34 | 1.63 | 0.79 | 0.80 | 0.31 | 0.65 | 0.65 | 0.61 | 1.08 |
| 7133 | 1.32 | 0.99 | 1.56 | 1.50 | 3.02 | 1.57 | 1.62 | 1.11 | 2.00 | 1.01 | 1.32 | 2.67 | 2.90 | 1.62 | 1.34 | 0.23 | 1.52 | 1.62 | 1.21 | 1.34 |
| 7134 | 0.27 | 0.17 | 0.18 | 0.18 | 0.94 | 0.18 | 0.30 | 0.18 | 0.36 | 0.45 | 0.25 | 0.22 | 0.37 | 0.32 | 0.27 | 0.90 | 0.23 | 0.23 | 0.21 | 1.06 |
| 7135 | 0.15 | 0.15 | 0.11 | 0.11 | 0.38 | 0.13 | 0.19 | 0.14 | 0.20 | 0.29 | 0.17 | 0.17 | 0.24 | 0.27 | 0.20 | 0.47 | 0.14 | 0.13 | 0.17 | 0.80 |
| 7136 | 0.69 | 0.32 | 0.39 | 0.39 | 2.76 | 0.38 | 0.64 | 0.34 | 0.90 | 0.98 | 0.50 | 0.37 | 0.75 | 0.44 | 0.55 | 2.25 | 0.52 | 0.53 | 0.41 | 1.29 |
| 7137 | 1.13 | 0.44 | 0.66 | 0.79 | 4.24 | 0.64 | 0.83 | 0.49 | 1.50 | 1.15 | 0.77 | 0.97 | 1.43 | 0.60 | 0.74 | 2.34 | 0.88 | 0.92 | 0.60 | 1.53 |
| 7138 | 0.15 | 0.14 | 0.12 | 0.12 | 0.42 | 0.13 | 0.20 | 0.13 | 0.20 | 0.28 | 0.18 | 0.18 | 0.26 | 0.26 | 0.20 | 0.49 | 0.14 | 0.14 | 0.16 | 0.85 |
| 7139 | 0.61 | 0.27 | 0.34 | 0.40 | 2.47 | 0.35 | 0.66 | 0.35 | 0.77 | 1.09 | 0.48 | 0.28 | 0.77 | 0.32 | 0.53 | 2.36 | 0.49 | 0.50 | 0.38 | 1.34 |
| 7140 | 1.12 | 0.56 | 0.83 | 0.92 | 3.73 | 0.83 | 1.02 | 0.62 | 1.53 | 1.08 | 0.88 | 1.35 | 1.73 | 0.74 | 0.87 | 1.95 | 0.99 | 1.04 | 0.73 | 1.42 |
| 7141 | 0.19 | 0.21 | 0.16 | 0.16 | 0.53 | 0.18 | 0.27 | 0.18 | 0.29 | 0.38 | 0.27 | 0.27 | 0.36 | 0.35 | 0.27 | 0.58 | 0.20 | 0.19 | 0.24 | 0.81 |
| 7142 | 0.71 | 0.51 | 0.75 | 0.67 | 1.66 | 0.70 | 0.79 | 0.57 | 0.87 | 0.90 | 0.63 | 1.09 | 1.41 | 0.74 | 0.83 | 1.14 | 0.73 | 0.75 | 0.63 | 1.20 |
| 7143 | 0.89 | 0.71 | 1.05 | 1.04 | 2.26 | 1.09 | 1.36 | 0.83 | 1.33 | 1.17 | 1.02 | 1.65 | 2.02 | 0.83 | 1.09 | 1.63 | 1.06 | 1.13 | 0.89 | 1.27 |
| 7608 | 0.45 | 0.30 | 0.30 | 0.29 | 0.29 | 0.33 | 0.51 | 0.35 | 0.68 | 0.67 | 0.45 | 0.45 | 0.63 | 0.48 | 0.43 | 1.09 | 0.34 | 0.32 | 0.36 | 0.89 |
| 7609 | 0.25 | 0.21 | 0.22 | 0.20 | 0.22 | 0.23 | 0.38 | 0.24 | 0.39 | 0.48 | 0.31 | 0.32 | 0.43 | 0.34 | 0.31 | 0.80 | 0.23 | 0.23 | 0.25 | 0.89 |
| 7612 | 0.47 | 0.38 | 0.51 | 0.47 | 0.49 | 0.55 | 0.85 | 0.50 | 0.76 | 0.83 | 0.61 | 0.63 | 0.92 | 0.63 | 0.61 | 1.47 | 0.51 | 0.52 | 0.48 | 1.08 |
| 7615 | 0.75 | 0.61 | 0.89 | 0.84 | 0.83 | 0.98 | 1.49 | 0.92 | 1.36 | 1.40 | 1.03 | 1.13 | 1.58 | 0.97 | 0.99 | 2.17 | 0.88 | 0.92 | 0.79 | 1.17 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7195 | 1.12 | 0.84 | 1.09 | 1.21 | 7.83 | 1.02 | 3.28 | 1.19 | 2.11 | 4.36 | 2.05 | -0.09 | 1.88 | 0.69 | 1.78 | 11.51 | 1.48 | 1.58 | 1.25 | 1.27 |
| 7104 | 1.09 | 0.47 | 0.72 | 1.05 | 3.09 | 0.79 | 0.97 | 0.63 | 1.31 | 1.24 | 0.83 | 1.54 | 2.16 | 0.64 | 0.92 | 1.85 | 0.97 | 1.03 | 0.69 | 1.48 |
| 7105 | 1.65 | 0.98 | 1.33 | 1.43 | 4.51 | 1.33 | 1.58 | 1.07 | 2.13 | 1.66 | 1.37 | 2.18 | 2.79 | 1.31 | 1.51 | 2.63 | 1.51 | 1.57 | 1.23 | 1.28 |
| 7108 | 1.62 | 1.21 | 1.59 | 1.54 | 4.14 | 1.63 | 1.90 | 1.29 | 2.32 | 1.81 | 1.67 | 2.75 | 3.22 | 1.83 | 1.76 | 2.21 | 1.68 | 1.73 | 1.48 | 1.17 |
| 7111 | 1.77 | 1.38 | 1.78 | 1.73 | 4.25 | 1.86 | 2.07 | 1.45 | 2.66 | 1.72 | 1.82 | 3.12 | 3.50 | 2.07 | 1.87 | 1.50 | 1.87 | 1.93 | 1.65 | 1.18 |
| 7114 | 1.45 | 1.02 | 1.61 | 1.51 | 3.35 | 1.54 | 1.62 | 1.12 | 2.00 | 1.26 | 1.39 | 2.70 | 3.04 | 1.61 | 1.51 | 0.78 | 1.56 | 1.64 | 1.27 | 1.30 |
| 7115 | 2.64 | 2.45 | 1.95 | 1.88 | 6.33 | 2.22 | 3.29 | 2.43 | 3.43 | 4.66 | 2.83 | 2.93 | 4.28 | 4.06 | 3.47 | 8.04 | 2.41 | 2.29 | 2.79 | 0.82 |
| 7116 | 1.34 | 0.60 | 0.93 | 1.15 | 4.49 | 0.89 | 1.22 | 0.68 | 1.67 | 1.56 | 1.09 | 1.58 | 2.25 | 1.04 | 1.05 | 2.98 | 1.17 | 1.23 | 0.85 | 1.45 |
| 7117 | 1.34 | 0.60 | 0.93 | 1.15 | 4.49 | 0.89 | 1.22 | 0.68 | 1.67 | 1.56 | 1.09 | 1.58 | 2.25 | 1.04 | 1.05 | 2.98 | 1.17 | 1.23 | 0.85 | 1.45 |
| 7124 | 1.36 | 0.92 | 1.44 | 1.34 | 5.43 | 1.27 | 2.08 | 1.13 | 1.99 | 2.66 | 1.62 | 1.60 | 2.67 | 1.41 | 1.69 | 5.16 | 1.51 | 1.60 | 1.25 | 1.28 |
| 7125 | 1.98 | 1.72 | 1.79 | 1.70 | 5.19 | 1.98 | 2.74 | 1.96 | 2.71 | 4.11 | 2.36 | 2.75 | 3.78 | 3.08 | 2.64 | 5.35 | 2.03 | 2.02 | 2.09 | 0.97 |
| 7126 | 1.25 | 0.52 | 0.71 | 1.08 | 5.22 | 0.79 | 1.56 | 0.75 | 1.46 | 2.46 | 1.01 | 0.78 | 2.11 | 0.90 | 1.23 | 5.81 | 1.11 | 1.17 | 0.81 | 1.44 |
| 7127 | 1.42 | 0.71 | 1.13 | 1.35 | 4.28 | 1.12 | 1.31 | 0.81 | 1.86 | 1.31 | 1.18 | 1.93 | 2.57 | 1.10 | 1.15 | 2.01 | 1.33 | 1.41 | 0.96 | 1.47 |
| 7128 | 2.12 | 1.53 | 1.64 | 1.57 | 5.24 | 1.79 | 2.35 | 1.83 | 2.49 | 3.76 | 1.84 | 2.46 | 3.60 | 2.61 | 2.56 | 5.05 | 1.89 | 1.87 | 1.86 | 1.01 |
| 7129 | 1.87 | 1.03 | 1.40 | 1.43 | 6.37 | 1.45 | 1.92 | 1.18 | 2.52 | 2.44 | 1.53 | 1.93 | 2.86 | 1.37 | 1.74 | 4.42 | 1.66 | 1.72 | 1.32 | 1.30 |
| 7130 | 1.40 | 1.03 | 1.60 | 1.53 | 3.30 | 1.60 | 1.66 | 1.11 | 2.06 | 1.24 | 1.46 | 2.75 | 3.24 | 1.69 | 1.50 | 0.59 | 1.57 | 1.66 | 1.29 | 1.29 |
| 7131 | 2.23 | 1.65 | 1.46 | 1.47 | 6.67 | 1.62 | 3.07 | 1.79 | 2.71 | 4.52 | 2.47 | 2.11 | 3.49 | 2.74 | 2.71 | 8.35 | 1.93 | 1.86 | 2.06 | 0.90 |
| 7132 | 1.70 | 1.03 | 1.19 | 1.29 | 3.27 | 1.52 | 1.54 | 1.21 | 2.10 | 1.84 | 1.41 | 2.96 | 3.61 | 1.76 | 1.76 | 0.70 | 1.45 | 1.45 | 1.34 | 1.08 |
| 7133 | 1.55 | 1.16 | 1.83 | 1.76 | 3.53 | 1.84 | 1.90 | 1.30 | 2.34 | 1.19 | 1.55 | 3.12 | 3.39 | 1.90 | 1.57 | 0.27 | 1.78 | 1.90 | 1.41 | 1.34 |
| 7134 | 2.11 | 1.32 | 1.37 | 1.38 | 7.31 | 1.39 | 2.37 | 1.39 | 2.78 | 3.49 | 1.98 | 1.70 | 2.84 | 2.46 | 2.11 | 6.96 | 1.77 | 1.76 | 1.66 | 1.06 |
| 7135 | 2.76 | 2.62 | 2.01 | 1.93 | 6.85 | 2.26 | 3.50 | 2.55 | 3.59 | 5.17 | 3.04 | 3.09 | 4.34 | 4.80 | 3.63 | 8.51 | 2.52 | 2.38 | 2.97 | 0.80 |
| 7136 | 1.97 | 0.91 | 1.12 | 1.12 | 7.90 | 1.09 | 1.83 | 0.99 | 2.57 | 2.82 | 1.42 | 1.06 | 2.16 | 1.26 | 1.58 | 6.45 | 1.50 | 1.52 | 1.18 | 1.29 |
| 7137 | 1.69 | 0.66 | 0.98 | 1.18 | 6.32 | 0.95 | 1.24 | 0.73 | 2.24 | 1.71 | 1.14 | 1.44 | 2.12 | 0.89 | 1.10 | 3.49 | 1.31 | 1.37 | 0.90 | 1.53 |
| 7138 | 2.13 | 2.01 | 1.66 | 1.67 | 5.99 | 1.80 | 2.84 | 1.90 | 2.92 | 3.97 | 2.59 | 2.53 | 3.67 | 3.74 | 2.79 | 7.01 | 2.07 | 1.99 | 2.34 | 0.85 |
| 7139 | 1.66 | 0.73 | 0.92 | 1.10 | 6.77 | 0.96 | 1.82 | 0.95 | 2.10 | 2.99 | 1.32 | 0.77 | 2.10 | 0.87 | 1.46 | 6.44 | 1.33 | 1.37 | 1.03 | 1.34 |
| 7140 | 1.67 | 0.83 | 1.24 | 1.36 | 5.55 | 1.24 | 1.51 | 0.92 | 2.27 | 1.61 | 1.32 | 2.01 | 2.57 | 1.10 | 1.29 | 2.91 | 1.47 | 1.55 | 1.09 | 1.42 |
| 7141 | 2.31 | 2.51 | 1.98 | 1.89 | 6.50 | 2.22 | 3.32 | 2.23 | 3.57 | 4.62 | 3.24 | 3.25 | 4.34 | 4.32 | 3.27 | 7.04 | 2.42 | 2.32 | 2.87 | 0.81 |
| 7142 | 1.79 | 1.29 | 1.89 | 1.70 | 4.20 | 1.77 | 2.00 | 1.44 | 2.21 | 2.29 | 1.59 | 2.77 | 3.57 | 1.87 | 2.11 | 2.90 | 1.84 | 1.91 | 1.59 | 1.20 |
| 7143 | 1.48 | 1.18 | 1.74 | 1.72 | 3.75 | 1.81 | 2.25 | 1.38 | 2.21 | 1.94 | 1.69 | 2.74 | 3.35 | 1.37 | 1.81 | 2.71 | 1.77 | 1.87 | 1.48 | 1.27 |
| 7608 | 2.15 | 1.43 | 1.46 | 1.41 | 1.41 | 1.59 | 2.47 | 1.67 | 3.26 | 3.24 | 2.15 | 2.19 | 3.02 | 2.31 | 2.07 | 5.27 | 1.64 | 1.56 | 1.75 | 0.89 |
| 7609 | 1.36 | 1.14 | 1.21 | 1.12 | 1.24 | 1.29 | 2.10 | 1.35 | 2.18 | 2.67 | 1.73 | 1.75 | 2.37 | 1.90 | 1.70 | 4.44 | 1.29 | 1.25 | 1.40 | 0.89 |
| 7612 | 1.55 | 1.27 | 1.69 | 1.57 | 1.62 | 1.82 | 2.82 | 1.67 | 2.54 | 2.75 | 2.02 | 2.09 | 3.05 | 2.09 | 2.02 | 4.88 | 1.69 | 1.73 | 1.60 | 1.08 |
| 7615 | 1.33 | 1.09 | 1.59 | 1.50 | 1.47 | 1.75 | 2.66 | 1.63 | 2.42 | 2.50 | 1.84 | 2.02 | 2.82 | 1.73 | 1.77 | 3.86 | 1.57 | 1.64 | 1.40 | 1.17 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 7618 | 89 | Plant 15 | Raw Coal (+ x 3/4") | 75.8 |
| 7621 | 43 | Plant 15 | Fine Reject (100M x 0) | 30.93 |
| 7622 | 58.8 | Plant 15 | Fine Reject (1mm x 100M / Flt x 1.6 SG) | 7.67 |
| 7623 | -0.8 | Plant 15 | Fine Reject (1mm x 100M / 1.6 x 1.8 SG) | 35.4 |
| 7624 | 106.9 | Plant 15 | Fine Reject (1mm x 100M / 1.8 x Snk SG) | 79.09 |
| 7634 | 42.3 | Plant 15 | Coarse Reject (100M x 0) | 35.79 |
| 7635 | 52.5 | Plant 15 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 9.41 |
| 7636 | 58.7 | Plant 15 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 34.71 |
| 7637 | 89.1 | Plant 15 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 77.86 |
| 7638 | 19.7 | Plant 15 | Coarse Reject (3/8" x 1mm / Flt x 1.6 SG) | 13.07 |
| 7639 | 53 | Plant 15 | Coarse Reject (3/8" x 1mm / 1.6 x 1.8 SG) | 40.75 |
| 7640 | 93.8 | Plant 15 | Coarse Reject (3/8" x 1mm / 1.8 x Snk SG) | 83.69 |
| 7641 | 47.1 | Plant 15 | Coarse Reject (3/4" x 3/8" / Flt x 1.6 SG) | 16.79 |
| 7642 | 62.2 | Plant 15 | Coarse Reject (3/4" x 3/8" / 1.6 x 1.8 SG) | 38.43 |
| 7643 | 73.3 | Plant 15 | Coarse Reject (3/4" x 3/8" / 1.8 x Snk SG) | 85.51 |
| 7644 | 13.1 | Plant 15 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 17.95 |
| 7645 | 40.1 | Plant 15 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 38.5 |
| 7646 | 87.9 | Plant 15 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 85.01 |
| 7647 | 47.9 | Plant 15 | Clean Coal (100M x 0) | 6.06 |
| 7648 | 37.8 | Plant 15 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 5.17 |
| 7649 | 22 | Plant 15 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 34.84 |
| 7650 | 23.7 | Plant 15 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 55.01 |
| 7651 | 47.2 | Plant 15 | Clean Coal (3/8" x 1mm / Flt x 1.6 SG) | 9.35 |
| 7652 | 32 | Plant 15 | Clean Coal (3/8" x 1mm / 1.6 x 1.8 SG) | 38.01 |
| 7653 | 12.4 | Plant 15 | Clean Coal (3/8" x 1mm / 1.8 x Snk SG) | 57.16 |
| 7654 | 64.3 | Plant 15 | Clean Coal (3/4" x 3/8" / Flt x 1.6 SG) | 15.2 |
| 7655 | 57.4 | Plant 15 | Clean Coal (3/4" x 3/8" / 1.6 x 1.8 SG) | 36.72 |
| 7656 | 6 | Plant 15 | Clean Coal (3/4" x 3/8" / 1.8 x Snk SG) | 54.56 |
| 7657 | 56.8 | Plant 15 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 16.76 |
| 7658 | 70.8 | Plant 15 | Clean Coal (+ x 3/4" / 1.6 x 1.8 SG) | 32.12 |
| 7659 | 10.9 | Plant 15 | Clean Coal (+ x 3/4" / 1.8 x Snk SG) | 45 |
| 6000 | 49 | Plant 16 | Raw Coal (100M x 0) | 56.68 |
| 6001 | 93.6 | Plant 16 | Raw Coal (28M x 100M) | 35.94 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7618 | 20.21 | 25.41 | 44.84 | 85.66 | 9.69 | 44.65 | 13.90 | 1.88 | 9.39 | 1.70 | 7.00 | 1.52 | 5.72 | 0.53 | 3.44 | 1.60 | 277.1 | 210.0 | 46.9 | 0.22 |
| 7621 | 25.79 | 27.93 | 41.64 | 82.60 | 9.03 | 41.06 | 12.88 | 2.00 | 10.62 | 1.85 | 7.29 | 1.55 | 5.88 | 0.60 | 3.59 | 1.61 | 275.9 | 199.8 | 50.3 | 0.25 |
| 7622 | 43.41 | 59.70 | 65.42 | 119.24 | 11.87 | 63.52 | 15.62 | 3.12 | 14.00 | 2.45 | 10.90 | 3.17 | 9.91 | 1.69 | 6.63 | 1.67 | 432.3 | 292.8 | 96.1 | 0.33 |
| 7623 | 21.91 | 26.23 | 46.43 | 88.51 | 12.22 | 43.81 | 17.78 | 2.14 | 10.88 | 2.33 | 8.51 | 0.96 | 5.29 | 0.47 | 3.84 | 2.90 | 294.2 | 221.8 | 50.5 | 0.23 |
| 7624 | 21.13 | 29.34 | 49.89 | 96.21 | 50.29 | 46.45 | 18.22 | 1.96 | 10.16 | 2.41 | 9.02 | 0.67 | 5.07 | 0.56 | 3.74 | 2.86 | 348.0 | 273.2 | 53.7 | 0.20 |
| 7634 | 29.07 | 26.21 | 37.49 | 79.09 | 8.65 | 37.20 | 12.21 | 1.87 | 11.60 | 1.94 | 7.30 | 1.52 | 5.41 | 0.56 | 3.44 | 1.84 | 265.4 | 188.1 | 48.2 | 0.26 |
| 7635 | 36.22 | 46.61 | 57.35 | 107.11 | 10.02 | 55.11 | 13.46 | 2.69 | 12.15 | 2.05 | 8.92 | 2.71 | 8.42 | 1.27 | 5.33 | 1.28 | 370.7 | 257.9 | 76.6 | 0.30 |
| 7636 | 27.40 | 29.62 | 40.64 | 79.52 | 9.34 | 40.83 | 12.95 | 2.04 | 11.68 | 1.93 | 7.53 | 1.54 | 5.65 | 0.58 | 3.62 | 1.76 | 276.6 | 197.0 | 52.2 | 0.27 |
| 7637 | 21.41 | 26.56 | 46.09 | 86.77 | 11.39 | 43.92 | 16.20 | 2.08 | 10.55 | 2.14 | 7.98 | 1.14 | 5.32 | 0.46 | 3.66 | 2.43 | 288.1 | 217.0 | 49.7 | 0.23 |
| 7638 | 35.14 | 41.40 | 53.60 | 96.35 | 9.88 | 50.47 | 13.88 | 2.62 | 10.92 | 2.47 | 8.52 | 2.20 | 7.76 | 1.08 | 5.33 | 1.80 | 343.4 | 237.7 | 70.5 | 0.30 |
| 7639 | 25.43 | 27.88 | 40.38 | 76.03 | 9.36 | 36.98 | 14.38 | 2.07 | 9.43 | 2.60 | 7.63 | 1.13 | 5.67 | 0.51 | 4.14 | 2.63 | 266.2 | 188.6 | 52.2 | 0.28 |
| 7640 | 20.23 | 25.90 | 47.13 | 89.40 | 10.38 | 47.55 | 14.80 | 2.12 | 9.86 | 1.76 | 7.32 | 1.56 | 5.80 | 0.52 | 3.51 | 1.58 | 289.4 | 221.2 | 48.0 | 0.22 |
| 7641 | 33.85 | 37.62 | 54.30 | 98.27 | 29.95 | 45.40 | 13.03 | 2.18 | 8.74 | 2.08 | 7.67 | 1.87 | 7.12 | 0.93 | 4.96 | 1.88 | 349.9 | 251.9 | 64.2 | 0.25 |
| 7642 | 30.64 | 22.60 | 28.26 | 65.80 | 48.68 | 25.17 | 15.18 | 2.32 | 8.31 | 3.90 | 7.41 | 0.16 | 4.77 | 0.38 | 4.82 | 3.95 | 272.4 | 193.7 | 48.0 | 0.25 |
| 7643 | 19.59 | 24.08 | 42.63 | 88.99 | 26.11 | 44.31 | 13.12 | 1.99 | 8.64 | 1.56 | 6.64 | 1.57 | 5.74 | 0.57 | 3.31 | 1.28 | 290.1 | 225.8 | 44.8 | 0.20 |
| 7644 | 71.89 | 41.30 | 32.37 | 63.88 | 55.44 | 29.36 | 20.40 | 3.87 | 9.51 | 6.03 | 11.43 | 0.43 | 6.82 | 1.10 | 8.84 | 5.53 | 368.2 | 214.8 | 81.5 | 0.38 |
| 7645 | 32.79 | 30.32 | 44.33 | 84.28 | 43.77 | 36.35 | 16.76 | 2.66 | 8.58 | 3.73 | 8.49 | 0.70 | 5.68 | 0.64 | 5.52 | 3.64 | 328.2 | 236.7 | 58.7 | 0.25 |
| 7646 | 46.73 | 69.62 | 62.70 | 115.47 | 41.70 | 55.89 | 17.53 | 3.34 | 14.32 | 3.25 | 12.55 | 2.73 | 9.82 | 1.63 | 7.58 | 2.78 | 467.6 | 310.9 | 109.9 | 0.35 |
| 7647 | 19.77 | 30.34 | 54.43 | 102.87 | 31.44 | 48.52 | 15.34 | 2.18 | 9.48 | 1.73 | 7.71 | 1.64 | 5.92 | 0.64 | 3.73 | 1.74 | 337.5 | 264.3 | 53.4 | 0.20 |
| 7648 | 43.86 | 68.09 | 65.05 | 117.52 | 29.91 | 57.09 | 14.36 | 3.06 | 12.67 | 2.40 | 10.76 | 2.95 | 9.28 | 1.55 | 7.07 | 1.82 | 447.5 | 299.7 | 103.9 | 0.35 |
| 7649 | 21.66 | 34.45 | 45.04 | 82.53 | 30.99 | 38.95 | 13.33 | 2.14 | 9.32 | 2.05 | 7.40 | 1.27 | 5.24 | 0.58 | 3.81 | 1.96 | 300.7 | 222.3 | 56.8 | 0.26 |
| 7650 | 13.58 | 24.71 | 32.41 | 59.18 | 51.51 | 23.51 | 17.97 | 1.65 | 7.93 | 2.99 | 8.16 | -0.45 | 2.83 | 0.14 | 3.64 | 4.55 | 254.3 | 194.2 | 46.6 | 0.24 |
| 7651 | 35.35 | 44.00 | 50.76 | 93.33 | 8.94 | 52.78 | 13.04 | 2.37 | 11.05 | 1.90 | 8.53 | 2.49 | 8.29 | 1.32 | 5.20 | 1.27 | 340.6 | 232.3 | 73.0 | 0.31 |
| 7652 | 25.33 | 31.95 | 47.70 | 90.80 | 31.09 | 43.08 | 13.26 | 2.12 | 8.51 | 2.26 | 7.34 | 1.51 | 6.45 | 0.67 | 4.38 | 1.99 | 318.4 | 236.6 | 56.5 | 0.24 |
| 7653 | 17.76 | 27.13 | 42.63 | 81.07 | 41.65 | 36.30 | 15.95 | 1.86 | 8.62 | 2.44 | 7.84 | 0.52 | 4.63 | 0.42 | 3.77 | 3.13 | 295.7 | 228.1 | 49.9 | 0.22 |
| 7654 | 31.76 | 39.90 | 57.51 | 108.51 | 29.89 | 54.46 | 13.21 | 1.94 | 9.42 | 1.90 | 8.67 | 2.22 | 7.43 | 0.87 | 4.63 | 1.39 | 373.7 | 274.9 | 67.0 | 0.24 |
| 7655 | 25.30 | 26.72 | 38.43 | 73.90 | 49.57 | 35.94 | 16.95 | 1.96 | 7.51 | 3.31 | 8.60 | 0.19 | 5.27 | 0.59 | 4.66 | 3.54 | 302.4 | 224.3 | 52.9 | 0.24 |
| 7656 | 20.62 | 25.98 | 67.91 | 146.59 | 24.00 | 88.44 | 35.59 | 5.79 | 18.73 | 3.55 | 9.95 | 0.34 | 4.76 | 0.34 | 4.53 | 4.74 | 461.8 | 387.0 | 54.2 | 0.14 |
| 7657 | 26.07 | 22.03 | 29.82 | 71.72 | 22.35 | 34.95 | 9.76 | 1.65 | 7.15 | 1.68 | 5.57 | 1.51 | 6.21 | 0.72 | 3.44 | 1.13 | 245.8 | 177.4 | 42.3 | 0.24 |
| 7658 | 42.07 | 25.15 | 27.68 | 60.76 | 56.04 | 23.64 | 19.67 | 2.76 | 7.31 | 5.06 | 8.80 | 0.00 | 4.70 | 0.47 | 6.34 | 5.50 | 296.0 | 197.9 | 56.0 | 0.28 |
| 7659 | 28.79 | 25.07 | 31.98 | 69.33 | 47.54 | 27.06 | 17.08 | 1.91 | 7.37 | 3.35 | 8.32 | 0.00 | 4.54 | 0.43 | 4.79 | 4.32 | 281.9 | 202.3 | 50.8 | 0.25 |
| 6000 | 21.89 | 27.34 | 44.92 | 83.75 | 29.67 | 41.88 | 9.79 | 1.42 | 9.54 | 1.30 | 6.30 | 2.02 | 6.51 | 0.08 | 3.34 | 0.95 | 290.7 | 221.0 | 47.8 | 0.22 |
| 6001 | 23.29 | 30.55 | 51.61 | 95.18 | 26.87 | 46.23 | 10.27 | 1.59 | 9.47 | 1.15 | 6.69 | 2.31 | 7.27 | 0.49 | 3.58 | 0.74 | 317.3 | 241.2 | 52.8 | 0.22 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7618 | 15.32 | 19.26 | 33.99 | 64.93 | 7.35 | 33.84 | 10.54 | 1.42 | 7.12 | 1.29 | 5.31 | 1.15 | 4.34 | 0.40 | 2.61 | 1.21 | 210.1 | 159.2 | 35.6 | 0.223 |
| 7621 | 7.98 | 8.64 | 12.88 | 25.55 | 2.79 | 12.70 | 3.98 | 0.62 | 3.28 | 0.57 | 2.25 | 0.48 | 1.82 | 0.19 | 1.11 | 0.50 | 85.3 | 61.8 | 15.6 | 0.252 |
| 7622 | 3.33 | 4.58 | 5.02 | 9.15 | 0.91 | 4.87 | 1.20 | 0.24 | 1.07 | 0.19 | 0.84 | 0.24 | 0.76 | 0.13 | 0.51 | 0.13 | 33.2 | 22.5 | 7.4 | 0.328 |
| 7623 | 7.76 | 9.29 | 16.44 | 31.33 | 4.32 | 15.51 | 6.29 | 0.76 | 3.85 | 0.83 | 3.01 | 0.34 | 1.87 | 0.17 | 1.36 | 1.03 | 104.2 | 78.5 | 17.9 | 0.228 |
| 7624 | 16.71 | 23.21 | 39.45 | 76.09 | 39.77 | 36.74 | 14.41 | 1.55 | 8.03 | 1.91 | 7.13 | 0.53 | 4.01 | 0.44 | 2.96 | 2.26 | 275.2 | 216.1 | 42.4 | 0.196 |
| 7634 | 10.40 | 9.38 | 13.42 | 28.30 | 3.10 | 13.31 | 4.37 | 0.67 | 4.15 | 0.69 | 2.61 | 0.54 | 1.94 | 0.20 | 1.23 | 0.66 | 95.0 | 67.3 | 17.3 | 0.256 |
| 7635 | 3.41 | 4.39 | 5.40 | 10.08 | 0.94 | 5.19 | 1.27 | 0.25 | 1.14 | 0.19 | 0.84 | 0.26 | 0.79 | 0.12 | 0.50 | 0.12 | 34.9 | 24.3 | 7.2 | 0.297 |
| 7636 | 9.51 | 10.28 | 14.11 | 27.60 | 3.24 | 14.17 | 4.49 | 0.71 | 4.05 | 0.67 | 2.61 | 0.54 | 1.96 | 0.20 | 1.26 | 0.61 | 96.0 | 68.4 | 18.1 | 0.265 |
| 7637 | 16.67 | 20.68 | 35.89 | 67.56 | 8.87 | 34.20 | 12.61 | 1.62 | 8.21 | 1.67 | 6.21 | 0.89 | 4.14 | 0.36 | 2.85 | 1.89 | 224.3 | 169.0 | 38.7 | 0.229 |
| 7638 | 4.59 | 5.41 | 7.01 | 12.59 | 1.29 | 6.60 | 1.81 | 0.34 | 1.43 | 0.32 | 1.11 | 0.29 | 1.01 | 0.14 | 0.70 | 0.24 | 44.9 | 31.1 | 9.2 | 0.297 |
| 7639 | 10.36 | 11.36 | 16.45 | 30.98 | 3.81 | 15.07 | 5.86 | 0.84 | 3.84 | 1.06 | 3.11 | 0.46 | 2.31 | 0.21 | 1.69 | 1.07 | 108.5 | 76.9 | 21.3 | 0.277 |
| 7640 | 16.93 | 21.68 | 39.44 | 74.82 | 8.69 | 39.80 | 12.38 | 1.77 | 8.25 | 1.47 | 6.13 | 1.31 | 4.86 | 0.43 | 2.94 | 1.32 | 242.2 | 185.2 | 40.1 | 0.217 |
| 7641 | 5.68 | 6.32 | 9.12 | 16.50 | 5.03 | 7.62 | 2.19 | 0.37 | 1.47 | 0.35 | 1.29 | 0.31 | 1.20 | 0.16 | 0.83 | 0.32 | 58.7 | 42.3 | 10.8 | 0.255 |
| 7642 | 11.78 | 8.69 | 10.86 | 25.29 | 18.71 | 9.67 | 5.84 | 0.89 | 3.19 | 1.50 | 2.85 | 0.06 | 1.84 | 0.15 | 1.85 | 1.52 | 104.7 | 74.4 | 18.4 | 0.248 |
| 7643 | 16.75 | 20.59 | 36.45 | 76.09 | 22.33 | 37.89 | 11.22 | 1.71 | 7.39 | 1.34 | 5.68 | 1.34 | 4.91 | 0.49 | 2.83 | 1.09 | 248.1 | 193.1 | 38.3 | 0.198 |
| 7644 | 12.90 | 7.41 | 5.81 | 11.47 | 9.95 | 5.27 | 3.66 | 0.69 | 1.71 | 1.08 | 2.05 | 0.08 | 1.22 | 0.20 | 1.59 | 0.99 | 66.1 | 38.6 | 14.6 | 0.379 |
| 7645 | 12.63 | 11.67 | 17.07 | 32.45 | 16.85 | 13.99 | 6.45 | 1.02 | 3.30 | 1.44 | 3.27 | 0.27 | 2.19 | 0.24 | 2.13 | 1.40 | 126.4 | 91.1 | 22.6 | 0.248 |
| 7646 | 39.72 | 59.18 | 53.31 | 98.16 | 35.45 | 47.51 | 14.90 | 2.84 | 12.17 | 2.76 | 10.67 | 2.32 | 8.34 | 1.38 | 6.44 | 2.36 | 397.5 | 264.3 | 93.5 | 0.354 |
| 7647 | 1.20 | 1.84 | 3.30 | 6.23 | 1.91 | 2.94 | 0.93 | 0.13 | 0.57 | 0.10 | 0.47 | 0.10 | 0.36 | 0.04 | 0.23 | 0.11 | 20.5 | 16.0 | 3.2 | 0.202 |
| 7648 | 2.27 | 3.52 | 3.36 | 6.08 | 1.55 | 2.95 | 0.74 | 0.16 | 0.66 | 0.12 | 0.56 | 0.15 | 0.48 | 0.08 | 0.37 | 0.09 | 23.1 | 15.5 | 5.4 | 0.347 |
| 7649 | 7.55 | 12.00 | 15.69 | 28.75 | 10.80 | 13.57 | 4.64 | 0.75 | 3.25 | 0.71 | 2.58 | 0.44 | 1.83 | 0.20 | 1.33 | 0.68 | 104.8 | 77.5 | 19.8 | 0.255 |
| 7650 | 7.47 | 13.59 | 17.83 | 32.55 | 28.34 | 12.94 | 9.88 | 0.91 | 4.36 | 1.65 | 4.49 | -0.25 | 1.56 | 0.08 | 2.00 | 2.50 | 139.9 | 106.8 | 25.6 | 0.24 |
| 7651 | 3.30 | 4.11 | 4.75 | 8.73 | 0.84 | 4.93 | 1.22 | 0.22 | 1.03 | 0.18 | 0.80 | 0.23 | 0.77 | 0.12 | 0.49 | 0.12 | 31.8 | 21.7 | 6.8 | 0.314 |
| 7652 | 9.63 | 12.15 | 18.13 | 34.51 | 11.82 | 16.37 | 5.04 | 0.80 | 3.23 | 0.86 | 2.79 | 0.57 | 2.45 | 0.25 | 1.67 | 0.76 | 121.0 | 89.9 | 21.5 | 0.239 |
| 7653 | 10.15 | 15.51 | 24.37 | 46.34 | 23.81 | 20.75 | 9.12 | 1.06 | 4.93 | 1.40 | 4.48 | 0.30 | 2.65 | 0.24 | 2.16 | 1.79 | 169.0 | 130.4 | 28.5 | 0.219 |
| 7654 | 4.83 | 6.06 | 8.74 | 16.49 | 4.54 | 8.28 | 2.01 | 0.30 | 1.43 | 0.29 | 1.32 | 0.34 | 1.13 | 0.13 | 0.70 | 0.21 | 56.8 | 41.8 | 10.2 | 0.244 |
| 7655 | 9.29 | 9.81 | 14.11 | 27.14 | 18.20 | 13.20 | 6.22 | 0.72 | 2.76 | 1.21 | 3.16 | 0.07 | 1.93 | 0.22 | 1.71 | 1.30 | 111.1 | 82.3 | 19.4 | 0.236 |
| 7656 | 11.25 | 14.18 | 37.05 | 79.98 | 13.09 | 48.25 | 19.42 | 3.16 | 10.22 | 1.94 | 5.43 | 0.19 | 2.59 | 0.19 | 2.47 | 2.59 | 252.0 | 211.2 | 29.6 | 0.14 |
| 7657 | 4.37 | 3.69 | 5.00 | 12.02 | 3.75 | 5.86 | 1.64 | 0.28 | 1.20 | 0.28 | 0.93 | 0.25 | 1.04 | 0.12 | 0.58 | 0.19 | 41.2 | 29.7 | 7.1 | 0.238 |
| 7658 | 13.51 | 8.08 | 8.89 | 19.52 | 18.00 | 7.59 | 6.32 | 0.89 | 2.35 | 1.63 | 2.83 | 0.00 | 1.51 | 0.15 | 2.04 | 1.77 | 95.1 | 63.6 | 18.0 | 0.283 |
| 7659 | 12.95 | 11.28 | 14.39 | 31.20 | 21.39 | 12.18 | 7.69 | 0.86 | 3.32 | 1.51 | 3.74 | 0.00 | 2.04 | 0.19 | 2.16 | 1.94 | 126.8 | 91.0 | 22.9 | 0.251 |
| 6000 | 12.41 | 15.50 | 25.46 | 47.47 | 16.82 | 23.74 | 5.55 | 0.81 | 5.41 | 0.74 | 3.57 | 1.15 | 3.69 | 0.04 | 1.89 | 0.54 | 164.8 | 125.3 | 27.1 | 0.217 |
| 6001 | 8.37 | 10.98 | 18.55 | 34.21 | 9.66 | 16.61 | 3.69 | 0.57 | 3.40 | 0.41 | 2.40 | 0.83 | 2.61 | 0.18 | 1.29 | 0.27 | 114.0 | 86.7 | 19.0 | 0.219 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7618 | 0.96 | 0.80 | 1.13 | 1.08 | 1.10 | 1.25 | 1.99 | 1.10 | 1.78 | 1.98 | 1.40 | 1.44 | 2.07 | 1.22 | 1.31 | 3.46 | 1.14 | 1.19 | 1.05 | 1.13 |
| 7621 | 0.50 | 0.36 | 0.43 | 0.43 | 0.42 | 0.47 | 0.75 | 0.47 | 0.82 | 0.88 | 0.59 | 0.60 | 0.87 | 0.57 | 0.55 | 1.42 | 0.46 | 0.46 | 0.46 | 1.01 |
| 7622 | 0.21 | 0.19 | 0.17 | 0.15 | 0.14 | 0.18 | 0.23 | 0.18 | 0.27 | 0.29 | 0.22 | 0.30 | 0.36 | 0.39 | 0.25 | 0.37 | 0.18 | 0.17 | 0.22 | 0.77 |
| 7623 | 0.48 | 0.39 | 0.55 | 0.52 | 0.65 | 0.57 | 1.19 | 0.58 | 0.96 | 1.27 | 0.79 | 0.42 | 0.89 | 0.51 | 0.68 | 2.93 | 0.57 | 0.58 | 0.53 | 1.11 |
| 7624 | 1.04 | 0.97 | 1.32 | 1.27 | 5.94 | 1.36 | 2.72 | 1.19 | 2.01 | 2.94 | 1.88 | 0.66 | 1.91 | 1.34 | 1.48 | 6.46 | 1.49 | 1.61 | 1.25 | 1.29 |
| 7634 | 0.65 | 0.39 | 0.45 | 0.47 | 0.46 | 0.49 | 0.82 | 0.51 | 1.04 | 1.07 | 0.69 | 0.68 | 0.92 | 0.61 | 0.62 | 1.89 | 0.52 | 0.50 | 0.51 | 0.99 |
| 7635 | 0.21 | 0.18 | 0.18 | 0.17 | 0.14 | 0.19 | 0.24 | 0.19 | 0.29 | 0.30 | 0.22 | 0.32 | 0.38 | 0.36 | 0.25 | 0.34 | 0.19 | 0.18 | 0.21 | 0.85 |
| 7636 | 0.59 | 0.43 | 0.47 | 0.46 | 0.48 | 0.52 | 0.85 | 0.54 | 1.01 | 1.03 | 0.69 | 0.67 | 0.93 | 0.61 | 0.63 | 1.75 | 0.52 | 0.51 | 0.53 | 0.96 |
| 7637 | 1.04 | 0.86 | 1.20 | 1.13 | 1.32 | 1.27 | 2.38 | 1.24 | 2.05 | 2.57 | 1.63 | 1.11 | 1.97 | 1.10 | 1.43 | 5.41 | 1.22 | 1.26 | 1.14 | 1.11 |
| 7638 | 0.29 | 0.23 | 0.23 | 0.21 | 0.19 | 0.24 | 0.34 | 0.26 | 0.36 | 0.50 | 0.29 | 0.36 | 0.48 | 0.43 | 0.35 | 0.67 | 0.24 | 0.23 | 0.27 | 0.85 |
| 7639 | 0.65 | 0.47 | 0.55 | 0.52 | 0.57 | 0.56 | 1.11 | 0.65 | 0.96 | 1.63 | 0.82 | 0.58 | 1.10 | 0.63 | 0.84 | 3.06 | 0.59 | 0.57 | 0.62 | 0.92 |
| 7640 | 1.06 | 0.90 | 1.31 | 1.25 | 1.30 | 1.47 | 2.34 | 1.36 | 2.06 | 2.27 | 1.61 | 1.63 | 2.31 | 1.31 | 1.47 | 3.77 | 1.31 | 1.38 | 1.18 | 1.17 |
| 7641 | 0.36 | 0.26 | 0.30 | 0.27 | 0.75 | 0.28 | 0.41 | 0.28 | 0.37 | 0.54 | 0.34 | 0.39 | 0.57 | 0.47 | 0.42 | 0.90 | 0.32 | 0.31 | 0.32 | 0.99 |
| 7642 | 0.74 | 0.36 | 0.36 | 0.42 | 2.79 | 0.36 | 1.10 | 0.69 | 0.80 | 2.31 | 0.75 | 0.08 | 0.87 | 0.44 | 0.93 | 4.34 | 0.57 | 0.55 | 0.54 | 1.02 |
| 7643 | 1.05 | 0.86 | 1.21 | 1.27 | 3.33 | 1.40 | 2.12 | 1.31 | 1.85 | 2.06 | 1.49 | 1.68 | 2.34 | 1.49 | 1.42 | 3.12 | 1.35 | 1.44 | 1.12 | 1.28 |
| 7644 | 0.81 | 0.31 | 0.19 | 0.19 | 1.49 | 0.20 | 0.69 | 0.53 | 0.43 | 1.67 | 0.54 | 0.10 | 0.58 | 0.60 | 0.79 | 2.84 | 0.36 | 0.29 | 0.43 | 0.67 |
| 7645 | 0.79 | 0.49 | 0.57 | 0.54 | 2.51 | 0.52 | 1.22 | 0.79 | 0.83 | 2.21 | 0.86 | 0.34 | 1.04 | 0.74 | 1.06 | 4.00 | 0.69 | 0.68 | 0.66 | 1.02 |
| 7646 | 2.48 | 2.47 | 1.78 | 1.64 | 5.29 | 1.76 | 2.81 | 2.19 | 3.04 | 4.25 | 2.81 | 2.90 | 3.97 | 4.20 | 3.22 | 6.74 | 2.16 | 1.97 | 2.75 | 0.72 |
| 7647 | 0.07 | 0.08 | 0.11 | 0.10 | 0.28 | 0.11 | 0.18 | 0.10 | 0.14 | 0.16 | 0.12 | 0.12 | 0.17 | 0.12 | 0.11 | 0.30 | 0.11 | 0.12 | 0.10 | 1.25 |
| 7648 | 0.14 | 0.15 | 0.11 | 0.10 | 0.23 | 0.11 | 0.14 | 0.12 | 0.16 | 0.19 | 0.15 | 0.19 | 0.23 | 0.24 | 0.18 | 0.27 | 0.13 | 0.12 | 0.16 | 0.73 |
| 7649 | 0.47 | 0.50 | 0.52 | 0.48 | 1.61 | 0.50 | 0.88 | 0.57 | 0.81 | 1.10 | 0.68 | 0.55 | 0.87 | 0.61 | 0.66 | 1.95 | 0.57 | 0.58 | 0.58 | 0.99 |
| 7650 | 0.47 | 0.57 | 0.59 | 0.54 | 4.23 | 0.48 | 1.86 | 0.70 | 1.09 | 2.53 | 1.18 | -0.31 | 0.74 | 0.24 | 1.00 | 7.15 | 0.76 | 0.80 | 0.75 | 1.06 |
| 7651 | 0.21 | 0.17 | 0.16 | 0.15 | 0.12 | 0.18 | 0.23 | 0.17 | 0.26 | 0.27 | 0.21 | 0.29 | 0.37 | 0.37 | 0.24 | 0.34 | 0.17 | 0.16 | 0.20 | 0.81 |
| 7652 | 0.60 | 0.51 | 0.60 | 0.58 | 1.76 | 0.61 | 0.95 | 0.62 | 0.81 | 1.32 | 0.73 | 0.72 | 1.17 | 0.77 | 0.83 | 2.16 | 0.66 | 0.67 | 0.63 | 1.06 |
| 7653 | 0.63 | 0.65 | 0.81 | 0.77 | 3.55 | 0.77 | 1.72 | 0.82 | 1.23 | 2.15 | 1.18 | 0.37 | 1.26 | 0.73 | 1.08 | 5.11 | 0.92 | 0.97 | 0.84 | 1.16 |
| 7654 | 0.30 | 0.25 | 0.29 | 0.27 | 0.68 | 0.31 | 0.38 | 0.23 | 0.36 | 0.45 | 0.35 | 0.42 | 0.54 | 0.40 | 0.35 | 0.60 | 0.31 | 0.31 | 0.30 | 1.04 |
| 7655 | 0.58 | 0.41 | 0.47 | 0.45 | 2.72 | 0.49 | 1.17 | 0.55 | 0.69 | 1.87 | 0.83 | 0.09 | 0.92 | 0.66 | 0.86 | 3.71 | 0.60 | 0.61 | 0.57 | 1.07 |
| 7656 | 0.70 | 0.59 | 1.23 | 1.33 | 1.95 | 1.79 | 3.66 | 2.43 | 2.55 | 2.98 | 1.43 | 0.23 | 1.24 | 0.57 | 1.24 | 7.39 | 1.37 | 1.57 | 0.87 | 1.81 |
| 7657 | 0.27 | 0.15 | 0.17 | 0.20 | 0.56 | 0.22 | 0.31 | 0.21 | 0.30 | 0.43 | 0.25 | 0.32 | 0.50 | 0.37 | 0.29 | 0.54 | 0.22 | 0.22 | 0.21 | 1.06 |
| 7658 | 0.84 | 0.34 | 0.30 | 0.33 | 2.69 | 0.28 | 1.19 | 0.68 | 0.59 | 2.50 | 0.74 | 0.00 | 0.72 | 0.45 | 1.02 | 5.04 | 0.52 | 0.47 | 0.53 | 0.89 |
| 7659 | 0.81 | 0.47 | 0.48 | 0.52 | 3.19 | 0.45 | 1.45 | 0.66 | 0.83 | 2.32 | 0.98 | 0.00 | 0.97 | 0.58 | 1.08 | 5.55 | 0.69 | 0.68 | 0.67 | 1.01 |
| 6000 | 0.78 | 0.65 | 0.85 | 0.79 | 2.51 | 0.88 | 1.05 | 0.62 | 1.35 | 1.13 | 0.94 | 1.43 | 1.76 | 0.14 | 0.95 | 1.54 | 0.89 | 0.93 | 0.80 | 1.17 |
| 6001 | 0.52 | 0.46 | 0.62 | 0.57 | 1.44 | 0.62 | 0.70 | 0.44 | 0.85 | 0.64 | 0.63 | 1.04 | 1.24 | 0.54 | 0.64 | 0.76 | 0.62 | 0.65 | 0.56 | 1.16 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 7618 | 1.26 | 1.06 | 1.49 | 1.43 | 1.45 | 1.65 | 2.62 | 1.45 | 2.35 | 2.62 | 1.84 | 1.89 | 2.72 | 1.62 | 1.72 | 4.57 | 1.50 | 1.56 | 1.38 | 1.13 |
| 7621 | 1.61 | 1.16 | 1.39 | 1.38 | 1.35 | 1.52 | 2.43 | 1.54 | 2.65 | 2.85 | 1.92 | 1.94 | 2.80 | 1.83 | 1.79 | 4.59 | 1.50 | 1.49 | 1.48 | 1.01 |
| 7622 | 2.71 | 2.49 | 2.18 | 1.99 | 1.77 | 2.35 | 2.95 | 2.40 | 3.50 | 3.77 | 2.87 | 3.96 | 4.72 | 5.12 | 3.31 | 4.76 | 2.35 | 2.18 | 2.82 | 0.77 |
| 7623 | 1.37 | 1.09 | 1.55 | 1.48 | 1.82 | 1.62 | 3.35 | 1.65 | 2.72 | 3.59 | 2.24 | 1.20 | 2.52 | 1.44 | 1.92 | 8.28 | 1.60 | 1.65 | 1.49 | 1.11 |
| 7624 | 1.32 | 1.22 | 1.66 | 1.60 | 7.51 | 1.72 | 3.44 | 1.50 | 2.54 | 3.71 | 2.37 | 0.84 | 2.41 | 1.69 | 1.87 | 8.17 | 1.89 | 2.03 | 1.58 | 1.29 |
| 7634 | 1.82 | 1.09 | 1.25 | 1.32 | 1.29 | 1.38 | 2.30 | 1.44 | 2.90 | 2.98 | 1.92 | 1.90 | 2.58 | 1.69 | 1.72 | 5.27 | 1.44 | 1.40 | 1.42 | 0.99 |
| 7635 | 2.26 | 1.94 | 1.91 | 1.79 | 1.50 | 2.04 | 2.54 | 2.07 | 3.04 | 3.15 | 2.35 | 3.39 | 4.01 | 3.85 | 2.66 | 3.66 | 2.01 | 1.92 | 2.25 | 0.85 |
| 7636 | 1.71 | 1.23 | 1.35 | 1.33 | 1.39 | 1.51 | 2.44 | 1.57 | 2.92 | 2.96 | 1.98 | 1.93 | 2.69 | 1.75 | 1.81 | 5.04 | 1.50 | 1.47 | 1.53 | 0.96 |
| 7637 | 1.34 | 1.11 | 1.54 | 1.45 | 1.70 | 1.63 | 3.06 | 1.60 | 2.64 | 3.30 | 2.10 | 1.42 | 2.53 | 1.41 | 1.83 | 6.95 | 1.56 | 1.62 | 1.46 | 1.11 |
| 7638 | 2.20 | 1.72 | 1.79 | 1.61 | 1.47 | 1.87 | 2.62 | 2.02 | 2.73 | 3.80 | 2.24 | 2.75 | 3.70 | 3.26 | 2.67 | 5.14 | 1.86 | 1.77 | 2.07 | 0.85 |
| 7639 | 1.59 | 1.16 | 1.35 | 1.27 | 1.40 | 1.37 | 2.71 | 1.59 | 2.36 | 4.00 | 2.01 | 1.42 | 2.70 | 1.54 | 2.07 | 7.50 | 1.44 | 1.40 | 1.53 | 0.92 |
| 7640 | 1.26 | 1.08 | 1.57 | 1.49 | 1.55 | 1.76 | 2.79 | 1.63 | 2.46 | 2.71 | 1.93 | 1.95 | 2.76 | 1.57 | 1.76 | 4.50 | 1.57 | 1.65 | 1.41 | 1.17 |
| 7641 | 2.12 | 1.57 | 1.81 | 1.64 | 4.47 | 1.68 | 2.46 | 1.67 | 2.19 | 3.21 | 2.02 | 2.34 | 3.39 | 2.82 | 2.48 | 5.37 | 1.90 | 1.88 | 1.89 | 0.99 |
| 7642 | 1.92 | 0.94 | 0.94 | 1.10 | 7.26 | 0.93 | 2.86 | 1.79 | 2.08 | 6.00 | 1.95 | 0.20 | 2.27 | 1.15 | 2.41 | 11.28 | 1.48 | 1.44 | 1.41 | 1.02 |
| 7643 | 1.22 | 1.00 | 1.42 | 1.48 | 3.90 | 1.64 | 2.47 | 1.53 | 2.16 | 2.41 | 1.75 | 1.96 | 2.73 | 1.74 | 1.66 | 3.65 | 1.57 | 1.68 | 1.32 | 1.28 |
| 7644 | 4.49 | 1.72 | 1.08 | 1.06 | 8.27 | 1.09 | 3.85 | 2.97 | 2.38 | 9.28 | 3.01 | 0.54 | 3.25 | 3.32 | 4.42 | 15.80 | 2.00 | 1.60 | 2.39 | 0.67 |
| 7645 | 2.05 | 1.26 | 1.48 | 1.40 | 6.53 | 1.35 | 3.16 | 2.05 | 2.14 | 5.74 | 2.23 | 0.88 | 2.71 | 1.93 | 2.76 | 10.40 | 1.78 | 1.76 | 1.73 | 1.02 |
| 7646 | 2.92 | 2.90 | 2.09 | 1.92 | 6.22 | 2.07 | 3.31 | 2.57 | 3.58 | 5.00 | 3.30 | 3.41 | 4.67 | 4.94 | 3.79 | 7.93 | 2.54 | 2.32 | 3.23 | 0.72 |
| 7647 | 1.24 | 1.26 | 1.81 | 1.71 | 4.69 | 1.80 | 2.89 | 1.68 | 2.37 | 2.66 | 2.03 | 2.05 | 2.82 | 1.92 | 1.86 | 4.97 | 1.83 | 1.97 | 1.57 | 1.25 |
| 7648 | 2.74 | 2.84 | 2.17 | 1.96 | 4.46 | 2.11 | 2.71 | 2.35 | 3.17 | 3.69 | 2.83 | 3.68 | 4.42 | 4.71 | 3.54 | 5.21 | 2.43 | 2.23 | 3.05 | 0.73 |
| 7649 | 1.35 | 1.44 | 1.50 | 1.38 | 4.63 | 1.44 | 2.51 | 1.65 | 2.33 | 3.16 | 1.95 | 1.58 | 2.50 | 1.76 | 1.90 | 5.59 | 1.63 | 1.66 | 1.67 | 0.99 |
| 7650 | 0.85 | 1.03 | 1.08 | 0.99 | 7.69 | 0.87 | 3.39 | 1.27 | 1.98 | 4.60 | 2.15 | -0.57 | 1.35 | 0.43 | 1.82 | 13.01 | 1.38 | 1.45 | 1.37 | 1.06 |
| 7651 | 2.21 | 1.83 | 1.69 | 1.56 | 1.33 | 1.95 | 2.46 | 1.82 | 2.76 | 2.93 | 2.24 | 3.11 | 3.95 | 4.00 | 2.60 | 3.62 | 1.85 | 1.73 | 2.14 | 0.81 |
| 7652 | 1.58 | 1.33 | 1.59 | 1.51 | 4.64 | 1.60 | 2.50 | 1.63 | 2.13 | 3.47 | 1.93 | 1.88 | 3.07 | 2.03 | 2.19 | 5.68 | 1.73 | 1.76 | 1.66 | 1.06 |
| 7653 | 1.11 | 1.13 | 1.42 | 1.35 | 6.22 | 1.34 | 3.01 | 1.43 | 2.15 | 3.76 | 2.06 | 0.65 | 2.21 | 1.27 | 1.89 | 8.94 | 1.60 | 1.70 | 1.47 | 1.16 |
| 7654 | 1.99 | 1.66 | 1.92 | 1.81 | 4.46 | 2.02 | 2.49 | 1.50 | 2.35 | 2.93 | 2.28 | 2.78 | 3.54 | 2.64 | 2.31 | 3.98 | 2.03 | 2.05 | 1.97 | 1.04 |
| 7655 | 1.58 | 1.11 | 1.28 | 1.23 | 7.40 | 1.33 | 3.20 | 1.51 | 1.88 | 5.09 | 2.26 | 0.24 | 2.51 | 1.80 | 2.33 | 10.11 | 1.64 | 1.67 | 1.55 | 1.07 |
| 7656 | 1.29 | 1.08 | 2.26 | 2.44 | 3.58 | 3.28 | 6.72 | 4.45 | 4.68 | 5.47 | 2.62 | 0.43 | 2.26 | 1.04 | 2.27 | 13.54 | 2.51 | 2.88 | 1.59 | 1.81 |
| 7657 | 1.63 | 0.92 | 0.99 | 1.20 | 3.34 | 1.29 | 1.84 | 1.27 | 1.79 | 2.59 | 1.47 | 1.89 | 2.96 | 2.19 | 1.72 | 3.22 | 1.33 | 1.32 | 1.24 | 1.06 |
| 7658 | 2.63 | 1.05 | 0.92 | 1.01 | 8.36 | 0.88 | 3.71 | 2.12 | 1.83 | 7.79 | 2.32 | 0.00 | 2.24 | 1.42 | 3.17 | 15.70 | 1.61 | 1.47 | 1.65 | 0.89 |
| 7659 | 1.80 | 1.04 | 1.07 | 1.16 | 7.10 | 1.00 | 3.22 | 1.47 | 1.84 | 5.15 | 2.19 | 0.00 | 2.16 | 1.29 | 2.40 | 12.33 | 1.53 | 1.51 | 1.49 | 1.01 |
| 6000 | 1.37 | 1.14 | 1.50 | 1.40 | 4.43 | 1.55 | 1.85 | 1.10 | 2.39 | 2.00 | 1.66 | 2.53 | 3.10 | 0.24 | 1.67 | 2.71 | 1.58 | 1.65 | 1.41 | 1.17 |
| 6001 | 1.46 | 1.27 | 1.72 | 1.59 | 4.01 | 1.71 | 1.94 | 1.22 | 2.37 | 1.77 | 1.76 | 2.89 | 3.46 | 1.50 | 1.79 | 2.12 | 1.72 | 1.80 | 1.55 | 1.16 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6002 | 56 | Plant 16 | Raw Coal (1mm x 28M) | 37.02 |
| 6003 | 108 | Plant 16 | Raw Coal (1/8" x 1mm) | 35.11 |
| 6004 | 92 | Plant 16 | Raw Coal (5/16" x 1/8") | 37.12 |
| 6005 | 109 | Plant 16 | Raw Coal (+ x 5/16") | 74.9 |
| 6006 | 67 | Plant 16 | Fine Reject (100M x 0) | 77.01 |
| 6007 | 57.5 | Plant 16 | Fine Reject (+ x 100M / Flt x 1.6 SG) | 9.36 |
| 6008 | 4.8 | Plant 16 | Fine Reject (+ x 100M / 1.6 x 1.9 SG) | 41.64 |
| 6009 | 18.6 | Plant 16 | Fine Reject (+ x 100M / 1.9 x Snk SG) | 83.45 |
| 6010 | 66 | Plant 16 | Coarse Reject (100M x 0) | 86.44 |
| 6011 | 16 | Plant 16 | Coarse Reject (28M x 100M / Flt x 1.6 SG) | 18.37 |
| 6012 | 18 | Plant 16 | Coarse Reject (28M x 100M / 1.6 x 1.9 SG) | 43.53 |
| 6013 | 60 | Plant 16 | Coarse Reject (28M x 100M / 1.9 x Snk SG) | 88.21 |
| 6014 | 8 | Plant 16 | Coarse Reject (1mm x 28M / Flt x 1.6 SG) | 20.71 |
| 6015 | 20 | Plant 16 | Coarse Reject (1mm x 28M / 1.6 x 1.9 SG) | 44.76 |
| 6016 | 51 | Plant 16 | Coarse Reject (1mm x 28M / 1.9 x Snk SG) | 90.75 |
| 6017 | 21 | Plant 16 | Coarse Reject (1/8" x 1mm / Flt x 1.6 SG) | 21.14 |
| 6018 | 45 | Plant 16 | Coarse Reject (1/8" x 1mm / 1.6 x 1.9 SG) | 43.12 |
| 6019 | 73 | Plant 16 | Coarse Reject (1/8" x 1mm / 1.9 x Snk SG) | 0 |
| 6020 | 129.4 | Plant 16 | Coarse Reject (5/16" x 1/8" / Flt x 1.6 SG) | 18.95 |
| 6021 | 77 | Plant 16 | Coarse Reject (5/16" x 1/8" / 1.6 x 1.9 SG) | 43.82 |
| 6022 | 99 | Plant 16 | Coarse Reject (5/16" x 1/8" / 1.9 x Snk SG) | 85.75 |
| 6023 | 116 | Plant 16 | Coarse Reject (+ x 5/16" / Flt x 1.6 SG) | 14.71 |
| 6024 | 141 | Plant 16 | Coarse Reject (+ x 5/16" / 1.6 x 1.9 SG) | 46.67 |
| 6025 | 166 | Plant 16 | Coarse Reject (+ x 5/16" / 1.9 x Snk SG) | 87.16 |
| 6026 | 59 | Plant 16 | Clean Coal (100M x 0) | 20.34 |
| 6027 | 36 | Plant 16 | Clean Coal (28M x 100M / Flt x 1.6 SG) | 8.8 |
| 6028 | 30 | Plant 16 | Clean Coal (28M x 100M / 1.6 x 1.9 SG) | 39.63 |
| 6029 | 16 | Plant 16 | Clean Coal (28M x 100M / 1.9 x Snk SG) | 75.23 |
| 6030 | 57 | Plant 16 | Clean Coal (1mm x 28M / Flt x 1.6 SG) | 7.79 |
| 6031 | 11 | Plant 16 | Clean Coal (1mm x 28M / 1.6 x 1.9 SG) | 40.1 |
| 6032 | 25 | Plant 16 | Clean Coal (1mm x 28M / 1.9 x Snk SG) | 77.25 |
| 6033 | 68 | Plant 16 | Clean Coal (1/8" x 1mm / Flt x 1.6 SG) | 7.69 |
| 6034 | 10 | Plant 16 | Clean Coal (1/8" x 1mm / 1.6 x 1.9 SG) | 38.74 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6002 | 21.93 | 30.15 | 51.92 | 96.53 | 24.18 | 46.70 | 10.50 | 1.59 | 8.91 | 1.19 | 6.59 | 2.22 | 7.19 | 0.59 | 3.52 | 0.69 | 314.4 | 240.3 | 52.1 | 0.22 |
| 6003 | 22.51 | 30.91 | 54.39 | 100.53 | 24.32 | 48.88 | 10.85 | 1.62 | 9.19 | 1.20 | 6.85 | 2.43 | 7.62 | 0.70 | 3.58 | 0.63 | 326.2 | 249.8 | 53.9 | 0.22 |
| 6004 | 22.45 | 30.87 | 54.91 | 101.82 | 24.91 | 49.48 | 11.08 | 1.64 | 9.34 | 1.20 | 6.96 | 2.47 | 7.63 | 0.63 | 3.60 | 0.64 | 329.6 | 253.2 | 54.0 | 0.21 |
| 6005 | 17.18 | 27.01 | 46.96 | 92.34 | 22.09 | 45.32 | 10.97 | 1.49 | 8.20 | 1.13 | 6.36 | 2.02 | 6.63 | 0.42 | 3.32 | 0.84 | 292.3 | 227.4 | 47.7 | 0.21 |
| 6006 | 20.80 | 26.05 | 46.00 | 86.91 | 28.20 | 42.30 | 10.44 | 1.46 | 8.85 | 1.31 | 6.36 | 1.82 | 6.25 | 0.27 | 3.29 | 0.99 | 291.3 | 224.2 | 46.4 | 0.21 |
| 6007 | 39.04 | 58.99 | 88.34 | 158.05 | 38.37 | 74.11 | 15.39 | 2.76 | 15.50 | 1.86 | 11.57 | 4.11 | 11.86 | 1.36 | 5.86 | 0.78 | 528.0 | 392.5 | 96.4 | 0.25 |
| 6008 | 27.08 | 37.69 | 69.12 | 127.19 | 21.43 | 59.63 | 11.01 | 1.80 | 10.20 | 1.02 | 7.97 | 3.63 | 10.49 | 1.02 | 4.29 | 0.00 | 393.6 | 300.4 | 66.1 | 0.22 |
| 6009 | 23.23 | 24.44 | 46.44 | 86.66 | 29.61 | 42.32 | 9.16 | 1.34 | 9.17 | 1.08 | 5.99 | 2.04 | 6.43 | 0.52 | 3.09 | 0.68 | 292.2 | 224.7 | 44.3 | 0.20 |
| 6010 | 17.92 | 25.04 | 46.18 | 87.42 | 25.56 | 43.95 | 10.65 | 1.42 | 8.30 | 1.24 | 6.27 | 1.91 | 6.30 | 0.32 | 3.25 | 0.95 | 286.7 | 223.5 | 45.3 | 0.20 |
| 6011 | 37.29 | 57.81 | 82.45 | 154.80 | 26.68 | 72.69 | 13.90 | 2.62 | 13.99 | 1.74 | 11.46 | 4.64 | 13.34 | 1.46 | 5.99 | 0.08 | 500.9 | 367.1 | 96.5 | 0.26 |
| 6012 | 28.19 | 39.20 | 69.95 | 130.86 | 21.48 | 61.77 | 11.25 | 1.89 | 10.62 | 1.01 | 8.40 | 3.73 | 11.08 | 1.04 | 4.45 | 0.00 | 404.9 | 307.8 | 68.9 | 0.22 |
| 6013 | 19.75 | 24.61 | 47.74 | 89.49 | 23.61 | 44.27 | 9.92 | 1.41 | 8.20 | 1.05 | 6.10 | 2.07 | 6.40 | 0.57 | 3.14 | 0.63 | 289.0 | 224.6 | 44.6 | 0.20 |
| 6014 | 33.41 | 48.89 | 77.59 | 144.32 | 27.07 | 67.23 | 12.82 | 2.21 | 12.63 | 1.33 | 10.05 | 4.12 | 11.88 | 1.16 | 5.14 | 0.12 | 460.0 | 343.9 | 82.7 | 0.24 |
| 6015 | 27.23 | 33.01 | 55.22 | 109.51 | 20.64 | 54.25 | 9.42 | 1.57 | 9.76 | 1.02 | 7.39 | 3.49 | 10.57 | 0.92 | 3.95 | 0.00 | 348.0 | 260.4 | 60.4 | 0.23 |
| 6016 | 17.76 | 25.17 | 47.52 | 92.10 | 20.74 | 44.12 | 10.16 | 1.41 | 7.77 | 1.09 | 6.09 | 2.05 | 6.52 | 0.59 | 3.18 | 0.60 | 286.9 | 223.8 | 45.3 | 0.20 |
| 6017 | 35.92 | 51.60 | 82.83 | 154.42 | 27.45 | 71.82 | 12.95 | 2.24 | 13.39 | 1.27 | 10.46 | 4.54 | 12.93 | 1.24 | 5.36 | 0.00 | 488.4 | 365.1 | 87.4 | 0.24 |
| 6018 | 31.63 | 40.14 | 67.31 | 126.44 | 26.35 | 60.23 | 10.66 | 1.83 | 11.43 | 1.07 | 8.50 | 3.78 | 11.00 | 1.07 | 4.47 | 0.00 | 405.9 | 304.2 | 70.0 | 0.23 |
| 6019 | 16.30 | 20.36 | 38.13 | 79.01 | 18.61 | 39.97 | 9.12 | 1.25 | 6.75 | 1.03 | 5.35 | 1.91 | 6.23 | 0.52 | 2.85 | 0.55 | 248.0 | 192.8 | 38.8 | 0.20 |
| 6020 | 37.94 | 52.89 | 86.11 | 160.47 | 31.61 | 74.06 | 13.42 | 2.30 | 14.18 | 1.31 | 10.63 | 4.58 | 13.07 | 1.24 | 5.37 | 0.04 | 509.2 | 382.2 | 89.1 | 0.23 |
| 6021 | 32.42 | 40.61 | 67.43 | 126.69 | 27.69 | 60.96 | 10.79 | 1.84 | 11.85 | 1.06 | 8.60 | 3.82 | 11.03 | 1.02 | 4.44 | 0.00 | 410.3 | 307.3 | 70.6 | 0.23 |
| 6022 | 18.10 | 26.63 | 50.42 | 97.14 | 20.28 | 48.07 | 10.77 | 1.51 | 7.97 | 1.04 | 6.37 | 2.27 | 7.07 | 0.57 | 3.35 | 0.57 | 302.1 | 236.2 | 47.9 | 0.20 |
| 6023 | 28.98 | 28.86 | 49.34 | 123.41 | 28.85 | 48.26 | 8.13 | 1.46 | 10.26 | 0.87 | 6.78 | 3.35 | 9.84 | 0.85 | 3.26 | 0.04 | 352.5 | 269.7 | 53.8 | 0.20 |
| 6024 | 28.90 | 41.13 | 66.43 | 124.34 | 22.76 | 60.95 | 11.02 | 1.87 | 10.84 | 1.12 | 8.19 | 3.65 | 10.55 | 1.06 | 4.54 | 0.00 | 397.4 | 298.2 | 70.2 | 0.24 |
| 6025 | 18.22 | 26.31 | 49.97 | 98.02 | 20.83 | 47.61 | 10.96 | 1.51 | 8.08 | 1.11 | 6.46 | 2.20 | 7.07 | 0.58 | 3.36 | 0.63 | 302.9 | 237.0 | 47.7 | 0.20 |
| 6026 | 31.62 | 40.26 | 62.42 | 117.05 | 37.49 | 57.08 | 11.45 | 1.93 | 12.83 | 1.42 | 8.60 | 3.14 | 9.21 | 0.97 | 4.43 | 0.73 | 400.6 | 300.2 | 68.8 | 0.23 |
| 6027 | 41.08 | 61.91 | 92.52 | 165.95 | 40.19 | 79.23 | 15.92 | 2.93 | 16.50 | 1.94 | 12.35 | 4.30 | 12.31 | 1.51 | 6.08 | 0.74 | 555.5 | 413.2 | 101.2 | 0.24 |
| 6028 | 29.37 | 39.96 | 68.66 | 126.69 | 26.38 | 60.04 | 10.47 | 1.75 | 11.18 | 1.02 | 8.16 | 3.66 | 10.46 | 0.98 | 4.33 | 0.00 | 403.1 | 305.2 | 68.6 | 0.22 |
| 6029 | 32.66 | 19.51 | 39.69 | 78.15 | 43.79 | 35.34 | 5.99 | 1.05 | 11.14 | 0.87 | 4.93 | 2.01 | 5.83 | 0.47 | 2.47 | 0.44 | 284.3 | 215.2 | 36.5 | 0.17 |
| 6030 | 40.88 | 60.41 | 91.46 | 162.01 | 43.47 | 76.62 | 15.79 | 2.84 | 16.51 | 1.92 | 11.91 | 4.02 | 11.45 | 1.41 | 5.81 | 0.91 | 547.4 | 408.7 | 97.8 | 0.24 |
| 6031 | 31.98 | 40.14 | 70.06 | 130.16 | 29.17 | 61.86 | 10.43 | 1.73 | 11.98 | 0.99 | 8.17 | 3.78 | 10.69 | 0.93 | 4.30 | 0.00 | 416.4 | 315.4 | 69.0 | 0.22 |
| 6032 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6033 | 42.93 | 61.36 | 94.51 | 166.33 | 46.94 | 78.80 | 16.04 | 2.88 | 17.34 | 1.98 | 12.14 | 4.16 | 11.59 | 1.46 | 5.89 | 0.97 | 565.3 | 422.8 | 99.6 | 0.24 |
| 6034 | 28.40 | 35.40 | 60.84 | 114.42 | 25.38 | 54.47 | 9.32 | 1.56 | 10.55 | 0.85 | 7.55 | 3.33 | 9.75 | 0.66 | 3.83 | 0.00 | 366.3 | 276.5 | 61.4 | 0.22 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6002 | 8.12 | 11.16 | 19.22 | 35.73 | 8.95 | 17.29 | 3.89 | 0.59 | 3.30 | 0.44 | 2.44 | 0.82 | 2.66 | 0.22 | 1.30 | 0.26 | 116.4 | 89.0 | 19.3 | 0.217 |
| 6003 | 7.90 | 10.85 | 19.10 | 35.29 | 8.54 | 17.16 | 3.81 | 0.57 | 3.23 | 0.42 | 2.41 | 0.85 | 2.67 | 0.25 | 1.26 | 0.22 | 114.5 | 87.7 | 18.9 | 0.216 |
| 6004 | 8.33 | 11.46 | 20.38 | 37.79 | 9.25 | 18.37 | 4.11 | 0.61 | 3.47 | 0.45 | 2.58 | 0.92 | 2.83 | 0.23 | 1.34 | 0.24 | 122.4 | 94.0 | 20.0 | 0.213 |
| 6005 | 12.87 | 20.23 | 35.17 | 69.16 | 16.55 | 33.95 | 8.22 | 1.12 | 6.14 | 0.85 | 4.76 | 1.51 | 4.97 | 0.32 | 2.49 | 0.63 | 218.9 | 170.3 | 35.7 | 0.21 |
| 6006 | 16.02 | 20.06 | 35.43 | 66.93 | 21.71 | 32.58 | 8.04 | 1.13 | 6.82 | 1.01 | 4.90 | 1.40 | 4.81 | 0.21 | 2.54 | 0.76 | 224.3 | 172.6 | 35.7 | 0.207 |
| 6007 | 3.65 | 5.52 | 8.27 | 14.79 | 3.59 | 6.94 | 1.44 | 0.26 | 1.45 | 0.17 | 1.08 | 0.38 | 1.11 | 0.13 | 0.55 | 0.07 | 49.4 | 36.7 | 9.0 | 0.246 |
| 6008 | 11.28 | 15.69 | 28.78 | 52.96 | 8.92 | 24.83 | 4.58 | 0.75 | 4.25 | 0.43 | 3.32 | 1.51 | 4.37 | 0.43 | 1.79 | 0.00 | 163.9 | 125.1 | 27.5 | 0.22 |
| 6009 | 19.38 | 20.40 | 38.76 | 72.32 | 24.71 | 35.32 | 7.64 | 1.12 | 7.65 | 0.90 | 5.00 | 1.70 | 5.37 | 0.43 | 2.58 | 0.56 | 243.8 | 187.5 | 37.0 | 0.197 |
| 6010 | 15.49 | 21.65 | 39.92 | 75.56 | 22.09 | 37.99 | 9.21 | 1.23 | 7.17 | 1.07 | 5.42 | 1.65 | 5.44 | 0.28 | 2.81 | 0.82 | 247.8 | 193.2 | 39.1 | 0.203 |
| 6011 | 6.85 | 10.62 | 15.15 | 28.44 | 4.90 | 13.35 | 2.55 | 0.48 | 2.57 | 0.32 | 2.11 | 0.85 | 2.45 | 0.27 | 1.10 | 0.01 | 92.0 | 67.4 | 17.7 | 0.263 |
| 6012 | 12.27 | 17.06 | 30.45 | 56.96 | 9.35 | 26.89 | 4.90 | 0.82 | 4.62 | 0.44 | 3.66 | 1.62 | 4.82 | 0.45 | 1.94 | 0.00 | 176.3 | 134.0 | 30.0 | 0.224 |
| 6013 | 17.42 | 21.71 | 42.11 | 78.94 | 20.83 | 39.05 | 8.75 | 1.25 | 7.24 | 0.92 | 5.38 | 1.83 | 5.65 | 0.50 | 2.77 | 0.56 | 254.9 | 198.2 | 39.3 | 0.198 |
| 6014 | 6.92 | 10.12 | 16.07 | 29.89 | 5.61 | 13.92 | 2.65 | 0.46 | 2.62 | 0.28 | 2.08 | 0.85 | 2.46 | 0.24 | 1.06 | 0.03 | 95.3 | 71.2 | 17.1 | 0.24 |
| 6015 | 12.19 | 14.77 | 24.72 | 49.02 | 9.24 | 24.28 | 4.22 | 0.70 | 4.37 | 0.46 | 3.31 | 1.56 | 4.73 | 0.41 | 1.77 | 0.00 | 155.7 | 116.5 | 27.0 | 0.232 |
| 6016 | 16.11 | 22.85 | 43.13 | 83.58 | 18.82 | 40.04 | 9.22 | 1.28 | 7.06 | 0.99 | 5.53 | 1.86 | 5.92 | 0.53 | 2.89 | 0.54 | 260.3 | 203.1 | 41.1 | 0.202 |
| 6017 | 7.59 | 10.91 | 17.51 | 32.64 | 5.80 | 15.18 | 2.74 | 0.47 | 2.83 | 0.27 | 2.21 | 0.96 | 2.73 | 0.26 | 1.13 | 0.00 | 103.2 | 77.2 | 18.5 | 0.239 |
| 6018 | 13.64 | 17.31 | 29.02 | 54.52 | 11.36 | 25.97 | 4.60 | 0.79 | 4.93 | 0.46 | 3.67 | 1.63 | 4.74 | 0.46 | 1.93 | 0.00 | 175.0 | 131.2 | 30.2 | 0.23 |
| 6019 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6020 | 7.19 | 10.02 | 16.32 | 30.41 | 5.99 | 14.03 | 2.54 | 0.44 | 2.69 | 0.25 | 2.02 | 0.87 | 2.48 | 0.23 | 1.02 | 0.01 | 96.5 | 72.4 | 16.9 | 0.233 |
| 6021 | 14.21 | 17.79 | 29.55 | 55.52 | 12.13 | 26.71 | 4.73 | 0.81 | 5.19 | 0.46 | 3.77 | 1.68 | 4.84 | 0.45 | 1.95 | 0.00 | 179.8 | 134.6 | 30.9 | 0.23 |
| 6022 | 15.52 | 22.83 | 43.24 | 83.30 | 17.39 | 41.22 | 9.24 | 1.29 | 6.83 | 0.89 | 5.46 | 1.94 | 6.06 | 0.49 | 2.87 | 0.49 | 259.1 | 202.5 | 41.0 | 0.203 |
| 6023 | 4.26 | 4.25 | 7.26 | 18.15 | 4.24 | 7.10 | 1.20 | 0.21 | 1.51 | 0.13 | 1.00 | 0.49 | 1.45 | 0.12 | 0.48 | 0.01 | 51.9 | 39.7 | 7.9 | 0.2 |
| 6024 | 13.49 | 19.19 | 31.00 | 58.03 | 10.62 | 28.44 | 5.14 | 0.87 | 5.06 | 0.52 | 3.82 | 1.70 | 4.92 | 0.49 | 2.12 | 0.00 | 185.4 | 139.2 | 32.8 | 0.236 |
| 6025 | 15.88 | 22.93 | 43.55 | 85.44 | 18.16 | 41.50 | 9.56 | 1.31 | 7.04 | 0.97 | 5.63 | 1.92 | 6.16 | 0.51 | 2.93 | 0.55 | 264.0 | 206.6 | 41.6 | 0.201 |
| 6026 | 6.43 | 8.19 | 12.70 | 23.81 | 7.62 | 11.61 | 2.33 | 0.39 | 2.61 | 0.29 | 1.75 | 0.64 | 1.87 | 0.20 | 0.90 | 0.15 | 81.5 | 61.1 | 14.0 | 0.229 |
| 6027 | 3.62 | 5.45 | 8.14 | 14.60 | 3.54 | 6.97 | 1.40 | 0.26 | 1.45 | 0.17 | 1.09 | 0.38 | 1.08 | 0.13 | 0.54 | 0.07 | 48.9 | 36.4 | 8.9 | 0.245 |
| 6028 | 11.64 | 15.84 | 27.21 | 50.21 | 10.45 | 23.79 | 4.15 | 0.69 | 4.43 | 0.41 | 3.24 | 1.45 | 4.14 | 0.39 | 1.72 | 0.00 | 159.8 | 120.9 | 27.2 | 0.225 |
| 6029 | 24.57 | 14.68 | 29.86 | 58.80 | 32.95 | 26.59 | 4.51 | 0.79 | 8.38 | 0.66 | 3.71 | 1.51 | 4.38 | 0.35 | 1.86 | 0.33 | 213.9 | 161.9 | 27.5 | 0.17 |
| 6030 | 3.18 | 4.71 | 7.12 | 12.62 | 3.39 | 5.97 | 1.23 | 0.22 | 1.29 | 0.15 | 0.93 | 0.31 | 0.89 | 0.11 | 0.45 | 0.07 | 42.6 | 31.8 | 7.6 | 0.239 |
| 6031 | 12.82 | 16.10 | 28.10 | 52.19 | 11.70 | 24.81 | 4.18 | 0.70 | 4.80 | 0.40 | 3.28 | 1.52 | 4.29 | 0.37 | 1.72 | 0.00 | 167.0 | 126.5 | 27.7 | 0.219 |
| 6032 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6033 | 3.30 | 4.72 | 7.27 | 12.79 | 3.61 | 6.06 | 1.23 | 0.22 | 1.33 | 0.15 | 0.93 | 0.32 | 0.89 | 0.11 | 0.45 | 0.07 | 43.5 | 32.5 | 7.7 | 0.235 |
| 6034 | 11.00 | 13.71 | 23.57 | 44.33 | 9.83 | 21.10 | 3.61 | 0.61 | 4.09 | 0.33 | 2.92 | 1.29 | 3.78 | 0.26 | 1.48 | 0.00 | 141.9 | 107.1 | 23.8 | 0.222 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6002 | 0.51 | 0.46 | 0.64 | 0.60 | 1.34 | 0.64 | 0.73 | 0.45 | 0.82 | 0.68 | 0.64 | 1.03 | 1.27 | 0.66 | 0.65 | 0.73 | 0.63 | 0.66 | 0.57 | 1.17 |
| 6003 | 0.49 | 0.45 | 0.64 | 0.59 | 1.27 | 0.64 | 0.72 | 0.44 | 0.81 | 0.65 | 0.63 | 1.07 | 1.27 | 0.75 | 0.63 | 0.63 | 0.62 | 0.65 | 0.56 | 1.17 |
| 6004 | 0.52 | 0.48 | 0.68 | 0.63 | 1.38 | 0.68 | 0.78 | 0.47 | 0.87 | 0.68 | 0.68 | 1.15 | 1.35 | 0.71 | 0.67 | 0.68 | 0.66 | 0.70 | 0.59 | 1.19 |
| 6005 | 0.80 | 0.84 | 1.17 | 1.15 | 2.47 | 1.26 | 1.55 | 0.86 | 1.53 | 1.30 | 1.25 | 1.89 | 2.37 | 0.96 | 1.24 | 1.80 | 1.19 | 1.27 | 1.05 | 1.21 |
| 6006 | 1.00 | 0.84 | 1.18 | 1.12 | 3.24 | 1.21 | 1.52 | 0.87 | 1.70 | 1.55 | 1.29 | 1.75 | 2.29 | 0.64 | 1.27 | 2.17 | 1.22 | 1.29 | 1.05 | 1.23 |
| 6007 | 0.23 | 0.23 | 0.28 | 0.25 | 0.54 | 0.26 | 0.27 | 0.20 | 0.36 | 0.27 | 0.28 | 0.48 | 0.53 | 0.38 | 0.27 | 0.21 | 0.27 | 0.27 | 0.27 | 1.03 |
| 6008 | 0.70 | 0.65 | 0.96 | 0.88 | 1.33 | 0.92 | 0.86 | 0.58 | 1.06 | 0.66 | 0.87 | 1.89 | 2.08 | 1.29 | 0.89 | 0.00 | 0.89 | 0.93 | 0.81 | 1.15 |
| 6009 | 1.21 | 0.85 | 1.29 | 1.21 | 3.69 | 1.31 | 1.44 | 0.86 | 1.91 | 1.39 | 1.32 | 2.13 | 2.56 | 1.32 | 1.29 | 1.61 | 1.32 | 1.40 | 1.09 | 1.29 |
| 6010 | 0.97 | 0.90 | 1.33 | 1.26 | 3.30 | 1.41 | 1.74 | 0.95 | 1.79 | 1.65 | 1.43 | 2.06 | 2.59 | 0.85 | 1.41 | 2.35 | 1.34 | 1.44 | 1.15 | 1.25 |
| 6011 | 0.43 | 0.44 | 0.50 | 0.47 | 0.73 | 0.49 | 0.48 | 0.37 | 0.64 | 0.49 | 0.55 | 1.07 | 1.17 | 0.81 | 0.55 | 0.04 | 0.50 | 0.50 | 0.52 | 0.96 |
| 6012 | 0.77 | 0.71 | 1.01 | 0.95 | 1.40 | 1.00 | 0.92 | 0.63 | 1.16 | 0.67 | 0.96 | 2.03 | 2.30 | 1.37 | 0.97 | 0.00 | 0.96 | 1.00 | 0.88 | 1.13 |
| 6013 | 1.09 | 0.90 | 1.40 | 1.32 | 3.11 | 1.45 | 1.65 | 0.96 | 1.81 | 1.42 | 1.42 | 2.29 | 2.69 | 1.52 | 1.39 | 1.59 | 1.38 | 1.48 | 1.16 | 1.28 |
| 6014 | 0.43 | 0.42 | 0.54 | 0.50 | 0.84 | 0.52 | 0.50 | 0.35 | 0.65 | 0.42 | 0.55 | 1.07 | 1.17 | 0.73 | 0.53 | 0.07 | 0.52 | 0.53 | 0.50 | 1.05 |
| 6015 | 0.76 | 0.62 | 0.82 | 0.82 | 1.38 | 0.90 | 0.80 | 0.54 | 1.09 | 0.71 | 0.87 | 1.95 | 2.25 | 1.25 | 0.88 | 0.00 | 0.84 | 0.87 | 0.79 | 1.09 |
| 6016 | 1.01 | 0.95 | 1.44 | 1.39 | 2.81 | 1.48 | 1.74 | 0.99 | 1.76 | 1.52 | 1.45 | 2.33 | 2.82 | 1.61 | 1.44 | 1.55 | 1.41 | 1.51 | 1.21 | 1.25 |
| 6017 | 0.47 | 0.45 | 0.58 | 0.54 | 0.87 | 0.56 | 0.52 | 0.36 | 0.71 | 0.41 | 0.58 | 1.20 | 1.30 | 0.80 | 0.57 | 0.00 | 0.56 | 0.57 | 0.54 | 1.06 |
| 6018 | 0.85 | 0.72 | 0.97 | 0.91 | 1.70 | 0.96 | 0.87 | 0.61 | 1.23 | 0.71 | 0.96 | 2.03 | 2.26 | 1.39 | 0.96 | 0.00 | 0.95 | 0.98 | 0.89 | 1.10 |
| 6019 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6020 | 0.45 | 0.42 | 0.54 | 0.51 | 0.89 | 0.52 | 0.48 | 0.34 | 0.67 | 0.38 | 0.53 | 1.09 | 1.18 | 0.71 | 0.51 | 0.02 | 0.52 | 0.54 | 0.50 | 1.09 |
| 6021 | 0.89 | 0.74 | 0.98 | 0.93 | 1.81 | 0.99 | 0.89 | 0.62 | 1.30 | 0.71 | 0.99 | 2.10 | 2.30 | 1.35 | 0.97 | 0.00 | 0.98 | 1.00 | 0.91 | 1.10 |
| 6022 | 0.97 | 0.95 | 1.44 | 1.39 | 2.60 | 1.53 | 1.74 | 0.99 | 1.71 | 1.37 | 1.44 | 2.43 | 2.89 | 1.47 | 1.44 | 1.39 | 1.41 | 1.51 | 1.21 | 1.25 |
| 6023 | 0.27 | 0.18 | 0.24 | 0.30 | 0.63 | 0.26 | 0.23 | 0.17 | 0.38 | 0.20 | 0.26 | 0.62 | 0.69 | 0.38 | 0.24 | 0.02 | 0.28 | 0.30 | 0.23 | 1.27 |
| 6024 | 0.84 | 0.80 | 1.03 | 0.97 | 1.59 | 1.05 | 0.97 | 0.67 | 1.26 | 0.80 | 1.01 | 2.13 | 2.34 | 1.50 | 1.06 | 0.00 | 1.01 | 1.04 | 0.96 | 1.08 |
| 6025 | 0.99 | 0.96 | 1.45 | 1.42 | 2.71 | 1.54 | 1.80 | 1.01 | 1.76 | 1.49 | 1.48 | 2.40 | 2.93 | 1.53 | 1.46 | 1.56 | 1.43 | 1.54 | 1.22 | 1.26 |
| 6026 | 0.40 | 0.34 | 0.42 | 0.40 | 1.14 | 0.43 | 0.44 | 0.30 | 0.65 | 0.44 | 0.46 | 0.80 | 0.89 | 0.60 | 0.45 | 0.42 | 0.44 | 0.45 | 0.41 | 1.11 |
| 6027 | 0.23 | 0.23 | 0.27 | 0.24 | 0.53 | 0.26 | 0.26 | 0.20 | 0.36 | 0.26 | 0.29 | 0.47 | 0.52 | 0.40 | 0.27 | 0.19 | 0.27 | 0.27 | 0.26 | 1.04 |
| 6028 | 0.73 | 0.66 | 0.91 | 0.84 | 1.56 | 0.88 | 0.78 | 0.53 | 1.11 | 0.62 | 0.85 | 1.81 | 1.97 | 1.18 | 0.86 | 0.00 | 0.87 | 0.90 | 0.80 | 1.13 |
| 6029 | 1.54 | 0.61 | 1.00 | 0.98 | 4.92 | 0.98 | 0.85 | 0.61 | 2.10 | 1.01 | 0.98 | 1.89 | 2.09 | 1.07 | 0.93 | 0.95 | 1.16 | 1.21 | 0.81 | 1.49 |
| 6030 | 0.20 | 0.20 | 0.24 | 0.21 | 0.51 | 0.22 | 0.23 | 0.17 | 0.32 | 0.23 | 0.24 | 0.39 | 0.42 | 0.33 | 0.23 | 0.20 | 0.23 | 0.24 | 0.22 | 1.06 |
| 6031 | 0.80 | 0.67 | 0.94 | 0.87 | 1.75 | 0.92 | 0.79 | 0.53 | 1.20 | 0.61 | 0.86 | 1.90 | 2.04 | 1.13 | 0.86 | 0.00 | 0.91 | 0.94 | 0.81 | 1.16 |
| 6032 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6033 | 0.21 | 0.20 | 0.24 | 0.21 | 0.54 | 0.22 | 0.23 | 0.17 | 0.33 | 0.23 | 0.25 | 0.40 | 0.42 | 0.34 | 0.23 | 0.21 | 0.24 | 0.24 | 0.22 | 1.08 |
| 6034 | 0.69 | 0.57 | 0.79 | 0.74 | 1.47 | 0.78 | 0.68 | 0.47 | 1.02 | 0.51 | 0.77 | 1.61 | 1.80 | 0.78 | 0.74 | 0.00 | 0.77 | 0.80 | 0.70 | 1.14 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6002 | 1.37 | 1.26 | 1.73 | 1.61 | 3.61 | 1.73 | 1.98 | 1.22 | 2.23 | 1.83 | 1.73 | 2.78 | 3.42 | 1.79 | 1.76 | 1.97 | 1.71 | 1.79 | 1.53 | 1.17 |
| 6003 | 1.41 | 1.29 | 1.81 | 1.68 | 3.63 | 1.81 | 2.05 | 1.25 | 2.30 | 1.84 | 1.80 | 3.04 | 3.63 | 2.13 | 1.79 | 1.80 | 1.77 | 1.86 | 1.58 | 1.17 |
| 6004 | 1.40 | 1.29 | 1.83 | 1.70 | 3.72 | 1.83 | 2.09 | 1.26 | 2.33 | 1.85 | 1.83 | 3.09 | 3.63 | 1.91 | 1.80 | 1.83 | 1.79 | 1.89 | 1.59 | 1.19 |
| 6005 | 1.07 | 1.13 | 1.57 | 1.54 | 3.30 | 1.68 | 2.07 | 1.15 | 2.05 | 1.74 | 1.67 | 2.52 | 3.16 | 1.28 | 1.66 | 2.41 | 1.59 | 1.69 | 1.40 | 1.21 |
| 6006 | 1.30 | 1.09 | 1.53 | 1.45 | 4.21 | 1.57 | 1.97 | 1.13 | 2.21 | 2.02 | 1.67 | 2.27 | 2.98 | 0.83 | 1.65 | 2.82 | 1.58 | 1.67 | 1.36 | 1.23 |
| 6007 | 2.44 | 2.46 | 2.94 | 2.63 | 5.73 | 2.74 | 2.90 | 2.13 | 3.88 | 2.86 | 3.04 | 5.14 | 5.65 | 4.11 | 2.93 | 2.24 | 2.86 | 2.92 | 2.83 | 1.03 |
| 6008 | 1.69 | 1.57 | 2.30 | 2.12 | 3.20 | 2.21 | 2.08 | 1.38 | 2.55 | 1.57 | 2.10 | 4.54 | 5.00 | 3.10 | 2.15 | 0.00 | 2.14 | 2.24 | 1.94 | 1.15 |
| 6009 | 1.45 | 1.02 | 1.55 | 1.44 | 4.42 | 1.57 | 1.73 | 1.03 | 2.29 | 1.67 | 1.58 | 2.55 | 3.06 | 1.58 | 1.55 | 1.93 | 1.59 | 1.67 | 1.30 | 1.29 |
| 6010 | 1.12 | 1.04 | 1.54 | 1.46 | 3.81 | 1.63 | 2.01 | 1.10 | 2.07 | 1.91 | 1.65 | 2.39 | 3.00 | 0.98 | 1.63 | 2.71 | 1.56 | 1.66 | 1.33 | 1.25 |
| 6011 | 2.33 | 2.41 | 2.75 | 2.58 | 3.98 | 2.69 | 2.62 | 2.02 | 3.50 | 2.67 | 3.02 | 5.80 | 6.35 | 4.43 | 3.00 | 0.23 | 2.72 | 2.73 | 2.84 | 0.96 |
| 6012 | 1.76 | 1.63 | 2.33 | 2.18 | 3.21 | 2.29 | 2.12 | 1.45 | 2.65 | 1.55 | 2.21 | 4.66 | 5.28 | 3.14 | 2.22 | 0.00 | 2.20 | 2.29 | 2.02 | 1.13 |
| 6013 | 1.23 | 1.03 | 1.59 | 1.49 | 3.52 | 1.64 | 1.87 | 1.09 | 2.05 | 1.61 | 1.60 | 2.59 | 3.05 | 1.72 | 1.57 | 1.80 | 1.57 | 1.67 | 1.31 | 1.28 |
| 6014 | 2.09 | 2.04 | 2.59 | 2.41 | 4.04 | 2.49 | 2.42 | 1.70 | 3.16 | 2.04 | 2.64 | 5.15 | 5.66 | 3.52 | 2.57 | 0.35 | 2.50 | 2.56 | 2.43 | 1.05 |
| 6015 | 1.70 | 1.38 | 1.84 | 1.83 | 3.08 | 2.01 | 1.78 | 1.21 | 2.44 | 1.58 | 1.94 | 4.37 | 5.03 | 2.79 | 1.98 | 0.00 | 1.89 | 1.94 | 1.77 | 1.09 |
| 6016 | 1.11 | 1.05 | 1.58 | 1.53 | 3.10 | 1.63 | 1.92 | 1.09 | 1.94 | 1.67 | 1.60 | 2.56 | 3.10 | 1.78 | 1.59 | 1.70 | 1.56 | 1.67 | 1.33 | 1.25 |
| 6017 | 2.24 | 2.15 | 2.76 | 2.57 | 4.10 | 2.66 | 2.44 | 1.73 | 3.35 | 1.96 | 2.75 | 5.67 | 6.15 | 3.77 | 2.68 | 0.00 | 2.65 | 2.72 | 2.57 | 1.06 |
| 6018 | 1.98 | 1.67 | 2.24 | 2.11 | 3.93 | 2.23 | 2.01 | 1.41 | 2.86 | 1.64 | 2.24 | 4.72 | 5.24 | 3.23 | 2.23 | 0.00 | 2.20 | 2.27 | 2.06 | 1.10 |
| 6019 | 1.02 | 0.85 | 1.27 | 1.32 | 2.78 | 1.48 | 1.72 | 0.97 | 1.69 | 1.59 | 1.41 | 2.38 | 2.97 | 1.58 | 1.43 | 1.58 | 1.35 | 1.44 | 1.14 | 1.26 |
| 6020 | 2.37 | 2.20 | 2.87 | 2.67 | 4.72 | 2.74 | 2.53 | 1.77 | 3.55 | 2.01 | 2.80 | 5.73 | 6.22 | 3.75 | 2.69 | 0.11 | 2.76 | 2.85 | 2.62 | 1.09 |
| 6021 | 2.03 | 1.69 | 2.25 | 2.11 | 4.13 | 2.26 | 2.04 | 1.42 | 2.96 | 1.63 | 2.26 | 4.78 | 5.25 | 3.08 | 2.22 | 0.00 | 2.23 | 2.29 | 2.07 | 1.10 |
| 6022 | 1.13 | 1.11 | 1.68 | 1.62 | 3.03 | 1.78 | 2.03 | 1.16 | 1.99 | 1.60 | 1.68 | 2.84 | 3.37 | 1.72 | 1.68 | 1.62 | 1.64 | 1.76 | 1.41 | 1.25 |
| 6023 | 1.81 | 1.20 | 1.64 | 2.06 | 4.31 | 1.79 | 1.53 | 1.12 | 2.57 | 1.34 | 1.78 | 4.19 | 4.68 | 2.57 | 1.63 | 0.12 | 1.91 | 2.01 | 1.58 | 1.27 |
| 6024 | 1.81 | 1.71 | 2.21 | 2.07 | 3.40 | 2.26 | 2.08 | 1.44 | 2.71 | 1.72 | 2.16 | 4.56 | 5.02 | 3.21 | 2.27 | 0.00 | 2.16 | 2.22 | 2.06 | 1.08 |
| 6025 | 1.14 | 1.10 | 1.67 | 1.63 | 3.11 | 1.76 | 2.07 | 1.16 | 2.02 | 1.71 | 1.70 | 2.75 | 3.37 | 1.76 | 1.68 | 1.79 | 1.64 | 1.76 | 1.40 | 1.26 |
| 6026 | 1.98 | 1.68 | 2.08 | 1.95 | 5.60 | 2.11 | 2.16 | 1.48 | 3.21 | 2.19 | 2.26 | 3.92 | 4.39 | 2.94 | 2.21 | 2.09 | 2.17 | 2.24 | 2.02 | 1.11 |
| 6027 | 2.57 | 2.58 | 3.08 | 2.77 | 6.00 | 2.93 | 3.00 | 2.25 | 4.13 | 2.99 | 3.25 | 5.38 | 5.86 | 4.57 | 3.04 | 2.13 | 3.01 | 3.08 | 2.97 | 1.04 |
| 6028 | 1.84 | 1.67 | 2.29 | 2.11 | 3.94 | 2.22 | 1.97 | 1.35 | 2.80 | 1.57 | 2.15 | 4.57 | 4.98 | 2.98 | 2.16 | 0.00 | 2.19 | 2.27 | 2.02 | 1.13 |
| 6029 | 2.04 | 0.81 | 1.32 | 1.30 | 6.54 | 1.31 | 1.13 | 0.80 | 2.79 | 1.34 | 1.30 | 2.51 | 2.77 | 1.43 | 1.23 | 1.26 | 1.54 | 1.60 | 1.07 | 1.49 |
| 6030 | 2.55 | 2.52 | 3.05 | 2.70 | 6.49 | 2.84 | 2.98 | 2.18 | 4.13 | 2.96 | 3.13 | 5.02 | 5.45 | 4.26 | 2.91 | 2.60 | 2.97 | 3.04 | 2.88 | 1.06 |
| 6031 | 2.00 | 1.67 | 2.34 | 2.17 | 4.35 | 2.29 | 1.97 | 1.33 | 2.99 | 1.52 | 2.15 | 4.73 | 5.09 | 2.82 | 2.15 | 0.00 | 2.26 | 2.35 | 2.03 | 1.16 |
| 6032 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6033 | 2.68 | 2.56 | 3.15 | 2.77 | 7.01 | 2.92 | 3.03 | 2.21 | 4.33 | 3.05 | 3.20 | 5.20 | 5.52 | 4.42 | 2.94 | 2.77 | 3.07 | 3.15 | 2.93 | 1.08 |
| 6034 | 1.77 | 1.47 | 2.03 | 1.91 | 3.79 | 2.02 | 1.76 | 1.20 | 2.64 | 1.31 | 1.99 | 4.17 | 4.64 | 2.01 | 1.91 | 0.00 | 1.99 | 2.06 | 1.80 | 1.14 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6035 | 12 | Plant 16 | Clean Coal (1/8" x 1mm / 1.9 x Snk SG) | 69.41 |
| 6036 | 126.9 | Plant 16 | Clean Coal (5/16" x 1/8" / Flt x 1.6 SG) | 10.33 |
| 6037 | 144 | Plant 16 | Clean Coal (5/16" x 1/8" / 1.6 x 1.9 SG) | 41.26 |
| 6038 | 46 | Plant 16 | Clean Coal (5/16" x 1/8" / 1.9 x Snk SG) | 79.09 |
| 6039 | 118.9 | Plant 16 | Clean Coal (+ x 5/16" / Flt x 1.6 SG) | 10.95 |
| 6040 | 121 | Plant 16 | Clean Coal (+ x 5/16" / 1.6 x 1.9 SG) | 41.84 |
| 6041 | 40 | Plant 16 | Clean Coal (+ x 5/16" / 1.9 x Snk SG) | 75.75 |
| 6042 | 57.2 | Plant 17 | Raw Coal (100M x 0) | 31.82 |
| 6043 | 117.3 | Plant 17 | Raw Coal (1mm x 100M) | 25.48 |
| 6044 | 70.8 | Plant 17 | Raw Coal (1/8" x 1mm) | 33.03 |
| 6045 | 108.3 | Plant 17 | Raw Coal (7/8" x 1/8") | 45.94 |
| 6046 | 131.5 | Plant 17 | Raw Coal (+ x 7/8") | 77.36 |
| 6047 | 54 | Plant 17 | Fine Reject (100M x 0) | 65.92 |
| 6048 | 93 | Plant 17 | Fine Reject (+ x 100M / Flt x 1.6 SG) | 8.4 |
| 6049 | 20.4 | Plant 17 | Fine Reject (+ x 100M / 1.6 x 1.8 SG) | 38.52 |
| 6050 | 198.7 | Plant 17 | Fine Reject (+ x 100M / 1.8 x Snk SG) | 81.11 |
| 6051 | 52.4 | Plant 17 | Coarse Reject (100M x 0) | 70.28 |
| 6052 | 37 | Plant 17 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 15 |
| 6053 | 20.8 | Plant 17 | Coarse Reject (1mm x 100M / 1.6 x 1.8 SG) | 40.05 |
| 6054 | 156.3 | Plant 17 | Coarse Reject (1mm x 100M / 1.8 x Snk SG) | 84.17 |
| 6055 | 7 | Plant 17 | Coarse Reject (1/8" x 1mm / Flt x 1.6 SG) | 18.3 |
| 6056 | 61.3 | Plant 17 | Coarse Reject (1/8" x 1mm / 1.6 x 1.8 SG) | 39.88 |
| 6057 | 135.6 | Plant 17 | Coarse Reject (1/8" x 1mm / 1.8 x Snk SG) | 83.06 |
| 6058 | 114 | Plant 17 | Coarse Reject (7/8" x 1/8" / Flt x 1.6 SG) | 26.48 |
| 6059 | 108 | Plant 17 | Coarse Reject (7/8" x 1/8" / 1.6 x 1.8 SG) | 41.24 |
| 6060 | 124 | Plant 17 | Coarse Reject (7/8" x 1/8" / 1.8 x Snk SG) | 77.47 |
| 6061 | 138 | Plant 17 | Coarse Reject (+ x 7/8" / Flt x 1.6 SG) | 28.26 |
| 6062 | 134 | Plant 17 | Coarse Reject (+ x 7/8" / 1.6 x 1.8 SG) | 39.83 |
| 6063 | 119 | Plant 17 | Coarse Reject (+ x 7/8" / 1.8 x Snk SG) | 88.65 |
| 6064 | 88.4 | Plant 17 | Clean Coal (100M x 0 / - x - SG) | 10.4 |
| 6065 | 439 | Plant 17 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 5.91 |
| 6066 | 12.6 | Plant 17 | Clean Coal (1mm x 100M / 1.6 x 1.8 SG) | 34.46 |
| 6067 | 13.8 | Plant 17 | Clean Coal (1mm x 100M / 1.8 x Snk SG) | 60.25 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6035 | 23.63 | 30.26 | 55.01 | 103.01 | 29.90 | 50.63 | 10.86 | 1.56 | 10.28 | 1.21 | 6.97 | 2.48 | 7.94 | 0.16 | 3.69 | 0.74 | 338.3 | 261.3 | 53.4 | 0.20 |
| 6036 | 34.78 | 42.59 | 63.19 | 122.73 | 36.16 | 62.14 | 11.47 | 2.06 | 12.67 | 1.48 | 9.50 | 3.66 | 10.45 | 1.13 | 4.42 | 0.37 | 418.8 | 310.4 | 73.6 | 0.24 |
| 6037 | 33.77 | 36.57 | 58.09 | 119.98 | 30.42 | 56.38 | 8.92 | 1.62 | 11.08 | 0.88 | 8.04 | 3.68 | 10.10 | 0.86 | 3.88 | 0.00 | 384.3 | 286.5 | 64.0 | 0.22 |
| 6038 | 19.41 | 25.48 | 44.04 | 83.52 | 20.79 | 44.91 | 9.11 | 1.40 | 7.42 | 1.03 | 6.23 | 2.31 | 6.93 | 0.62 | 3.16 | 0.40 | 276.8 | 211.2 | 46.2 | 0.22 |
| 6039 | 42.50 | 54.33 | 90.52 | 160.99 | 48.77 | 76.50 | 13.60 | 2.44 | 16.05 | 1.42 | 11.01 | 4.20 | 11.39 | 1.20 | 5.12 | 0.50 | 540.5 | 408.9 | 89.2 | 0.22 |
| 6040 | 20.85 | 30.34 | 52.76 | 98.54 | 21.63 | 52.26 | 10.15 | 1.54 | 8.43 | 1.06 | 6.96 | 2.70 | 7.97 | 0.51 | 3.55 | 0.31 | 319.6 | 245.3 | 53.4 | 0.22 |
| 6041 | 32.63 | 38.07 | 60.38 | 117.79 | 29.88 | 58.92 | 9.64 | 1.76 | 11.20 | 1.03 | 8.38 | 3.68 | 10.03 | 0.95 | 4.06 | 0.00 | 388.4 | 289.6 | 66.2 | 0.23 |
| 6042 | 32.37 | 31.91 | 37.49 | 92.15 | 35.99 | 38.43 | 8.75 | 1.66 | 11.94 | 1.30 | 6.39 | 2.30 | 6.61 | 0.74 | 3.53 | 0.74 | 312.3 | 226.4 | 53.5 | 0.24 |
| 6043 | 26.55 | 30.04 | 35.93 | 82.08 | 22.54 | 42.67 | 10.05 | 1.89 | 9.78 | 1.62 | 6.70 | 2.58 | 7.52 | 0.89 | 3.88 | 0.46 | 285.2 | 204.9 | 53.7 | 0.26 |
| 6044 | 25.87 | 27.68 | 37.92 | 88.04 | 19.56 | 45.53 | 10.76 | 1.84 | 9.17 | 1.40 | 6.62 | 2.57 | 7.48 | 0.83 | 3.80 | 0.36 | 289.4 | 212.8 | 50.8 | 0.24 |
| 6045 | 22.48 | 22.36 | 35.10 | 81.49 | 17.64 | 40.85 | 9.39 | 1.51 | 7.68 | 1.17 | 5.29 | 2.21 | 6.84 | 0.66 | 3.15 | 0.30 | 258.1 | 193.7 | 42.0 | 0.22 |
| 6046 | 16.38 | 13.40 | 18.39 | 57.75 | 13.00 | 25.30 | 6.49 | 0.97 | 5.21 | 0.93 | 3.55 | 1.63 | 5.40 | 0.46 | 2.26 | 0.29 | 171.4 | 127.1 | 27.9 | 0.22 |
| 6047 | 25.66 | 25.08 | 36.10 | 82.62 | 31.31 | 38.70 | 9.34 | 1.49 | 10.10 | 1.27 | 5.70 | 1.94 | 6.12 | 0.55 | 3.12 | 0.80 | 279.9 | 209.7 | 44.6 | 0.21 |
| 6048 | 43.69 | 65.57 | 53.95 | 123.88 | 25.68 | 68.37 | 16.56 | 3.68 | 16.35 | 3.08 | 13.43 | 4.67 | 13.54 | 2.22 | 7.73 | 0.71 | 463.1 | 308.5 | 110.9 | 0.36 |
| 6049 | 26.69 | 23.71 | 35.26 | 87.74 | 15.01 | 45.47 | 8.76 | 1.54 | 8.35 | 1.03 | 4.98 | 2.99 | 9.23 | 0.75 | 3.30 | 0.00 | 274.8 | 202.1 | 46.0 | 0.23 |
| 6050 | 28.46 | 27.97 | 46.55 | 96.45 | 29.78 | 45.89 | 10.29 | 1.68 | 10.29 | 1.15 | 5.85 | 2.20 | 6.27 | 0.62 | 3.37 | 0.57 | 317.4 | 240.9 | 48.0 | 0.20 |
| 6051 | 27.09 | 23.36 | 35.03 | 81.00 | 30.45 | 37.64 | 8.55 | 1.43 | 9.74 | 1.20 | 5.26 | 2.10 | 6.20 | 0.58 | 3.04 | 0.60 | 273.3 | 203.8 | 42.3 | 0.21 |
| 6052 | 40.85 | 39.22 | 44.67 | 109.50 | 20.26 | 55.58 | 11.46 | 2.68 | 12.05 | 2.42 | 8.77 | 4.17 | 12.81 | 1.43 | 5.58 | 0.00 | 371.4 | 256.2 | 74.4 | 0.29 |
| 6053 | 19.77 | 9.96 | 13.38 | 48.47 | 8.27 | 26.67 | 3.93 | 0.75 | 5.23 | 0.90 | 2.39 | 2.58 | 8.78 | 0.53 | 1.77 | 0.00 | 153.4 | 106.7 | 26.9 | 0.25 |
| 6054 | 18.68 | 11.72 | 19.94 | 53.55 | 16.21 | 26.73 | 6.17 | 0.97 | 5.62 | 0.95 | 3.36 | 1.53 | 5.02 | 0.42 | 2.06 | 0.23 | 173.2 | 129.2 | 25.3 | 0.20 |
| 6055 | 48.27 | 63.32 | 83.98 | 169.07 | 27.88 | 77.60 | 16.64 | 3.36 | 16.17 | 2.31 | 12.54 | 4.85 | 13.88 | 1.63 | 7.17 | 0.29 | 549.0 | 394.7 | 106.0 | 0.27 |
| 6056 | 28.56 | 26.20 | 39.62 | 96.60 | 15.72 | 48.72 | 8.93 | 1.55 | 9.12 | 1.05 | 5.60 | 3.44 | 10.46 | 0.77 | 3.45 | 0.00 | 299.8 | 220.3 | 51.0 | 0.23 |
| 6057 | 16.65 | 8.91 | 17.49 | 54.12 | 12.88 | 24.40 | 5.84 | 0.85 | 4.58 | 0.87 | 2.78 | 1.43 | 5.00 | 0.35 | 1.90 | 0.20 | 158.2 | 120.2 | 21.4 | 0.18 |
| 6058 | 35.70 | 41.17 | 72.82 | 133.94 | 24.97 | 68.86 | 13.63 | 2.42 | 13.09 | 1.52 | 9.00 | 4.02 | 11.38 | 1.11 | 4.91 | 0.00 | 438.5 | 329.7 | 73.1 | 0.22 |
| 6059 | 36.00 | 50.95 | 81.10 | 165.76 | 25.61 | 71.68 | 13.43 | 2.29 | 13.48 | 1.01 | 9.11 | 4.53 | 12.25 | 1.08 | 5.01 | 0.00 | 493.3 | 373.3 | 83.9 | 0.22 |
| 6060 | 21.40 | 24.44 | 43.01 | 103.70 | 17.68 | 42.52 | 9.43 | 1.44 | 7.45 | 0.89 | 5.11 | 2.25 | 6.52 | 0.59 | 3.18 | 0.35 | 290.0 | 225.2 | 43.3 | 0.19 |
| 6061 | 39.23 | 64.58 | 151.05 | 252.33 | 32.31 | 98.36 | 17.50 | 2.90 | 16.40 | 0.70 | 11.31 | 5.56 | 14.24 | 1.29 | 5.64 | 0.00 | 713.4 | 570.8 | 103.3 | 0.18 |
| 6062 | 34.23 | 53.47 | 86.03 | 173.65 | 24.24 | 77.54 | 14.24 | 2.28 | 13.78 | 1.16 | 9.29 | 4.84 | 13.32 | 1.07 | 5.32 | 0.00 | 514.5 | 391.8 | 88.5 | 0.23 |
| 6063 | 19.14 | 25.41 | 46.76 | 98.98 | 20.32 | 46.61 | 11.48 | 1.60 | 8.12 | 1.13 | 5.81 | 2.04 | 6.29 | 0.50 | 3.26 | 0.72 | 298.2 | 233.9 | 45.2 | 0.19 |
| 6064 | 49.89 | 93.19 | 83.94 | 174.86 | 46.85 | 82.29 | 20.17 | 4.04 | 22.66 | 2.98 | 16.49 | 4.92 | 13.26 | 2.05 | 8.65 | 1.54 | 627.8 | 434.8 | 143.1 | 0.33 |
| 6065 | 68.57 | 169.22 | 142.38 | 279.09 | 50.81 | 136.61 | 35.02 | 7.22 | 34.44 | 5.16 | 29.94 | 8.27 | 21.34 | 3.74 | 15.16 | 2.42 | 1009.4 | 685.6 | 255.3 | 0.37 |
| 6066 | 33.98 | 51.39 | 91.67 | 172.49 | 28.91 | 75.31 | 15.04 | 2.56 | 14.20 | 1.19 | 9.39 | 4.00 | 10.73 | 1.05 | 5.03 | 0.20 | 517.2 | 400.2 | 83.0 | 0.21 |
| 6067 | 28.42 | 31.91 | 57.15 | 107.83 | 35.02 | 53.69 | 10.13 | 1.32 | 11.05 | 0.94 | 7.31 | 2.72 | 7.26 | 0.65 | 3.23 | 0.27 | 358.9 | 276.2 | 54.3 | 0.20 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6035 | 16.40 | 21.00 | 38.18 | 71.50 | 20.76 | 35.15 | 7.54 | 1.09 | 7.13 | 0.84 | 4.84 | 1.72 | 5.51 | 0.11 | 2.56 | 0.51 | 234.8 | 181.3 | 37.1 | 0.205 |
| 6036 | 3.59 | 4.40 | 6.53 | 12.68 | 3.74 | 6.42 | 1.18 | 0.21 | 1.31 | 0.15 | 0.98 | 0.38 | 1.08 | 0.12 | 0.46 | 0.04 | 43.3 | 32.1 | 7.6 | 0.237 |
| 6037 | 13.93 | 15.09 | 23.97 | 49.50 | 12.55 | 23.26 | 3.68 | 0.67 | 4.57 | 0.36 | 3.32 | 1.52 | 4.17 | 0.35 | 1.60 | 0.00 | 158.5 | 118.2 | 26.4 | 0.223 |
| 6038 | 15.35 | 20.15 | 34.83 | 66.05 | 16.44 | 35.52 | 7.20 | 1.11 | 5.87 | 0.81 | 4.93 | 1.83 | 5.48 | 0.49 | 2.50 | 0.32 | 218.9 | 167.0 | 36.5 | 0.219 |
| 6039 | 4.65 | 5.95 | 9.91 | 17.63 | 5.34 | 8.38 | 1.49 | 0.27 | 1.76 | 0.16 | 1.21 | 0.46 | 1.25 | 0.13 | 0.56 | 0.05 | 59.2 | 44.8 | 9.8 | 0.218 |
| 6040 | 8.72 | 12.69 | 22.07 | 41.23 | 9.05 | 21.87 | 4.25 | 0.64 | 3.53 | 0.44 | 2.91 | 1.13 | 3.34 | 0.21 | 1.48 | 0.13 | 133.7 | 102.6 | 22.3 | 0.218 |
| 6041 | 24.71 | 28.84 | 45.73 | 89.22 | 22.64 | 44.63 | 7.30 | 1.33 | 8.49 | 0.78 | 6.35 | 2.79 | 7.60 | 0.72 | 3.07 | 0.00 | 294.2 | 219.3 | 50.2 | 0.229 |
| 6042 | 10.30 | 10.15 | 11.93 | 29.32 | 11.45 | 12.23 | 2.79 | 0.53 | 3.80 | 0.41 | 2.03 | 0.73 | 2.10 | 0.24 | 1.12 | 0.24 | 99.4 | 72.0 | 17.0 | 0.236 |
| 6043 | 6.76 | 7.65 | 9.15 | 20.91 | 5.74 | 10.87 | 2.56 | 0.48 | 2.49 | 0.41 | 1.71 | 0.66 | 1.92 | 0.23 | 0.99 | 0.12 | 72.7 | 52.2 | 13.7 | 0.262 |
| 6044 | 8.54 | 9.14 | 12.52 | 29.08 | 6.46 | 15.04 | 3.55 | 0.61 | 3.03 | 0.46 | 2.19 | 0.85 | 2.47 | 0.28 | 1.26 | 0.12 | 95.6 | 70.3 | 16.8 | 0.238 |
| 6045 | 10.33 | 10.27 | 16.13 | 37.44 | 8.10 | 18.77 | 4.31 | 0.70 | 3.53 | 0.54 | 2.43 | 1.02 | 3.14 | 0.30 | 1.45 | 0.14 | 118.6 | 89.0 | 19.3 | 0.217 |
| 6046 | 12.67 | 10.36 | 14.23 | 44.68 | 10.05 | 19.57 | 5.02 | 0.75 | 4.03 | 0.72 | 2.75 | 1.26 | 4.18 | 0.35 | 1.75 | 0.22 | 132.6 | 98.3 | 21.6 | 0.22 |
| 6047 | 16.92 | 16.54 | 23.80 | 54.47 | 20.64 | 25.51 | 6.16 | 0.98 | 6.65 | 0.83 | 3.76 | 1.28 | 4.04 | 0.36 | 2.05 | 0.53 | 184.5 | 138.2 | 29.4 | 0.213 |
| 6048 | 3.67 | 5.51 | 4.53 | 10.41 | 2.16 | 5.74 | 1.39 | 0.31 | 1.37 | 0.26 | 1.13 | 0.39 | 1.14 | 0.19 | 0.65 | 0.06 | 38.9 | 25.9 | 9.3 | 0.36 |
| 6049 | 10.28 | 9.13 | 13.58 | 33.80 | 5.78 | 17.52 | 3.38 | 0.59 | 3.22 | 0.40 | 1.92 | 1.15 | 3.56 | 0.29 | 1.27 | 0.00 | 105.9 | 77.9 | 17.7 | 0.227 |
| 6050 | 23.09 | 22.69 | 37.75 | 78.23 | 24.16 | 37.22 | 8.35 | 1.36 | 8.35 | 0.93 | 4.75 | 1.78 | 5.09 | 0.50 | 2.73 | 0.46 | 257.4 | 195.4 | 38.9 | 0.199 |
| 6051 | 19.04 | 16.42 | 24.62 | 56.93 | 21.40 | 26.46 | 6.01 | 1.00 | 6.84 | 0.84 | 3.70 | 1.47 | 4.36 | 0.41 | 2.14 | 0.42 | 192.0 | 143.3 | 29.7 | 0.208 |
| 6052 | 6.13 | 5.88 | 6.70 | 16.42 | 3.04 | 8.34 | 1.72 | 0.40 | 1.81 | 0.36 | 1.32 | 0.63 | 1.92 | 0.21 | 0.84 | 0.00 | 55.7 | 38.4 | 11.2 | 0.29 |
| 6053 | 7.92 | 3.99 | 5.36 | 19.41 | 3.31 | 10.68 | 1.57 | 0.30 | 2.10 | 0.36 | 0.96 | 1.03 | 3.52 | 0.21 | 0.71 | 0.00 | 61.4 | 42.7 | 10.8 | 0.252 |
| 6054 | 15.72 | 9.87 | 16.78 | 45.07 | 13.65 | 22.50 | 5.20 | 0.82 | 4.73 | 0.80 | 2.83 | 1.29 | 4.22 | 0.35 | 1.73 | 0.20 | 145.8 | 108.7 | 21.3 | 0.196 |
| 6055 | 8.83 | 11.59 | 15.37 | 30.94 | 5.10 | 14.20 | 3.05 | 0.61 | 2.96 | 0.42 | 2.30 | 0.89 | 2.54 | 0.30 | 1.31 | 0.05 | 100.5 | 72.2 | 19.4 | 0.269 |
| 6056 | 11.39 | 10.45 | 15.80 | 38.52 | 6.27 | 19.43 | 3.56 | 0.62 | 3.64 | 0.42 | 2.23 | 1.37 | 4.17 | 0.31 | 1.38 | 0.00 | 119.6 | 87.8 | 20.3 | 0.231 |
| 6057 | 13.83 | 7.40 | 14.53 | 44.95 | 10.70 | 20.26 | 4.85 | 0.71 | 3.80 | 0.72 | 2.31 | 1.19 | 4.15 | 0.29 | 1.58 | 0.16 | 131.4 | 99.8 | 17.8 | 0.178 |
| 6058 | 9.45 | 10.90 | 19.28 | 35.47 | 6.61 | 18.23 | 3.61 | 0.64 | 3.47 | 0.40 | 2.38 | 1.06 | 3.01 | 0.29 | 1.30 | 0.00 | 116.1 | 87.3 | 19.4 | 0.222 |
| 6059 | 14.85 | 21.01 | 33.45 | 68.36 | 10.56 | 29.56 | 5.54 | 0.94 | 5.56 | 0.42 | 3.76 | 1.87 | 5.05 | 0.44 | 2.07 | 0.00 | 203.4 | 154.0 | 34.6 | 0.225 |
| 6060 | 16.58 | 18.93 | 33.32 | 80.34 | 13.70 | 32.94 | 7.30 | 1.11 | 5.77 | 0.69 | 3.96 | 1.74 | 5.05 | 0.46 | 2.46 | 0.27 | 224.6 | 174.5 | 33.6 | 0.192 |
| 6061 | 11.09 | 18.25 | 42.69 | 71.31 | 9.13 | 27.80 | 4.95 | 0.82 | 4.63 | 0.20 | 3.20 | 1.57 | 4.02 | 0.36 | 1.60 | 0.00 | 201.6 | 161.3 | 29.2 | 0.181 |
| 6062 | 13.64 | 21.30 | 34.27 | 69.17 | 9.65 | 30.88 | 5.67 | 0.91 | 5.49 | 0.46 | 3.70 | 1.93 | 5.30 | 0.43 | 2.12 | 0.00 | 204.9 | 156.0 | 35.2 | 0.226 |
| 6063 | 16.97 | 22.53 | 41.45 | 87.75 | 18.02 | 41.32 | 10.18 | 1.41 | 7.20 | 1.00 | 5.15 | 1.81 | 5.58 | 0.45 | 2.89 | 0.64 | 264.3 | 207.3 | 40.0 | 0.193 |
| 6064 | 5.19 | 9.69 | 8.73 | 18.19 | 4.87 | 8.56 | 2.10 | 0.42 | 2.36 | 0.31 | 1.71 | 0.51 | 1.38 | 0.21 | 0.90 | 0.16 | 65.3 | 45.2 | 14.9 | 0.329 |
| 6065 | 4.05 | 10.00 | 8.41 | 16.49 | 3.00 | 8.07 | 2.07 | 0.43 | 2.04 | 0.30 | 1.77 | 0.49 | 1.26 | 0.22 | 0.90 | 0.14 | 59.7 | 40.5 | 15.1 | 0.372 |
| 6066 | 11.71 | 17.71 | 31.59 | 59.44 | 9.96 | 25.95 | 5.18 | 0.88 | 4.89 | 0.41 | 3.24 | 1.38 | 3.70 | 0.36 | 1.73 | 0.07 | 178.2 | 137.9 | 28.6 | 0.207 |
| 6067 | 17.12 | 19.23 | 34.43 | 64.97 | 21.10 | 32.35 | 6.10 | 0.79 | 6.66 | 0.56 | 4.41 | 1.64 | 4.38 | 0.39 | 1.94 | 0.16 | 216.2 | 166.4 | 32.7 | 0.197 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6035 | 1.02 | 0.88 | 1.27 | 1.19 | 3.10 | 1.30 | 1.42 | 0.83 | 1.78 | 1.29 | 1.27 | 2.15 | 2.63 | 0.33 | 1.28 | 1.46 | 1.27 | 1.35 | 1.09 | 1.24 |
| 6036 | 0.22 | 0.18 | 0.22 | 0.21 | 0.56 | 0.24 | 0.22 | 0.16 | 0.33 | 0.23 | 0.26 | 0.47 | 0.51 | 0.35 | 0.23 | 0.11 | 0.23 | 0.24 | 0.22 | 1.07 |
| 6037 | 0.87 | 0.63 | 0.80 | 0.83 | 1.87 | 0.86 | 0.69 | 0.51 | 1.14 | 0.56 | 0.87 | 1.90 | 1.98 | 1.07 | 0.80 | 0.00 | 0.86 | 0.88 | 0.78 | 1.13 |
| 6038 | 0.96 | 0.84 | 1.16 | 1.10 | 2.45 | 1.32 | 1.36 | 0.85 | 1.47 | 1.25 | 1.30 | 2.29 | 2.61 | 1.48 | 1.25 | 0.91 | 1.19 | 1.24 | 1.07 | 1.16 |
| 6039 | 0.29 | 0.25 | 0.33 | 0.29 | 0.80 | 0.31 | 0.28 | 0.21 | 0.44 | 0.24 | 0.32 | 0.58 | 0.59 | 0.40 | 0.28 | 0.16 | 0.32 | 0.33 | 0.29 | 1.16 |
| 6040 | 0.55 | 0.53 | 0.74 | 0.69 | 1.35 | 0.81 | 0.80 | 0.50 | 0.88 | 0.68 | 0.77 | 1.41 | 1.59 | 0.65 | 0.74 | 0.38 | 0.73 | 0.76 | 0.66 | 1.16 |
| 6041 | 1.54 | 1.20 | 1.52 | 1.49 | 3.38 | 1.65 | 1.38 | 1.03 | 2.12 | 1.20 | 1.67 | 3.49 | 3.62 | 2.18 | 1.54 | 0.00 | 1.60 | 1.63 | 1.47 | 1.11 |
| 6042 | 0.64 | 0.42 | 0.40 | 0.49 | 1.71 | 0.45 | 0.53 | 0.41 | 0.95 | 0.64 | 0.53 | 0.92 | 1.00 | 0.71 | 0.56 | 0.67 | 0.54 | 0.54 | 0.50 | 1.07 |
| 6043 | 0.42 | 0.32 | 0.31 | 0.35 | 0.86 | 0.40 | 0.48 | 0.37 | 0.62 | 0.64 | 0.45 | 0.82 | 0.91 | 0.69 | 0.49 | 0.34 | 0.39 | 0.39 | 0.40 | 0.97 |
| 6044 | 0.53 | 0.38 | 0.42 | 0.48 | 0.96 | 0.56 | 0.67 | 0.47 | 0.76 | 0.71 | 0.58 | 1.06 | 1.18 | 0.84 | 0.63 | 0.34 | 0.52 | 0.52 | 0.49 | 1.06 |
| 6045 | 0.65 | 0.43 | 0.54 | 0.62 | 1.21 | 0.70 | 0.81 | 0.53 | 0.88 | 0.83 | 0.64 | 1.27 | 1.50 | 0.92 | 0.72 | 0.40 | 0.64 | 0.66 | 0.57 | 1.17 |
| 6046 | 0.79 | 0.43 | 0.47 | 0.74 | 1.50 | 0.72 | 0.95 | 0.58 | 1.01 | 1.11 | 0.72 | 1.58 | 1.99 | 1.07 | 0.88 | 0.64 | 0.72 | 0.73 | 0.63 | 1.15 |
| 6047 | 1.06 | 0.69 | 0.79 | 0.91 | 3.08 | 0.94 | 1.16 | 0.75 | 1.66 | 1.28 | 0.99 | 1.60 | 1.92 | 1.10 | 1.03 | 1.51 | 1.00 | 1.03 | 0.86 | 1.19 |
| 6048 | 0.23 | 0.23 | 0.15 | 0.17 | 0.32 | 0.21 | 0.26 | 0.24 | 0.34 | 0.40 | 0.30 | 0.49 | 0.54 | 0.56 | 0.32 | 0.17 | 0.21 | 0.19 | 0.27 | 0.70 |
| 6049 | 0.64 | 0.38 | 0.45 | 0.56 | 0.86 | 0.65 | 0.64 | 0.45 | 0.80 | 0.61 | 0.50 | 1.44 | 1.69 | 0.87 | 0.63 | 0.00 | 0.57 | 0.58 | 0.52 | 1.11 |
| 6050 | 1.44 | 0.95 | 1.26 | 1.30 | 3.61 | 1.38 | 1.57 | 1.05 | 2.09 | 1.43 | 1.25 | 2.23 | 2.42 | 1.52 | 1.37 | 1.32 | 1.40 | 1.46 | 1.14 | 1.27 |
| 6051 | 1.19 | 0.68 | 0.82 | 0.95 | 3.19 | 0.98 | 1.13 | 0.77 | 1.71 | 1.29 | 0.97 | 1.84 | 2.07 | 1.23 | 1.07 | 1.20 | 1.04 | 1.07 | 0.87 | 1.22 |
| 6052 | 0.38 | 0.25 | 0.22 | 0.27 | 0.45 | 0.31 | 0.32 | 0.31 | 0.45 | 0.56 | 0.35 | 0.78 | 0.92 | 0.65 | 0.42 | 0.00 | 0.30 | 0.29 | 0.33 | 0.87 |
| 6053 | 0.49 | 0.17 | 0.18 | 0.32 | 0.49 | 0.40 | 0.30 | 0.23 | 0.52 | 0.56 | 0.25 | 1.29 | 1.67 | 0.64 | 0.35 | 0.00 | 0.33 | 0.32 | 0.32 | 1.00 |
| 6054 | 0.98 | 0.41 | 0.56 | 0.75 | 2.04 | 0.83 | 0.98 | 0.63 | 1.18 | 1.23 | 0.74 | 1.61 | 2.01 | 1.07 | 0.87 | 0.56 | 0.79 | 0.81 | 0.63 | 1.29 |
| 6055 | 0.55 | 0.48 | 0.51 | 0.52 | 0.76 | 0.53 | 0.57 | 0.47 | 0.74 | 0.65 | 0.60 | 1.11 | 1.21 | 0.90 | 0.66 | 0.15 | 0.55 | 0.54 | 0.57 | 0.94 |
| 6056 | 0.71 | 0.44 | 0.53 | 0.64 | 0.94 | 0.72 | 0.67 | 0.48 | 0.91 | 0.64 | 0.59 | 1.71 | 1.99 | 0.93 | 0.69 | 0.00 | 0.65 | 0.65 | 0.60 | 1.10 |
| 6057 | 0.86 | 0.31 | 0.48 | 0.75 | 1.60 | 0.75 | 0.91 | 0.54 | 0.95 | 1.11 | 0.61 | 1.49 | 1.98 | 0.89 | 0.79 | 0.47 | 0.71 | 0.74 | 0.52 | 1.42 |
| 6058 | 0.59 | 0.45 | 0.64 | 0.59 | 0.99 | 0.68 | 0.68 | 0.49 | 0.87 | 0.62 | 0.63 | 1.33 | 1.44 | 0.89 | 0.65 | 0.00 | 0.63 | 0.65 | 0.57 | 1.14 |
| 6059 | 0.93 | 0.88 | 1.11 | 1.14 | 1.58 | 1.09 | 1.04 | 0.73 | 1.39 | 0.64 | 0.99 | 2.34 | 2.41 | 1.35 | 1.03 | 0.00 | 1.10 | 1.15 | 1.02 | 1.13 |
| 6060 | 1.04 | 0.79 | 1.11 | 1.34 | 2.04 | 1.22 | 1.38 | 0.86 | 1.44 | 1.06 | 1.04 | 2.17 | 2.41 | 1.38 | 1.23 | 0.77 | 1.22 | 1.30 | 0.99 | 1.32 |
| 6061 | 0.69 | 0.76 | 1.42 | 1.19 | 1.36 | 1.03 | 0.93 | 0.63 | 1.16 | 0.30 | 0.84 | 1.96 | 1.92 | 1.10 | 0.80 | 0.00 | 1.09 | 1.20 | 0.86 | 1.40 |
| 6062 | 0.85 | 0.89 | 1.14 | 1.15 | 1.44 | 1.14 | 1.07 | 0.70 | 1.37 | 0.71 | 0.97 | 2.41 | 2.53 | 1.30 | 1.06 | 0.00 | 1.11 | 1.16 | 1.04 | 1.12 |
| 6063 | 1.06 | 0.94 | 1.38 | 1.46 | 2.69 | 1.53 | 1.92 | 1.09 | 1.80 | 1.54 | 1.35 | 2.26 | 2.66 | 1.36 | 1.45 | 1.82 | 1.43 | 1.54 | 1.18 | 1.31 |
| 6064 | 0.32 | 0.40 | 0.29 | 0.30 | 0.73 | 0.32 | 0.40 | 0.32 | 0.59 | 0.48 | 0.45 | 0.64 | 0.66 | 0.65 | 0.45 | 0.46 | 0.35 | 0.34 | 0.44 | 0.77 |
| 6065 | 0.25 | 0.42 | 0.28 | 0.27 | 0.45 | 0.30 | 0.39 | 0.33 | 0.51 | 0.47 | 0.47 | 0.61 | 0.60 | 0.67 | 0.45 | 0.41 | 0.32 | 0.30 | 0.44 | 0.68 |
| 6066 | 0.73 | 0.74 | 1.05 | 0.99 | 1.49 | 0.96 | 0.98 | 0.68 | 1.22 | 0.63 | 0.85 | 1.73 | 1.76 | 1.09 | 0.87 | 0.20 | 0.97 | 1.03 | 0.84 | 1.22 |
| 6067 | 1.07 | 0.80 | 1.15 | 1.08 | 3.15 | 1.20 | 1.15 | 0.61 | 1.66 | 0.87 | 1.16 | 2.05 | 2.08 | 1.19 | 0.97 | 0.47 | 1.17 | 1.24 | 0.96 | 1.29 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6035 | 1.48 | 1.26 | 1.83 | 1.72 | 4.46 | 1.88 | 2.05 | 1.20 | 2.57 | 1.86 | 1.83 | 3.10 | 3.78 | 0.47 | 1.84 | 2.11 | 1.84 | 1.95 | 1.57 | 1.24 |
| 6036 | 2.17 | 1.77 | 2.11 | 2.05 | 5.40 | 2.30 | 2.16 | 1.59 | 3.17 | 2.27 | 2.50 | 4.58 | 4.97 | 3.43 | 2.21 | 1.05 | 2.27 | 2.31 | 2.16 | 1.07 |
| 6037 | 2.11 | 1.52 | 1.94 | 2.00 | 4.54 | 2.09 | 1.68 | 1.25 | 2.77 | 1.36 | 2.12 | 4.60 | 4.81 | 2.60 | 1.94 | 0.00 | 2.08 | 2.13 | 1.88 | 1.13 |
| 6038 | 1.21 | 1.06 | 1.47 | 1.39 | 3.10 | 1.66 | 1.72 | 1.08 | 1.86 | 1.58 | 1.64 | 2.89 | 3.30 | 1.87 | 1.58 | 1.15 | 1.50 | 1.57 | 1.36 | 1.16 |
| 6039 | 2.66 | 2.26 | 3.02 | 2.68 | 7.28 | 2.83 | 2.57 | 1.88 | 4.01 | 2.19 | 2.90 | 5.25 | 5.43 | 3.65 | 2.56 | 1.42 | 2.93 | 3.04 | 2.62 | 1.16 |
| 6040 | 1.30 | 1.26 | 1.76 | 1.64 | 3.23 | 1.94 | 1.92 | 1.18 | 2.11 | 1.64 | 1.83 | 3.38 | 3.80 | 1.55 | 1.77 | 0.90 | 1.73 | 1.83 | 1.57 | 1.16 |
| 6041 | 2.04 | 1.59 | 2.01 | 1.96 | 4.46 | 2.18 | 1.82 | 1.35 | 2.80 | 1.59 | 2.21 | 4.60 | 4.78 | 2.87 | 2.03 | 0.00 | 2.11 | 2.16 | 1.95 | 1.11 |
| 6042 | 2.02 | 1.33 | 1.25 | 1.54 | 5.37 | 1.42 | 1.65 | 1.27 | 2.99 | 2.00 | 1.68 | 2.88 | 3.15 | 2.24 | 1.77 | 2.11 | 1.69 | 1.69 | 1.57 | 1.07 |
| 6043 | 1.66 | 1.25 | 1.20 | 1.37 | 3.36 | 1.58 | 1.90 | 1.45 | 2.45 | 2.49 | 1.76 | 3.23 | 3.58 | 2.69 | 1.94 | 1.33 | 1.55 | 1.53 | 1.58 | 0.97 |
| 6044 | 1.62 | 1.15 | 1.26 | 1.47 | 2.92 | 1.69 | 2.03 | 1.42 | 2.29 | 2.15 | 1.74 | 3.22 | 3.56 | 2.53 | 1.90 | 1.03 | 1.57 | 1.58 | 1.49 | 1.06 |
| 6045 | 1.41 | 0.93 | 1.17 | 1.36 | 2.63 | 1.51 | 1.77 | 1.16 | 1.92 | 1.80 | 1.39 | 2.77 | 3.26 | 2.00 | 1.57 | 0.87 | 1.40 | 1.44 | 1.23 | 1.17 |
| 6046 | 1.02 | 0.56 | 0.61 | 0.96 | 1.94 | 0.94 | 1.23 | 0.75 | 1.30 | 1.43 | 0.93 | 2.04 | 2.57 | 1.38 | 1.13 | 0.83 | 0.93 | 0.95 | 0.82 | 1.15 |
| 6047 | 1.60 | 1.05 | 1.20 | 1.38 | 4.67 | 1.43 | 1.76 | 1.15 | 2.52 | 1.95 | 1.50 | 2.43 | 2.92 | 1.66 | 1.56 | 2.29 | 1.52 | 1.56 | 1.31 | 1.19 |
| 6048 | 2.73 | 2.73 | 1.80 | 2.06 | 3.83 | 2.53 | 3.12 | 2.83 | 4.09 | 4.75 | 3.53 | 5.84 | 6.45 | 6.72 | 3.86 | 2.04 | 2.51 | 2.30 | 3.26 | 0.70 |
| 6049 | 1.67 | 0.99 | 1.18 | 1.46 | 2.24 | 1.68 | 1.65 | 1.18 | 2.09 | 1.58 | 1.31 | 3.73 | 4.40 | 2.27 | 1.65 | 0.00 | 1.49 | 1.51 | 1.35 | 1.11 |
| 6050 | 1.78 | 1.17 | 1.55 | 1.61 | 4.45 | 1.70 | 1.94 | 1.29 | 2.57 | 1.77 | 1.54 | 2.75 | 2.99 | 1.88 | 1.68 | 1.63 | 1.72 | 1.79 | 1.41 | 1.27 |
| 6051 | 1.69 | 0.97 | 1.17 | 1.35 | 4.55 | 1.39 | 1.61 | 1.10 | 2.43 | 1.84 | 1.38 | 2.62 | 2.95 | 1.75 | 1.52 | 1.71 | 1.48 | 1.52 | 1.24 | 1.22 |
| 6052 | 2.55 | 1.63 | 1.49 | 1.82 | 3.02 | 2.06 | 2.16 | 2.06 | 3.01 | 3.72 | 2.31 | 5.21 | 6.10 | 4.32 | 2.79 | 0.00 | 2.01 | 1.91 | 2.19 | 0.87 |
| 6053 | 1.24 | 0.42 | 0.45 | 0.81 | 1.23 | 0.99 | 0.74 | 0.58 | 1.31 | 1.39 | 0.63 | 3.22 | 4.18 | 1.61 | 0.88 | 0.00 | 0.83 | 0.79 | 0.79 | 1.00 |
| 6054 | 1.17 | 0.49 | 0.66 | 0.89 | 2.42 | 0.99 | 1.16 | 0.75 | 1.41 | 1.46 | 0.88 | 1.91 | 2.39 | 1.27 | 1.03 | 0.67 | 0.94 | 0.96 | 0.74 | 1.29 |
| 6055 | 3.02 | 2.64 | 2.80 | 2.82 | 4.16 | 2.87 | 3.14 | 2.58 | 4.04 | 3.56 | 3.30 | 6.06 | 6.61 | 4.93 | 3.58 | 0.84 | 2.98 | 2.94 | 3.11 | 0.94 |
| 6056 | 1.78 | 1.09 | 1.32 | 1.61 | 2.35 | 1.80 | 1.68 | 1.20 | 2.28 | 1.62 | 1.47 | 4.30 | 4.98 | 2.34 | 1.72 | 0.00 | 1.63 | 1.64 | 1.50 | 1.10 |
| 6057 | 1.04 | 0.37 | 0.58 | 0.90 | 1.92 | 0.90 | 1.10 | 0.66 | 1.15 | 1.34 | 0.73 | 1.79 | 2.38 | 1.07 | 0.95 | 0.56 | 0.86 | 0.89 | 0.63 | 1.42 |
| 6058 | 2.23 | 1.72 | 2.43 | 2.23 | 3.73 | 2.55 | 2.57 | 1.86 | 3.27 | 2.33 | 2.37 | 5.03 | 5.42 | 3.37 | 2.45 | 0.00 | 2.38 | 2.46 | 2.15 | 1.14 |
| 6059 | 2.25 | 2.12 | 2.70 | 2.76 | 3.82 | 2.65 | 2.53 | 1.76 | 3.37 | 1.55 | 2.40 | 5.67 | 5.83 | 3.27 | 2.50 | 0.00 | 2.68 | 2.78 | 2.47 | 1.13 |
| 6060 | 1.34 | 1.02 | 1.43 | 1.73 | 2.64 | 1.57 | 1.78 | 1.10 | 1.86 | 1.36 | 1.34 | 2.81 | 3.11 | 1.78 | 1.59 | 0.99 | 1.57 | 1.68 | 1.27 | 1.32 |
| 6061 | 2.45 | 2.69 | 5.03 | 4.21 | 4.82 | 3.64 | 3.30 | 2.23 | 4.10 | 1.08 | 2.98 | 6.95 | 6.78 | 3.90 | 2.82 | 0.00 | 3.87 | 4.25 | 3.04 | 1.40 |
| 6062 | 2.14 | 2.23 | 2.87 | 2.89 | 3.62 | 2.87 | 2.69 | 1.75 | 3.44 | 1.78 | 2.44 | 6.05 | 6.34 | 3.25 | 2.66 | 0.00 | 2.79 | 2.92 | 2.60 | 1.12 |
| 6063 | 1.20 | 1.06 | 1.56 | 1.65 | 3.03 | 1.73 | 2.17 | 1.23 | 2.03 | 1.74 | 1.53 | 2.55 | 3.00 | 1.53 | 1.63 | 2.05 | 1.62 | 1.74 | 1.33 | 1.31 |
| 6064 | 3.12 | 3.88 | 2.80 | 2.91 | 6.99 | 3.05 | 3.80 | 3.10 | 5.66 | 4.59 | 4.34 | 6.15 | 6.32 | 6.22 | 4.33 | 4.41 | 3.41 | 3.24 | 4.20 | 0.77 |
| 6065 | 4.29 | 7.05 | 4.75 | 4.65 | 7.58 | 5.06 | 6.61 | 5.56 | 8.61 | 7.94 | 7.88 | 10.34 | 10.16 | 11.34 | 7.58 | 6.92 | 5.48 | 5.10 | 7.50 | 0.68 |
| 6066 | 2.12 | 2.14 | 3.06 | 2.87 | 4.31 | 2.79 | 2.84 | 1.97 | 3.55 | 1.83 | 2.47 | 5.01 | 5.11 | 3.17 | 2.52 | 0.58 | 2.81 | 2.98 | 2.44 | 1.22 |
| 6067 | 1.78 | 1.33 | 1.91 | 1.80 | 5.23 | 1.99 | 1.91 | 1.01 | 2.76 | 1.44 | 1.92 | 3.40 | 3.46 | 1.98 | 1.61 | 0.78 | 1.95 | 2.06 | 1.60 | 1.29 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6068 | 386 | Plant 17 | Clean Coal (1/8" x 1mm / Flt x 1.6 SG) | 7.24 |
| 6069 | 20 | Plant 17 | Clean Coal (1/8" x 1mm / 1.6 x 1.8 SG) | 39.21 |
| 6070 | 22.7 | Plant 17 | Clean Coal (1/8" x 1mm / 1.8 x Snk SG) | 62.94 |
| 6071 | 398.1 | Plant 17 | Clean Coal (7/8" x 1/8" / Flt x 1.6 SG) | 9.95 |
| 6072 | 151.1 | Plant 17 | Clean Coal (7/8" x 1/8" / 1.6 x 1.8 SG) | 36.89 |
| 6073 | 126 | Plant 17 | Clean Coal (7/8" x 1/8" / 1.8 x Snk SG) | 56.45 |
| 6074 | 385.4 | Plant 17 | Clean Coal (+ x 7/8" / Flt x 1.6 SG) | 15.34 |
| 6075 | 65.5 | Plant 17 | Clean Coal (+ x 7/8" / 1.6 x 1.8 SG) | 33.2 |
| 6076 | 9 | Plant 17 | Clean Coal (+ x 7/8" / 1.8 x Snk SG) | 56.34 |
| 6077 | 37 | Plant 17 | Middlings (100M x 0) | 22.61 |
| 6078 | 135 | Plant 17 | Middlings (1mm x 100M / Flt x 1.6 SG) | 14.59 |
| 6079 | 102.1 | Plant 17 | Middlings (1mm x 100M / 1.6 x 1.8 SG) | 38.48 |
| 6080 | 62.4 | Plant 17 | Middlings (1mm x 100M / 1.8 x Snk SG) | 54.97 |
| 6081 | 132 | Plant 17 | Middlings (1/8" x 1mm / Flt x 1.6 SG) | 22.04 |
| 6082 | 148.6 | Plant 17 | Middlings (1/8" x 1mm / 1.6 x 1.8 SG) | 37.6 |
| 6083 | 70.6 | Plant 17 | Middlings (1/8" x 1mm / 1.8 x Snk SG) | 60.61 |
| 6084 | 136 | Plant 17 | Middlings (7/8" x 1/8" / Flt x 1.6 SG) | 28 |
| 6085 | 115 | Plant 17 | Middlings (7/8" x 1/8" / 1.6 x 1.8 SG) | 38.95 |
| 6086 | 122 | Plant 17 | Middlings (7/8" x 1/8" / 1.8 x Snk SG) | 61.74 |
| 6087 | 78.3 | Plant 17 | Middlings (+ x 7/8" / Flt x 1.6 SG) | 31.91 |
| 6088 | 21 | Plant 17 | Middlings (+ x 7/8" / 1.6 x 1.8 SG) | 68.06 |
| 6089 | 84 | Plant 17 | Middlings (+ x 7/8" / 1.8 x Snk SG) | 55.62 |
| 6090 | 58 | Plant 18 | Raw Coal (100M x 0) | 43.03 |
| 6091 | 144 | Plant 18 | Raw Coal (1mm x 100M) | 31.44 |
| 6092 | 97 | Plant 18 | Raw Coal (1/8" x 1mm) | 30.77 |
| 6093 | 106 | Plant 18 | Raw Coal (3/4" x 1/8") | 30.29 |
| 6094 | 121 | Plant 18 | Raw Coal (+ x 3/4) | 53.92 |
| 6095 | 66.3 | Plant 18 | Fine Reject (100M x 0) | 64.24 |
| 6096 | 51 | Plant 18 | Fine Reject (+ x 100M / Flt x 1.6 SG) | 7.28 |
| 6097 | 12 | Plant 18 | Fine Reject (+ x 100M / 1.6 x 1.9 SG) | 33.51 |
| 6098 | 126 | Plant 18 | Fine Reject (+ x 100M / 1.9 x Snk SG) | 84.73 |
| 6099 | 103 | Plant 18 | Coarse Reject (100M x 0) | 79.74 |
| 6100 | 38 | Plant 18 | Coarse Reject (1mm x 100M / Flt x 1.6 SG) | 10.62 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6068 | 45.37 | 126.97 | 125.19 | 224.68 | 46.05 | 115.15 | 27.96 | 4.58 | 25.64 | 3.72 | 23.30 | 6.17 | 15.43 | 2.78 | 10.20 | 1.84 | 805.0 | 569.2 | 190.4 | 0.33 |
| 6069 | 30.81 | 45.73 | 72.46 | 143.31 | 22.18 | 69.84 | 12.51 | 1.68 | 11.91 | 1.06 | 10.25 | 4.35 | 11.13 | 0.99 | 4.37 | 0.00 | 442.6 | 333.9 | 77.9 | 0.23 |
| 6070 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6071 | 39.95 | 98.51 | 107.73 | 194.65 | 46.35 | 99.15 | 22.64 | 3.47 | 21.56 | 2.73 | 18.13 | 5.14 | 12.97 | 2.15 | 7.86 | 1.41 | 684.4 | 495.5 | 148.9 | 0.30 |
| 6072 | 34.79 | 42.77 | 66.74 | 124.48 | 32.12 | 66.71 | 11.00 | 1.48 | 12.79 | 1.14 | 9.65 | 4.18 | 10.95 | 0.96 | 4.19 | 0.00 | 423.9 | 315.3 | 73.8 | 0.23 |
| 6073 | 23.80 | 25.08 | 39.85 | 96.19 | 26.21 | 50.52 | 6.85 | 0.85 | 8.91 | 0.55 | 5.33 | 2.88 | 7.66 | 0.59 | 2.76 | 0.00 | 298.0 | 229.4 | 44.8 | 0.20 |
| 6074 | 23.60 | 38.48 | 43.34 | 63.74 | 23.24 | 57.09 | 9.64 | 1.31 | 10.52 | 1.55 | 8.75 | 3.47 | 10.14 | 1.12 | 4.16 | 0.00 | 300.2 | 208.9 | 67.7 | 0.32 |
| 6075 | 78.59 | 7.10 | 11.90 | 21.80 | 139.87 | 12.33 | 0.00 | 0.22 | 24.10 | 1.03 | 2.95 | 0.83 | 1.99 | 0.19 | 0.93 | 0.91 | 304.7 | 210.2 | 15.9 | 0.08 |
| 6076 | 17.75 | 36.56 | 60.77 | 124.07 | 17.94 | 77.47 | 12.09 | 1.38 | 9.93 | 0.85 | 7.00 | 3.52 | 9.12 | 0.65 | 4.06 | 0.04 | 383.2 | 303.6 | 61.8 | 0.20 |
| 6077 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6078 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6079 | 31.82 | 47.43 | 89.64 | 168.04 | 22.72 | 78.66 | 13.64 | 1.79 | 12.26 | 1.04 | 10.70 | 4.66 | 11.89 | 1.05 | 4.57 | 0.00 | 499.9 | 386.8 | 81.3 | 0.21 |
| 6080 | 28.97 | 29.03 | 53.15 | 105.00 | 34.45 | 51.02 | 9.50 | 1.29 | 10.80 | 0.88 | 7.05 | 2.68 | 6.87 | 0.68 | 2.90 | 0.12 | 344.4 | 265.2 | 50.2 | 0.19 |
| 6081 | 40.10 | 68.14 | 107.49 | 189.46 | 29.51 | 89.26 | 17.62 | 2.61 | 15.75 | 1.83 | 14.16 | 5.08 | 12.62 | 1.44 | 6.17 | 0.27 | 601.5 | 451.7 | 109.7 | 0.24 |
| 6082 | 32.55 | 47.26 | 86.62 | 164.69 | 22.35 | 76.97 | 13.51 | 1.79 | 12.23 | 1.05 | 10.90 | 4.77 | 11.91 | 1.05 | 4.58 | 0.00 | 492.2 | 378.2 | 81.5 | 0.22 |
| 6083 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6084 | 37.59 | 55.93 | 88.30 | 157.90 | 30.44 | 80.38 | 15.01 | 2.20 | 14.59 | 1.71 | 12.43 | 4.70 | 11.94 | 1.24 | 5.34 | 0.03 | 519.7 | 388.8 | 93.3 | 0.24 |
| 6085 | 31.84 | 45.13 | 75.48 | 144.43 | 23.47 | 72.17 | 12.08 | 1.60 | 11.96 | 1.07 | 10.36 | 4.52 | 11.69 | 0.99 | 4.39 | 0.00 | 451.2 | 341.2 | 78.2 | 0.23 |
| 6086 | 27.22 | 34.95 | 62.17 | 118.03 | 26.03 | 59.92 | 10.83 | 1.41 | 10.25 | 1.06 | 8.13 | 3.21 | 8.52 | 0.78 | 3.63 | 0.03 | 376.2 | 288.6 | 60.3 | 0.21 |
| 6087 | 26.54 | 49.09 | 84.85 | 168.39 | 19.66 | 82.07 | 13.45 | 1.61 | 12.35 | 0.94 | 11.10 | 5.22 | 13.47 | 1.07 | 4.55 | 0.00 | 494.3 | 382.4 | 85.4 | 0.22 |
| 6088 | 28.08 | 44.99 | 80.55 | 160.40 | 21.56 | 77.92 | 13.55 | 1.63 | 11.62 | 1.06 | 10.35 | 4.47 | 11.90 | 1.02 | 4.38 | 0.00 | 473.5 | 367.2 | 78.2 | 0.21 |
| 6089 | 26.39 | 47.45 | 81.42 | 163.72 | 19.36 | 80.10 | 13.18 | 1.58 | 12.06 | 0.89 | 11.03 | 5.11 | 13.06 | 1.06 | 4.42 | 0.00 | 480.8 | 371.4 | 83.0 | 0.22 |
| 6090 | 23.88 | 25.65 | 41.26 | 81.65 | 29.37 | 42.30 | 9.81 | 1.51 | 8.61 | 1.28 | 6.56 | 1.96 | 5.96 | 0.62 | 3.28 | 0.78 | 284.5 | 214.5 | 46.1 | 0.21 |
| 6091 | 23.29 | 32.62 | 51.53 | 101.62 | 25.12 | 50.52 | 12.33 | 1.91 | 8.78 | 1.53 | 7.71 | 2.31 | 6.70 | 0.85 | 4.01 | 0.94 | 331.8 | 251.8 | 56.7 | 0.23 |
| 6092 | 20.51 | 21.00 | 32.28 | 75.10 | 20.86 | 38.65 | 9.68 | 1.46 | 6.78 | 1.39 | 6.18 | 1.93 | 5.81 | 0.64 | 3.21 | 0.75 | 246.2 | 184.8 | 40.9 | 0.22 |
| 6093 | 21.70 | 27.47 | 43.51 | 89.97 | 23.82 | 45.43 | 11.40 | 1.67 | 7.93 | 1.47 | 7.18 | 1.96 | 6.24 | 0.74 | 3.62 | 0.94 | 295.1 | 223.7 | 49.6 | 0.22 |
| 6094 | 20.47 | 28.05 | 46.50 | 91.20 | 24.81 | 45.83 | 11.94 | 1.66 | 8.06 | 1.46 | 7.34 | 1.93 | 6.18 | 0.68 | 3.62 | 1.03 | 300.8 | 230.0 | 50.3 | 0.22 |
| 6095 | 22.70 | 25.72 | 46.24 | 87.96 | 26.25 | 45.31 | 10.43 | 1.54 | 8.29 | 1.17 | 6.55 | 2.04 | 5.85 | 0.57 | 3.26 | 0.77 | 294.6 | 226.0 | 45.9 | 0.20 |
| 6096 | 36.49 | 56.19 | 55.01 | 117.18 | 25.08 | 67.00 | 15.00 | 3.24 | 13.72 | 2.90 | 13.32 | 4.42 | 12.58 | 1.93 | 7.09 | 0.59 | 431.7 | 296.2 | 99.0 | 0.33 |
| 6097 | 26.11 | 38.41 | 66.10 | 122.36 | 26.11 | 61.95 | 13.42 | 2.10 | 10.04 | 1.50 | 8.70 | 3.02 | 8.12 | 0.95 | 4.63 | 0.69 | 394.2 | 302.1 | 66.0 | 0.22 |
| 6098 | 19.60 | 22.52 | 44.06 | 91.46 | 24.24 | 42.79 | 10.53 | 1.43 | 7.06 | 1.16 | 6.11 | 1.71 | 5.31 | 0.48 | 3.08 | 0.87 | 282.4 | 221.6 | 41.2 | 0.19 |
| 6099 | 20.48 | 28.09 | 48.60 | 92.08 | 35.84 | 46.02 | 14.07 | 1.80 | 8.42 | 1.95 | 7.79 | 1.46 | 5.77 | 0.44 | 3.97 | 1.92 | 318.7 | 246.8 | 51.4 | 0.21 |
| 6100 | 34.47 | 61.00 | 67.03 | 132.31 | 29.01 | 69.10 | 16.17 | 3.49 | 14.31 | 3.28 | 14.00 | 4.48 | 12.87 | 1.56 | 7.45 | 0.85 | 471.4 | 331.4 | 105.5 | 0.32 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6068 | 3.28 | 9.19 | 9.06 | 16.27 | 3.33 | 8.34 | 2.02 | 0.33 | 1.86 | 0.27 | 1.69 | 0.45 | 1.12 | 0.20 | 0.74 | 0.13 | 58.3 | 41.2 | 13.8 | 0.335 |
| 6069 | 12.08 | 17.93 | 28.41 | 56.19 | 8.70 | 27.38 | 4.90 | 0.66 | 4.67 | 0.42 | 4.02 | 1.70 | 4.36 | 0.39 | 1.71 | 0.00 | 173.5 | 130.9 | 30.5 | 0.233 |
| 6070 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6071 | 3.98 | 9.80 | 10.72 | 19.37 | 4.61 | 9.87 | 2.25 | 0.35 | 2.14 | 0.27 | 1.80 | 0.51 | 1.29 | 0.21 | 0.78 | 0.14 | 68.1 | 49.3 | 14.8 | 0.3 |
| 6072 | 12.83 | 15.78 | 24.62 | 45.92 | 11.85 | 24.61 | 4.06 | 0.55 | 4.72 | 0.42 | 3.56 | 1.54 | 4.04 | 0.35 | 1.55 | 0.00 | 156.4 | 116.3 | 27.2 | 0.234 |
| 6073 | 13.44 | 14.16 | 22.49 | 54.30 | 14.80 | 28.52 | 3.87 | 0.48 | 5.03 | 0.31 | 3.01 | 1.63 | 4.32 | 0.33 | 1.56 | 0.00 | 168.2 | 129.5 | 25.3 | 0.196 |
| 6074 | 3.62 | 5.90 | 6.65 | 9.78 | 3.57 | 8.76 | 1.48 | 0.20 | 1.61 | 0.24 | 1.34 | 0.53 | 1.56 | 0.17 | 0.64 | 0.00 | 46.0 | 32.0 | 10.4 | 0.324 |
| 6075 | 26.09 | 2.36 | 3.95 | 7.24 | 46.44 | 4.09 | 0.00 | 0.07 | 8.00 | 0.34 | 0.98 | 0.28 | 0.66 | 0.06 | 0.31 | 0.30 | 101.2 | 69.8 | 5.3 | 0.076 |
| 6076 | 10.00 | 20.60 | 34.24 | 69.90 | 10.11 | 43.64 | 6.81 | 0.78 | 5.59 | 0.48 | 3.94 | 1.98 | 5.14 | 0.37 | 2.29 | 0.02 | 215.9 | 171.1 | 34.8 | 0.204 |
| 6077 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6078 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6079 | 12.24 | 18.25 | 34.49 | 64.66 | 8.74 | 30.27 | 5.25 | 0.69 | 4.72 | 0.40 | 4.12 | 1.79 | 4.57 | 0.40 | 1.76 | 0.00 | 192.4 | 148.8 | 31.3 | 0.21 |
| 6080 | 15.93 | 15.96 | 29.22 | 57.72 | 18.94 | 28.05 | 5.22 | 0.71 | 5.94 | 0.48 | 3.87 | 1.48 | 3.77 | 0.37 | 1.60 | 0.07 | 189.3 | 145.8 | 27.6 | 0.189 |
| 6081 | 8.84 | 15.02 | 23.69 | 41.76 | 6.50 | 19.67 | 3.88 | 0.58 | 3.47 | 0.40 | 3.12 | 1.12 | 2.78 | 0.32 | 1.36 | 0.06 | 132.6 | 99.6 | 24.2 | 0.243 |
| 6082 | 12.24 | 17.77 | 32.57 | 61.92 | 8.40 | 28.94 | 5.08 | 0.67 | 4.60 | 0.39 | 4.10 | 1.79 | 4.48 | 0.39 | 1.72 | 0.00 | 185.1 | 142.2 | 30.6 | 0.216 |
| 6083 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6084 | 10.52 | 15.66 | 24.72 | 44.21 | 8.52 | 22.51 | 4.20 | 0.62 | 4.08 | 0.48 | 3.48 | 1.32 | 3.34 | 0.35 | 1.50 | 0.01 | 145.5 | 108.9 | 26.1 | 0.24 |
| 6085 | 12.40 | 17.58 | 29.40 | 56.26 | 9.14 | 28.11 | 4.71 | 0.62 | 4.66 | 0.42 | 4.04 | 1.76 | 4.55 | 0.39 | 1.71 | 0.00 | 175.7 | 132.9 | 30.4 | 0.229 |
| 6086 | 16.81 | 21.58 | 38.38 | 72.87 | 16.07 | 37.00 | 6.69 | 0.87 | 6.33 | 0.65 | 5.02 | 1.98 | 5.26 | 0.48 | 2.24 | 0.02 | 232.2 | 178.2 | 37.2 | 0.209 |
| 6087 | 8.47 | 15.66 | 27.07 | 53.73 | 6.27 | 26.19 | 4.29 | 0.51 | 3.94 | 0.30 | 3.54 | 1.66 | 4.30 | 0.34 | 1.45 | 0.00 | 157.7 | 122.0 | 27.3 | 0.223 |
| 6088 | 19.11 | 30.62 | 54.82 | 109.17 | 14.68 | 53.04 | 9.22 | 1.11 | 7.91 | 0.72 | 7.05 | 3.04 | 8.10 | 0.69 | 2.98 | 0.00 | 322.3 | 249.9 | 53.2 | 0.213 |
| 6089 | 14.68 | 26.39 | 45.28 | 91.06 | 10.77 | 44.55 | 7.33 | 0.88 | 6.71 | 0.49 | 6.13 | 2.84 | 7.27 | 0.59 | 2.46 | 0.00 | 267.4 | 206.6 | 46.2 | 0.223 |
| 6090 | 10.28 | 11.04 | 17.75 | 35.13 | 12.64 | 18.20 | 4.22 | 0.65 | 3.70 | 0.55 | 2.82 | 0.85 | 2.56 | 0.27 | 1.41 | 0.34 | 122.4 | 92.3 | 19.8 | 0.215 |
| 6091 | 7.32 | 10.26 | 16.20 | 31.95 | 7.90 | 15.88 | 3.88 | 0.60 | 2.76 | 0.48 | 2.43 | 0.73 | 2.11 | 0.27 | 1.26 | 0.29 | 104.3 | 79.2 | 17.8 | 0.225 |
| 6092 | 6.31 | 6.46 | 9.93 | 23.11 | 6.42 | 11.89 | 2.98 | 0.45 | 2.09 | 0.43 | 1.90 | 0.59 | 1.79 | 0.20 | 0.99 | 0.23 | 75.8 | 56.9 | 12.6 | 0.221 |
| 6093 | 6.57 | 8.32 | 13.18 | 27.25 | 7.22 | 13.76 | 3.45 | 0.51 | 2.40 | 0.45 | 2.17 | 0.59 | 1.89 | 0.22 | 1.10 | 0.28 | 89.4 | 67.8 | 15.0 | 0.222 |
| 6094 | 11.04 | 15.12 | 25.07 | 49.18 | 13.38 | 24.71 | 6.44 | 0.89 | 4.34 | 0.79 | 3.96 | 1.04 | 3.33 | 0.37 | 1.95 | 0.56 | 162.2 | 124.0 | 27.1 | 0.219 |
| 6095 | 14.58 | 16.53 | 29.71 | 56.50 | 16.86 | 29.11 | 6.70 | 0.99 | 5.33 | 0.75 | 4.21 | 1.31 | 3.76 | 0.36 | 2.09 | 0.49 | 189.3 | 145.2 | 29.5 | 0.203 |
| 6096 | 2.66 | 4.09 | 4.00 | 8.53 | 1.83 | 4.88 | 1.09 | 0.24 | 1.00 | 0.21 | 0.97 | 0.32 | 0.92 | 0.14 | 0.52 | 0.04 | 31.4 | 21.6 | 7.2 | 0.334 |
| 6097 | 8.75 | 12.87 | 22.15 | 41.00 | 8.75 | 20.76 | 4.50 | 0.70 | 3.36 | 0.50 | 2.92 | 1.01 | 2.72 | 0.32 | 1.55 | 0.23 | 132.1 | 101.2 | 22.1 | 0.219 |
| 6098 | 16.61 | 19.08 | 37.34 | 77.49 | 20.54 | 36.25 | 8.92 | 1.21 | 5.98 | 0.98 | 5.17 | 1.45 | 4.50 | 0.41 | 2.61 | 0.74 | 239.3 | 187.7 | 34.9 | 0.186 |
| 6099 | 16.33 | 22.40 | 38.76 | 73.43 | 28.58 | 36.70 | 11.22 | 1.44 | 6.71 | 1.55 | 6.21 | 1.16 | 4.60 | 0.35 | 3.16 | 1.53 | 254.1 | 196.8 | 41.0 | 0.208 |
| 6100 | 3.66 | 6.48 | 7.12 | 14.05 | 3.08 | 7.34 | 1.72 | 0.37 | 1.52 | 0.35 | 1.49 | 0.48 | 1.37 | 0.17 | 0.79 | 0.09 | 50.1 | 35.2 | 11.2 | 0.318 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6068 | 0.21 | 0.38 | 0.30 | 0.27 | 0.50 | 0.31 | 0.38 | 0.26 | 0.46 | 0.41 | 0.44 | 0.56 | 0.53 | 0.61 | 0.37 | 0.38 | 0.32 | 0.31 | 0.41 | 0.76 |
| 6069 | 0.76 | 0.75 | 0.95 | 0.94 | 1.30 | 1.01 | 0.93 | 0.51 | 1.17 | 0.64 | 1.06 | 2.13 | 2.08 | 1.18 | 0.86 | 0.00 | 0.94 | 0.97 | 0.90 | 1.09 |
| 6070 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6071 | 0.25 | 0.41 | 0.36 | 0.32 | 0.69 | 0.37 | 0.42 | 0.27 | 0.54 | 0.42 | 0.47 | 0.64 | 0.61 | 0.65 | 0.39 | 0.40 | 0.37 | 0.37 | 0.44 | 0.84 |
| 6072 | 0.80 | 0.66 | 0.82 | 0.77 | 1.77 | 0.91 | 0.77 | 0.42 | 1.18 | 0.65 | 0.94 | 1.93 | 1.92 | 1.07 | 0.77 | 0.00 | 0.85 | 0.87 | 0.80 | 1.08 |
| 6073 | 0.84 | 0.59 | 0.75 | 0.90 | 2.21 | 1.06 | 0.73 | 0.37 | 1.26 | 0.48 | 0.79 | 2.03 | 2.06 | 1.00 | 0.78 | 0.00 | 0.91 | 0.96 | 0.74 | 1.30 |
| 6074 | 0.23 | 0.25 | 0.22 | 0.16 | 0.53 | 0.32 | 0.28 | 0.15 | 0.40 | 0.37 | 0.35 | 0.66 | 0.74 | 0.52 | 0.32 | 0.00 | 0.25 | 0.24 | 0.30 | 0.78 |
| 6075 | 1.63 | 0.10 | 0.13 | 0.12 | 6.93 | 0.15 | 0.00 | 0.06 | 2.00 | 0.53 | 0.26 | 0.34 | 0.32 | 0.19 | 0.15 | 0.86 | 0.55 | 0.52 | 0.16 | 3.34 |
| 6076 | 0.63 | 0.86 | 1.14 | 1.16 | 1.51 | 1.62 | 1.29 | 0.60 | 1.40 | 0.74 | 1.04 | 2.48 | 2.45 | 1.12 | 1.14 | 0.06 | 1.17 | 1.27 | 1.02 | 1.24 |
| 6077 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6078 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6079 | 0.77 | 0.76 | 1.15 | 1.08 | 1.30 | 1.12 | 0.99 | 0.53 | 1.18 | 0.61 | 1.08 | 2.24 | 2.18 | 1.22 | 0.88 | 0.00 | 1.04 | 1.11 | 0.92 | 1.20 |
| 6080 | 1.00 | 0.67 | 0.97 | 0.96 | 2.83 | 1.04 | 0.99 | 0.54 | 1.48 | 0.74 | 1.02 | 1.84 | 1.80 | 1.13 | 0.80 | 0.19 | 1.03 | 1.09 | 0.81 | 1.34 |
| 6081 | 0.55 | 0.63 | 0.79 | 0.70 | 0.97 | 0.73 | 0.73 | 0.44 | 0.87 | 0.62 | 0.82 | 1.40 | 1.32 | 0.96 | 0.68 | 0.17 | 0.72 | 0.74 | 0.71 | 1.04 |
| 6082 | 0.76 | 0.74 | 1.09 | 1.03 | 1.25 | 1.07 | 0.96 | 0.52 | 1.15 | 0.61 | 1.08 | 2.24 | 2.13 | 1.19 | 0.86 | 0.00 | 1.00 | 1.06 | 0.90 | 1.18 |
| 6083 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6084 | 0.66 | 0.65 | 0.82 | 0.74 | 1.27 | 0.83 | 0.79 | 0.47 | 1.02 | 0.73 | 0.92 | 1.64 | 1.59 | 1.05 | 0.75 | 0.02 | 0.79 | 0.81 | 0.77 | 1.06 |
| 6085 | 0.78 | 0.73 | 0.98 | 0.94 | 1.36 | 1.04 | 0.89 | 0.48 | 1.16 | 0.64 | 1.06 | 2.20 | 2.17 | 1.17 | 0.85 | 0.00 | 0.95 | 0.99 | 0.89 | 1.11 |
| 6086 | 1.05 | 0.90 | 1.28 | 1.21 | 2.40 | 1.37 | 1.26 | 0.67 | 1.58 | 1.00 | 1.32 | 2.48 | 2.51 | 1.46 | 1.12 | 0.05 | 1.26 | 1.33 | 1.09 | 1.21 |
| 6087 | 0.53 | 0.65 | 0.90 | 0.90 | 0.94 | 0.97 | 0.81 | 0.39 | 0.99 | 0.46 | 0.93 | 2.08 | 2.05 | 1.04 | 0.73 | 0.00 | 0.86 | 0.91 | 0.80 | 1.13 |
| 6088 | 1.19 | 1.28 | 1.83 | 1.82 | 2.19 | 1.96 | 1.74 | 0.85 | 1.98 | 1.11 | 1.85 | 3.80 | 3.86 | 2.09 | 1.49 | 0.00 | 1.75 | 1.86 | 1.56 | 1.19 |
| 6089 | 0.92 | 1.10 | 1.51 | 1.52 | 1.61 | 1.65 | 1.38 | 0.68 | 1.68 | 0.76 | 1.61 | 3.55 | 3.46 | 1.78 | 1.23 | 0.00 | 1.45 | 1.54 | 1.36 | 1.13 |
| 6090 | 0.64 | 0.46 | 0.59 | 0.59 | 1.89 | 0.67 | 0.80 | 0.50 | 0.93 | 0.85 | 0.74 | 1.06 | 1.22 | 0.80 | 0.71 | 0.96 | 0.66 | 0.69 | 0.58 | 1.18 |
| 6091 | 0.46 | 0.43 | 0.54 | 0.53 | 1.18 | 0.59 | 0.73 | 0.46 | 0.69 | 0.74 | 0.64 | 0.91 | 1.00 | 0.81 | 0.63 | 0.84 | 0.57 | 0.59 | 0.52 | 1.13 |
| 6092 | 0.39 | 0.27 | 0.33 | 0.39 | 0.96 | 0.44 | 0.56 | 0.35 | 0.52 | 0.66 | 0.50 | 0.74 | 0.85 | 0.60 | 0.49 | 0.66 | 0.41 | 0.42 | 0.37 | 1.14 |
| 6093 | 0.41 | 0.35 | 0.44 | 0.45 | 1.08 | 0.51 | 0.65 | 0.39 | 0.60 | 0.69 | 0.57 | 0.74 | 0.90 | 0.68 | 0.55 | 0.81 | 0.48 | 0.50 | 0.44 | 1.14 |
| 6094 | 0.69 | 0.63 | 0.84 | 0.82 | 2.00 | 0.92 | 1.21 | 0.69 | 1.09 | 1.21 | 1.04 | 1.30 | 1.59 | 1.11 | 0.98 | 1.59 | 0.88 | 0.92 | 0.80 | 1.16 |
| 6095 | 0.91 | 0.69 | 0.99 | 0.94 | 2.52 | 1.08 | 1.26 | 0.76 | 1.33 | 1.15 | 1.11 | 1.64 | 1.79 | 1.10 | 1.05 | 1.41 | 1.03 | 1.08 | 0.87 | 1.25 |
| 6096 | 0.17 | 0.17 | 0.13 | 0.14 | 0.27 | 0.18 | 0.21 | 0.18 | 0.25 | 0.33 | 0.26 | 0.40 | 0.44 | 0.42 | 0.26 | 0.12 | 0.17 | 0.16 | 0.21 | 0.76 |
| 6097 | 0.55 | 0.54 | 0.74 | 0.68 | 1.31 | 0.77 | 0.85 | 0.54 | 0.84 | 0.77 | 0.77 | 1.27 | 1.30 | 0.96 | 0.78 | 0.66 | 0.72 | 0.75 | 0.65 | 1.16 |
| 6098 | 1.04 | 0.80 | 1.24 | 1.29 | 3.07 | 1.34 | 1.68 | 0.93 | 1.50 | 1.51 | 1.36 | 1.82 | 2.14 | 1.24 | 1.30 | 2.11 | 1.30 | 1.40 | 1.03 | 1.36 |
| 6099 | 1.02 | 0.93 | 1.29 | 1.22 | 4.27 | 1.36 | 2.12 | 1.11 | 1.68 | 2.39 | 1.64 | 1.45 | 2.19 | 1.06 | 1.58 | 4.37 | 1.38 | 1.47 | 1.20 | 1.22 |
| 6100 | 0.23 | 0.27 | 0.24 | 0.23 | 0.46 | 0.27 | 0.32 | 0.29 | 0.38 | 0.54 | 0.39 | 0.59 | 0.65 | 0.50 | 0.40 | 0.26 | 0.27 | 0.26 | 0.33 | 0.80 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6068 | 2.84 | 5.29 | 4.17 | 3.74 | 6.87 | 4.26 | 5.28 | 3.52 | 6.41 | 5.73 | 6.13 | 7.71 | 7.35 | 8.42 | 5.10 | 5.26 | 4.37 | 4.24 | 5.60 | 0.76 |
| 6069 | 1.93 | 1.91 | 2.42 | 2.39 | 3.31 | 2.59 | 2.36 | 1.29 | 2.98 | 1.63 | 2.70 | 5.43 | 5.30 | 3.01 | 2.18 | 0.00 | 2.40 | 2.49 | 2.29 | 1.09 |
| 6070 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6071 | 2.50 | 4.10 | 3.59 | 3.24 | 6.92 | 3.67 | 4.27 | 2.67 | 5.39 | 4.19 | 4.77 | 6.42 | 6.18 | 6.52 | 3.93 | 4.04 | 3.71 | 3.69 | 4.38 | 0.84 |
| 6072 | 2.17 | 1.78 | 2.22 | 2.07 | 4.79 | 2.47 | 2.08 | 1.14 | 3.20 | 1.75 | 2.54 | 5.22 | 5.21 | 2.90 | 2.10 | 0.00 | 2.30 | 2.35 | 2.17 | 1.08 |
| 6073 | 1.49 | 1.04 | 1.33 | 1.60 | 3.91 | 1.87 | 1.29 | 0.66 | 2.23 | 0.85 | 1.40 | 3.60 | 3.65 | 1.78 | 1.38 | 0.00 | 1.62 | 1.71 | 1.32 | 1.30 |
| 6074 | 1.48 | 1.60 | 1.44 | 1.06 | 3.47 | 2.11 | 1.82 | 1.01 | 2.63 | 2.38 | 2.30 | 4.33 | 4.83 | 3.40 | 2.08 | 0.00 | 1.63 | 1.56 | 1.99 | 0.78 |
| 6075 | 4.91 | 0.30 | 0.40 | 0.36 | 20.88 | 0.46 | 0.00 | 0.17 | 6.02 | 1.59 | 0.78 | 1.04 | 0.95 | 0.58 | 0.47 | 2.60 | 1.65 | 1.57 | 0.47 | 3.34 |
| 6076 | 1.11 | 1.52 | 2.03 | 2.07 | 2.68 | 2.87 | 2.28 | 1.06 | 2.48 | 1.31 | 1.84 | 4.40 | 4.34 | 1.98 | 2.03 | 0.10 | 2.08 | 2.26 | 1.82 | 1.24 |
| 6077 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6078 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6079 | 1.99 | 1.98 | 2.99 | 2.80 | 3.39 | 2.91 | 2.57 | 1.38 | 3.07 | 1.59 | 2.82 | 5.82 | 5.66 | 3.17 | 2.29 | 0.00 | 2.71 | 2.88 | 2.39 | 1.20 |
| 6080 | 1.81 | 1.21 | 1.77 | 1.75 | 5.14 | 1.89 | 1.79 | 0.99 | 2.70 | 1.35 | 1.85 | 3.36 | 3.27 | 2.06 | 1.45 | 0.34 | 1.87 | 1.97 | 1.48 | 1.34 |
| 6081 | 2.51 | 2.84 | 3.58 | 3.16 | 4.40 | 3.31 | 3.32 | 2.01 | 3.94 | 2.81 | 3.73 | 6.35 | 6.01 | 4.37 | 3.09 | 0.77 | 3.26 | 3.36 | 3.22 | 1.04 |
| 6082 | 2.03 | 1.97 | 2.89 | 2.74 | 3.34 | 2.85 | 2.55 | 1.38 | 3.06 | 1.61 | 2.87 | 5.96 | 5.67 | 3.18 | 2.29 | 0.00 | 2.67 | 2.82 | 2.40 | 1.18 |
| 6083 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6084 | 2.35 | 2.33 | 2.94 | 2.63 | 4.54 | 2.98 | 2.83 | 1.69 | 3.65 | 2.62 | 3.27 | 5.87 | 5.68 | 3.76 | 2.67 | 0.08 | 2.82 | 2.90 | 2.74 | 1.06 |
| 6085 | 1.99 | 1.88 | 2.52 | 2.41 | 3.50 | 2.67 | 2.28 | 1.23 | 2.99 | 1.65 | 2.73 | 5.65 | 5.57 | 3.01 | 2.19 | 0.00 | 2.45 | 2.54 | 2.30 | 1.11 |
| 6086 | 1.70 | 1.46 | 2.07 | 1.97 | 3.89 | 2.22 | 2.04 | 1.08 | 2.56 | 1.63 | 2.14 | 4.01 | 4.06 | 2.36 | 1.81 | 0.08 | 2.04 | 2.15 | 1.77 | 1.21 |
| 6087 | 1.66 | 2.05 | 2.83 | 2.81 | 2.93 | 3.04 | 2.54 | 1.24 | 3.09 | 1.44 | 2.92 | 6.52 | 6.41 | 3.26 | 2.27 | 0.00 | 2.68 | 2.85 | 2.51 | 1.13 |
| 6088 | 1.76 | 1.87 | 2.68 | 2.67 | 3.22 | 2.89 | 2.56 | 1.26 | 2.91 | 1.63 | 2.72 | 5.59 | 5.66 | 3.08 | 2.19 | 0.00 | 2.57 | 2.73 | 2.30 | 1.19 |
| 6089 | 1.65 | 1.98 | 2.71 | 2.73 | 2.89 | 2.97 | 2.49 | 1.22 | 3.02 | 1.36 | 2.90 | 6.39 | 6.22 | 3.20 | 2.21 | 0.00 | 2.61 | 2.77 | 2.44 | 1.13 |
| 6090 | 1.49 | 1.07 | 1.38 | 1.36 | 4.38 | 1.57 | 1.85 | 1.16 | 2.15 | 1.97 | 1.73 | 2.46 | 2.84 | 1.87 | 1.64 | 2.23 | 1.54 | 1.60 | 1.35 | 1.18 |
| 6091 | 1.46 | 1.36 | 1.72 | 1.69 | 3.75 | 1.87 | 2.33 | 1.47 | 2.19 | 2.36 | 2.03 | 2.89 | 3.19 | 2.56 | 2.01 | 2.67 | 1.80 | 1.87 | 1.67 | 1.13 |
| 6092 | 1.28 | 0.88 | 1.08 | 1.25 | 3.11 | 1.43 | 1.83 | 1.12 | 1.69 | 2.14 | 1.63 | 2.41 | 2.77 | 1.95 | 1.61 | 2.14 | 1.34 | 1.38 | 1.20 | 1.14 |
| 6093 | 1.36 | 1.14 | 1.45 | 1.50 | 3.56 | 1.68 | 2.15 | 1.28 | 1.98 | 2.27 | 1.89 | 2.45 | 2.97 | 2.25 | 1.81 | 2.68 | 1.60 | 1.67 | 1.46 | 1.14 |
| 6094 | 1.28 | 1.17 | 1.55 | 1.52 | 3.70 | 1.70 | 2.25 | 1.28 | 2.01 | 2.25 | 1.93 | 2.41 | 2.94 | 2.06 | 1.81 | 2.94 | 1.63 | 1.71 | 1.48 | 1.16 |
| 6095 | 1.42 | 1.07 | 1.54 | 1.47 | 3.92 | 1.68 | 1.97 | 1.18 | 2.07 | 1.80 | 1.72 | 2.55 | 2.79 | 1.71 | 1.63 | 2.20 | 1.60 | 1.68 | 1.35 | 1.25 |
| 6096 | 2.28 | 2.34 | 1.83 | 1.95 | 3.74 | 2.48 | 2.83 | 2.49 | 3.43 | 4.47 | 3.50 | 5.53 | 5.99 | 5.84 | 3.55 | 1.69 | 2.34 | 2.21 | 2.91 | 0.76 |
| 6097 | 1.63 | 1.60 | 2.20 | 2.04 | 3.90 | 2.29 | 2.53 | 1.61 | 2.51 | 2.30 | 2.29 | 3.78 | 3.87 | 2.87 | 2.32 | 1.98 | 2.14 | 2.25 | 1.94 | 1.16 |
| 6098 | 1.22 | 0.94 | 1.47 | 1.52 | 3.62 | 1.58 | 1.99 | 1.10 | 1.77 | 1.78 | 1.61 | 2.14 | 2.53 | 1.46 | 1.54 | 2.49 | 1.53 | 1.65 | 1.21 | 1.36 |
| 6099 | 1.28 | 1.17 | 1.62 | 1.53 | 5.35 | 1.70 | 2.66 | 1.39 | 2.10 | 3.00 | 2.05 | 1.82 | 2.75 | 1.33 | 1.98 | 5.48 | 1.73 | 1.84 | 1.51 | 1.22 |
| 6100 | 2.15 | 2.54 | 2.23 | 2.21 | 4.33 | 2.56 | 3.05 | 2.69 | 3.58 | 5.05 | 3.68 | 5.60 | 6.13 | 4.73 | 3.73 | 2.42 | 2.56 | 2.47 | 3.10 | 0.80 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6101 | 146 | Plant 18 | Coarse Reject (1mm x 100M / 1.6 x 1.9 SG) | 47.94 |
| 6102 | 95 | Plant 18 | Coarse Reject (1mm x 100M / 1.9 x Snk SG) | 83.81 |
| 6103 | 159 | Plant 18 | Coarse Reject (1/8" x 1mm / Flt x 1.6 SG) | 11.71 |
| 6104 | 16 | Plant 18 | Coarse Reject (1/8" x 1mm / 1.6 x 1.9 SG) | 42.72 |
| 6105 | 199 | Plant 18 | Coarse Reject (1/8" x 1mm / 1.9 x Snk SG) | 86.17 |
| 6106 | 135 | Plant 18 | Coarse Reject (3/4" x 1/8" / Flt x 1.6 SG) | 12.05 |
| 6107 | 25 | Plant 18 | Coarse Reject (3/4" x 1/8" / 1.6 x 1.9 SG) | 45.89 |
| 6108 | 187 | Plant 18 | Coarse Reject (3/4" x 1/8" / 1.9 x Snk SG) | 77.98 |
| 6109 | 155 | Plant 18 | Coarse Reject (+ x 3/4" / Flt x 1.6 SG) | 17.37 |
| 6110 | 30 | Plant 18 | Coarse Reject (+ x 3/4" / 1.6 x 1.9 SG) | 48.68 |
| 6111 | 173 | Plant 18 | Coarse Reject (+ x 3/4" / 1.9 x Snk SG) Clean | 77.51 |
| 6112 | 104 | Plant 18 | Coal (100M x 0) | 10.46 |
| 6113 | 435 | Plant 18 | Clean Coal (1mm x 100M / Flt x 1.6 SG) | 3.43 |
| 6114 | 168 | Plant 18 | Clean Coal (1mm x 100M / 1.6 x 1.9 SG) | 46.9 |
| 6115 | 27 | Plant 18 | Clean Coal (1mm x 100M / 1.9 x Snk SG) | 58.21 |
| 6116 | 119 | Plant 18 | Clean Coal (1/8" x 1mm / Flt x 1.6 SG) | 6.06 |
| 6117 | 166 | Plant 18 | Clean Coal (1/8" x 1mm / 1.6 x 1.9 SG) | 41.61 |
| 6118 | 10 | Plant 18 | Clean Coal (1/8" x 1mm / 1.9 x Snk SG) | 68.14 |
| 6119 | 438 | Plant 18 | Clean Coal (3/4" x 1/8" / Flt x 1.6 SG) | 6.12 |
| 6120 | 12 | Plant 18 | Clean Coal (3/4" x 1/8" / 1.6 x 1.9 SG) | 51.32 |
| 6121 | 157 | Plant 18 | Clean Coal (3/4" x 1/8" / 1.9 x Snk SG) | 62.28 |
| 6122 | 690 | Plant 18 | Clean Coal (+ x 3/4" / Flt x 1.6 SG) | 6.84 |
| 6123 | 8 | Plant 18 | Clean Coal (+ x 3/4" / 1.6 x 1.9 SG) | 30.32 |
| 6124 | 55 | Plant 18 | Clean Coal (+ x 3/4" / 1.9 x Snk SG) | 68.55 |
| 6125 | 51.5 | Plant 19 | Raw Coal (100M x 0) | 49.69 |
| 6126 | 113 | Plant 19 | Raw Coal (1mm x 100M) | 33.39 |
| 6127 | 93 | Plant 19 | Raw Coal (1/8" x 1mm) | 34.45 |
| 6128 | 135.3 | Plant 19 | Raw Coal (3/8" x 1/8") | 39.72 |
| 6129 | 163.1 | Plant 19 | Raw Coal (+ x 3/8) | 68.7 |
| 6130 | 94 | Plant 19 | Fine Reject (100M x 0) | 72.45 |
| 6131 | 29.5 | Plant 19 | Fine Reject (+ x 100M / Flt x 1.5 SG) | 7.27 |
| 6132 | 11.6 | Plant 19 | Fine Reject (+ x 100M / 1.5 x 1.6 SG) | 25.98 |
| 6133 | 23 | Plant 19 | Fine Reject (+ x 100M / 1.6 x 1.9 SG) | 42.36 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6101 | 25.30 | 34.04 | 57.16 | 107.93 | 33.54 | 54.31 | 14.17 | 2.03 | 9.92 | 1.86 | 8.55 | 2.04 | 6.76 | 0.73 | 4.36 | 1.40 | 364.1 | 279.1 | 59.8 | 0.21 |
| 6102 | 19.77 | 24.98 | 44.06 | 89.09 | 23.18 | 43.82 | 10.98 | 1.54 | 7.44 | 1.28 | 6.63 | 1.81 | 5.76 | 0.63 | 3.35 | 0.85 | 285.2 | 220.1 | 45.3 | 0.21 |
| 6103 | 27.02 | 36.02 | 58.62 | 120.33 | 27.19 | 57.34 | 13.55 | 2.05 | 9.50 | 1.68 | 8.62 | 2.63 | 7.85 | 0.91 | 4.65 | 0.98 | 378.9 | 288.6 | 63.3 | 0.22 |
| 6104 | 38.06 | 63.16 | 68.07 | 132.02 | 26.10 | 69.92 | 15.91 | 3.50 | 13.75 | 3.44 | 13.72 | 4.06 | 11.15 | 1.78 | 7.65 | 0.92 | 473.2 | 329.3 | 105.9 | 0.32 |
| 6105 | 14.32 | 9.23 | 11.08 | 37.18 | 13.00 | 16.67 | 5.58 | 0.76 | 4.21 | 1.19 | 3.36 | 1.09 | 4.37 | 0.36 | 2.02 | 0.59 | 125.0 | 88.5 | 22.2 | 0.25 |
| 6106 | 39.57 | 71.26 | 73.95 | 140.22 | 28.35 | 73.71 | 16.98 | 3.17 | 14.37 | 2.59 | 13.90 | 4.14 | 11.28 | 1.92 | 7.59 | 1.19 | 504.2 | 350.7 | 113.9 | 0.32 |
| 6107 | 24.93 | 34.74 | 61.72 | 115.20 | 28.08 | 58.18 | 13.31 | 2.02 | 9.81 | 1.56 | 8.24 | 2.51 | 7.43 | 0.77 | 4.31 | 0.82 | 373.6 | 288.3 | 60.4 | 0.21 |
| 6108 | 19.53 | 26.51 | 46.20 | 90.18 | 26.34 | 45.19 | 12.09 | 1.64 | 7.84 | 1.48 | 7.01 | 1.62 | 5.86 | 0.50 | 3.57 | 1.19 | 296.8 | 229.5 | 47.8 | 0.21 |
| 6109 | 21.72 | 22.23 | 28.72 | 78.82 | 14.46 | 34.69 | 8.09 | 1.30 | 6.95 | 1.18 | 5.32 | 2.28 | 7.00 | 0.97 | 3.12 | 0.27 | 237.1 | 173.0 | 42.4 | 0.24 |
| 6110 | 26.05 | 37.94 | 63.35 | 117.62 | 28.87 | 59.61 | 13.76 | 2.16 | 10.35 | 1.69 | 8.57 | 2.67 | 7.61 | 0.83 | 4.54 | 0.85 | 386.5 | 295.7 | 64.7 | 0.22 |
| 6111 | 13.15 | 9.87 | 14.57 | 44.81 | 17.69 | 17.67 | 6.91 | 0.78 | 4.53 | 1.32 | 4.00 | 0.93 | 4.21 | 0.31 | 2.06 | 1.01 | 143.8 | 106.9 | 23.7 | 0.22 |
| 6112 | 25.93 | 32.75 | 34.77 | 83.77 | 26.98 | 39.41 | 11.05 | 2.09 | 10.96 | 2.24 | 8.82 | 2.57 | 8.22 | 1.17 | 4.52 | 1.03 | 296.3 | 209.0 | 61.3 | 0.29 |
| 6113 | 29.61 | 38.54 | 27.57 | 72.54 | 17.20 | 40.80 | 10.65 | 2.81 | 11.04 | 3.14 | 9.34 | 3.24 | 10.49 | 2.34 | 5.75 | 0.61 | 285.7 | 182.6 | 73.5 | 0.40 |
| 6114 | 12.28 | 8.86 | 14.58 | 35.94 | 14.90 | 19.64 | 5.88 | 0.95 | 4.32 | 1.46 | 3.43 | 1.18 | 4.81 | 0.41 | 2.00 | 0.56 | 131.2 | 96.2 | 22.7 | 0.24 |
| 6115 | 23.37 | 35.53 | 61.61 | 115.79 | 25.04 | 57.53 | 13.63 | 1.85 | 9.32 | 1.49 | 7.90 | 2.38 | 6.81 | 0.81 | 4.16 | 0.94 | 368.2 | 284.8 | 60.0 | 0.21 |
| 6116 | 39.80 | 84.69 | 89.71 | 169.85 | 31.44 | 87.26 | 19.61 | 3.38 | 17.04 | 2.72 | 14.75 | 4.86 | 12.47 | 2.05 | 7.99 | 1.29 | 588.9 | 418.3 | 130.8 | 0.31 |
| 6117 | 23.09 | 20.80 | 32.21 | 77.02 | 20.81 | 37.22 | 9.81 | 1.67 | 8.19 | 1.59 | 6.17 | 2.05 | 6.41 | 0.68 | 3.41 | 0.63 | 251.8 | 186.9 | 41.7 | 0.22 |
| 6118 | 15.15 | 8.89 | 16.62 | 61.50 | 15.13 | 18.63 | 5.49 | 0.75 | 3.99 | 0.95 | 3.22 | 1.24 | 4.42 | 0.36 | 1.99 | 0.59 | 158.9 | 122.1 | 21.7 | 0.18 |
| 6119 | 31.59 | 40.23 | 37.20 | 89.88 | 18.15 | 47.73 | 11.77 | 2.23 | 11.20 | 2.13 | 9.36 | 3.26 | 9.81 | 2.02 | 5.18 | 0.52 | 322.3 | 218.2 | 72.5 | 0.33 |
| 6120 | 21.06 | 23.48 | 42.70 | 93.25 | 25.31 | 42.38 | 12.21 | 1.62 | 8.45 | 1.56 | 6.66 | 1.75 | 5.77 | 0.60 | 3.50 | 1.19 | 291.5 | 225.9 | 44.5 | 0.20 |
| 6121 | 17.29 | 12.02 | 19.81 | 68.85 | 18.47 | 23.12 | 7.51 | 0.99 | 5.22 | 1.24 | 4.47 | 1.30 | 4.84 | 0.41 | 2.46 | 0.86 | 188.9 | 144.0 | 27.6 | 0.19 |
| 6122 | 38.08 | 65.17 | 70.93 | 155.30 | 24.36 | 75.49 | 17.87 | 3.18 | 16.91 | 2.28 | 13.77 | 4.85 | 13.03 | 2.30 | 7.05 | 0.63 | 511.2 | 364.0 | 109.1 | 0.30 |
| 6123 | 32.12 | 41.77 | 57.34 | 108.81 | 35.03 | 56.02 | 12.66 | 2.33 | 11.71 | 1.99 | 9.37 | 2.79 | 8.20 | 1.02 | 4.99 | 0.90 | 387.0 | 283.9 | 71.0 | 0.25 |
| 6124 | 12.66 | 7.75 | 11.94 | 41.18 | 12.00 | 16.58 | 4.78 | 0.66 | 3.77 | 1.05 | 2.94 | 1.22 | 4.58 | 0.36 | 1.71 | 0.40 | 123.6 | 90.9 | 20.0 | 0.22 |
| 6125 | 25.53 | 26.63 | 42.05 | 79.84 | 32.84 | 40.13 | 9.66 | 1.57 | 10.10 | 1.32 | 6.48 | 1.87 | 5.71 | 0.42 | 3.29 | 0.92 | 288.4 | 216.2 | 46.6 | 0.22 |
| 6126 | 21.62 | 31.09 | 49.89 | 93.84 | 23.11 | 46.04 | 11.68 | 1.89 | 8.85 | 1.49 | 7.33 | 1.94 | 6.21 | 0.73 | 3.81 | 0.97 | 310.5 | 235.3 | 53.6 | 0.23 |
| 6127 | 19.56 | 27.82 | 41.15 | 91.20 | 19.68 | 40.59 | 10.32 | 1.65 | 7.69 | 1.30 | 6.67 | 1.85 | 5.95 | 0.63 | 3.52 | 0.86 | 280.4 | 212.3 | 48.6 | 0.23 |
| 6128 | 20.56 | 26.98 | 43.98 | 88.92 | 21.45 | 43.36 | 10.87 | 1.72 | 8.16 | 1.34 | 6.76 | 1.87 | 5.99 | 0.67 | 3.48 | 0.87 | 287.0 | 218.5 | 48.0 | 0.22 |
| 6129 | 11.62 | 6.18 | 11.56 | 32.18 | 13.61 | 16.15 | 4.39 | 0.56 | 3.05 | 0.94 | 2.76 | 0.87 | 3.99 | 0.32 | 1.56 | 0.54 | 110.3 | 81.5 | 17.2 | 0.21 |
| 6130 | 22.39 | 24.39 | 44.33 | 88.47 | 27.00 | 42.71 | 9.77 | 1.53 | 8.27 | 1.14 | 6.24 | 1.80 | 5.50 | 0.56 | 2.99 | 0.76 | 287.9 | 222.1 | 43.4 | 0.20 |
| 6131 | 41.93 | 96.85 | 76.35 | 162.58 | 32.80 | 83.53 | 21.51 | 4.49 | 20.58 | 3.58 | 17.54 | 5.18 | 14.21 | 2.54 | 9.34 | 1.41 | 594.4 | 401.8 | 150.6 | 0.37 |
| 6132 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6133 | 22.57 | 36.94 | 60.97 | 114.52 | 23.11 | 57.48 | 12.77 | 2.16 | 9.36 | 1.34 | 7.83 | 2.45 | 6.88 | 0.82 | 4.12 | 0.72 | 364.0 | 280.4 | 61.1 | 0.22 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6101 | 12.13 | 16.32 | 27.40 | 51.74 | 16.08 | 26.04 | 6.79 | 0.97 | 4.76 | 0.89 | 4.10 | 0.98 | 3.24 | 0.35 | 2.09 | 0.67 | 174.6 | 133.8 | 28.6 | 0.214 |
| 6102 | 16.57 | 20.93 | 36.92 | 74.67 | 19.43 | 36.72 | 9.20 | 1.29 | 6.23 | 1.07 | 5.56 | 1.52 | 4.83 | 0.53 | 2.80 | 0.71 | 239.0 | 184.5 | 38.0 | 0.206 |
| 6103 | 3.16 | 4.22 | 6.86 | 14.09 | 3.18 | 6.71 | 1.59 | 0.24 | 1.11 | 0.20 | 1.01 | 0.31 | 0.92 | 0.11 | 0.54 | 0.11 | 44.4 | 33.8 | 7.4 | 0.219 |
| 6104 | 16.26 | 26.98 | 29.08 | 56.40 | 11.15 | 29.87 | 6.80 | 1.50 | 5.87 | 1.47 | 5.86 | 1.73 | 4.76 | 0.76 | 3.27 | 0.39 | 202.2 | 140.7 | 45.2 | 0.322 |
| 6105 | 12.34 | 7.96 | 9.54 | 32.04 | 11.20 | 14.36 | 4.81 | 0.65 | 3.63 | 1.02 | 2.89 | 0.94 | 3.77 | 0.31 | 1.74 | 0.51 | 107.7 | 76.2 | 19.1 | 0.251 |
| 6106 | 4.77 | 8.59 | 8.91 | 16.90 | 3.42 | 8.88 | 2.05 | 0.38 | 1.73 | 0.31 | 1.68 | 0.50 | 1.36 | 0.23 | 0.92 | 0.14 | 60.8 | 42.3 | 13.7 | 0.325 |
| 6107 | 11.44 | 15.94 | 28.32 | 52.87 | 12.89 | 26.70 | 6.11 | 0.93 | 4.50 | 0.71 | 3.78 | 1.15 | 3.41 | 0.36 | 1.98 | 0.38 | 171.5 | 132.3 | 27.7 | 0.209 |
| 6108 | 15.23 | 20.67 | 36.02 | 70.32 | 20.54 | 35.24 | 9.43 | 1.28 | 6.11 | 1.15 | 5.47 | 1.27 | 4.57 | 0.39 | 2.78 | 0.93 | 231.4 | 178.9 | 37.2 | 0.208 |
| 6109 | 3.77 | 3.86 | 4.99 | 13.69 | 2.51 | 6.03 | 1.40 | 0.23 | 1.21 | 0.21 | 0.92 | 0.40 | 1.22 | 0.17 | 0.54 | 0.05 | 41.2 | 30.1 | 7.4 | 0.245 |
| 6110 | 12.68 | 18.47 | 30.84 | 57.26 | 14.05 | 29.02 | 6.70 | 1.05 | 5.04 | 0.82 | 4.17 | 1.30 | 3.71 | 0.40 | 2.21 | 0.41 | 188.1 | 144.0 | 31.5 | 0.219 |
| 6111 | 10.19 | 7.65 | 11.30 | 34.73 | 13.71 | 13.69 | 5.36 | 0.60 | 3.51 | 1.03 | 3.10 | 0.72 | 3.26 | 0.24 | 1.60 | 0.78 | 111.5 | 82.9 | 18.4 | 0.222 |
| 6112 | 2.71 | 3.43 | 3.64 | 8.76 | 2.82 | 4.12 | 1.16 | 0.22 | 1.15 | 0.23 | 0.92 | 0.27 | 0.86 | 0.12 | 0.47 | 0.11 | 31.0 | 21.9 | 6.4 | 0.293 |
| 6113 | 1.02 | 1.32 | 0.95 | 2.49 | 0.59 | 1.40 | 0.37 | 0.10 | 0.38 | 0.11 | 0.32 | 0.11 | 0.36 | 0.08 | 0.20 | 0.02 | 9.8 | 6.3 | 2.5 | 0.402 |
| 6114 | 5.76 | 4.15 | 6.84 | 16.85 | 6.99 | 9.21 | 2.76 | 0.44 | 2.02 | 0.69 | 1.61 | 0.55 | 2.26 | 0.19 | 0.94 | 0.26 | 61.5 | 45.1 | 10.7 | 0.236 |
| 6115 | 13.60 | 20.68 | 35.86 | 67.40 | 14.58 | 33.49 | 7.94 | 1.08 | 5.42 | 0.87 | 4.60 | 1.38 | 3.96 | 0.47 | 2.42 | 0.55 | 214.3 | 165.8 | 34.9 | 0.211 |
| 6116 | 2.41 | 5.13 | 5.44 | 10.29 | 1.91 | 5.29 | 1.19 | 0.20 | 1.03 | 0.16 | 0.89 | 0.29 | 0.76 | 0.12 | 0.48 | 0.08 | 35.7 | 25.3 | 7.9 | 0.313 |
| 6117 | 9.61 | 8.65 | 13.40 | 32.05 | 8.66 | 15.49 | 4.08 | 0.69 | 3.41 | 0.66 | 2.57 | 0.85 | 2.67 | 0.28 | 1.42 | 0.26 | 104.8 | 77.8 | 17.4 | 0.223 |
| 6118 | 10.32 | 6.06 | 11.33 | 41.91 | 10.31 | 12.70 | 3.74 | 0.51 | 2.72 | 0.65 | 2.20 | 0.84 | 3.01 | 0.25 | 1.36 | 0.40 | 108.3 | 83.2 | 14.8 | 0.177 |
| 6119 | 1.93 | 2.46 | 2.28 | 5.50 | 1.11 | 2.92 | 0.72 | 0.14 | 0.69 | 0.13 | 0.57 | 0.20 | 0.60 | 0.12 | 0.32 | 0.03 | 19.7 | 13.4 | 4.4 | 0.332 |
| 6120 | 10.81 | 12.05 | 21.91 | 47.85 | 12.99 | 21.75 | 6.27 | 0.83 | 4.34 | 0.80 | 3.42 | 0.90 | 2.96 | 0.31 | 1.80 | 0.61 | 149.6 | 115.9 | 22.8 | 0.197 |
| 6121 | 10.77 | 7.49 | 12.34 | 42.88 | 11.51 | 14.40 | 4.68 | 0.62 | 3.25 | 0.77 | 2.78 | 0.81 | 3.01 | 0.25 | 1.53 | 0.53 | 117.6 | 89.7 | 17.2 | 0.192 |
| 6122 | 2.60 | 4.46 | 4.85 | 10.62 | 1.67 | 5.16 | 1.22 | 0.22 | 1.16 | 0.16 | 0.94 | 0.33 | 0.89 | 0.16 | 0.48 | 0.04 | 35.0 | 24.9 | 7.5 | 0.3 |
| 6123 | 9.74 | 12.67 | 17.38 | 32.99 | 10.62 | 16.99 | 3.84 | 0.71 | 3.55 | 0.60 | 2.84 | 0.85 | 2.49 | 0.31 | 1.51 | 0.27 | 117.4 | 86.1 | 21.5 | 0.25 |
| 6124 | 8.68 | 5.31 | 8.19 | 28.23 | 8.23 | 11.37 | 3.27 | 0.45 | 2.59 | 0.72 | 2.02 | 0.84 | 3.14 | 0.25 | 1.17 | 0.28 | 84.7 | 62.3 | 13.7 | 0.22 |
| 6125 | 12.68 | 13.23 | 20.89 | 39.67 | 16.32 | 19.94 | 4.80 | 0.78 | 5.02 | 0.66 | 3.22 | 0.93 | 2.84 | 0.21 | 1.63 | 0.46 | 143.3 | 107.4 | 23.2 | 0.216 |
| 6126 | 7.22 | 10.38 | 16.66 | 31.33 | 7.72 | 15.37 | 3.90 | 0.63 | 2.95 | 0.50 | 2.45 | 0.65 | 2.07 | 0.24 | 1.27 | 0.32 | 103.7 | 78.6 | 17.9 | 0.228 |
| 6127 | 6.74 | 9.58 | 14.18 | 31.42 | 6.78 | 13.98 | 3.55 | 0.57 | 2.65 | 0.45 | 2.30 | 0.64 | 2.05 | 0.22 | 1.21 | 0.29 | 96.6 | 73.1 | 16.7 | 0.229 |
| 6128 | 8.17 | 10.72 | 17.47 | 35.32 | 8.52 | 17.22 | 4.32 | 0.68 | 3.24 | 0.53 | 2.68 | 0.74 | 2.38 | 0.27 | 1.38 | 0.35 | 114.0 | 86.8 | 19.1 | 0.22 |
| 6129 | 7.98 | 4.24 | 7.94 | 22.11 | 9.35 | 11.10 | 3.02 | 0.39 | 2.10 | 0.65 | 1.90 | 0.59 | 2.74 | 0.22 | 1.07 | 0.37 | 75.8 | 56.0 | 11.8 | 0.21 |
| 6130 | 16.22 | 17.67 | 32.12 | 64.10 | 19.56 | 30.94 | 7.08 | 1.11 | 5.99 | 0.82 | 4.52 | 1.30 | 3.98 | 0.41 | 2.17 | 0.55 | 208.6 | 160.9 | 31.4 | 0.195 |
| 6131 | 3.05 | 7.04 | 5.55 | 11.82 | 2.38 | 6.07 | 1.56 | 0.33 | 1.50 | 0.26 | 1.28 | 0.38 | 1.03 | 0.18 | 0.68 | 0.10 | 43.2 | 29.2 | 11.0 | 0.375 |
| 6132 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6133 | 9.56 | 15.65 | 25.83 | 48.51 | 9.79 | 24.35 | 5.41 | 0.92 | 3.96 | 0.57 | 3.32 | 1.04 | 2.92 | 0.35 | 1.74 | 0.30 | 154.2 | 118.8 | 25.9 | 0.218 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6101 | 0.76 | 0.68 | 0.91 | 0.86 | 2.40 | 0.96 | 1.28 | 0.75 | 1.19 | 1.38 | 1.08 | 1.22 | 1.54 | 1.07 | 1.05 | 1.92 | 0.95 | 1.00 | 0.84 | 1.18 |
| 6102 | 1.04 | 0.87 | 1.23 | 1.24 | 2.90 | 1.36 | 1.74 | 0.99 | 1.56 | 1.65 | 1.46 | 1.89 | 2.30 | 1.60 | 1.40 | 2.03 | 1.30 | 1.37 | 1.12 | 1.23 |
| 6103 | 0.20 | 0.18 | 0.23 | 0.23 | 0.48 | 0.25 | 0.30 | 0.18 | 0.28 | 0.30 | 0.27 | 0.38 | 0.44 | 0.32 | 0.27 | 0.33 | 0.24 | 0.25 | 0.22 | 1.15 |
| 6104 | 1.02 | 1.12 | 0.97 | 0.94 | 1.66 | 1.11 | 1.28 | 1.15 | 1.47 | 2.26 | 1.54 | 2.17 | 2.27 | 2.30 | 1.63 | 1.12 | 1.10 | 1.05 | 1.33 | 0.79 |
| 6105 | 0.77 | 0.33 | 0.32 | 0.53 | 1.67 | 0.53 | 0.91 | 0.50 | 0.91 | 1.57 | 0.76 | 1.18 | 1.79 | 0.94 | 0.87 | 1.45 | 0.58 | 0.57 | 0.56 | 1.01 |
| 6106 | 0.30 | 0.36 | 0.30 | 0.28 | 0.51 | 0.33 | 0.39 | 0.29 | 0.43 | 0.48 | 0.44 | 0.62 | 0.65 | 0.70 | 0.46 | 0.41 | 0.33 | 0.31 | 0.40 | 0.78 |
| 6107 | 0.71 | 0.66 | 0.94 | 0.88 | 1.92 | 0.99 | 1.15 | 0.71 | 1.13 | 1.10 | 1.00 | 1.44 | 1.62 | 1.08 | 0.99 | 1.08 | 0.93 | 0.99 | 0.81 | 1.21 |
| 6108 | 0.95 | 0.86 | 1.20 | 1.17 | 3.07 | 1.31 | 1.78 | 0.98 | 1.53 | 1.78 | 1.44 | 1.58 | 2.18 | 1.19 | 1.39 | 2.66 | 1.26 | 1.33 | 1.09 | 1.22 |
| 6109 | 0.24 | 0.16 | 0.17 | 0.23 | 0.37 | 0.22 | 0.27 | 0.17 | 0.30 | 0.32 | 0.24 | 0.49 | 0.58 | 0.51 | 0.27 | 0.14 | 0.22 | 0.22 | 0.22 | 1.03 |
| 6110 | 0.79 | 0.77 | 1.03 | 0.95 | 2.10 | 1.07 | 1.26 | 0.81 | 1.26 | 1.27 | 1.10 | 1.63 | 1.76 | 1.23 | 1.11 | 1.18 | 1.02 | 1.07 | 0.93 | 1.16 |
| 6111 | 0.64 | 0.32 | 0.38 | 0.58 | 2.05 | 0.51 | 1.01 | 0.47 | 0.88 | 1.58 | 0.82 | 0.90 | 1.55 | 0.72 | 0.80 | 2.23 | 0.60 | 0.62 | 0.54 | 1.14 |
| 6112 | 0.17 | 0.14 | 0.12 | 0.15 | 0.42 | 0.15 | 0.22 | 0.17 | 0.29 | 0.36 | 0.24 | 0.34 | 0.41 | 0.37 | 0.24 | 0.31 | 0.17 | 0.16 | 0.19 | 0.86 |
| 6113 | 0.06 | 0.06 | 0.03 | 0.04 | 0.09 | 0.05 | 0.07 | 0.07 | 0.09 | 0.17 | 0.08 | 0.14 | 0.17 | 0.24 | 0.10 | 0.06 | 0.05 | 0.05 | 0.07 | 0.63 |
| 6114 | 0.36 | 0.17 | 0.23 | 0.28 | 1.04 | 0.34 | 0.52 | 0.34 | 0.51 | 1.06 | 0.42 | 0.69 | 1.07 | 0.58 | 0.47 | 0.75 | 0.33 | 0.34 | 0.31 | 1.07 |
| 6115 | 0.85 | 0.86 | 1.20 | 1.12 | 2.18 | 1.24 | 1.50 | 0.83 | 1.36 | 1.33 | 1.21 | 1.73 | 1.89 | 1.42 | 1.21 | 1.57 | 1.16 | 1.23 | 1.03 | 1.20 |
| 6116 | 0.15 | 0.21 | 0.18 | 0.17 | 0.28 | 0.20 | 0.22 | 0.16 | 0.26 | 0.25 | 0.24 | 0.37 | 0.36 | 0.38 | 0.24 | 0.22 | 0.19 | 0.19 | 0.23 | 0.81 |
| 6117 | 0.60 | 0.36 | 0.45 | 0.53 | 1.29 | 0.57 | 0.77 | 0.53 | 0.85 | 1.02 | 0.68 | 1.07 | 1.27 | 0.85 | 0.71 | 0.74 | 0.57 | 0.58 | 0.51 | 1.14 |
| 6118 | 0.65 | 0.25 | 0.38 | 0.70 | 1.54 | 0.47 | 0.71 | 0.39 | 0.68 | 1.00 | 0.58 | 1.05 | 1.43 | 0.75 | 0.68 | 1.15 | 0.59 | 0.62 | 0.43 | 1.43 |
| 6119 | 0.12 | 0.10 | 0.08 | 0.09 | 0.17 | 0.11 | 0.14 | 0.10 | 0.17 | 0.20 | 0.15 | 0.25 | 0.29 | 0.37 | 0.16 | 0.09 | 0.11 | 0.10 | 0.13 | 0.76 |
| 6120 | 0.68 | 0.50 | 0.73 | 0.80 | 1.94 | 0.81 | 1.18 | 0.64 | 1.08 | 1.23 | 0.90 | 1.12 | 1.41 | 0.94 | 0.90 | 1.75 | 0.81 | 0.86 | 0.67 | 1.29 |
| 6121 | 0.67 | 0.31 | 0.41 | 0.71 | 1.72 | 0.53 | 0.88 | 0.48 | 0.81 | 1.19 | 0.73 | 1.01 | 1.43 | 0.77 | 0.77 | 1.53 | 0.64 | 0.67 | 0.51 | 1.32 |
| 6122 | 0.16 | 0.19 | 0.16 | 0.18 | 0.25 | 0.19 | 0.23 | 0.17 | 0.29 | 0.24 | 0.25 | 0.41 | 0.42 | 0.48 | 0.24 | 0.12 | 0.19 | 0.19 | 0.22 | 0.85 |
| 6123 | 0.61 | 0.53 | 0.58 | 0.55 | 1.59 | 0.63 | 0.72 | 0.54 | 0.89 | 0.93 | 0.75 | 1.06 | 1.18 | 0.94 | 0.76 | 0.78 | 0.64 | 0.64 | 0.63 | 1.01 |
| 6124 | 0.54 | 0.22 | 0.27 | 0.47 | 1.23 | 0.42 | 0.62 | 0.35 | 0.65 | 1.10 | 0.53 | 1.05 | 1.50 | 0.75 | 0.58 | 0.79 | 0.46 | 0.46 | 0.40 | 1.15 |
| 6125 | 0.79 | 0.55 | 0.70 | 0.66 | 2.44 | 0.74 | 0.91 | 0.60 | 1.26 | 1.01 | 0.85 | 1.16 | 1.35 | 0.63 | 0.82 | 1.31 | 0.78 | 0.80 | 0.68 | 1.17 |
| 6126 | 0.45 | 0.43 | 0.56 | 0.52 | 1.15 | 0.57 | 0.74 | 0.49 | 0.74 | 0.77 | 0.64 | 0.81 | 0.99 | 0.74 | 0.64 | 0.92 | 0.56 | 0.58 | 0.53 | 1.11 |
| 6127 | 0.42 | 0.40 | 0.47 | 0.52 | 1.01 | 0.52 | 0.67 | 0.44 | 0.66 | 0.69 | 0.60 | 0.80 | 0.98 | 0.66 | 0.61 | 0.84 | 0.52 | 0.54 | 0.49 | 1.11 |
| 6128 | 0.51 | 0.45 | 0.58 | 0.59 | 1.27 | 0.64 | 0.81 | 0.53 | 0.81 | 0.82 | 0.71 | 0.93 | 1.13 | 0.81 | 0.69 | 0.99 | 0.62 | 0.65 | 0.56 | 1.15 |
| 6129 | 0.50 | 0.18 | 0.26 | 0.37 | 1.40 | 0.41 | 0.57 | 0.30 | 0.52 | 0.99 | 0.50 | 0.74 | 1.31 | 0.66 | 0.54 | 1.06 | 0.41 | 0.42 | 0.35 | 1.20 |
| 6130 | 1.01 | 0.74 | 1.07 | 1.07 | 2.92 | 1.15 | 1.34 | 0.85 | 1.50 | 1.27 | 1.19 | 1.63 | 1.90 | 1.23 | 1.08 | 1.58 | 1.13 | 1.20 | 0.92 | 1.30 |
| 6131 | 0.19 | 0.29 | 0.19 | 0.20 | 0.36 | 0.22 | 0.30 | 0.25 | 0.37 | 0.40 | 0.34 | 0.47 | 0.49 | 0.56 | 0.34 | 0.29 | 0.23 | 0.22 | 0.32 | 0.68 |
| 6132 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6133 | 0.60 | 0.65 | 0.86 | 0.81 | 1.46 | 0.90 | 1.02 | 0.70 | 0.99 | 0.87 | 0.87 | 1.30 | 1.39 | 1.05 | 0.87 | 0.87 | 0.84 | 0.88 | 0.76 | 1.16 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab | 21 | 39 | 57 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | Total | Light | Heavy | H/L |
| ID | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | REE | REE | REE | Ratio |
| 6101 | 1.58 | 1.42 | 1.91 | 1.80 | 5.01 | 2.01 | 2.67 | 1.56 | 2.48 | 2.87 | 2.25 | 2.55 | 3.22 | 2.22 | 2.18 | 4.00 | 1.98 | 2.08 | 1.76 | 1.18 |
| 6102 | 1.24 | 1.04 | 1.47 | 1.48 | 3.46 | 1.62 | 2.07 | 1.18 | 1.86 | 1.97 | 1.75 | 2.26 | 2.74 | 1.91 | 1.67 | 2.42 | 1.55 | 1.64 | 1.33 | 1.23 |
| 6103 | 1.69 | 1.50 | 1.95 | 2.01 | 4.06 | 2.12 | 2.56 | 1.57 | 2.37 | 2.58 | 2.27 | 3.28 | 3.74 | 2.75 | 2.33 | 2.80 | 2.06 | 2.15 | 1.86 | 1.15 |
| 6104 | 2.38 | 2.63 | 2.27 | 2.20 | 3.90 | 2.59 | 3.00 | 2.69 | 3.44 | 5.29 | 3.61 | 5.07 | 5.31 | 5.39 | 3.82 | 2.62 | 2.57 | 2.45 | 3.11 | 0.79 |
| 6105 | 0.90 | 0.38 | 0.37 | 0.62 | 1.94 | 0.62 | 1.05 | 0.58 | 1.05 | 1.83 | 0.88 | 1.37 | 2.08 | 1.09 | 1.01 | 1.68 | 0.68 | 0.66 | 0.65 | 1.01 |
| 6106 | 2.47 | 2.97 | 2.47 | 2.34 | 4.23 | 2.73 | 3.20 | 2.43 | 3.59 | 3.99 | 3.66 | 5.17 | 5.37 | 5.83 | 3.80 | 3.40 | 2.74 | 2.61 | 3.35 | 0.78 |
| 6107 | 1.56 | 1.45 | 2.06 | 1.92 | 4.19 | 2.15 | 2.51 | 1.56 | 2.45 | 2.40 | 2.17 | 3.13 | 3.54 | 2.34 | 2.16 | 2.35 | 2.03 | 2.15 | 1.77 | 1.21 |
| 6108 | 1.22 | 1.10 | 1.54 | 1.50 | 3.93 | 1.67 | 2.28 | 1.26 | 1.96 | 2.28 | 1.85 | 2.03 | 2.79 | 1.53 | 1.78 | 3.41 | 1.61 | 1.71 | 1.40 | 1.22 |
| 6109 | 1.36 | 0.93 | 0.96 | 1.31 | 2.16 | 1.28 | 1.53 | 1.00 | 1.74 | 1.82 | 1.40 | 2.84 | 3.33 | 2.94 | 1.56 | 0.78 | 1.29 | 1.29 | 1.24 | 1.03 |
| 6110 | 1.63 | 1.58 | 2.11 | 1.96 | 4.31 | 2.21 | 2.60 | 1.66 | 2.59 | 2.60 | 2.26 | 3.34 | 3.63 | 2.52 | 2.27 | 2.43 | 2.10 | 2.20 | 1.90 | 1.16 |
| 6111 | 0.82 | 0.41 | 0.49 | 0.75 | 2.64 | 0.65 | 1.30 | 0.60 | 1.13 | 2.03 | 1.05 | 1.17 | 2.00 | 0.92 | 1.03 | 2.88 | 0.78 | 0.80 | 0.70 | 1.14 |
| 6112 | 1.62 | 1.36 | 1.16 | 1.40 | 4.03 | 1.46 | 2.08 | 1.60 | 2.74 | 3.45 | 2.32 | 3.22 | 3.91 | 3.55 | 2.26 | 2.93 | 1.61 | 1.56 | 1.80 | 0.86 |
| 6113 | 1.85 | 1.61 | 0.92 | 1.21 | 2.57 | 1.51 | 2.01 | 2.16 | 2.76 | 4.83 | 2.46 | 4.05 | 4.99 | 7.08 | 2.87 | 1.75 | 1.55 | 1.36 | 2.16 | 0.63 |
| 6114 | 0.77 | 0.37 | 0.49 | 0.60 | 2.22 | 0.73 | 1.11 | 0.73 | 1.08 | 2.25 | 0.90 | 1.47 | 2.29 | 1.24 | 1.00 | 1.61 | 0.71 | 0.72 | 0.67 | 1.07 |
| 6115 | 1.46 | 1.48 | 2.05 | 1.93 | 3.74 | 2.13 | 2.57 | 1.43 | 2.33 | 2.29 | 2.08 | 2.97 | 3.24 | 2.45 | 2.08 | 2.69 | 2.00 | 2.12 | 1.76 | 1.20 |
| 6116 | 2.49 | 3.53 | 2.99 | 2.83 | 4.69 | 3.23 | 3.70 | 2.60 | 4.26 | 4.19 | 3.88 | 6.08 | 5.94 | 6.20 | 4.00 | 3.69 | 3.19 | 3.11 | 3.84 | 0.81 |
| 6117 | 1.44 | 0.87 | 1.07 | 1.28 | 3.11 | 1.38 | 1.85 | 1.28 | 2.05 | 2.44 | 1.62 | 2.57 | 3.05 | 2.05 | 1.70 | 1.79 | 1.37 | 1.39 | 1.23 | 1.14 |
| 6118 | 0.95 | 0.37 | 0.55 | 1.03 | 2.26 | 0.69 | 1.04 | 0.58 | 1.00 | 1.46 | 0.85 | 1.55 | 2.10 | 1.10 | 1.00 | 1.68 | 0.86 | 0.91 | 0.64 | 1.43 |
| 6119 | 1.97 | 1.68 | 1.24 | 1.50 | 2.71 | 1.77 | 2.22 | 1.71 | 2.80 | 3.28 | 2.46 | 4.08 | 4.67 | 6.11 | 2.59 | 1.48 | 1.75 | 1.62 | 2.13 | 0.76 |
| 6120 | 1.32 | 0.98 | 1.42 | 1.55 | 3.78 | 1.57 | 2.30 | 1.24 | 2.11 | 2.40 | 1.75 | 2.18 | 2.75 | 1.83 | 1.75 | 3.41 | 1.58 | 1.68 | 1.31 | 1.29 |
| 6121 | 1.08 | 0.50 | 0.66 | 1.15 | 2.76 | 0.86 | 1.42 | 0.76 | 1.30 | 1.91 | 1.18 | 1.63 | 2.30 | 1.24 | 1.23 | 2.45 | 1.02 | 1.07 | 0.81 | 1.32 |
| 6122 | 2.38 | 2.72 | 2.36 | 2.59 | 3.64 | 2.80 | 3.37 | 2.45 | 4.23 | 3.50 | 3.62 | 6.06 | 6.21 | 6.97 | 3.52 | 1.81 | 2.77 | 2.71 | 3.21 | 0.85 |
| 6123 | 2.01 | 1.74 | 1.91 | 1.81 | 5.23 | 2.07 | 2.39 | 1.79 | 2.93 | 3.06 | 2.47 | 3.49 | 3.91 | 3.09 | 2.50 | 2.56 | 2.10 | 2.11 | 2.09 | 1.01 |
| 6124 | 0.79 | 0.32 | 0.40 | 0.69 | 1.79 | 0.61 | 0.90 | 0.51 | 0.94 | 1.61 | 0.77 | 1.53 | 2.18 | 1.09 | 0.85 | 1.15 | 0.67 | 0.68 | 0.59 | 1.15 |
| 6125 | 1.60 | 1.11 | 1.40 | 1.33 | 4.90 | 1.49 | 1.82 | 1.21 | 2.53 | 2.04 | 1.70 | 2.34 | 2.72 | 1.26 | 1.64 | 2.64 | 1.56 | 1.61 | 1.37 | 1.17 |
| 6126 | 1.35 | 1.30 | 1.66 | 1.56 | 3.45 | 1.71 | 2.20 | 1.45 | 2.21 | 2.30 | 1.93 | 2.42 | 2.96 | 2.21 | 1.91 | 2.76 | 1.68 | 1.75 | 1.57 | 1.11 |
| 6127 | 1.22 | 1.16 | 1.37 | 1.52 | 2.94 | 1.50 | 1.95 | 1.27 | 1.92 | 2.00 | 1.75 | 2.32 | 2.83 | 1.91 | 1.76 | 2.45 | 1.52 | 1.58 | 1.43 | 1.11 |
| 6128 | 1.29 | 1.12 | 1.47 | 1.48 | 3.20 | 1.61 | 2.05 | 1.32 | 2.04 | 2.07 | 1.78 | 2.34 | 2.85 | 2.04 | 1.74 | 2.50 | 1.56 | 1.63 | 1.41 | 1.15 |
| 6129 | 0.73 | 0.26 | 0.39 | 0.54 | 2.03 | 0.60 | 0.83 | 0.43 | 0.76 | 1.45 | 0.73 | 1.08 | 1.90 | 0.97 | 0.78 | 1.54 | 0.60 | 0.61 | 0.50 | 1.20 |
| 6130 | 1.40 | 1.02 | 1.48 | 1.47 | 4.03 | 1.58 | 1.84 | 1.18 | 2.07 | 1.75 | 1.64 | 2.25 | 2.62 | 1.69 | 1.50 | 2.18 | 1.56 | 1.65 | 1.27 | 1.30 |
| 6131 | 2.62 | 4.04 | 2.54 | 2.71 | 4.90 | 3.09 | 4.06 | 3.46 | 5.14 | 5.50 | 4.62 | 6.48 | 6.77 | 7.69 | 4.67 | 4.04 | 3.22 | 2.99 | 4.43 | 0.68 |
| 6132 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6133 | 1.41 | 1.54 | 2.03 | 1.91 | 3.45 | 2.13 | 2.41 | 1.66 | 2.34 | 2.06 | 2.06 | 3.06 | 3.28 | 2.48 | 2.06 | 2.05 | 1.97 | 2.09 | 1.80 | 1.16 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6134 | 223.8 | Plant 19 | Fine Reject (+ x 100M / 1.9 x Snk SG) | 88.91 |
| 6135 | 96.9 | Plant 19 | Coarse Reject (100M x 0) | 79.99 |
| 6136 | 24.4 | Plant 19 | Coarse Reject (1mm x 100M / Flt x 1.5 SG) | 6.84 |
| 6137 | 9 | Plant 19 | Coarse Reject (1mm x 100M / 1.5 x 1.6 SG) | 28.3 |
| 6138 | 27 | Plant 19 | Coarse Reject (1mm x 100M / 1.6 x 1.9 SG) | 44.1 |
| 6139 | 245 | Plant 19 | Coarse Reject (1mm x 100M / 1.9 x Snk SG) | 88.92 |
| 6140 | 14.9 | Plant 19 | Coarse Reject (1/8" x 1mm / Flt x 1.5 SG) | 6.34 |
| 6141 | 9.7 | Plant 19 | Coarse Reject (1/8" x 1mm / 1.5 x 1.6 SG) | 30.43 |
| 6142 | 28 | Plant 19 | Coarse Reject (1/8" x 1mm / 1.6 x 1.9 SG) | 45.07 |
| 6143 | 157 | Plant 19 | Coarse Reject (1/8" x 1mm / 1.9 x Snk SG) | 89.73 |
| 6144 | 228.9 | Plant 19 | Coarse Reject (3/8" x 1/8" / Flt x 1.5 SG) | 8.14 |
| 6145 | 42.8 | Plant 19 | Coarse Reject (3/8" x 1/8" / 1.5 x 1.6 SG) | 28.82 |
| 6146 | 135.8 | Plant 19 | Coarse Reject (3/8" x 1/8" / 1.6 x 1.9 SG) | 51.18 |
| 6147 | 154.9 | Plant 19 | Coarse Reject (3/8" x 1/8" / 1.9 x Snk SG) | 88.78 |
| 6148 | 721 | Plant 19 | Coarse Reject (+ x 3/8" / Flt x 1.5 SG) | 10.14 |
| 6149 | 151.2 | Plant 19 | Coarse Reject (+ x 3/8" / 1.5 x 1.6 SG) | 30.14 |
| 6150 | 147.3 | Plant 19 | Coarse Reject (+ x 3/8" / 1.6 x 1.9 SG) | 51.5 |
| 6151 | 161.4 | Plant 19 | Coarse Reject (+ x 3/8" / 1.9 x Snk SG) | 89.44 |
| 6152 | 60.6 | Plant 19 | Clean Coal (100M x 0) | 12.29 |
| 6153 | 398 | Plant 19 | Clean Coal (1mm x 100M / Flt x 1.5 SG) | 4.26 |
| 6154 | 9.6 | Plant 19 | Clean Coal (1mm x 100M / 1.5 x 1.6 SG) | 28.71 |
| 6155 | 8 | Plant 19 | Clean Coal (1mm x 100M / 1.6 x 1.9 SG) | 42.84 |
| 6156 | 25.4 | Plant 19 | Clean Coal (1mm x 100M / 1.9 x Snk SG) | 80.7 |
| 6157 | 403.7 | Plant 19 | Clean Coal (1/8" x 1mm / Flt x 1.5 SG) | 5.6 |
| 6158 | 8.4 | Plant 19 | Clean Coal (1/8" x 1mm / 1.5 x 1.6 SG) | 28.96 |
| 6159 | 8 | Plant 19 | Clean Coal (1/8" x 1mm / 1.6 x 1.9 SG) | 39.45 |
| 6160 | 8 | Plant 19 | Clean Coal (1/8" x 1mm / 1.9 x Snk SG) | 80.94 |
| 6161 | 422 | Plant 19 | Clean Coal (3/8" x 1/8" / Flt x 1.5 SG) | 6.68 |
| 6162 | 150.1 | Plant 19 | Clean Coal (3/8" x 1/8" / 1.5 x 1.6 SG) | 32.05 |
| 6163 | 147.4 | Plant 19 | Clean Coal (3/8" x 1/8" / 1.6 x 1.9 SG) | 43.57 |
| 6164 | 66 | Plant 19 | Clean Coal (3/8" x 1/8" / 1.9 x Snk SG) | 73.35 |
| 6165 | 405.6 | Plant 19 | Clean Coal (+ x 3/8" / Flt x 1.5 SG) | 7.74 |
| 6166 | 163.3 | Plant 19 | Clean Coal (+ x 3/8" / 1.5 x 1.6 SG) | 34.4 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6134 | 19.39 | 24.27 | 45.46 | 84.73 | 24.26 | 42.80 | 10.51 | 1.55 | 7.47 | 1.17 | 6.20 | 1.66 | 5.11 | 0.56 | 3.06 | 0.92 | 279.1 | 216.8 | 42.9 | 0.20 |
| 6135 | 19.35 | 24.43 | 41.97 | 80.60 | 25.97 | 41.89 | 10.36 | 1.55 | 7.73 | 1.28 | 6.41 | 1.71 | 5.38 | 0.52 | 3.14 | 1.00 | 273.3 | 210.1 | 43.9 | 0.21 |
| 6136 | 43.37 | 95.18 | 74.32 | 148.67 | 34.63 | 83.23 | 20.31 | 5.33 | 19.01 | 5.04 | 19.26 | 5.38 | 16.24 | 2.46 | 10.45 | 1.58 | 584.5 | 385.5 | 155.6 | 0.40 |
| 6137 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6138 | 22.93 | 38.65 | 61.95 | 115.18 | 26.98 | 59.69 | 13.77 | 2.32 | 9.82 | 1.72 | 8.60 | 2.39 | 7.21 | 0.83 | 4.41 | 1.07 | 377.5 | 289.7 | 64.9 | 0.22 |
| 6139 | 16.95 | 18.16 | 31.30 | 76.07 | 19.31 | 32.95 | 8.30 | 1.22 | 5.74 | 1.00 | 5.29 | 1.51 | 4.77 | 0.53 | 2.62 | 0.74 | 226.5 | 174.9 | 34.6 | 0.20 |
| 6140 | 43.35 | 103.36 | 81.91 | 161.04 | 40.17 | 87.25 | 22.74 | 4.11 | 20.34 | 3.94 | 19.55 | 4.61 | 13.29 | 2.44 | 9.58 | 2.08 | 619.8 | 417.6 | 158.9 | 0.38 |
| 6141 | 30.41 | 47.46 | 69.83 | 131.89 | 27.31 | 66.85 | 15.44 | 2.41 | 11.54 | 2.10 | 10.38 | 3.05 | 8.39 | 1.02 | 5.35 | 0.94 | 434.3 | 325.3 | 78.7 | 0.24 |
| 6142 | 22.88 | 29.12 | 44.99 | 97.73 | 23.37 | 48.62 | 12.10 | 2.04 | 8.70 | 1.73 | 6.66 | 2.13 | 6.86 | 0.73 | 4.10 | 0.98 | 312.7 | 237.5 | 52.3 | 0.22 |
| 6143 | 14.35 | 12.29 | 17.69 | 48.39 | 14.99 | 23.43 | 6.08 | 0.90 | 4.28 | 1.00 | 4.25 | 1.20 | 4.41 | 0.41 | 2.14 | 0.53 | 156.3 | 115.8 | 26.2 | 0.23 |
| 6144 | 41.91 | 103.95 | 81.43 | 152.67 | 34.00 | 82.00 | 21.42 | 3.79 | 18.68 | 3.58 | 18.45 | 4.74 | 12.98 | 2.79 | 9.55 | 2.05 | 594.0 | 394.0 | 158.1 | 0.40 |
| 6145 | 28.80 | 46.00 | 61.24 | 114.38 | 29.31 | 61.67 | 15.61 | 3.04 | 11.69 | 2.45 | 10.10 | 2.51 | 7.76 | 0.84 | 5.44 | 1.44 | 402.3 | 296.9 | 76.6 | 0.26 |
| 6146 | 17.72 | 15.32 | 20.31 | 62.33 | 16.45 | 27.88 | 6.97 | 1.25 | 4.90 | 1.27 | 4.76 | 1.49 | 5.11 | 0.49 | 2.68 | 0.64 | 189.6 | 140.1 | 31.8 | 0.23 |
| 6147 | 16.71 | 18.37 | 29.59 | 71.58 | 17.91 | 33.26 | 8.23 | 1.23 | 5.75 | 1.12 | 5.33 | 1.50 | 5.08 | 0.50 | 2.69 | 0.63 | 219.5 | 167.6 | 35.2 | 0.21 |
| 6148 | 36.61 | 90.36 | 82.47 | 151.87 | 27.90 | 81.96 | 18.85 | 3.66 | 17.07 | 2.57 | 16.02 | 4.65 | 11.91 | 2.27 | 7.87 | 1.23 | 557.3 | 383.8 | 136.9 | 0.36 |
| 6149 | 27.60 | 43.20 | 63.19 | 114.56 | 25.47 | 58.39 | 13.65 | 2.71 | 10.25 | 2.12 | 9.47 | 2.59 | 7.26 | 0.96 | 5.00 | 1.02 | 387.4 | 288.2 | 71.6 | 0.25 |
| 6150 | 22.54 | 32.92 | 55.00 | 108.11 | 23.00 | 53.75 | 12.42 | 2.10 | 8.69 | 1.50 | 7.67 | 2.19 | 6.62 | 0.68 | 4.02 | 0.95 | 342.2 | 263.1 | 56.6 | 0.22 |
| 6151 | 15.88 | 15.87 | 26.29 | 62.60 | 19.47 | 29.77 | 8.06 | 1.11 | 5.30 | 1.17 | 5.02 | 1.25 | 4.59 | 0.37 | 2.45 | 0.88 | 200.1 | 152.6 | 31.6 | 0.21 |
| 6152 | 32.98 | 63.47 | 57.49 | 109.66 | 38.78 | 60.44 | 15.22 | 2.94 | 14.83 | 2.65 | 12.77 | 3.22 | 9.51 | 1.46 | 6.15 | 1.60 | 433.2 | 299.4 | 100.8 | 0.34 |
| 6153 | 46.51 | 129.29 | 90.59 | 186.12 | 49.43 | 104.58 | 27.33 | 4.93 | 26.02 | 4.55 | 24.09 | 5.69 | 15.52 | 3.02 | 11.28 | 2.71 | 731.7 | 489.0 | 196.2 | 0.40 |
| 6154 | 24.28 | 45.25 | 62.16 | 115.49 | 27.67 | 59.34 | 13.91 | 2.43 | 10.60 | 1.82 | 9.50 | 2.62 | 7.39 | 0.95 | 4.66 | 1.12 | 389.2 | 291.6 | 73.3 | 0.25 |
| 6155 | 21.49 | 36.79 | 58.62 | 107.30 | 27.04 | 55.03 | 12.65 | 2.10 | 9.43 | 1.53 | 7.95 | 2.12 | 6.27 | 0.79 | 3.95 | 1.02 | 354.1 | 272.2 | 60.4 | 0.22 |
| 6156 | 19.49 | 22.32 | 47.22 | 87.71 | 28.16 | 43.56 | 11.14 | 1.24 | 6.80 | 1.29 | 6.12 | 1.31 | 4.82 | 0.56 | 3.02 | 1.17 | 285.9 | 225.8 | 40.6 | 0.18 |
| 6157 | 43.07 | 118.53 | 86.83 | 163.15 | 34.95 | 88.49 | 22.60 | 3.90 | 20.85 | 3.52 | 19.82 | 5.27 | 13.92 | 3.06 | 10.02 | 2.04 | 640.0 | 420.8 | 176.2 | 0.42 |
| 6158 | 25.30 | 36.52 | 48.06 | 95.91 | 25.73 | 51.01 | 11.89 | 2.22 | 9.52 | 1.86 | 8.65 | 2.47 | 7.30 | 0.87 | 4.29 | 0.89 | 332.5 | 244.3 | 62.9 | 0.26 |
| 6159 | 25.24 | 41.57 | 63.48 | 117.12 | 30.71 | 60.71 | 14.14 | 2.47 | 10.85 | 1.89 | 9.19 | 2.58 | 7.52 | 0.84 | 4.66 | 1.19 | 394.2 | 299.5 | 69.4 | 0.23 |
| 6160 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6161 | 42.09 | 113.26 | 87.13 | 164.49 | 32.25 | 89.41 | 22.15 | 3.77 | 20.31 | 3.29 | 19.33 | 5.33 | 13.96 | 3.14 | 9.73 | 1.76 | 631.4 | 419.5 | 169.8 | 0.40 |
| 6162 | 27.79 | 47.74 | 68.13 | 125.30 | 24.19 | 66.04 | 14.04 | 2.63 | 11.13 | 1.75 | 9.81 | 3.12 | 8.40 | 1.03 | 4.99 | 0.77 | 416.8 | 311.5 | 77.6 | 0.25 |
| 6163 | 23.45 | 35.95 | 59.77 | 110.46 | 24.51 | 56.86 | 12.58 | 2.18 | 9.40 | 1.52 | 8.10 | 2.40 | 6.84 | 0.80 | 4.12 | 0.83 | 359.8 | 275.8 | 60.6 | 0.22 |
| 6164 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 6165 | 26.55 | 40.48 | 66.74 | 129.25 | 19.23 | 62.22 | 12.35 | 2.35 | 9.81 | 1.32 | 8.62 | 3.13 | 8.00 | 1.02 | 4.39 | 0.38 | 395.8 | 302.0 | 67.3 | 0.22 |
| 6166 | 36.71 | 84.85 | 78.54 | 151.93 | 28.92 | 80.76 | 19.56 | 3.80 | 18.25 | 2.77 | 16.24 | 4.56 | 12.73 | 2.64 | 8.13 | 1.23 | 551.6 | 381.8 | 133.1 | 0.35 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6134 | 17.24 | 21.58 | 40.42 | 75.34 | 21.57 | 38.05 | 9.35 | 1.38 | 6.65 | 1.04 | 5.51 | 1.48 | 4.54 | 0.50 | 2.72 | 0.81 | 248.2 | 192.7 | 38.2 | 0.198 |
| 6135 | 15.48 | 19.54 | 33.58 | 64.47 | 20.77 | 33.51 | 8.29 | 1.24 | 6.19 | 1.03 | 5.13 | 1.36 | 4.30 | 0.42 | 2.51 | 0.80 | 218.6 | 168.0 | 35.1 | 0.209 |
| 6136 | 2.97 | 6.51 | 5.08 | 10.17 | 2.37 | 5.69 | 1.39 | 0.36 | 1.30 | 0.34 | 1.32 | 0.37 | 1.11 | 0.17 | 0.71 | 0.11 | 40.0 | 26.4 | 10.6 | 0.404 |
| 6137 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6138 | 10.11 | 17.04 | 27.32 | 50.79 | 11.90 | 26.32 | 6.07 | 1.02 | 4.33 | 0.76 | 3.79 | 1.05 | 3.18 | 0.37 | 1.94 | 0.47 | 166.5 | 127.8 | 28.6 | 0.224 |
| 6139 | 15.07 | 16.15 | 27.83 | 67.64 | 17.17 | 29.30 | 7.38 | 1.09 | 5.10 | 0.88 | 4.70 | 1.35 | 4.24 | 0.47 | 2.33 | 0.65 | 201.4 | 155.5 | 30.8 | 0.198 |
| 6140 | 2.75 | 6.55 | 5.19 | 10.21 | 2.55 | 5.53 | 1.44 | 0.26 | 1.29 | 0.25 | 1.24 | 0.29 | 0.84 | 0.15 | 0.61 | 0.13 | 39.3 | 26.5 | 10.1 | 0.38 |
| 6141 | 9.25 | 14.44 | 21.25 | 40.13 | 8.31 | 20.34 | 4.70 | 0.73 | 3.51 | 0.64 | 3.16 | 0.93 | 2.55 | 0.31 | 1.63 | 0.28 | 132.2 | 99.0 | 23.9 | 0.242 |
| 6142 | 10.31 | 13.13 | 20.28 | 44.04 | 10.53 | 21.91 | 5.45 | 0.92 | 3.92 | 0.78 | 3.00 | 0.96 | 3.09 | 0.33 | 1.85 | 0.44 | 141.0 | 107.1 | 23.6 | 0.22 |
| 6143 | 12.88 | 11.03 | 15.87 | 43.42 | 13.45 | 21.03 | 5.45 | 0.81 | 3.84 | 0.90 | 3.81 | 1.08 | 3.96 | 0.36 | 1.92 | 0.47 | 140.3 | 103.9 | 23.5 | 0.227 |
| 6144 | 3.41 | 8.46 | 6.63 | 12.43 | 2.77 | 6.67 | 1.74 | 0.31 | 1.52 | 0.29 | 1.50 | 0.39 | 1.06 | 0.23 | 0.78 | 0.17 | 48.4 | 32.1 | 12.9 | 0.401 |
| 6145 | 8.30 | 13.26 | 17.65 | 32.96 | 8.45 | 17.77 | 4.50 | 0.88 | 3.37 | 0.71 | 2.91 | 0.72 | 2.24 | 0.24 | 1.57 | 0.42 | 115.9 | 85.6 | 22.1 | 0.258 |
| 6146 | 9.07 | 7.84 | 10.40 | 31.90 | 8.42 | 14.27 | 3.57 | 0.64 | 2.51 | 0.65 | 2.44 | 0.76 | 2.61 | 0.25 | 1.37 | 0.33 | 97.0 | 71.7 | 16.3 | 0.227 |
| 6147 | 14.83 | 16.31 | 26.27 | 63.55 | 15.90 | 29.52 | 7.31 | 1.10 | 5.11 | 0.99 | 4.74 | 1.33 | 4.51 | 0.45 | 2.39 | 0.56 | 194.9 | 148.8 | 31.3 | 0.21 |
| 6148 | 3.71 | 9.16 | 8.36 | 15.40 | 2.83 | 8.31 | 1.91 | 0.37 | 1.73 | 0.26 | 1.62 | 0.47 | 1.21 | 0.23 | 0.80 | 0.12 | 56.5 | 38.9 | 13.9 | 0.357 |
| 6149 | 8.32 | 13.02 | 19.05 | 34.53 | 7.68 | 17.60 | 4.11 | 0.82 | 3.09 | 0.64 | 2.85 | 0.78 | 2.19 | 0.29 | 1.51 | 0.31 | 116.8 | 86.9 | 21.6 | 0.248 |
| 6150 | 11.61 | 16.95 | 28.32 | 55.68 | 11.84 | 27.68 | 6.40 | 1.08 | 4.47 | 0.77 | 3.95 | 1.13 | 3.41 | 0.35 | 2.07 | 0.49 | 176.2 | 135.5 | 29.1 | 0.215 |
| 6151 | 14.20 | 14.19 | 23.52 | 55.99 | 17.41 | 26.62 | 7.21 | 0.99 | 4.74 | 1.05 | 4.49 | 1.12 | 4.11 | 0.33 | 2.19 | 0.78 | 178.9 | 136.5 | 28.3 | 0.207 |
| 6152 | 4.05 | 7.80 | 7.07 | 13.48 | 4.77 | 7.43 | 1.87 | 0.36 | 1.82 | 0.33 | 1.57 | 0.40 | 1.17 | 0.18 | 0.76 | 0.20 | 53.2 | 36.8 | 12.4 | 0.337 |
| 6153 | 1.98 | 5.51 | 3.86 | 7.93 | 2.11 | 4.46 | 1.16 | 0.21 | 1.11 | 0.19 | 1.03 | 0.24 | 0.66 | 0.13 | 0.48 | 0.12 | 31.2 | 20.8 | 8.4 | 0.401 |
| 6154 | 6.97 | 12.99 | 17.85 | 33.16 | 7.94 | 17.04 | 3.99 | 0.70 | 3.04 | 0.52 | 2.73 | 0.75 | 2.12 | 0.27 | 1.34 | 0.32 | 111.7 | 83.7 | 21.0 | 0.251 |
| 6155 | 9.20 | 15.76 | 25.11 | 45.97 | 11.58 | 23.57 | 5.42 | 0.90 | 4.04 | 0.66 | 3.41 | 0.91 | 2.69 | 0.34 | 1.69 | 0.44 | 151.7 | 116.6 | 25.9 | 0.222 |
| 6156 | 15.73 | 18.01 | 38.11 | 70.78 | 22.73 | 35.15 | 8.99 | 1.00 | 5.49 | 1.04 | 4.94 | 1.06 | 3.89 | 0.45 | 2.44 | 0.94 | 230.7 | 182.2 | 32.8 | 0.18 |
| 6157 | 2.41 | 6.64 | 4.86 | 9.14 | 1.96 | 4.96 | 1.27 | 0.22 | 1.17 | 0.20 | 1.11 | 0.30 | 0.78 | 0.17 | 0.56 | 0.11 | 35.8 | 23.6 | 9.9 | 0.419 |
| 6158 | 7.33 | 10.58 | 13.92 | 27.77 | 7.45 | 14.77 | 3.44 | 0.64 | 2.76 | 0.54 | 2.50 | 0.72 | 2.11 | 0.25 | 1.24 | 0.26 | 96.3 | 70.8 | 18.2 | 0.257 |
| 6159 | 9.96 | 16.40 | 25.04 | 46.20 | 12.11 | 23.95 | 5.58 | 0.97 | 4.28 | 0.75 | 3.63 | 1.02 | 2.97 | 0.33 | 1.84 | 0.47 | 155.5 | 118.1 | 27.4 | 0.232 |
| 6160 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6161 | 2.81 | 7.57 | 5.82 | 10.99 | 2.15 | 5.97 | 1.48 | 0.25 | 1.36 | 0.22 | 1.29 | 0.36 | 0.93 | 0.21 | 0.65 | 0.12 | 42.2 | 28.0 | 11.3 | 0.405 |
| 6162 | 8.91 | 15.30 | 21.83 | 40.16 | 7.75 | 21.16 | 4.50 | 0.84 | 3.57 | 0.56 | 3.14 | 1.00 | 2.69 | 0.33 | 1.60 | 0.25 | 133.6 | 99.8 | 24.9 | 0.249 |
| 6163 | 10.22 | 15.66 | 26.04 | 48.13 | 10.68 | 24.78 | 5.48 | 0.95 | 4.09 | 0.66 | 3.53 | 1.05 | 2.98 | 0.35 | 1.79 | 0.36 | 156.8 | 120.1 | 26.4 | 0.22 |
| 6164 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6165 | 2.05 | 3.13 | 5.17 | 10.00 | 1.49 | 4.82 | 0.96 | 0.18 | 0.76 | 0.10 | 0.67 | 0.24 | 0.62 | 0.08 | 0.34 | 0.03 | 30.6 | 23.4 | 5.2 | 0.223 |
| 6166 | 12.63 | 29.19 | 27.02 | 52.26 | 9.95 | 27.78 | 6.73 | 1.31 | 6.28 | 0.95 | 5.59 | 1.57 | 4.38 | 0.91 | 2.80 | 0.42 | 189.8 | 131.3 | 45.8 | 0.349 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6134 | 1.08 | 0.90 | 1.35 | 1.26 | 3.22 | 1.41 | 1.76 | 1.06 | 1.66 | 1.59 | 1.45 | 1.85 | 2.16 | 1.50 | 1.36 | 2.33 | 1.35 | 1.44 | 1.12 | 1.28 |
| 6135 | 0.97 | 0.81 | 1.12 | 1.07 | 3.10 | 1.24 | 1.56 | 0.96 | 1.55 | 1.58 | 1.35 | 1.71 | 2.05 | 1.27 | 1.26 | 2.28 | 1.19 | 1.25 | 1.03 | 1.21 |
| 6136 | 0.19 | 0.27 | 0.17 | 0.17 | 0.35 | 0.21 | 0.26 | 0.28 | 0.33 | 0.53 | 0.35 | 0.46 | 0.53 | 0.51 | 0.36 | 0.31 | 0.22 | 0.20 | 0.31 | 0.63 |
| 6137 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6138 | 0.63 | 0.71 | 0.91 | 0.85 | 1.78 | 0.97 | 1.15 | 0.79 | 1.08 | 1.17 | 1.00 | 1.32 | 1.51 | 1.11 | 0.97 | 1.35 | 0.90 | 0.95 | 0.84 | 1.13 |
| 6139 | 0.94 | 0.67 | 0.93 | 1.13 | 2.56 | 1.09 | 1.39 | 0.84 | 1.28 | 1.36 | 1.24 | 1.68 | 2.02 | 1.42 | 1.16 | 1.87 | 1.09 | 1.16 | 0.90 | 1.28 |
| 6140 | 0.17 | 0.27 | 0.17 | 0.17 | 0.38 | 0.20 | 0.27 | 0.20 | 0.32 | 0.38 | 0.33 | 0.37 | 0.40 | 0.47 | 0.30 | 0.38 | 0.21 | 0.20 | 0.30 | 0.67 |
| 6141 | 0.58 | 0.60 | 0.71 | 0.67 | 1.24 | 0.75 | 0.89 | 0.56 | 0.88 | 0.98 | 0.83 | 1.16 | 1.22 | 0.94 | 0.81 | 0.81 | 0.72 | 0.74 | 0.70 | 1.05 |
| 6142 | 0.64 | 0.55 | 0.68 | 0.73 | 1.57 | 0.81 | 1.03 | 0.71 | 0.98 | 1.20 | 0.79 | 1.20 | 1.47 | 1.00 | 0.92 | 1.27 | 0.76 | 0.80 | 0.69 | 1.15 |
| 6143 | 0.80 | 0.46 | 0.53 | 0.72 | 2.01 | 0.78 | 1.03 | 0.62 | 0.96 | 1.38 | 1.00 | 1.35 | 1.88 | 1.10 | 0.96 | 1.36 | 0.76 | 0.77 | 0.69 | 1.12 |
| 6144 | 0.21 | 0.35 | 0.22 | 0.21 | 0.41 | 0.25 | 0.33 | 0.24 | 0.38 | 0.45 | 0.40 | 0.48 | 0.50 | 0.69 | 0.39 | 0.48 | 0.26 | 0.24 | 0.38 | 0.63 |
| 6145 | 0.52 | 0.55 | 0.59 | 0.55 | 1.26 | 0.66 | 0.85 | 0.67 | 0.84 | 1.09 | 0.77 | 0.91 | 1.06 | 0.73 | 0.78 | 1.19 | 0.63 | 0.64 | 0.65 | 0.98 |
| 6146 | 0.57 | 0.33 | 0.35 | 0.53 | 1.26 | 0.53 | 0.67 | 0.49 | 0.63 | 1.00 | 0.64 | 0.95 | 1.24 | 0.76 | 0.69 | 0.94 | 0.53 | 0.53 | 0.48 | 1.12 |
| 6147 | 0.93 | 0.68 | 0.88 | 1.06 | 2.37 | 1.09 | 1.38 | 0.84 | 1.28 | 1.53 | 1.25 | 1.66 | 2.15 | 1.36 | 1.19 | 1.60 | 1.06 | 1.11 | 0.92 | 1.21 |
| 6148 | 0.23 | 0.38 | 0.28 | 0.26 | 0.42 | 0.31 | 0.36 | 0.29 | 0.43 | 0.40 | 0.43 | 0.59 | 0.58 | 0.70 | 0.40 | 0.36 | 0.31 | 0.29 | 0.41 | 0.71 |
| 6149 | 0.52 | 0.54 | 0.63 | 0.58 | 1.15 | 0.65 | 0.78 | 0.63 | 0.77 | 0.98 | 0.75 | 0.98 | 1.04 | 0.87 | 0.75 | 0.87 | 0.63 | 0.65 | 0.63 | 1.02 |
| 6150 | 0.73 | 0.71 | 0.94 | 0.93 | 1.77 | 1.03 | 1.21 | 0.83 | 1.12 | 1.19 | 1.04 | 1.41 | 1.62 | 1.07 | 1.04 | 1.39 | 0.96 | 1.01 | 0.86 | 1.18 |
| 6151 | 0.89 | 0.59 | 0.78 | 0.93 | 2.60 | 0.99 | 1.36 | 0.76 | 1.19 | 1.61 | 1.18 | 1.40 | 1.96 | 1.00 | 1.09 | 2.24 | 0.97 | 1.02 | 0.83 | 1.22 |
| 6152 | 0.25 | 0.32 | 0.24 | 0.22 | 0.71 | 0.28 | 0.35 | 0.28 | 0.46 | 0.50 | 0.41 | 0.50 | 0.56 | 0.54 | 0.38 | 0.56 | 0.29 | 0.27 | 0.36 | 0.75 |
| 6153 | 0.12 | 0.23 | 0.13 | 0.13 | 0.31 | 0.17 | 0.22 | 0.16 | 0.28 | 0.30 | 0.27 | 0.30 | 0.31 | 0.39 | 0.24 | 0.33 | 0.17 | 0.16 | 0.25 | 0.63 |
| 6154 | 0.44 | 0.54 | 0.59 | 0.55 | 1.19 | 0.63 | 0.75 | 0.54 | 0.76 | 0.81 | 0.72 | 0.94 | 1.01 | 0.83 | 0.67 | 0.92 | 0.61 | 0.62 | 0.62 | 1.01 |
| 6155 | 0.58 | 0.66 | 0.84 | 0.77 | 1.73 | 0.87 | 1.02 | 0.69 | 1.01 | 1.01 | 0.90 | 1.13 | 1.28 | 1.02 | 0.85 | 1.25 | 0.82 | 0.87 | 0.76 | 1.14 |
| 6156 | 0.98 | 0.75 | 1.27 | 1.18 | 3.39 | 1.30 | 1.70 | 0.77 | 1.37 | 1.60 | 1.30 | 1.32 | 1.85 | 1.38 | 1.22 | 2.69 | 1.25 | 1.36 | 0.96 | 1.41 |
| 6157 | 0.15 | 0.28 | 0.16 | 0.15 | 0.29 | 0.18 | 0.24 | 0.17 | 0.29 | 0.30 | 0.29 | 0.37 | 0.37 | 0.52 | 0.28 | 0.33 | 0.19 | 0.18 | 0.29 | 0.61 |
| 6158 | 0.46 | 0.44 | 0.46 | 0.46 | 1.11 | 0.55 | 0.65 | 0.50 | 0.69 | 0.83 | 0.66 | 0.89 | 1.01 | 0.76 | 0.62 | 0.74 | 0.52 | 0.53 | 0.53 | 0.99 |
| 6159 | 0.62 | 0.68 | 0.83 | 0.77 | 1.81 | 0.89 | 1.05 | 0.75 | 1.07 | 1.15 | 0.95 | 1.27 | 1.41 | 1.00 | 0.92 | 1.34 | 0.84 | 0.88 | 0.81 | 1.09 |
| 6160 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6161 | 0.18 | 0.32 | 0.19 | 0.18 | 0.32 | 0.22 | 0.28 | 0.19 | 0.34 | 0.34 | 0.34 | 0.45 | 0.44 | 0.64 | 0.33 | 0.34 | 0.23 | 0.21 | 0.33 | 0.63 |
| 6162 | 0.56 | 0.64 | 0.73 | 0.67 | 1.16 | 0.78 | 0.85 | 0.65 | 0.89 | 0.86 | 0.83 | 1.25 | 1.28 | 1.00 | 0.80 | 0.70 | 0.72 | 0.74 | 0.73 | 1.02 |
| 6163 | 0.64 | 0.65 | 0.87 | 0.80 | 1.59 | 0.92 | 1.03 | 0.73 | 1.02 | 1.02 | 0.93 | 1.31 | 1.42 | 1.06 | 0.90 | 1.03 | 0.85 | 0.89 | 0.78 | 1.15 |
| 6164 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 6165 | 0.13 | 0.13 | 0.17 | 0.17 | 0.22 | 0.18 | 0.18 | 0.14 | 0.19 | 0.16 | 0.18 | 0.30 | 0.29 | 0.24 | 0.17 | 0.08 | 0.17 | 0.17 | 0.15 | 1.14 |
| 6166 | 0.79 | 1.22 | 0.90 | 0.87 | 1.48 | 1.03 | 1.27 | 1.01 | 1.57 | 1.47 | 1.47 | 1.96 | 2.09 | 2.75 | 1.40 | 1.21 | 1.03 | 0.98 | 1.35 | 0.73 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab | 21 | 39 | 57 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | Total | Light | Heavy | H/L |
| ID | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | REE | REE | REE | Ratio |
| 6134 | 1.21 | 1.01 | 1.52 | 1.41 | 3.62 | 1.59 | 1.98 | 1.19 | 1.87 | 1.79 | 1.63 | 2.08 | 2.43 | 1.69 | 1.53 | 2.62 | 1.51 | 1.61 | 1.26 | 1.28 |
| 6135 | 1.21 | 1.02 | 1.40 | 1.34 | 3.88 | 1.55 | 1.95 | 1.20 | 1.93 | 1.97 | 1.69 | 2.13 | 2.56 | 1.59 | 1.57 | 2.85 | 1.48 | 1.56 | 1.29 | 1.21 |
| 6136 | 2.71 | 3.97 | 2.48 | 2.48 | 5.17 | 3.08 | 3.83 | 4.10 | 4.75 | 7.76 | 5.07 | 6.72 | 7.74 | 7.45 | 5.22 | 4.52 | 3.17 | 2.87 | 4.57 | 0.63 |
| 6137 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6138 | 1.43 | 1.61 | 2.06 | 1.92 | 4.03 | 2.21 | 2.60 | 1.78 | 2.46 | 2.65 | 2.26 | 2.99 | 3.43 | 2.52 | 2.21 | 3.05 | 2.05 | 2.16 | 1.91 | 1.13 |
| 6139 | 1.06 | 0.76 | 1.04 | 1.27 | 2.88 | 1.22 | 1.57 | 0.94 | 1.43 | 1.53 | 1.39 | 1.89 | 2.27 | 1.60 | 1.31 | 2.10 | 1.23 | 1.30 | 1.02 | 1.28 |
| 6140 | 2.71 | 4.31 | 2.73 | 2.68 | 6.00 | 3.23 | 4.29 | 3.16 | 5.09 | 6.06 | 5.15 | 5.76 | 6.33 | 7.40 | 4.79 | 5.95 | 3.36 | 3.11 | 4.67 | 0.67 |
| 6141 | 1.90 | 1.98 | 2.33 | 2.20 | 4.08 | 2.48 | 2.91 | 1.85 | 2.88 | 3.23 | 2.73 | 3.81 | 3.99 | 3.10 | 2.68 | 2.67 | 2.36 | 2.42 | 2.31 | 1.05 |
| 6142 | 1.43 | 1.21 | 1.50 | 1.63 | 3.49 | 1.80 | 2.28 | 1.57 | 2.18 | 2.67 | 1.75 | 2.66 | 3.27 | 2.22 | 2.05 | 2.81 | 1.70 | 1.77 | 1.54 | 1.15 |
| 6143 | 0.90 | 0.51 | 0.59 | 0.81 | 2.24 | 0.87 | 1.15 | 0.69 | 1.07 | 1.54 | 1.12 | 1.50 | 2.10 | 1.23 | 1.07 | 1.51 | 0.85 | 0.86 | 0.77 | 1.12 |
| 6144 | 2.62 | 4.33 | 2.71 | 2.54 | 5.07 | 3.04 | 4.04 | 2.92 | 4.67 | 5.51 | 4.86 | 5.92 | 6.18 | 8.46 | 4.78 | 5.85 | 3.22 | 2.93 | 4.65 | 0.63 |
| 6145 | 1.80 | 1.92 | 2.04 | 1.91 | 4.37 | 2.28 | 2.95 | 2.34 | 2.92 | 3.78 | 2.66 | 3.14 | 3.70 | 2.54 | 2.72 | 4.12 | 2.18 | 2.21 | 2.25 | 0.98 |
| 6146 | 1.11 | 0.64 | 0.68 | 1.04 | 2.46 | 1.03 | 1.32 | 0.96 | 1.23 | 1.95 | 1.25 | 1.86 | 2.43 | 1.49 | 1.34 | 1.84 | 1.03 | 1.04 | 0.93 | 1.12 |
| 6147 | 1.04 | 0.77 | 0.99 | 1.19 | 2.67 | 1.23 | 1.55 | 0.95 | 1.44 | 1.72 | 1.40 | 1.87 | 2.42 | 1.53 | 1.34 | 1.80 | 1.19 | 1.25 | 1.04 | 1.21 |
| 6148 | 2.29 | 3.77 | 2.75 | 2.53 | 4.16 | 3.04 | 3.56 | 2.82 | 4.27 | 3.96 | 4.22 | 5.81 | 5.67 | 6.87 | 3.93 | 3.51 | 3.02 | 2.86 | 4.02 | 0.71 |
| 6149 | 1.72 | 1.80 | 2.11 | 1.91 | 3.80 | 2.16 | 2.57 | 2.08 | 2.56 | 3.25 | 2.49 | 3.24 | 3.46 | 2.90 | 2.50 | 2.90 | 2.10 | 2.15 | 2.10 | 1.02 |
| 6150 | 1.41 | 1.37 | 1.83 | 1.80 | 3.43 | 1.99 | 2.34 | 1.62 | 2.17 | 2.30 | 2.02 | 2.74 | 3.15 | 2.07 | 2.01 | 2.70 | 1.86 | 1.96 | 1.66 | 1.18 |
| 6151 | 0.99 | 0.66 | 0.88 | 1.04 | 2.91 | 1.10 | 1.52 | 0.85 | 1.33 | 1.80 | 1.32 | 1.57 | 2.19 | 1.12 | 1.22 | 2.50 | 1.09 | 1.14 | 0.93 | 1.22 |
| 6152 | 2.06 | 2.64 | 1.92 | 1.83 | 5.79 | 2.24 | 2.87 | 2.26 | 3.71 | 4.07 | 3.36 | 4.03 | 4.53 | 4.43 | 3.07 | 4.57 | 2.35 | 2.23 | 2.96 | 0.75 |
| 6153 | 2.91 | 5.39 | 3.02 | 3.10 | 7.38 | 3.87 | 5.16 | 3.79 | 6.50 | 6.99 | 6.34 | 7.12 | 7.39 | 9.16 | 5.64 | 7.75 | 3.97 | 3.64 | 5.76 | 0.63 |
| 6154 | 1.52 | 1.89 | 2.07 | 1.92 | 4.13 | 2.20 | 2.62 | 1.87 | 2.65 | 2.81 | 2.50 | 3.28 | 3.52 | 2.88 | 2.33 | 3.21 | 2.11 | 2.17 | 2.15 | 1.01 |
| 6155 | 1.34 | 1.53 | 1.95 | 1.79 | 4.04 | 2.04 | 2.39 | 1.62 | 2.36 | 2.36 | 2.09 | 2.65 | 2.99 | 2.39 | 1.97 | 2.92 | 1.92 | 2.03 | 1.78 | 1.14 |
| 6156 | 1.22 | 0.93 | 1.57 | 1.46 | 4.20 | 1.61 | 2.10 | 0.95 | 1.70 | 1.98 | 1.61 | 1.64 | 2.30 | 1.71 | 1.51 | 3.33 | 1.55 | 1.68 | 1.19 | 1.41 |
| 6157 | 2.69 | 4.94 | 2.89 | 2.72 | 5.22 | 3.28 | 4.26 | 3.00 | 5.21 | 5.41 | 5.21 | 6.59 | 6.63 | 9.28 | 5.01 | 5.84 | 3.47 | 3.13 | 5.18 | 0.61 |
| 6158 | 1.58 | 1.52 | 1.60 | 1.60 | 3.84 | 1.89 | 2.24 | 1.71 | 2.38 | 2.86 | 2.28 | 3.09 | 3.48 | 2.63 | 2.15 | 2.55 | 1.80 | 1.82 | 1.85 | 0.99 |
| 6159 | 1.58 | 1.73 | 2.12 | 1.95 | 4.58 | 2.25 | 2.67 | 1.90 | 2.71 | 2.91 | 2.42 | 3.23 | 3.58 | 2.54 | 2.33 | 3.40 | 2.14 | 2.23 | 2.04 | 1.09 |
| 6160 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6161 | 2.63 | 4.72 | 2.90 | 2.74 | 4.81 | 3.31 | 4.18 | 2.90 | 5.08 | 5.06 | 5.09 | 6.67 | 6.65 | 9.53 | 4.87 | 5.03 | 3.43 | 3.12 | 4.99 | 0.63 |
| 6162 | 1.74 | 1.99 | 2.27 | 2.09 | 3.61 | 2.45 | 2.65 | 2.02 | 2.78 | 2.69 | 2.58 | 3.90 | 4.00 | 3.13 | 2.50 | 2.19 | 2.26 | 2.32 | 2.28 | 1.02 |
| 6163 | 1.47 | 1.50 | 1.99 | 1.84 | 3.66 | 2.11 | 2.37 | 1.67 | 2.35 | 2.33 | 2.13 | 3.00 | 3.26 | 2.43 | 2.06 | 2.36 | 1.95 | 2.05 | 1.78 | 1.15 |
| 6164 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 6165 | 1.66 | 1.69 | 2.22 | 2.15 | 2.87 | 2.30 | 2.33 | 1.81 | 2.45 | 2.03 | 2.27 | 3.91 | 3.81 | 3.08 | 2.20 | 1.10 | 2.15 | 2.25 | 1.98 | 1.14 |
| 6166 | 2.29 | 3.54 | 2.62 | 2.53 | 4.32 | 2.99 | 3.69 | 2.93 | 4.56 | 4.26 | 4.27 | 5.69 | 6.06 | 7.99 | 4.06 | 3.50 | 2.99 | 2.84 | 3.91 | 0.73 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 6167 | 136.6 | Plant 19 | Clean Coal (+ x 3/8" / 1.6 x 1.9 SG) | 42.92 |
| 6168 | 54.8 | Plant 19 | Clean Coal (+ x 3/8" / 1.9 x Snk SG) | 53.45 |
| 5003 | | Plant 20 | Raw Coal (3/4" x 1/4") | 74.01 |
| 5004 | | Plant 20 | Raw Coal (+ x 3/4") | 79.09 |
| 5005 | | Plant 20 | Coarse Reject (100M x 0) | 81.96 |
| 5006 | | Plant 20 | Coarse Reject (14M x 100M / Flt x 1.5 SG) | 6.14 |
| 5007 | | Plant 20 | Coarse Reject (14M x 100M / 1.5 x 1.6 SG) | 33.89 |
| 5008 | | Plant 20 | Coarse Reject (14M x 100M / 1.6 x 1.8 SG) | 46.5 |
| 5009 | | Plant 20 | Coarse Reject (14M x 100M / 1.8 x Snk SG) | 91.04 |
| 5010 | | Plant 20 | Coarse Reject (1/4" x 14M / Flt x 1.5 SG) | 6.99 |
| 5011 | | Plant 20 | Coarse Reject (1/4" x 14M / 1.5 x 1.6 SG) | 35.16 |
| 5012 | | Plant 20 | Coarse Reject (1/4" x 14M / 1.6 x 1.8 SG) | 45.5 |
| 5013 | | Plant 20 | Coarse Reject (1/4" x 14M / 1.8 x Snk SG) | 92.27 |
| 5014 | | Plant 20 | Coarse Reject (3/4" x 1/4" / Flt x 1.5 SG) | 7.13 |
| 5015 | | Plant 20 | Coarse Reject (3/4" x 1/4" / 1.5 x 1.6 SG) | 33.81 |
| 5016 | | Plant 20 | Coarse Reject (3/4" x 1/4" / 1.6 x 1.8 SG) | 41.26 |
| 5017 | | Plant 20 | Coarse Reject (3/4" x 1/4" / 1.8 x Snk SG) | 91.79 |
| 5018 | | Plant 20 | Coarse Reject (+ x 3/4" / Flt x 1.5 SG) | 8.6 |
| 5019 | | Plant 20 | Coarse Reject (+ x 3/4" / 1.5 x 1.6 SG) | 35.75 |
| 5020 | | Plant 20 | Coarse Reject (+ x 3/4" / 1.6 x 1.8 SG) | 42.13 |
| 5021 | | Plant 20 | Coarse Reject (+ x 3/4" / 1.8 x Snk SG) | 92.98 |
| 5022 | | Plant 20 | Clean Coal (100M x 0) | 14.81 |
| 5023 | | Plant 20 | Clean Coal (14M x 100M / Flt x 1.5 SG) | 3.08 |
| 5024 | | Plant 20 | Clean Coal (14M x 100M / 1.5 x 1.6 SG) | 25.92 |
| 5025 | | Plant 20 | Clean Coal (14M x 100M / 1.6 x 1.8 SG) | 44.63 |
| 5026 | | Plant 20 | Clean Coal (14M x 100M / 1.8 x Snk SG) | 76.25 |
| 5027 | | Plant 20 | Clean Coal (1/4" x 14M / Flt x 1.5 SG) | 3.88 |
| 5028 | | Plant 20 | Clean Coal (1/4" x 14M / 1.5 x 1.6 SG) | 33.89 |
| 5029 | | Plant 20 | Clean Coal (1/4" x 14M / 1.6 x 1.8 SG) | 44.14 |
| 5030 | | Plant 20 | Clean Coal (1/4" x 14M / 1.8 x Snk SG) | 81.97 |
| 5031 | | Plant 20 | Clean Coal (3/4" x 1/4" / Flt x 1.5 SG) | 5.65 |
| 5032 | | Plant 20 | Clean Coal (3/4" x 1/4" / 1.5 x 1.6 SG) | 30.44 |
| 5033 | | Plant 20 | Clean Coal (3/4" x 1/4" / 1.6 x 1.8 SG) | 38.76 |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6167 | 23.82 | 32.64 | 62.42 | 115.21 | 23.54 | 55.85 | 12.96 | 2.18 | 9.33 | 1.50 | 7.58 | 2.35 | 6.97 | 0.76 | 4.12 | 0.88 | 362.1 | 281.5 | 56.8 | 0.20 |
| 6168 | 14.88 | 18.30 | 38.81 | 77.27 | 46.12 | 29.84 | 16.64 | 1.29 | 6.43 | 2.56 | 7.26 | 0.08 | 3.85 | 0.38 | 3.50 | 3.62 | 270.8 | 216.4 | 39.5 | 0.18 |
| 5003 | 18.11 | 23.57 | 40.73 | 79.37 | 26.88 | 43.57 | 10.70 | 1.27 | 7.59 | 1.32 | 6.85 | 2.02 | 5.57 | 0.39 | 3.11 | 0.84 | 271.9 | 210.1 | 43.7 | 0.21 |
| 5004 | 11.82 | 12.81 | 23.31 | 50.72 | 19.49 | 32.30 | 7.40 | 0.85 | 5.39 | 1.11 | 4.96 | 1.61 | 4.82 | 0.12 | 1.99 | 0.57 | 179.3 | 139.5 | 28.0 | 0.20 |
| 5005 | 13.40 | 10.79 | 20.04 | 50.72 | 21.87 | 26.84 | 7.32 | 0.87 | 4.70 | 1.17 | 4.85 | 1.32 | 4.49 | 0.27 | 2.03 | 0.77 | 171.4 | 132.4 | 25.7 | 0.19 |
| 5006 | 28.95 | 30.39 | 29.50 | 80.55 | 29.50 | 53.50 | 12.78 | 2.53 | 9.83 | 3.28 | 10.74 | 3.33 | 10.41 | 2.15 | 4.67 | 1.00 | 313.1 | 218.2 | 66.0 | 0.30 |
| 5007 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 5008 | 21.37 | 25.16 | 55.46 | 110.40 | 27.38 | 53.89 | 12.38 | 1.66 | 8.41 | 1.62 | 7.46 | 2.46 | 6.44 | 0.43 | 3.06 | 0.85 | 338.4 | 269.6 | 47.5 | 0.18 |
| 5009 | 14.07 | 12.82 | 26.57 | 59.17 | 24.03 | 31.29 | 8.48 | 0.92 | 5.12 | 1.25 | 5.22 | 1.34 | 4.58 | 0.37 | 2.23 | 0.84 | 198.3 | 155.6 | 28.6 | 0.18 |
| 5010 | 24.02 | 21.74 | 19.06 | 56.63 | 22.15 | 38.00 | 9.35 | 1.74 | 6.91 | 2.33 | 7.70 | 2.24 | 6.99 | 2.03 | 3.25 | 0.76 | 224.9 | 153.8 | 47.0 | 0.31 |
| 5011 | 21.14 | 17.11 | 28.99 | 66.60 | 25.54 | 37.19 | 9.76 | 1.53 | 5.85 | 1.96 | 6.16 | 1.55 | 5.20 | 0.64 | 2.93 | 1.11 | 233.3 | 175.5 | 36.7 | 0.21 |
| 5012 | 14.59 | 8.20 | 15.02 | 37.79 | 13.79 | 26.03 | 5.19 | 0.77 | 3.68 | 1.23 | 3.97 | 1.67 | 5.00 | 0.80 | 1.48 | 0.03 | 139.2 | 102.3 | 22.4 | 0.22 |
| 5013 | 11.41 | 10.24 | 18.12 | 43.31 | 20.97 | 25.56 | 6.98 | 0.73 | 4.45 | 1.20 | 4.68 | 1.26 | 4.40 | 0.25 | 1.91 | 0.68 | 156.1 | 120.1 | 24.6 | 0.20 |
| 5014 | 20.33 | 20.16 | 22.63 | 61.87 | 16.56 | 41.96 | 8.16 | 1.25 | 6.55 | 1.56 | 6.70 | 2.61 | 7.10 | 1.63 | 2.54 | 0.11 | 221.7 | 159.0 | 42.4 | 0.27 |
| 5015 | 29.06 | 26.19 | 39.76 | 81.82 | 18.96 | 44.64 | 9.53 | 1.59 | 7.11 | 1.64 | 6.97 | 2.28 | 6.14 | 0.91 | 3.26 | 0.43 | 280.3 | 203.4 | 47.8 | 0.24 |
| 5016 | 15.77 | 10.67 | 17.42 | 47.22 | 15.19 | 30.94 | 6.37 | 0.83 | 4.68 | 1.22 | 4.82 | 1.87 | 5.73 | 0.95 | 1.64 | 0.02 | 165.3 | 122.7 | 26.9 | 0.22 |
| 5017 | 18.95 | 26.64 | 46.41 | 88.06 | 29.37 | 47.89 | 11.76 | 1.42 | 8.03 | 1.43 | 7.54 | 2.01 | 5.86 | 0.52 | 3.41 | 0.96 | 300.3 | 232.9 | 48.4 | 0.21 |
| 5018 | 18.82 | 18.42 | 14.68 | 40.33 | 9.79 | 32.74 | 5.72 | 1.07 | 5.47 | 1.40 | 6.17 | 2.54 | 7.19 | 1.25 | 2.64 | 0.00 | 168.2 | 109.8 | 39.6 | 0.36 |
| 5019 | 16.63 | 8.69 | 15.43 | 40.79 | 6.20 | 28.99 | 4.07 | 0.71 | 4.09 | 0.87 | 4.08 | 2.36 | 6.06 | 1.08 | 1.13 | 0.00 | 141.2 | 100.3 | 24.3 | 0.24 |
| 5020 | 25.22 | 22.82 | 39.04 | 90.03 | 11.80 | 47.39 | 8.51 | 1.30 | 7.28 | 1.03 | 6.79 | 3.05 | 7.24 | 1.25 | 2.34 | 0.00 | 275.1 | 205.3 | 44.5 | 0.22 |
| 5021 | 10.48 | 11.93 | 20.51 | 48.82 | 20.37 | 31.54 | 7.42 | 0.73 | 4.61 | 1.12 | 4.91 | 1.32 | 4.86 | 0.33 | 2.08 | 0.64 | 171.7 | 134.0 | 27.2 | 0.20 |
| 5022 | 12.66 | 8.37 | 14.32 | 48.38 | 21.72 | 23.16 | 5.88 | 0.66 | 3.98 | 1.13 | 4.32 | 1.30 | 4.64 | 0.71 | 1.70 | 0.79 | 153.7 | 118.1 | 23.0 | 0.19 |
| 5023 | 23.68 | 45.35 | 31.11 | 57.93 | 22.89 | 49.73 | 11.55 | 2.31 | 10.02 | 2.78 | 10.89 | 3.13 | 9.21 | 4.11 | 5.27 | 1.01 | 291.0 | 185.5 | 81.7 | 0.44 |
| 5024 | 20.67 | 29.41 | 36.47 | 74.25 | 19.71 | 39.37 | 9.67 | 1.44 | 6.92 | 1.53 | 7.32 | 2.05 | 5.46 | 1.02 | 3.06 | 0.62 | 259.0 | 187.8 | 50.5 | 0.27 |
| 5025 | 17.10 | 17.21 | 27.85 | 62.02 | 17.43 | 31.09 | 7.45 | 1.02 | 5.11 | 1.17 | 5.22 | 1.50 | 4.34 | 0.55 | 2.26 | 0.51 | 201.8 | 152.0 | 32.8 | 0.22 |
| 5026 | 19.71 | 36.10 | 52.79 | 103.13 | 40.99 | 55.81 | 16.97 | 2.16 | 11.79 | 2.59 | 8.77 | 1.87 | 6.47 | 0.00 | 4.32 | 2.01 | 365.5 | 283.6 | 62.1 | 0.22 |
| 5027 | 35.85 | 67.09 | 53.31 | 105.82 | 27.12 | 68.49 | 15.97 | 2.80 | 13.86 | 2.84 | 14.50 | 3.99 | 10.51 | 3.57 | 6.52 | 1.10 | 433.3 | 287.4 | 110.1 | 0.38 |
| 5028 | 14.87 | 7.58 | 11.32 | 27.64 | 8.89 | 22.58 | 3.60 | 0.74 | 2.94 | 1.08 | 3.32 | 1.56 | 4.57 | 0.87 | 1.36 | 0.00 | 112.9 | 77.7 | 20.3 | 0.26 |
| 5029 | 12.98 | 3.82 | 6.01 | 21.22 | 8.79 | 19.34 | 2.99 | 0.45 | 2.58 | 0.86 | 2.65 | 1.42 | 4.49 | 0.64 | 0.93 | 0.00 | 89.1 | 61.4 | 14.8 | 0.24 |
| 5030 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |
| 5031 | 18.02 | 19.64 | 19.93 | 50.51 | 15.05 | 41.73 | 7.19 | 1.11 | 6.20 | 1.50 | 6.47 | 2.50 | 7.46 | 1.44 | 2.62 | 0.00 | 201.4 | 141.7 | 41.6 | 0.29 |
| 5032 | 21.41 | 9.79 | 13.96 | 38.11 | 8.70 | 26.32 | 4.19 | 0.86 | 3.72 | 1.16 | 3.89 | 1.94 | 5.15 | 1.21 | 1.52 | 0.00 | 141.9 | 95.8 | 24.7 | 0.26 |
| 5033 | 21.00 | 13.46 | 24.01 | 57.33 | 11.92 | 35.68 | 6.21 | 0.98 | 5.08 | 1.18 | 5.14 | 2.26 | 6.13 | 1.06 | 1.85 | 0.00 | 193.3 | 141.2 | 31.1 | 0.22 |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6167 | 10.23 | 14.01 | 26.79 | 49.45 | 10.10 | 23.97 | 5.56 | 0.94 | 4.00 | 0.64 | 3.25 | 1.01 | 2.99 | 0.32 | 1.77 | 0.38 | 155.4 | 120.8 | 24.4 | 0.202 |
| 6168 | 7.95 | 9.78 | 20.75 | 41.30 | 24.65 | 15.95 | 8.89 | 0.69 | 3.44 | 1.37 | 3.88 | 0.04 | 2.06 | 0.20 | 1.87 | 1.94 | 144.8 | 115.7 | 21.1 | 0.183 |
| 5003 | 13.4 | 17.44 | 30.14 | 58.74 | 19.89 | 32.24 | 7.922 | 0.94 | 5.615 | 0.975 | 5.073 | 1.497 | 4.126 | 0.288 | 2.3 | 0.625 | 201.2 | 155.5 | 32.3 | 0.208 |
| 5004 | 9.351 | 10.14 | 18.44 | 40.12 | 15.42 | 25.54 | 5.852 | 0.67 | 4.267 | 0.875 | 3.923 | 1.275 | 3.809 | 0.098 | 1.578 | 0.45 | 141.8 | 110.3 | 22.1 | 0.201 |
| 5005 | 10.98 | 8.845 | 16.42 | 41.57 | 17.93 | 22 | 6.003 | 0.715 | 3.85 | 0.958 | 3.972 | 1.08 | 3.679 | 0.219 | 1.665 | 0.634 | 140.5 | 108.5 | 21.1 | 0.194 |
| 5006 | 1.777 | 1.866 | 1.811 | 4.946 | 1.811 | 3.285 | 0.784 | 0.155 | 0.603 | 0.202 | 0.659 | 0.204 | 0.639 | 0.132 | 0.287 | 0.061 | 19.2 | 13.4 | 4.1 | 0.302 |
| 5007 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 5008 | 9.936 | 11.7 | 25.79 | 51.33 | 12.73 | 25.06 | 5.755 | 0.773 | 3.911 | 0.755 | 3.471 | 1.142 | 2.994 | 0.198 | 1.421 | 0.396 | 157.4 | 125.4 | 22.1 | 0.176 |
| 5009 | 12.81 | 11.67 | 24.19 | 53.87 | 21.88 | 28.48 | 7.718 | 0.837 | 4.663 | 1.142 | 4.749 | 1.218 | 4.168 | 0.333 | 2.027 | 0.761 | 180.5 | 141.6 | 26.1 | 0.184 |
| 5010 | 1.679 | 1.519 | 1.332 | 3.958 | 1.549 | 2.656 | 0.654 | 0.121 | 0.483 | 0.163 | 0.538 | 0.156 | 0.489 | 0.142 | 0.227 | 0.053 | 15.7 | 10.8 | 3.3 | 0.306 |
| 5011 | 7.432 | 6.017 | 10.19 | 23.42 | 8.982 | 13.08 | 3.432 | 0.539 | 2.055 | 0.688 | 2.166 | 0.544 | 1.829 | 0.226 | 1.03 | 0.39 | 82.0 | 61.7 | 12.9 | 0.209 |
| 5012 | 6.638 | 3.73 | 6.836 | 17.19 | 6.273 | 11.84 | 2.363 | 0.351 | 1.676 | 0.559 | 1.805 | 0.762 | 2.276 | 0.365 | 0.674 | 0.014 | 63.4 | 46.5 | 10.2 | 0.219 |
| 5013 | 10.53 | 9.444 | 16.72 | 39.97 | 19.35 | 23.58 | 6.444 | 0.671 | 4.107 | 1.107 | 4.317 | 1.16 | 4.064 | 0.227 | 1.762 | 0.628 | 144.1 | 110.8 | 22.7 | 0.205 |
| 5014 | 1.449 | 1.438 | 1.614 | 4.412 | 1.18 | 2.992 | 0.582 | 0.089 | 0.467 | 0.111 | 0.477 | 0.186 | 0.506 | 0.116 | 0.181 | 0.008 | 15.8 | 11.3 | 3.0 | 0.267 |
| 5015 | 9.825 | 8.855 | 13.44 | 27.66 | 6.409 | 15.09 | 3.223 | 0.538 | 2.403 | 0.553 | 2.358 | 0.771 | 2.076 | 0.309 | 1.104 | 0.147 | 94.8 | 68.8 | 16.2 | 0.235 |
| 5016 | 6.505 | 4.401 | 7.189 | 19.48 | 6.268 | 12.76 | 2.629 | 0.344 | 1.932 | 0.503 | 1.988 | 0.77 | 2.366 | 0.391 | 0.675 | 0.009 | 68.2 | 50.6 | 11.1 | 0.219 |
| 5017 | 17.39 | 24.45 | 42.6 | 80.83 | 26.96 | 43.96 | 10.8 | 1.307 | 7.367 | 1.316 | 6.918 | 1.842 | 5.381 | 0.475 | 3.132 | 0.883 | 275.6 | 213.8 | 44.4 | 0.208 |
| 5018 | 1.619 | 1.584 | 1.262 | 3.469 | 0.842 | 2.816 | 0.492 | 0.092 | 0.47 | 0.12 | 0.53 | 0.219 | 0.618 | 0.108 | 0.227 | 0 | 14.5 | 9.4 | 3.4 | 0.361 |
| 5019 | 5.945 | 3.107 | 5.517 | 14.58 | 2.215 | 10.36 | 1.454 | 0.255 | 1.462 | 0.311 | 1.458 | 0.843 | 2.166 | 0.386 | 0.405 | 0 | 50.5 | 35.9 | 8.7 | 0.242 |
| 5020 | 10.62 | 9.615 | 16.45 | 37.93 | 4.97 | 19.96 | 3.586 | 0.548 | 3.067 | 0.435 | 2.861 | 1.287 | 3.05 | 0.527 | 0.987 | 0 | 115.9 | 86.5 | 18.8 | 0.217 |
| 5021 | 9.743 | 11.1 | 19.07 | 45.39 | 18.94 | 29.33 | 6.901 | 0.681 | 4.283 | 1.042 | 4.565 | 1.226 | 4.516 | 0.311 | 1.937 | 0.594 | 159.6 | 124.6 | 25.3 | 0.203 |
| 5022 | 1.874 | 1.239 | 2.12 | 7.165 | 3.217 | 3.43 | 0.871 | 0.098 | 0.59 | 0.168 | 0.64 | 0.193 | 0.687 | 0.106 | 0.252 | 0.118 | 22.8 | 17.5 | 3.4 | 0.194 |
| 5023 | 0.729 | 1.397 | 0.958 | 1.784 | 0.705 | 1.532 | 0.356 | 0.071 | 0.309 | 0.086 | 0.335 | 0.096 | 0.284 | 0.127 | 0.162 | 0.031 | 9.0 | 5.7 | 2.5 | 0.441 |
| 5024 | 5.357 | 7.622 | 9.453 | 19.25 | 5.108 | 10.2 | 2.506 | 0.374 | 1.794 | 0.398 | 1.896 | 0.531 | 1.415 | 0.264 | 0.793 | 0.16 | 67.1 | 48.7 | 13.1 | 0.269 |
| 5025 | 7.63 | 7.681 | 12.43 | 27.68 | 7.777 | 13.88 | 3.324 | 0.453 | 2.279 | 0.52 | 2.329 | 0.672 | 1.939 | 0.248 | 1.007 | 0.227 | 90.1 | 67.8 | 14.6 | 0.216 |
| 5026 | 15.03 | 27.53 | 40.25 | 78.64 | 31.26 | 42.55 | 12.94 | 1.645 | 8.993 | 1.974 | 6.69 | 1.426 | 4.935 | 0 | 3.29 | 1.535 | 278.7 | 216.3 | 47.4 | 0.219 |
| 5027 | 1.391 | 2.603 | 2.068 | 4.106 | 1.052 | 2.657 | 0.62 | 0.109 | 0.538 | 0.11 | 0.563 | 0.155 | 0.408 | 0.139 | 0.253 | 0.043 | 16.8 | 11.1 | 4.3 | 0.383 |
| 5028 | 5.04 | 2.568 | 3.838 | 9.366 | 3.011 | 7.653 | 1.219 | 0.252 | 0.995 | 0.367 | 1.126 | 0.53 | 1.55 | 0.293 | 0.459 | 0 | 38.3 | 26.3 | 6.9 | 0.262 |
| 5029 | 5.728 | 1.685 | 2.653 | 9.366 | 3.88 | 8.535 | 1.32 | 0.198 | 1.139 | 0.378 | 1.17 | 0.625 | 1.98 | 0.282 | 0.409 | 0 | 39.3 | 27.1 | 6.5 | 0.241 |
| 5030 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 5031 | 1.018 | 1.109 | 1.126 | 2.854 | 0.85 | 2.358 | 0.406 | 0.063 | 0.35 | 0.085 | 0.366 | 0.141 | 0.421 | 0.081 | 0.148 | 0 | 11.4 | 8.0 | 2.4 | 0.294 |
| 5032 | 6.518 | 2.981 | 4.248 | 11.6 | 2.648 | 8.012 | 1.277 | 0.261 | 1.132 | 0.352 | 1.185 | 0.591 | 1.569 | 0.368 | 0.462 | 0 | 43.2 | 29.2 | 7.5 | 0.257 |
| 5033 | 8.14 | 5.216 | 9.306 | 22.22 | 4.621 | 13.83 | 2.408 | 0.381 | 1.967 | 0.456 | 1.991 | 0.877 | 2.376 | 0.413 | 0.718 | 0 | 74.9 | 54.7 | 12.0 | 0.22 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6167 | 0.64 | 0.58 | 0.89 | 0.82 | 1.51 | 0.89 | 1.05 | 0.72 | 1.00 | 0.99 | 0.86 | 1.26 | 1.43 | 0.98 | 0.88 | 1.08 | 0.84 | 0.90 | 0.72 | 1.26 |
| 6168 | 0.50 | 0.41 | 0.69 | 0.69 | 3.68 | 0.59 | 1.68 | 0.53 | 0.86 | 2.10 | 1.02 | 0.05 | 0.98 | 0.61 | 0.93 | 5.53 | 0.79 | 0.86 | 0.62 | 1.39 |
| 5003 | 0.84 | 0.73 | 1.00 | 0.98 | 2.97 | 1.19 | 1.49 | 0.72 | 1.40 | 1.50 | 1.34 | 1.87 | 1.96 | 0.87 | 1.15 | 1.78 | 1.09 | 1.16 | 0.95 | 1.22 |
| 5004 | 0.58 | 0.42 | 0.61 | 0.67 | 2.30 | 0.95 | 1.10 | 0.52 | 1.07 | 1.35 | 1.03 | 1.59 | 1.81 | 0.30 | 0.79 | 1.28 | 0.77 | 0.82 | 0.65 | 1.26 |
| 5005 | 0.69 | 0.37 | 0.55 | 0.69 | 2.68 | 0.81 | 1.13 | 0.55 | 0.96 | 1.47 | 1.05 | 1.35 | 1.75 | 0.66 | 0.83 | 1.81 | 0.76 | 0.81 | 0.62 | 1.31 |
| 5006 | 0.11 | 0.08 | 0.06 | 0.08 | 0.27 | 0.12 | 0.15 | 0.12 | 0.15 | 0.31 | 0.17 | 0.26 | 0.30 | 0.40 | 0.14 | 0.17 | 0.10 | 0.10 | 0.12 | 0.84 |
| 5007 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 5008 | 0.62 | 0.49 | 0.86 | 0.86 | 1.90 | 0.93 | 1.09 | 0.59 | 0.98 | 1.16 | 0.91 | 1.43 | 1.43 | 0.60 | 0.71 | 1.13 | 0.85 | 0.93 | 0.65 | 1.44 |
| 5009 | 0.80 | 0.49 | 0.81 | 0.90 | 3.27 | 1.05 | 1.46 | 0.64 | 1.17 | 1.76 | 1.25 | 1.52 | 1.98 | 1.01 | 1.01 | 2.18 | 0.98 | 1.05 | 0.77 | 1.38 |
| 5010 | 0.10 | 0.06 | 0.04 | 0.07 | 0.23 | 0.10 | 0.12 | 0.09 | 0.12 | 0.25 | 0.14 | 0.20 | 0.23 | 0.43 | 0.11 | 0.15 | 0.09 | 0.08 | 0.10 | 0.83 |
| 5011 | 0.46 | 0.25 | 0.34 | 0.39 | 1.34 | 0.48 | 0.65 | 0.41 | 0.51 | 1.06 | 0.57 | 0.68 | 0.87 | 0.69 | 0.52 | 1.11 | 0.44 | 0.46 | 0.38 | 1.21 |
| 5012 | 0.41 | 0.16 | 0.23 | 0.29 | 0.94 | 0.44 | 0.45 | 0.27 | 0.42 | 0.86 | 0.47 | 0.95 | 1.08 | 1.11 | 0.34 | 0.04 | 0.34 | 0.35 | 0.30 | 1.16 |
| 5013 | 0.66 | 0.39 | 0.56 | 0.67 | 2.89 | 0.87 | 1.22 | 0.52 | 1.03 | 1.70 | 1.14 | 1.45 | 1.94 | 0.69 | 0.88 | 1.79 | 0.78 | 0.83 | 0.67 | 1.24 |
| 5014 | 0.09 | 0.06 | 0.05 | 0.07 | 0.18 | 0.11 | 0.11 | 0.07 | 0.12 | 0.17 | 0.13 | 0.23 | 0.24 | 0.35 | 0.09 | 0.02 | 0.09 | 0.08 | 0.09 | 0.95 |
| 5015 | 0.61 | 0.37 | 0.45 | 0.46 | 0.96 | 0.56 | 0.61 | 0.41 | 0.60 | 0.85 | 0.62 | 0.96 | 0.99 | 0.94 | 0.55 | 0.42 | 0.51 | 0.51 | 0.48 | 1.08 |
| 5016 | 0.41 | 0.18 | 0.24 | 0.32 | 0.94 | 0.47 | 0.50 | 0.26 | 0.48 | 0.77 | 0.52 | 0.96 | 1.13 | 1.19 | 0.34 | 0.02 | 0.37 | 0.38 | 0.33 | 1.15 |
| 5017 | 1.09 | 1.02 | 1.42 | 1.35 | 4.02 | 1.63 | 2.04 | 1.01 | 1.84 | 2.02 | 1.82 | 2.30 | 2.56 | 1.44 | 1.57 | 2.52 | 1.50 | 1.59 | 1.30 | 1.22 |
| 5018 | 0.10 | 0.07 | 0.04 | 0.06 | 0.13 | 0.10 | 0.09 | 0.07 | 0.12 | 0.18 | 0.14 | 0.27 | 0.29 | 0.33 | 0.11 | 0.00 | 0.08 | 0.07 | 0.10 | 0.70 |
| 5019 | 0.37 | 0.13 | 0.18 | 0.24 | 0.33 | 0.38 | 0.27 | 0.20 | 0.37 | 0.48 | 0.38 | 1.05 | 1.03 | 1.17 | 0.20 | 0.00 | 0.27 | 0.27 | 0.25 | 1.05 |
| 5020 | 0.66 | 0.40 | 0.55 | 0.63 | 0.74 | 0.74 | 0.68 | 0.42 | 0.77 | 0.67 | 0.75 | 1.61 | 1.45 | 1.60 | 0.49 | 0.00 | 0.63 | 0.64 | 0.55 | 1.17 |
| 5021 | 0.61 | 0.46 | 0.64 | 0.76 | 2.83 | 1.09 | 1.30 | 0.52 | 1.07 | 1.60 | 1.20 | 1.53 | 2.15 | 0.94 | 0.97 | 1.70 | 0.87 | 0.93 | 0.74 | 1.25 |
| 5022 | 0.12 | 0.05 | 0.07 | 0.12 | 0.48 | 0.13 | 0.16 | 0.08 | 0.15 | 0.26 | 0.17 | 0.24 | 0.33 | 0.32 | 0.13 | 0.34 | 0.12 | 0.13 | 0.10 | 1.30 |
| 5023 | 0.05 | 0.06 | 0.03 | 0.03 | 0.11 | 0.06 | 0.07 | 0.05 | 0.08 | 0.13 | 0.09 | 0.12 | 0.14 | 0.38 | 0.08 | 0.09 | 0.05 | 0.04 | 0.07 | 0.58 |
| 5024 | 0.33 | 0.32 | 0.32 | 0.32 | 0.76 | 0.38 | 0.47 | 0.29 | 0.45 | 0.61 | 0.50 | 0.66 | 0.67 | 0.80 | 0.40 | 0.46 | 0.36 | 0.36 | 0.38 | 0.94 |
| 5025 | 0.48 | 0.32 | 0.41 | 0.46 | 1.16 | 0.51 | 0.63 | 0.35 | 0.57 | 0.80 | 0.61 | 0.84 | 0.92 | 0.75 | 0.50 | 0.65 | 0.49 | 0.50 | 0.43 | 1.18 |
| 5026 | 0.94 | 1.15 | 1.34 | 1.31 | 4.67 | 1.58 | 2.44 | 1.27 | 2.25 | 3.04 | 1.76 | 1.78 | 2.35 | 0.00 | 1.65 | 4.39 | 1.51 | 1.61 | 1.39 | 1.16 |
| 5027 | 0.09 | 0.11 | 0.07 | 0.07 | 0.16 | 0.10 | 0.12 | 0.08 | 0.13 | 0.17 | 0.15 | 0.19 | 0.19 | 0.42 | 0.13 | 0.12 | 0.09 | 0.08 | 0.13 | 0.66 |
| 5028 | 0.32 | 0.11 | 0.13 | 0.16 | 0.45 | 0.28 | 0.23 | 0.19 | 0.25 | 0.56 | 0.30 | 0.66 | 0.74 | 0.89 | 0.23 | 0.00 | 0.21 | 0.20 | 0.20 | 0.97 |
| 5029 | 0.36 | 0.07 | 0.09 | 0.16 | 0.58 | 0.32 | 0.25 | 0.15 | 0.28 | 0.58 | 0.31 | 0.78 | 0.94 | 0.85 | 0.20 | 0.00 | 0.21 | 0.20 | 0.19 | 1.05 |
| 5030 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| 5031 | 0.06 | 0.05 | 0.04 | 0.05 | 0.13 | 0.09 | 0.08 | 0.05 | 0.09 | 0.13 | 0.10 | 0.18 | 0.20 | 0.25 | 0.07 | 0.00 | 0.06 | 0.06 | 0.07 | 0.86 |
| 5032 | 0.41 | 0.12 | 0.14 | 0.19 | 0.40 | 0.30 | 0.24 | 0.20 | 0.28 | 0.54 | 0.31 | 0.74 | 0.75 | 1.11 | 0.23 | 0.00 | 0.23 | 0.22 | 0.22 | 0.98 |
| 5033 | 0.51 | 0.22 | 0.31 | 0.37 | 0.69 | 0.51 | 0.45 | 0.29 | 0.49 | 0.70 | 0.52 | 1.10 | 1.13 | 1.25 | 0.36 | 0.00 | 0.41 | 0.41 | 0.35 | 1.15 |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 6167 | 1.49 | 1.36 | 2.08 | 1.92 | 3.51 | 2.07 | 2.44 | 1.68 | 2.33 | 2.30 | 1.99 | 2.94 | 3.32 | 2.29 | 2.06 | 2.52 | 1.96 | 2.10 | 1.67 | 1.26 |
| 6168 | 0.93 | 0.76 | 1.29 | 1.29 | 6.88 | 1.11 | 3.14 | 1.00 | 1.61 | 3.93 | 1.91 | 0.09 | 1.83 | 1.15 | 1.75 | 10.35 | 1.47 | 1.61 | 1.16 | 1.39 |
| 5003 | 1.13 | 0.98 | 1.36 | 1.32 | 4.01 | 1.61 | 2.02 | 0.98 | 1.90 | 2.03 | 1.80 | 2.53 | 2.65 | 1.18 | 1.55 | 2.41 | 1.48 | 1.56 | 1.28 | 1.22 |
| 5004 | 0.74 | 0.53 | 0.78 | 0.85 | 2.91 | 1.20 | 1.40 | 0.65 | 1.35 | 1.70 | 1.31 | 2.02 | 2.29 | 0.38 | 1.00 | 1.62 | 0.97 | 1.04 | 0.82 | 1.26 |
| 5005 | 0.84 | 0.45 | 0.67 | 0.85 | 3.26 | 0.99 | 1.38 | 0.67 | 1.17 | 1.80 | 1.28 | 1.65 | 2.14 | 0.81 | 1.02 | 2.21 | 0.93 | 0.99 | 0.75 | 1.31 |
| 5006 | 1.81 | 1.27 | 0.98 | 1.34 | 4.40 | 1.98 | 2.41 | 1.94 | 2.46 | 5.05 | 2.83 | 4.16 | 4.96 | 6.52 | 2.33 | 2.84 | 1.70 | 1.62 | 1.94 | 0.84 |
| 5007 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 5008 | 1.34 | 1.05 | 1.85 | 1.84 | 4.09 | 2.00 | 2.34 | 1.28 | 2.10 | 2.50 | 1.96 | 3.07 | 3.07 | 1.29 | 1.53 | 2.43 | 1.84 | 2.01 | 1.40 | 1.44 |
| 5009 | 0.88 | 0.53 | 0.89 | 0.99 | 3.59 | 1.16 | 1.60 | 0.71 | 1.28 | 1.93 | 1.37 | 1.67 | 2.18 | 1.11 | 1.11 | 2.39 | 1.08 | 1.16 | 0.84 | 1.38 |
| 5010 | 1.50 | 0.91 | 0.64 | 0.94 | 3.31 | 1.41 | 1.76 | 1.34 | 1.73 | 3.58 | 2.03 | 2.79 | 3.33 | 6.16 | 1.62 | 2.16 | 1.22 | 1.15 | 1.38 | 0.83 |
| 5011 | 1.32 | 0.71 | 0.97 | 1.11 | 3.81 | 1.38 | 1.84 | 1.18 | 1.46 | 3.01 | 1.62 | 1.93 | 2.48 | 1.95 | 1.46 | 3.17 | 1.27 | 1.31 | 1.08 | 1.21 |
| 5012 | 0.91 | 0.34 | 0.50 | 0.63 | 2.06 | 0.96 | 0.98 | 0.59 | 0.92 | 1.89 | 1.04 | 2.09 | 2.38 | 2.43 | 0.74 | 0.09 | 0.76 | 0.76 | 0.66 | 1.16 |
| 5013 | 0.71 | 0.43 | 0.60 | 0.72 | 3.13 | 0.95 | 1.32 | 0.56 | 1.11 | 1.85 | 1.23 | 1.57 | 2.10 | 0.74 | 0.95 | 1.94 | 0.85 | 0.89 | 0.72 | 1.24 |
| 5014 | 1.27 | 0.84 | 0.75 | 1.03 | 2.47 | 1.55 | 1.54 | 0.96 | 1.64 | 2.40 | 1.76 | 3.27 | 3.38 | 4.95 | 1.27 | 0.32 | 1.20 | 1.18 | 1.25 | 0.95 |
| 5015 | 1.82 | 1.09 | 1.33 | 1.36 | 2.83 | 1.65 | 1.80 | 1.22 | 1.78 | 2.52 | 1.83 | 2.85 | 2.92 | 2.77 | 1.63 | 1.24 | 1.52 | 1.51 | 1.41 | 1.08 |
| 5016 | 0.99 | 0.44 | 0.58 | 0.79 | 2.27 | 1.15 | 1.20 | 0.64 | 1.17 | 1.88 | 1.27 | 2.33 | 2.73 | 2.88 | 0.82 | 0.06 | 0.90 | 0.91 | 0.79 | 1.15 |
| 5017 | 1.18 | 1.11 | 1.55 | 1.47 | 4.38 | 1.77 | 2.22 | 1.10 | 2.01 | 2.21 | 1.98 | 2.51 | 2.79 | 1.57 | 1.71 | 2.75 | 1.63 | 1.73 | 1.42 | 1.22 |
| 5018 | 1.18 | 0.77 | 0.49 | 0.67 | 1.46 | 1.21 | 1.08 | 0.83 | 1.37 | 2.15 | 1.62 | 3.18 | 3.42 | 3.79 | 1.32 | 0.00 | 0.91 | 0.82 | 1.16 | 0.70 |
| 5019 | 1.04 | 0.36 | 0.51 | 0.68 | 0.92 | 1.07 | 0.77 | 0.55 | 1.02 | 1.34 | 1.07 | 2.95 | 2.89 | 3.27 | 0.57 | 0.00 | 0.77 | 0.75 | 0.71 | 1.05 |
| 5020 | 1.58 | 0.95 | 1.30 | 1.50 | 1.76 | 1.76 | 1.61 | 1.00 | 1.82 | 1.59 | 1.79 | 3.82 | 3.45 | 3.79 | 1.17 | 0.00 | 1.49 | 1.53 | 1.31 | 1.17 |
| 5021 | 0.65 | 0.50 | 0.68 | 0.81 | 3.04 | 1.17 | 1.40 | 0.56 | 1.15 | 1.72 | 1.29 | 1.65 | 2.31 | 1.02 | 1.04 | 1.82 | 0.93 | 1.00 | 0.80 | 1.25 |
| 5022 | 0.79 | 0.35 | 0.48 | 0.81 | 3.24 | 0.86 | 1.11 | 0.51 | 1.00 | 1.74 | 1.14 | 1.63 | 2.21 | 2.16 | 0.85 | 2.27 | 0.83 | 0.88 | 0.67 | 1.30 |
| 5023 | 1.48 | 1.89 | 1.04 | 0.97 | 3.42 | 1.84 | 2.18 | 1.78 | 2.50 | 4.27 | 2.87 | 3.91 | 4.38 | 12.45 | 2.64 | 2.88 | 1.58 | 1.38 | 2.40 | 0.58 |
| 5024 | 1.29 | 1.23 | 1.22 | 1.24 | 2.94 | 1.46 | 1.82 | 1.11 | 1.73 | 2.36 | 1.93 | 2.56 | 2.60 | 3.09 | 1.53 | 1.76 | 1.40 | 1.40 | 1.48 | 0.94 |
| 5025 | 1.07 | 0.72 | 0.93 | 1.03 | 2.60 | 1.15 | 1.41 | 0.78 | 1.28 | 1.79 | 1.37 | 1.88 | 2.07 | 1.68 | 1.13 | 1.45 | 1.09 | 1.13 | 0.96 | 1.18 |
| 5026 | 1.23 | 1.50 | 1.76 | 1.72 | 6.12 | 2.07 | 3.20 | 1.66 | 2.95 | 3.98 | 2.31 | 2.34 | 3.08 | 0.00 | 2.16 | 5.75 | 1.98 | 2.11 | 1.83 | 1.16 |
| 5027 | 2.24 | 2.80 | 1.78 | 1.76 | 4.05 | 2.54 | 3.01 | 2.16 | 3.46 | 4.37 | 3.82 | 4.99 | 5.00 | 10.82 | 3.26 | 3.14 | 2.35 | 2.14 | 3.24 | 0.66 |
| 5028 | 0.93 | 0.32 | 0.38 | 0.46 | 1.33 | 0.84 | 0.68 | 0.57 | 0.73 | 1.67 | 0.87 | 1.95 | 2.18 | 2.62 | 0.68 | 0.00 | 0.61 | 0.58 | 0.60 | 0.97 |
| 5029 | 0.81 | 0.16 | 0.20 | 0.35 | 1.31 | 0.72 | 0.56 | 0.35 | 0.65 | 1.32 | 0.70 | 1.77 | 2.14 | 1.93 | 0.46 | 0.00 | 0.48 | 0.46 | 0.43 | 1.05 |
| 5030 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |
| 5031 | 1.13 | 0.82 | 0.66 | 0.84 | 2.25 | 1.55 | 1.36 | 0.85 | 1.55 | 2.30 | 1.70 | 3.13 | 3.55 | 4.35 | 1.31 | 0.00 | 1.09 | 1.06 | 1.22 | 0.86 |
| 5032 | 1.34 | 0.41 | 0.47 | 0.64 | 1.30 | 0.97 | 0.79 | 0.66 | 0.93 | 1.78 | 1.02 | 2.43 | 2.45 | 3.66 | 0.76 | 0.00 | 0.77 | 0.71 | 0.72 | 0.98 |
| 5033 | 1.31 | 0.56 | 0.80 | 0.96 | 1.78 | 1.32 | 1.17 | 0.76 | 1.27 | 1.81 | 1.35 | 2.83 | 2.92 | 3.23 | 0.93 | 0.00 | 1.05 | 1.05 | 0.91 | 1.15 |

| Lab ID | Lab (gms) | Plant ID | Full Sample Description | Ash (%, dry) |
|---|---|---|---|---|
| 5034 | | Plant 20 | Clean Coal (3/4" x 1/4" / 1.8 x Snk SG) | 66.74 |
| 5035 | | Plant 20 | Clean Coal (+ x 3/4" / Flt x 1.5 SG) | 3.21 |
| 5036 | | Plant 20 | Clean Coal (+ x 3/4" / 1.5 x 1.6 SG) | 37.42 |
| 5037 | | Plant 20 | Clean Coal (+ x 3/4" / 1.6 x 1.8 SG) | 41.01 |
| 5038 | | Plant 20 | Clean Coal (+ x 3/4" / 1.8 x Snk SG) | n/a |

| | (Concentration, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 5034 | 21.60 | 23.37 | 51.54 | 95.13 | 32.37 | 46.26 | 12.33 | 1.43 | 7.33 | 1.65 | 7.72 | 1.80 | 5.88 | 0.70 | 3.33 | 1.22 | 313.7 | 246.4 | 45.7 | 0.19 |
| 5035 | 28.25 | 42.08 | 68.21 | 140.96 | 49.32 | 69.41 | 13.77 | 1.85 | 13.29 | 1.60 | 9.86 | 3.19 | 8.08 | 0.86 | 4.00 | 1.24 | 456.0 | 356.8 | 70.9 | 0.20 |
| 5036 | 15.58 | 7.14 | 16.40 | 43.63 | 6.74 | 28.33 | 3.19 | 0.57 | 3.40 | 0.82 | 3.66 | 2.38 | 6.27 | 0.28 | 1.64 | 0.00 | 140.0 | 102.3 | 22.2 | 0.22 |
| 5037 | 13.65 | 3.26 | 6.50 | 15.60 | 3.54 | 17.60 | 1.75 | 0.67 | 2.22 | 0.97 | 2.47 | 1.54 | 4.43 | 0.79 | 0.92 | 0.00 | 75.9 | 47.9 | 14.4 | 0.30 |
| 5038 | | | | | | | | | | | | | | | | | #N/A | #N/A | #N/A | #N/A |

| | (Concentration, ppm dry whole coal basis) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 5034 | 14.41 | 15.6 | 34.4 | 63.49 | 21.61 | 30.87 | 8.228 | 0.951 | 4.889 | 1.104 | 5.155 | 1.204 | 3.925 | 0.466 | 2.222 | 0.812 | 209.3 | 164.4 | 30.5 | 0.185 |
| 5035 | 0.907 | 1.351 | 2.189 | 4.525 | 1.583 | 2.228 | 0.442 | 0.059 | 0.427 | 0.051 | 0.316 | 0.103 | 0.259 | 0.028 | 0.128 | 0.04 | 14.6 | 11.5 | 2.3 | 0.199 |
| 5036 | 5.83 | 2.673 | 6.138 | 16.33 | 2.523 | 10.6 | 1.193 | 0.215 | 1.272 | 0.308 | 1.369 | 0.892 | 2.347 | 0.104 | 0.613 | 0 | 52.4 | 38.3 | 8.3 | 0.217 |
| 5037 | 5.597 | 1.336 | 2.664 | 6.398 | 1.453 | 7.218 | 0.719 | 0.273 | 0.91 | 0.398 | 1.012 | 0.633 | 1.816 | 0.324 | 0.379 | 0 | 31.1 | 19.6 | 5.9 | 0.3 |
| 5038 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry whole coal) | | | | | | | | | | | | | | | | | | | |
| Lab ID | 21 Sc | 39 Y | 57 La | 58 Ce | 59 Pr | 60 Nd | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu | Total REE | Light REE | Heavy REE | H/L Ratio |
| 5034 | 0.90 | 0.65 | 1.15 | 1.06 | 3.22 | 1.14 | 1.55 | 0.73 | 1.22 | 1.70 | 1.36 | 1.50 | 1.87 | 1.41 | 1.11 | 2.32 | 1.14 | 1.22 | 0.90 | 1.37 |
| 5035 | 0.06 | 0.06 | 0.07 | 0.08 | 0.24 | 0.08 | 0.08 | 0.05 | 0.11 | 0.08 | 0.08 | 0.13 | 0.12 | 0.08 | 0.06 | 0.11 | 0.08 | 0.09 | 0.07 | 1.27 |
| 5036 | 0.36 | 0.11 | 0.20 | 0.27 | 0.38 | 0.39 | 0.23 | 0.17 | 0.32 | 0.47 | 0.36 | 1.12 | 1.12 | 0.31 | 0.31 | 0.00 | 0.28 | 0.28 | 0.24 | 1.17 |
| 5037 | 0.35 | 0.06 | 0.09 | 0.11 | 0.22 | 0.27 | 0.14 | 0.21 | 0.23 | 0.61 | 0.27 | 0.79 | 0.86 | 0.98 | 0.19 | 0.00 | 0.17 | 0.15 | 0.17 | 0.84 |
| 5038 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |

| | 16 | 24 | 30 | 60 | 6.7 | 27 | 5.3 | 1.3 | 4 | 0.65 | 3.8 | 0.8 | 2.1 | 0.33 | 2 | 0.35 | 184 | 134 | 34 | 3.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Concentration/Concentration in Crust, ppm dry ash basis) | | | | | | | | | | | | | | | | | | | |
| Lab | 21 | 39 | 57 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | Total | Light | Heavy | H/L |
| ID | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | REE | REE | REE | Ratio |
| 5034 | 1.35 | 0.97 | 1.72 | 1.59 | 4.83 | 1.71 | 2.33 | 1.10 | 1.83 | 2.55 | 2.03 | 2.25 | 2.80 | 2.11 | 1.66 | 3.47 | 1.70 | 1.83 | 1.34 | 1.37 |
| 5035 | 1.77 | 1.75 | 2.27 | 2.35 | 7.36 | 2.57 | 2.60 | 1.42 | 3.32 | 2.46 | 2.59 | 3.99 | 3.85 | 2.60 | 2.00 | 3.54 | 2.47 | 2.66 | 2.08 | 1.27 |
| 5036 | 0.97 | 0.30 | 0.55 | 0.73 | 1.01 | 1.05 | 0.60 | 0.44 | 0.85 | 1.27 | 0.96 | 2.98 | 2.99 | 0.84 | 0.82 | 0.00 | 0.76 | 0.76 | 0.65 | 1.17 |
| 5037 | 0.85 | 0.14 | 0.22 | 0.26 | 0.53 | 0.65 | 0.33 | 0.51 | 0.55 | 1.49 | 0.65 | 1.93 | 2.11 | 2.40 | 0.46 | 0.00 | 0.41 | 0.36 | 0.42 | 0.84 |
| 5038 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | #N/A | #N/A | #N/A | #N/A |

# APPENDIX 2

SUMMARY OF

PLANT PERFORMANCE DATA

## PLANT 1

X

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1196.6 | TPH |
| Plus 1-1/4" | 275.46 | 213.92 | 97.78 | 275.46 | 213.92 | 97.78 | 1196.62 | 654.38 | 296.44 |
| 1-1/4" x 1/2" | 295.57 | 170.19 | 82.69 | 571.03 | 384.11 | 180.47 | 921.16 | 440.46 | 198.66 |
| 1/2" x 1mm | 414.99 | 173.96 | 72.10 | 986.02 | 558.07 | 252.57 | 625.59 | 270.27 | 115.97 |
| 1mm x 100M | 99.68 | 33.43 | 18.12 | 1085.70 | 591.51 | 270.69 | 210.61 | 96.31 | 43.86 |
| Minus 100M | 110.93 | 62.87 | 25.75 | 1196.62 | 654.38 | 296.44 | 110.93 | 62.87 | 25.75 |
| **Clean Coal** | | | | | | | | 444.0 | TPH |
| Plus 1-1/4" | 35.12 | 3.62 | 4.10 | 35.12 | 3.62 | 4.10 | 444.04 | 41.86 | 35.53 |
| 1-1/4" x 1/2" | 88.41 | 7.93 | 9.30 | 123.53 | 11.56 | 13.41 | 408.92 | 38.23 | 31.43 |
| 1/2" x 1mm | 247.55 | 17.72 | 17.93 | 371.08 | 29.27 | 31.33 | 320.51 | 30.30 | 22.12 |
| 1mm x 100M | 53.55 | 6.65 | 4.20 | 424.63 | 35.92 | 35.53 | 72.96 | 12.58 | 4.20 |
| Minus 100M | 19.40 | 5.94 | 0.00 | 444.04 | 41.86 | 35.53 | 19.40 | 5.94 | 0.00 |
| **Coarse Refuse** | | | | | | | | 552.9 | TPH |
| Plus 1-1/4" | 185.82 | 165.83 | 49.75 | 185.82 | 165.83 | 49.75 | 552.88 | 477.46 | 149.70 |
| 1-1/4" x 1/2" | 157.29 | 133.46 | 37.29 | 343.12 | 299.30 | 87.04 | 367.06 | 311.63 | 99.94 |
| 1/2" x 1mm | 183.17 | 155.60 | 54.54 | 526.28 | 454.90 | 141.58 | 209.76 | 178.17 | 62.65 |
| 1mm x 100M | 21.62 | 18.30 | 6.86 | 547.90 | 473.20 | 148.44 | 26.59 | 22.57 | 8.12 |
| Minus 100M | 4.98 | 4.27 | 1.26 | 552.88 | 477.46 | 149.70 | 4.98 | 4.27 | 1.26 |
| **Fine Refuse** | | | | | | | | 199.7 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.71 | 135.06 | 41.78 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.71 | 135.06 | 41.78 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.71 | 135.06 | 41.78 |
| 1mm x 100M | 15.16 | 9.53 | 4.01 | 15.16 | 9.53 | 4.01 | 199.71 | 135.06 | 41.78 |
| Minus 100M | 184.55 | 125.53 | 37.77 | 199.71 | 135.06 | 41.78 | 184.55 | 125.53 | 37.77 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 6,581,428 | 3,599,091 | 815.2 | 123.86 | 226.50 |
| Clean Coal | 2,442,212 | 230,205 | 97.7 | 40.01 | 424.44 |
| Coarse Refuse | 3,040,824 | 2,626,046 | 411.7 | 135.38 | 156.76 |
| Fine Refuse | 1,098,392 | 742,840 | 114.9 | 104.61 | 154.68 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

## PLANT 1

| Size | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 7.58 | 8.96 | 12.54 | 31.32 | 7.52 | 14.98 | 3.62 | 0.55 | 2.63 | 0.47 | 2.58 | 0.79 | 2.54 | 0.28 | 1.21 | 0.23 |
| 1-1/4" x 1/2" | 6.19 | 7.75 | 11.41 | 26.06 | 6.25 | 12.82 | 3.00 | 0.46 | 2.18 | 0.38 | 2.09 | 0.63 | 2.03 | 0.25 | 0.99 | 0.19 |
| 1/2" x 1mm | 6.33 | 6.64 | 8.15 | 24.46 | 5.76 | 9.94 | 2.43 | 0.38 | 1.81 | 0.35 | 1.88 | 0.63 | 1.98 | 0.25 | 0.93 | 0.18 |
| 1mm x 100M | 1.40 | 1.90 | 2.69 | 5.28 | 1.39 | 2.78 | 0.64 | 0.11 | 0.48 | 0.09 | 0.47 | 0.14 | 0.43 | 0.06 | 0.22 | 0.04 |
| Minus 100M | 2.25 | 2.09 | 2.92 | 9.55 | 1.95 | 3.42 | 0.77 | 0.13 | 0.62 | 0.10 | 0.62 | 0.23 | 0.67 | 0.08 | 0.31 | 0.05 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.31 | 0.80 | 0.53 | 1.06 | 0.16 | 0.59 | 0.12 | 0.03 | 0.12 | 0.02 | 0.13 | 0.04 | 0.11 | 0.02 | 0.06 | 0.00 |
| 1-1/4" x 1/2" | 0.69 | 1.77 | 1.20 | 2.39 | 0.45 | 1.32 | 0.28 | 0.06 | 0.28 | 0.04 | 0.29 | 0.09 | 0.24 | 0.05 | 0.14 | 0.02 |
| 1/2" x 1mm | 1.46 | 3.40 | 2.07 | 4.31 | 1.06 | 2.54 | 0.61 | 0.12 | 0.58 | 0.11 | 0.60 | 0.17 | 0.47 | 0.10 | 0.30 | 0.04 |
| 1mm x 100M | 0.35 | 0.56 | 0.54 | 1.11 | 0.31 | 0.64 | 0.14 | 0.03 | 0.13 | 0.02 | 0.12 | 0.04 | 0.11 | 0.02 | 0.06 | 0.01 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 4.65 | 4.22 | 5.41 | 15.23 | 4.26 | 7.37 | 1.97 | 0.27 | 1.58 | 0.33 | 1.18 | 0.45 | 1.82 | 0.14 | 0.73 | 0.13 |
| 1-1/4" x 1/2" | 3.73 | 2.89 | 4.05 | 11.27 | 3.38 | 5.48 | 1.49 | 0.20 | 1.17 | 0.27 | 0.88 | 0.33 | 1.39 | 0.11 | 0.54 | 0.10 |
| 1/2" x 1mm | 4.82 | 4.48 | 6.61 | 17.47 | 4.27 | 8.12 | 2.09 | 0.29 | 1.63 | 0.30 | 1.20 | 0.44 | 1.77 | 0.15 | 0.76 | 0.12 |
| 1mm x 100M | 0.59 | 0.50 | 0.84 | 2.51 | 0.54 | 0.91 | 0.23 | 0.03 | 0.18 | 0.03 | 0.14 | 0.05 | 0.19 | 0.02 | 0.08 | 0.02 |
| Minus 100M | 0.13 | 0.10 | 0.14 | 0.42 | 0.10 | 0.18 | 0.04 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.05 | 0.00 | 0.02 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.30 | 0.27 | 0.60 | 1.33 | 0.34 | 0.63 | 0.15 | 0.02 | 0.10 | 0.02 | 0.09 | 0.03 | 0.09 | 0.01 | 0.04 | 0.01 |
| Minus 100M | 3.78 | 2.41 | 3.52 | 14.26 | 2.92 | 5.38 | 1.15 | 0.20 | 0.93 | 0.18 | 0.93 | 0.37 | 1.14 | 0.10 | 0.45 | 0.05 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 65.3 | 75.2 | 103.7 | 265.8 | 62.9 | 120.9 | 28.8 | 4.5 | 21.2 | 3.8 | 21.0 | 6.6 | 21.0 | 2.5 | 10.1 | 1.9 |
| Clean Coal | 7.7 | 18.0 | 11.9 | 24.4 | 5.5 | 14.0 | 3.2 | 0.6 | 3.0 | 0.5 | 3.1 | 0.9 | 2.6 | 0.5 | 1.6 | 0.2 |
| Coarse Refuse | 38.3 | 33.5 | 46.9 | 129.0 | 34.5 | 60.7 | 16.0 | 2.2 | 12.7 | 2.6 | 9.4 | 3.5 | 14.4 | 1.2 | 5.8 | 1.0 |
| Fine Refuse | 11.2 | 7.4 | 11.3 | 42.9 | 9.0 | 16.5 | 3.6 | 0.6 | 2.8 | 0.5 | 2.8 | 1.1 | 3.4 | 0.3 | 1.3 | 0.2 |

## PLANT 1

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1196.6 | TPH |
| Float 1.6 | 434.46 | 32.94 | 34.40 | 434.46 | 32.94 | 34.40 | 987.69 | 518.65 | 187.98 |
| 1.6 x 1.8 | 22.01 | 9.41 | 5.41 | 456.47 | 42.35 | 39.81 | 553.23 | 485.71 | 153.58 |
| Sink 1.8 | 531.22 | 476.30 | 148.17 | 987.69 | 518.65 | 187.98 | 531.22 | 476.30 | 148.17 |
| **Clean Coal (Plus 100M)** | | | | | | | | 444.0 | TPH |
| Float 1.6 | 415.94 | 30.55 | 32.60 | 415.94 | 30.55 | 32.60 | 424.63 | 35.92 | 35.53 |
| 1.6 x 1.8 | 3.88 | 1.46 | 0.92 | 419.81 | 32.01 | 33.51 | 8.70 | 5.37 | 2.93 |
| Sink 1.8 | 4.82 | 3.91 | 2.02 | 424.63 | 35.92 | 35.53 | 4.82 | 3.91 | 2.02 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 552.9 | TPH |
| Float 1.6 | 14.04 | 2.15 | 1.81 | 14.04 | 2.15 | 1.81 | 547.90 | 473.20 | 148.44 |
| 1.6 x 1.8 | 17.77 | 7.80 | 4.40 | 31.80 | 9.96 | 6.20 | 533.87 | 471.04 | 146.63 |
| Sink 1.8 | 516.10 | 463.24 | 142.24 | 547.90 | 473.20 | 148.44 | 516.10 | 463.24 | 142.24 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 199.7 | TPH |
| Float 1.6 | 4.49 | 0.24 | 0.00 | 4.49 | 0.24 | 0.00 | 15.16 | 9.53 | 4.01 |
| 1.6 x 1.8 | 0.37 | 0.15 | 0.09 | 4.86 | 0.39 | 0.09 | 10.67 | 9.29 | 4.01 |
| Sink 1.8 | 10.30 | 9.15 | 3.92 | 15.16 | 9.53 | 4.01 | 10.30 | 9.15 | 3.92 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 5,432,312 | 2,852,557 | 516.9 | 95.16 | 181.22 |
| Clean Coal | 2,335,487 | 197,558 | 97.7 | 41.84 | 494.58 |
| Coarse Refuse | 3,013,457 | 2,602,578 | 408.2 | 135.46 | 156.85 |
| Fine Refuse | 83,368 | 52,421 | 11.0 | 132.29 | 210.39 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

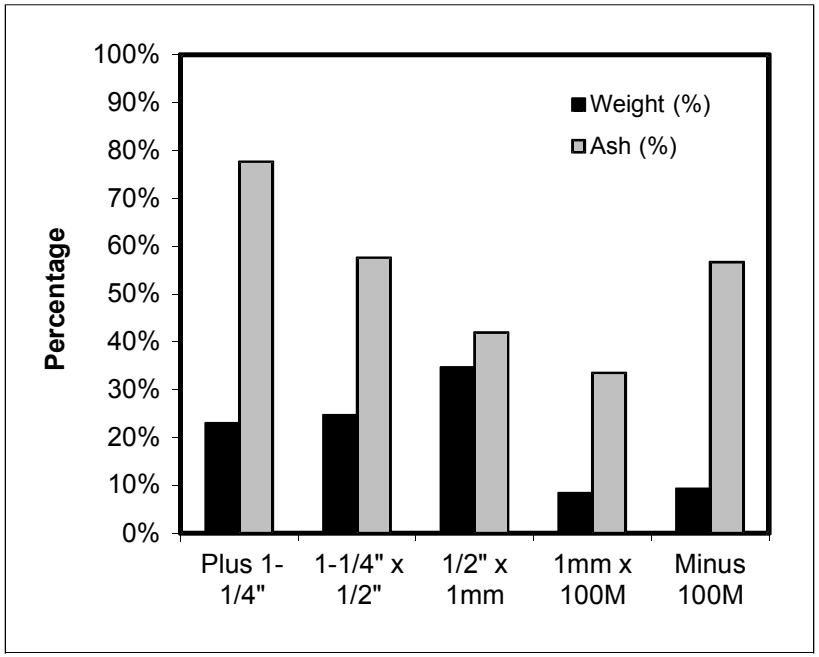
## PLANT 1

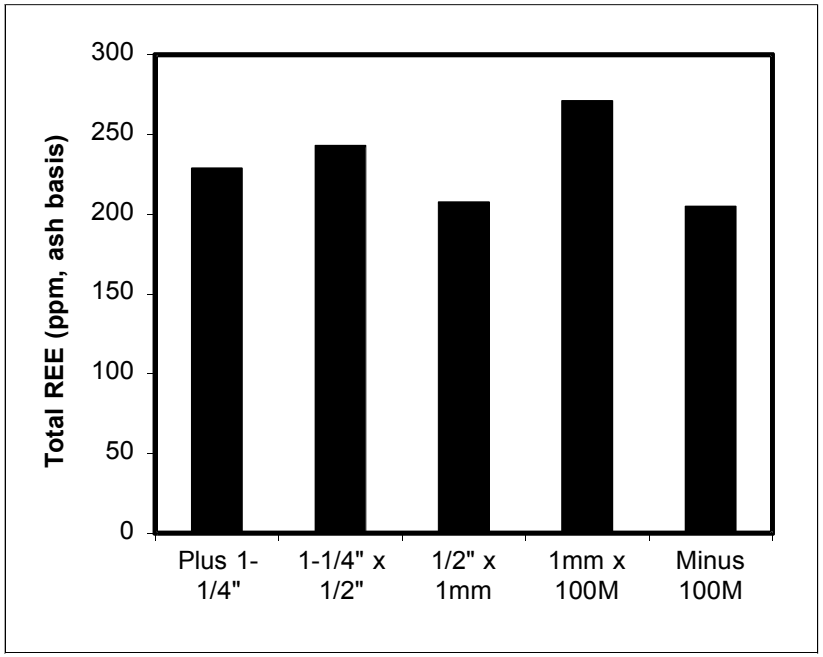
| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 2.74 | 6.55 | 4.11 | 8.48 | 1.83 | 4.90 | 1.11 | 0.23 | 1.08 | 0.19 | 1.12 | 0.33 | 0.92 | 0.20 | 0.56 | 0.07 |
| 1.6 x 1.8 | 0.46 | 0.50 | 0.76 | 1.74 | 0.33 | 0.84 | 0.16 | 0.03 | 0.15 | 0.02 | 0.11 | 0.05 | 0.17 | 0.02 | 0.07 | 0.00 |
| Sink 1.8 | 13.70 | 11.84 | 16.98 | 46.47 | 12.61 | 21.85 | 5.80 | 0.79 | 4.54 | 0.93 | 3.41 | 1.25 | 5.12 | 0.41 | 2.09 | 0.38 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 2.59 | 6.29 | 3.88 | 7.96 | 1.73 | 4.63 | 1.05 | 0.22 | 1.03 | 0.18 | 1.07 | 0.31 | 0.87 | 0.19 | 0.53 | 0.07 |
| 1.6 x 1.8 | 0.07 | 0.09 | 0.13 | 0.28 | 0.07 | 0.15 | 0.03 | 0.00 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 0.14 | 0.16 | 0.33 | 0.63 | 0.18 | 0.31 | 0.07 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.15 | 0.27 | 0.23 | 0.52 | 0.09 | 0.26 | 0.06 | 0.01 | 0.05 | 0.01 | 0.04 | 0.02 | 0.05 | 0.01 | 0.03 | 0.00 |
| 1.6 x 1.8 | 0.38 | 0.40 | 0.61 | 1.43 | 0.26 | 0.68 | 0.13 | 0.02 | 0.12 | 0.02 | 0.09 | 0.04 | 0.14 | 0.02 | 0.06 | 0.00 |
| Sink 1.8 | 13.27 | 11.42 | 16.07 | 44.54 | 12.10 | 20.94 | 5.59 | 0.76 | 4.39 | 0.90 | 3.27 | 1.21 | 4.99 | 0.39 | 2.03 | 0.37 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.8 | 0.01 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.29 | 0.27 | 0.58 | 1.30 | 0.33 | 0.61 | 0.14 | 0.02 | 0.10 | 0.02 | 0.09 | 0.03 | 0.09 | 0.01 | 0.04 | 0.01 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 46.5 | 52.0 | 60.1 | 155.9 | 40.6 | 75.9 | 19.5 | 2.9 | 15.9 | 3.1 | 12.7 | 4.5 | 17.1 | 1.7 | 7.5 | 1.2 |
| Clean Coal | 7.7 | 18.0 | 11.9 | 24.4 | 5.5 | 14.0 | 3.2 | 0.6 | 3.0 | 0.5 | 3.1 | 0.9 | 2.6 | 0.5 | 1.6 | 0.2 |
| Coarse Refuse | 38.0 | 33.3 | 46.5 | 127.9 | 34.2 | 60.2 | 15.9 | 2.2 | 12.6 | 2.6 | 9.4 | 3.5 | 14.3 | 1.2 | 5.8 | 1.0 |
| Fine Refuse | 0.8 | 0.8 | 1.6 | 3.7 | 0.9 | 1.7 | 0.4 | 0.1 | 0.3 | 0.0 | 0.3 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 |

## PLANT 1

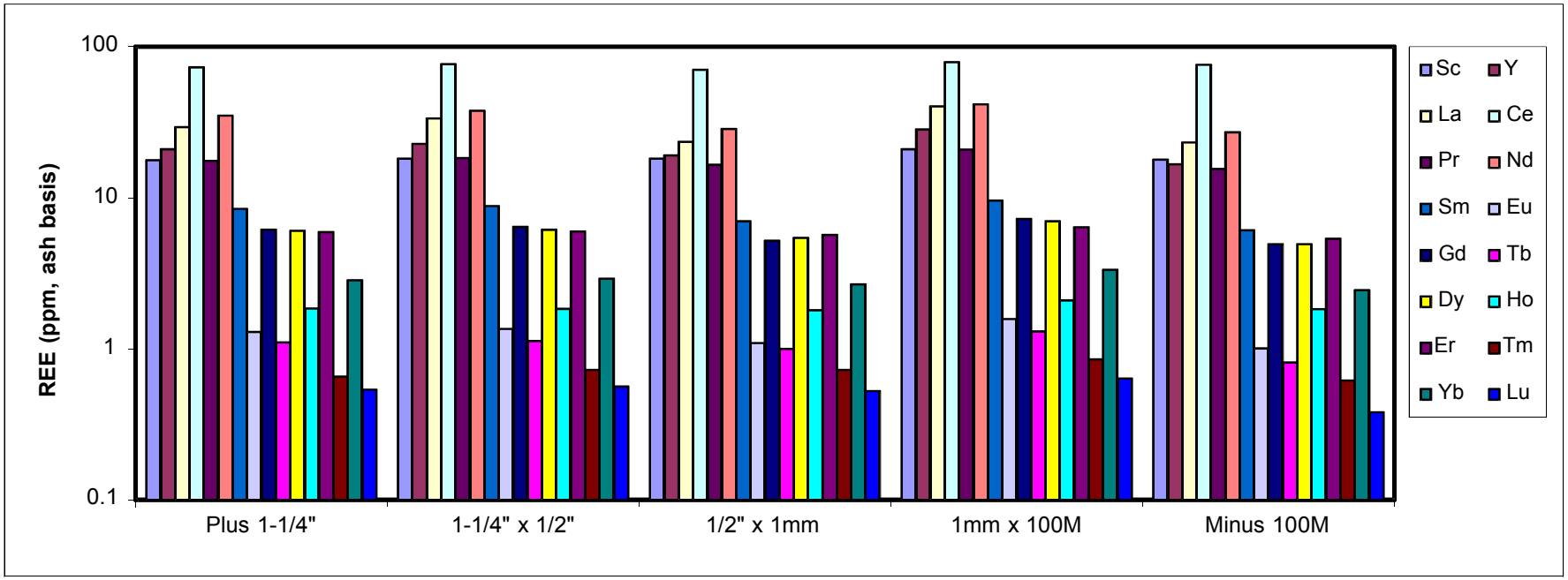
| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 23.02% | 77.66% | 228.54 | 23.02% | 77.66% | 228.54 | 100.00% | 54.69% | 226.50 |
| 1-1/4" x 1/2" | 24.70% | 57.58% | 242.94 | 47.72% | 67.27% | 234.92 | 76.98% | 47.82% | 225.51 |
| 1/2" x 1mm | 34.68% | 41.92% | 207.23 | 82.40% | 56.60% | 226.29 | 52.28% | 43.20% | 214.54 |
| 1mm x 100M | 8.33% | 33.54% | 270.94 | 90.73% | 54.48% | 228.81 | 17.60% | 45.73% | 227.74 |
| Minus 100M | 9.27% | 56.68% | 204.76 | 100.00% | 54.69% | 226.50 | 9.27% | 56.68% | 204.76 |



## PLANT 1

| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 17.71 | 20.93 | 29.30 | 73.19 | 17.57 | 35.02 | 8.45 | 1.29 | 6.14 | 1.10 | 6.04 | 1.84 | 5.94 | 0.65 | 2.83 | 0.54 |
| 1-1/4" x 1/2" | 18.18 | 22.78 | 33.51 | 76.55 | 18.37 | 37.68 | 8.83 | 1.35 | 6.42 | 1.12 | 6.13 | 1.84 | 5.98 | 0.72 | 2.92 | 0.56 |
| 1/2" x 1mm | 18.20 | 19.09 | 23.43 | 70.30 | 16.55 | 28.57 | 6.99 | 1.09 | 5.20 | 1.00 | 5.41 | 1.80 | 5.69 | 0.72 | 2.67 | 0.52 |
| 1mm x 100M | 20.94 | 28.34 | 40.26 | 78.96 | 20.84 | 41.64 | 9.56 | 1.58 | 7.24 | 1.30 | 6.98 | 2.09 | 6.38 | 0.85 | 3.33 | 0.63 |
| Minus 100M | 17.89 | 16.66 | 23.21 | 75.97 | 15.48 | 27.17 | 6.09 | 1.00 | 4.93 | 0.81 | 4.93 | 1.83 | 5.35 | 0.62 | 2.45 | 0.38 |



## PLANT 1

| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 7.91% | 10.32% | 566.09 | 7.91% | 10.32% | 566.09 | 100.00% | 9.43% | 424.44 |
| 1-1/4" x 1/2" | 19.91% | 8.97% | 586.48 | 27.82% | 9.35% | 580.09 | 92.09% | 9.35% | 411.01 |
| 1/2" x 1mm | 55.75% | 7.16% | 505.95 | 83.57% | 7.89% | 535.22 | 72.18% | 9.45% | 365.08 |
| 1mm x 100M | 12.06% | 12.42% | 315.65 | 95.63% | 8.46% | 494.58 | 16.43% | 17.25% | 166.77 |
| Minus 100M | 4.37% | 30.59% | 0.00 | 100.00% | 9.43% | 424.44 | 4.37% | 30.59% | 0.00 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.98% | 10.31% | 566.49 | 99.98% | 10.31% | 566.49 | 100.00% | 10.32% | 566.09 |
| 1.6 x 1.8 | 0.01% | 23.15% | 0.00 | 99.99% | 10.31% | 566.36 | 0.02% | 36.46% | 0.00 |
| Sink 1.8 | 0.01% | 49.77% | 0.00 | 100.00% | 10.32% | 566.09 | 0.01% | 49.77% | 0.00 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.73% | 8.89% | 588.20 | 99.73% | 8.89% | 588.20 | 100.00% | 8.97% | 586.48 |
| 1.6 x 1.8 | 0.26% | 37.89% | 456.46 | 99.99% | 8.97% | 586.76 | 0.27% | 39.40% | 443.01 |
| Sink 1.8 | 0.01% | 78.79% | 274.89 | 100.00% | 8.97% | 586.48 | 0.01% | 78.79% | 274.89 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.94% | 6.80% | 518.43 | 98.94% | 6.80% | 518.43 | 100.00% | 7.16% | 505.95 |
| 1.6 x 1.8 | 0.97% | 37.66% | 308.72 | 99.91% | 7.10% | 507.63 | 1.06% | 40.42% | 309.94 |
| Sink 1.8 | 0.09% | 70.17% | 316.99 | 100.00% | 7.16% | 505.95 | 0.09% | 70.17% | 316.99 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 89.12% | 5.10% | 411.61 | 89.12% | 5.10% | 411.61 | 100.00% | 12.42% | 315.65 |
| 1.6 x 1.8 | 2.32% | 37.49% | 302.12 | 91.44% | 5.92% | 394.03 | 10.88% | 72.34% | 260.24 |
| Sink 1.8 | 8.56% | 81.78% | 255.03 | 100.00% | 12.42% | 315.65 | 8.56% | 81.78% | 255.03 |

## PLANT 1

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 42.19 | 110.08 | 72.85 | 146.02 | 22.19 | 81.64 | 16.51 | 3.50 | 17.02 | 2.55 | 17.80 | 5.82 | 15.42 | 3.23 | 8.87 | 0.39 |
| 1-1/4" x 1/2" | 43.36 | 111.58 | 75.75 | 150.56 | 28.26 | 83.33 | 17.83 | 3.58 | 17.37 | 2.77 | 18.21 | 5.53 | 15.15 | 3.16 | 9.09 | 0.96 |
| 1/2" x 1mm | 41.25 | 96.06 | 58.31 | 121.57 | 29.98 | 71.59 | 17.13 | 3.43 | 16.32 | 2.98 | 16.93 | 4.67 | 13.25 | 2.90 | 8.33 | 1.26 |
| 1mm x 100M | 26.07 | 42.13 | 40.94 | 83.85 | 23.59 | 47.88 | 10.64 | 2.11 | 9.46 | 1.85 | 9.20 | 2.73 | 8.37 | 1.50 | 4.62 | 0.74 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.22 | 110.16 | 72.90 | 146.12 | 22.21 | 81.69 | 16.52 | 3.50 | 17.03 | 2.55 | 17.81 | 5.83 | 15.43 | 3.24 | 8.88 | 0.39 |
| 1.6 x 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.55 | 112.32 | 75.87 | 150.64 | 28.38 | 83.43 | 17.88 | 3.59 | 17.43 | 2.78 | 18.30 | 5.54 | 15.18 | 3.18 | 9.14 | 0.97 |
| 1.6 x 1.8 | 28.23 | 51.56 | 68.21 | 147.36 | 18.16 | 77.31 | 14.17 | 2.60 | 12.55 | 1.20 | 10.99 | 4.79 | 12.57 | 1.46 | 5.28 | 0.00 |
| Sink 1.8 | 18.67 | 23.78 | 42.28 | 92.47 | 17.62 | 43.05 | 9.02 | 1.47 | 6.76 | 0.94 | 6.34 | 2.23 | 6.41 | 0.60 | 2.94 | 0.32 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.33 | 100.43 | 59.12 | 123.29 | 30.31 | 73.03 | 17.55 | 3.55 | 16.86 | 3.08 | 17.53 | 4.80 | 13.59 | 3.02 | 8.63 | 1.30 |
| 1.6 x 1.8 | 25.10 | 27.81 | 44.64 | 94.49 | 22.95 | 49.37 | 10.01 | 1.65 | 7.80 | 1.35 | 7.58 | 2.73 | 8.25 | 0.94 | 3.65 | 0.42 |
| Sink 1.8 | 19.09 | 25.13 | 50.88 | 95.10 | 35.03 | 46.59 | 13.46 | 1.58 | 7.81 | 1.67 | 7.47 | 1.48 | 6.00 | 0.63 | 3.37 | 1.68 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.92 | 78.91 | 38.97 | 88.26 | 24.51 | 61.64 | 14.01 | 3.54 | 14.62 | 3.35 | 15.20 | 4.46 | 13.45 | 3.00 | 7.91 | 0.87 |
| 1.6 x 1.8 | 22.29 | 29.68 | 44.89 | 87.74 | 24.69 | 48.75 | 10.17 | 1.66 | 8.16 | 1.31 | 7.58 | 2.51 | 7.58 | 0.95 | 3.62 | 0.54 |
| Sink 1.8 | 18.20 | 19.79 | 41.72 | 80.49 | 22.87 | 38.83 | 8.51 | 1.24 | 6.27 | 0.94 | 5.50 | 1.64 | 5.17 | 0.59 | 2.60 | 0.68 |

## PLANT 1

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 33.61% | 89.24% | 150.01 | 33.61% | 89.24% | 150.01 | 100.00% | 86.36% | 156.76 |
| 1-1/4" x 1/2" | 28.45% | 84.85% | 139.70 | 62.06% | 87.23% | 145.41 | 66.39% | 84.90% | 160.36 |
| 1/2" x 1mm | 33.13% | 84.95% | 175.24 | 95.19% | 86.44% | 155.62 | 37.94% | 84.94% | 175.83 |
| 1mm x 100M | 3.91% | 84.65% | 187.49 | 99.10% | 86.37% | 156.85 | 4.81% | 84.86% | 179.91 |
| Minus 100M | 0.90% | 85.75% | 147.42 | 100.00% | 86.36% | 156.76 | 0.90% | 85.75% | 147.42 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.09% | 20.52% | 366.94 | 1.09% | 20.52% | 366.94 | 100.00% | 89.24% | 150.01 |
| 1.6 x 1.8 | 1.96% | 45.02% | 132.05 | 3.05% | 36.26% | 179.55 | 98.91% | 90.00% | 149.47 |
| Sink 1.8 | 96.95% | 90.91% | 149.64 | 100.00% | 89.24% | 150.01 | 96.95% | 90.91% | 149.64 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 4.43% | 14.37% | 455.47 | 4.43% | 14.37% | 455.47 | 100.00% | 84.85% | 139.70 |
| 1.6 x 1.8 | 3.29% | 43.99% | 309.61 | 7.72% | 26.99% | 354.17 | 95.57% | 88.12% | 137.31 |
| Sink 1.8 | 92.28% | 89.69% | 134.30 | 100.00% | 84.85% | 139.70 | 92.28% | 89.69% | 134.30 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.31% | 15.56% | 385.71 | 2.31% | 15.56% | 385.71 | 100.00% | 84.95% | 175.24 |
| 1.6 x 1.8 | 4.63% | 43.58% | 330.74 | 6.94% | 34.25% | 339.05 | 97.69% | 86.59% | 174.35 |
| Sink 1.8 | 93.06% | 88.73% | 170.53 | 100.00% | 84.95% | 175.24 | 93.06% | 88.73% | 170.53 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 3.75% | 9.67% | 521.53 | 3.75% | 9.67% | 521.53 | 100.00% | 84.65% | 187.49 |
| 1.6 x 1.8 | 2.18% | 40.55% | 288.68 | 5.93% | 21.02% | 356.41 | 96.25% | 87.57% | 186.05 |
| Sink 1.8 | 94.07% | 88.66% | 184.96 | 100.00% | 84.65% | 187.49 | 94.07% | 88.66% | 184.96 |

## PLANT 1

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 14.03 | 12.72 | 16.31 | 45.92 | 12.84 | 22.23 | 5.94 | 0.81 | 4.78 | 0.99 | 3.57 | 1.35 | 5.50 | 0.43 | 2.20 | 0.39 |
| 1-1/4" x 1/2" | 13.98 | 10.84 | 15.17 | 42.23 | 12.67 | 20.54 | 5.57 | 0.75 | 4.38 | 1.01 | 3.30 | 1.22 | 5.22 | 0.42 | 2.02 | 0.38 |
| 1/2" x 1mm | 15.50 | 14.39 | 21.25 | 56.15 | 13.71 | 26.08 | 6.70 | 0.94 | 5.25 | 0.96 | 3.87 | 1.42 | 5.70 | 0.48 | 2.43 | 0.40 |
| 1mm x 100M | 16.20 | 13.59 | 22.82 | 68.72 | 14.76 | 24.86 | 6.37 | 0.89 | 4.81 | 0.84 | 3.70 | 1.43 | 5.31 | 0.45 | 2.31 | 0.43 |
| Minus 100M | 14.97 | 11.31 | 16.26 | 48.98 | 11.43 | 20.74 | 5.17 | 0.76 | 4.31 | 0.89 | 3.13 | 1.42 | 5.33 | 0.40 | 2.07 | 0.26 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 31.53 | 50.49 | 42.76 | 109.86 | 15.35 | 57.85 | 10.60 | 1.90 | 11.04 | 1.43 | 8.40 | 4.13 | 13.75 | 2.65 | 5.21 | 0.00 |
| 1.6 x 1.8 | 19.64 | 10.32 | 8.41 | 42.65 | 6.01 | 21.08 | 2.62 | 0.52 | 4.12 | 0.82 | 2.27 | 2.22 | 8.42 | 0.97 | 1.98 | 0.00 |
| Sink 1.8 | 13.93 | 12.65 | 16.32 | 45.79 | 12.90 | 22.15 | 5.96 | 0.81 | 4.77 | 0.99 | 3.57 | 1.34 | 5.45 | 0.42 | 2.19 | 0.40 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.91 | 69.46 | 60.50 | 131.97 | 22.27 | 63.93 | 14.17 | 2.59 | 13.44 | 1.85 | 11.65 | 4.13 | 12.83 | 2.34 | 6.90 | 0.53 |
| 1.6 x 1.8 | 26.52 | 28.95 | 43.84 | 100.77 | 17.00 | 48.60 | 9.23 | 1.54 | 8.46 | 1.06 | 6.04 | 2.96 | 9.59 | 1.10 | 3.97 | 0.00 |
| Sink 1.8 | 13.59 | 10.08 | 14.32 | 40.52 | 12.52 | 19.71 | 5.44 | 0.72 | 4.24 | 1.00 | 3.19 | 1.17 | 5.08 | 0.39 | 1.95 | 0.38 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.42 | 55.18 | 48.29 | 108.97 | 22.04 | 57.97 | 12.52 | 2.25 | 11.33 | 1.88 | 8.98 | 3.39 | 10.98 | 1.97 | 5.87 | 0.68 |
| 1.6 x 1.8 | 25.35 | 30.83 | 49.61 | 108.25 | 20.68 | 50.39 | 10.40 | 1.62 | 8.86 | 1.12 | 6.48 | 2.72 | 9.09 | 1.00 | 4.08 | 0.27 |
| Sink 1.8 | 15.18 | 13.82 | 20.44 | 54.65 | 13.51 | 25.35 | 6.59 | 0.92 | 5.14 | 0.96 | 3.78 | 1.38 | 5.59 | 0.46 | 2.37 | 0.40 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.56 | 84.40 | 61.76 | 140.48 | 29.60 | 75.55 | 16.46 | 3.55 | 16.44 | 3.20 | 13.11 | 4.79 | 15.54 | 2.66 | 8.57 | 0.85 |
| 1.6 x 1.8 | 22.82 | 25.83 | 40.43 | 91.46 | 22.65 | 43.61 | 9.70 | 1.47 | 8.23 | 1.22 | 5.89 | 2.34 | 8.18 | 0.83 | 3.52 | 0.52 |
| Sink 1.8 | 16.01 | 13.15 | 22.47 | 68.16 | 14.61 | 24.44 | 6.29 | 0.88 | 4.72 | 0.83 | 3.63 | 1.40 | 5.24 | 0.44 | 2.27 | 0.43 |

## PLANT 1

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 7.59% | 62.88% | 210.39 | 7.59% | 62.88% | 210.39 | 100.00% | 67.63% | 154.68 |
| Minus 100M | 92.41% | 68.02% | 150.45 | 100.00% | 67.63% | 154.68 | 92.41% | 68.02% | 150.45 |
| Float/Sink Analysis - Plus 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 29.62% | 5.35% | 0.00 | 29.62% | 5.35% | 0.00 | 100.00% | 62.88% | 210.39 |
| 1.6 x 1.8 | 2.41% | 39.72% | 316.08 | 32.03% | 7.94% | 119.03 | 70.38% | 87.09% | 215.83 |
| Sink 1.8 | 67.97% | 88.77% | 214.24 | 100.00% | 62.88% | 210.39 | 67.97% | 88.77% | 214.24 |

## PLANT 1

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 15.59 | 14.37 | 31.22 | 69.79 | 17.63 | 32.90 | 7.67 | 1.09 | 5.12 | 0.93 | 4.78 | 1.41 | 4.68 | 0.46 | 2.20 | 0.53 |
| Minus 100M | 15.05 | 9.6 | 14.04 | 56.79 | 11.63 | 21.42 | 4.6 | 0.79 | 3.71 | 0.7 | 3.7 | 1.49 | 4.56 | 0.41 | 1.78 | 0.18 |
| Float/Sink Analysis - Plus 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.8 | 23.21 | 29.29 | 50.74 | 98.33 | 19.96 | 51.5 | 10.17 | 1.78 | 8.13 | 1.13 | 7.22 | 2.61 | 7.47 | 0.73 | 3.53 | 0.28 |
| Sink 1.8 | 15.88 | 14.51 | 31.73 | 71.17 | 18.06 | 33.47 | 7.83 | 1.11 | 5.21 | 0.95 | 4.87 | 1.43 | 4.76 | 0.47 | 2.24 | 0.55 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 682.9 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 682.90 | 279.26 | 166.50 |
| 1-1/4" x 3/4" | 230.55 | 112.78 | 47.86 | 230.55 | 112.78 | 47.86 | 682.90 | 279.26 | 166.50 |
| 3/4" x 1mm | 354.63 | 125.89 | 90.07 | 585.17 | 238.68 | 137.93 | 452.35 | 166.48 | 118.65 |
| 1mm x 100M | 54.63 | 17.97 | 13.15 | 639.81 | 256.65 | 151.08 | 97.72 | 40.58 | 28.57 |
| Minus 100M | 43.09 | 22.61 | 15.43 | 682.90 | 279.26 | 166.50 | 43.09 | 22.61 | 15.43 |
| **Clean Coal** | | | | | | | | 268.1 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 268.09 | 24.86 | 26.76 |
| 1-1/4" x 3/4" | 35.42 | 2.29 | 3.27 | 35.42 | 2.29 | 3.27 | 268.09 | 24.86 | 26.76 |
| 3/4" x 1mm | 173.27 | 15.71 | 19.83 | 208.68 | 18.00 | 23.11 | 232.68 | 22.57 | 23.49 |
| 1mm x 100M | 45.74 | 4.24 | 3.65 | 254.42 | 22.24 | 26.76 | 59.41 | 6.85 | 3.65 |
| Minus 100M | 13.67 | 2.61 | 0.00 | 268.09 | 24.86 | 26.76 | 13.67 | 2.61 | 0.00 |
| **Coarse Refuse** | | | | | | | | 311.7 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 311.66 | 205.05 | 141.15 |
| 1-1/4" x 3/4" | 142.30 | 88.58 | 60.49 | 142.30 | 88.58 | 60.49 | 311.66 | 205.05 | 141.15 |
| 3/4" x 1mm | 156.33 | 107.60 | 75.10 | 298.63 | 196.19 | 135.58 | 169.36 | 116.47 | 80.66 |
| 1mm x 100M | 10.04 | 6.62 | 4.11 | 308.67 | 202.81 | 139.70 | 13.03 | 8.86 | 5.57 |
| Minus 100M | 2.99 | 2.24 | 1.45 | 311.66 | 205.05 | 141.15 | 2.99 | 2.24 | 1.45 |
| **Fine Refuse** | | | | | | | | 103.1 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 103.14 | 49.35 | 30.96 |
| 1-1/4" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 103.14 | 49.35 | 30.96 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 103.14 | 49.35 | 30.96 |
| 1mm x 100M | 15.33 | 4.04 | 2.98 | 15.33 | 4.04 | 2.98 | 103.14 | 49.35 | 30.96 |
| Minus 100M | 87.82 | 45.30 | 27.99 | 103.14 | 49.35 | 30.96 | 87.82 | 45.30 | 27.99 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,755,933 | 1,535,927 | 457.9 | 121.91 | 298.11 |
| Clean Coal | 1,474,518 | 136,716 | 73.6 | 49.90 | 538.23 |
| Coarse Refuse | 1,714,121 | 1,127,788 | 388.2 | 226.45 | 344.18 |
| Fine Refuse | 567,293 | 271,423 | 85.2 | 150.10 | 313.72 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 3.89 | 3.35 | 6.47 | 16.65 | 3.55 | 7.21 | 1.67 | 0.27 | 1.29 | 0.20 | 0.92 | 0.40 | 1.31 | 0.08 | 0.52 | 0.07 |
| 3/4" x 1mm | 6.28 | 9.81 | 14.58 | 28.77 | 5.61 | 12.57 | 2.98 | 0.51 | 2.34 | 0.34 | 1.97 | 0.67 | 2.08 | 0.22 | 1.12 | 0.19 |
| 1mm x 100M | 0.88 | 1.47 | 2.19 | 4.20 | 0.75 | 1.88 | 0.43 | 0.07 | 0.35 | 0.04 | 0.28 | 0.10 | 0.30 | 0.03 | 0.16 | 0.02 |
| Minus 100M | 1.01 | 1.65 | 2.51 | 4.96 | 0.90 | 2.27 | 0.52 | 0.08 | 0.41 | 0.05 | 0.33 | 0.12 | 0.37 | 0.03 | 0.18 | 0.02 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 0.22 | 0.61 | 0.45 | 0.87 | 0.16 | 0.44 | 0.11 | 0.02 | 0.10 | 0.01 | 0.09 | 0.03 | 0.07 | 0.02 | 0.05 | 0.01 |
| 3/4" x 1mm | 1.47 | 3.25 | 2.86 | 5.49 | 1.03 | 2.78 | 0.64 | 0.11 | 0.57 | 0.09 | 0.56 | 0.16 | 0.44 | 0.07 | 0.27 | 0.04 |
| 1mm x 100M | 0.29 | 0.60 | 0.50 | 0.90 | 0.23 | 0.53 | 0.12 | 0.02 | 0.11 | 0.02 | 0.11 | 0.03 | 0.10 | 0.01 | 0.06 | 0.01 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 3.84 | 6.03 | 10.03 | 19.70 | 3.33 | 9.29 | 1.96 | 0.30 | 1.59 | 0.19 | 1.30 | 0.50 | 1.56 | 0.14 | 0.68 | 0.05 |
| 3/4" x 1mm | 4.69 | 7.03 | 12.64 | 24.46 | 4.64 | 11.43 | 2.61 | 0.39 | 1.92 | 0.26 | 1.60 | 0.55 | 1.73 | 0.17 | 0.84 | 0.14 |
| 1mm x 100M | 0.27 | 0.36 | 0.64 | 1.36 | 0.30 | 0.60 | 0.15 | 0.02 | 0.11 | 0.02 | 0.09 | 0.03 | 0.10 | 0.01 | 0.05 | 0.01 |
| Minus 100M | 0.09 | 0.12 | 0.25 | 0.47 | 0.10 | 0.22 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.22 | 0.36 | 0.44 | 0.92 | 0.20 | 0.41 | 0.10 | 0.02 | 0.08 | 0.01 | 0.07 | 0.02 | 0.07 | 0.01 | 0.04 | 0.01 |
| Minus 100M | 1.86 | 2.52 | 4.33 | 9.49 | 1.88 | 4.08 | 1.04 | 0.16 | 0.74 | 0.10 | 0.57 | 0.19 | 0.60 | 0.06 | 0.31 | 0.07 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 33.2 | 44.8 | 70.8 | 150.1 | 29.8 | 65.8 | 15.4 | 2.6 | 12.1 | 1.8 | 9.6 | 3.5 | 11.2 | 1.0 | 5.4 | 0.9 |
| Clean Coal | 5.4 | 12.3 | 10.5 | 20.0 | 3.9 | 10.3 | 2.4 | 0.4 | 2.2 | 0.4 | 2.1 | 0.6 | 1.7 | 0.3 | 1.0 | 0.2 |
| Coarse Refuse | 24.4 | 37.2 | 64.8 | 126.5 | 23.0 | 59.3 | 13.1 | 2.0 | 10.0 | 1.3 | 8.3 | 3.0 | 9.4 | 0.9 | 4.3 | 0.5 |
| Fine Refuse | 5.7 | 7.9 | 13.1 | 28.6 | 5.7 | 12.4 | 3.1 | 0.5 | 2.3 | 0.3 | 1.8 | 0.6 | 1.9 | 0.2 | 1.0 | 0.2 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 682.9 | TPH |
| Float 1.6 | 289.42 | 27.97 | 33.68 | 289.42 | 27.97 | 33.68 | 578.41 | 229.10 | 169.43 |
| Float 1.8 | 53.68 | 22.87 | 17.25 | 343.10 | 50.84 | 50.93 | 288.99 | 201.13 | 135.75 |
| Sink 1.8 | 235.31 | 178.26 | 118.50 | 578.41 | 229.10 | 169.43 | 235.31 | 178.26 | 118.50 |
| **Clean Coal (Plus 100M)** | | | | | | | | 268.1 | TPH |
| Float 1.6 | 249.17 | 19.76 | 25.00 | 249.17 | 19.76 | 25.00 | 254.42 | 22.24 | 26.76 |
| Float 1.8 | 3.40 | 1.30 | 1.02 | 252.57 | 21.06 | 26.01 | 5.26 | 2.49 | 1.76 |
| Sink 1.8 | 1.85 | 1.19 | 0.75 | 254.42 | 22.24 | 26.76 | 1.85 | 1.19 | 0.75 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 311.7 | TPH |
| Float 1.6 | 29.70 | 7.38 | 7.65 | 29.70 | 7.38 | 7.65 | 308.67 | 202.81 | 139.70 |
| Float 1.8 | 49.11 | 21.11 | 15.93 | 78.82 | 28.49 | 23.58 | 278.96 | 195.43 | 132.05 |
| Sink 1.8 | 229.85 | 174.32 | 116.12 | 308.67 | 202.81 | 139.70 | 229.85 | 174.32 | 116.12 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 103.1 | TPH |
| Float 1.6 | 10.55 | 0.82 | 1.04 | 10.55 | 0.82 | 1.04 | 15.33 | 4.04 | 2.98 |
| Float 1.8 | 1.17 | 0.47 | 0.30 | 11.72 | 1.29 | 1.34 | 4.77 | 3.22 | 1.94 |
| Sink 1.8 | 3.61 | 2.75 | 1.63 | 15.33 | 4.04 | 2.98 | 3.61 | 2.75 | 1.63 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,181,280 | 1,260,052 | 465.9 | 146.46 | 369.77 |
| Clean Coal | 1,399,316 | 122,345 | 73.6 | 52.59 | 601.45 |
| Coarse Refuse | 1,697,664 | 1,115,460 | 384.2 | 226.29 | 344.40 |
| Fine Refuse | 84,300 | 22,247 | 8.2 | 97.07 | 367.83 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

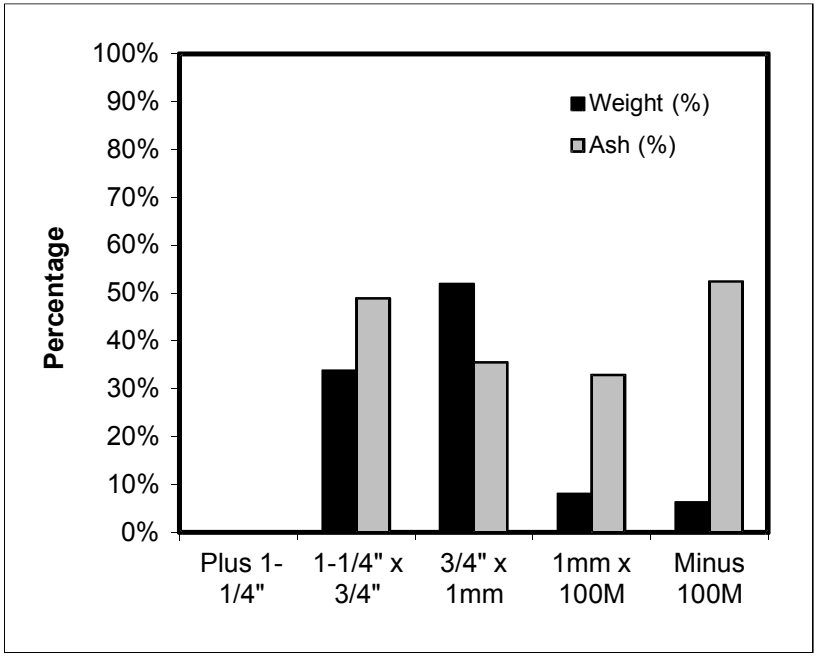
****Unless otherwise noted, REE values reported in ppm*

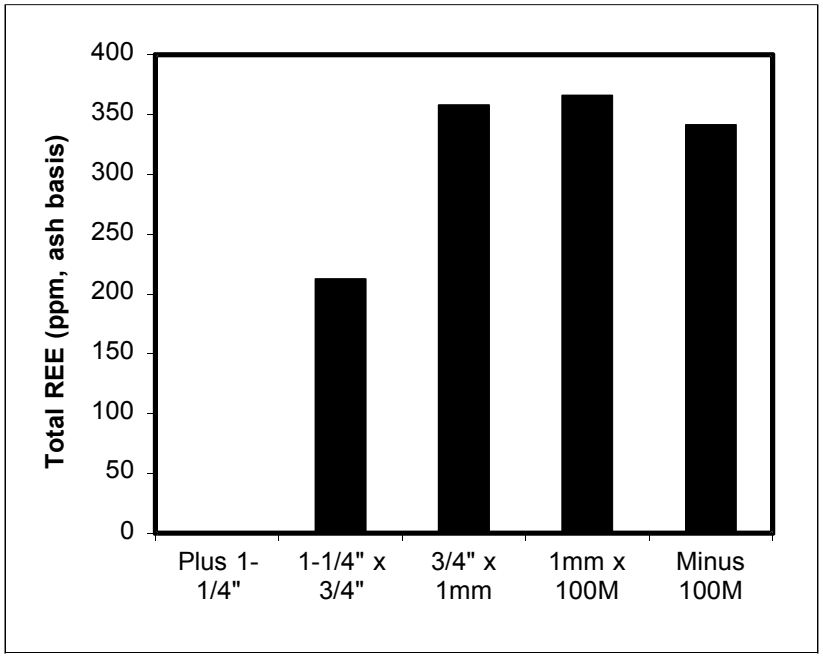
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 2.51 | 5.43 | 4.92 | 9.32 | 1.69 | 4.74 | 1.07 | 0.20 | 0.98 | 0.16 | 0.93 | 0.29 | 0.79 | 0.13 | 0.47 | 0.06 |
| Float 1.8 | 1.20 | 1.73 | 2.74 | 5.57 | 0.93 | 2.70 | 0.54 | 0.09 | 0.44 | 0.06 | 0.39 | 0.15 | 0.46 | 0.04 | 0.20 | 0.01 |
| Sink 1.8 | 7.29 | 11.07 | 19.89 | 38.81 | 7.27 | 18.04 | 4.08 | 0.60 | 3.06 | 0.39 | 2.51 | 0.89 | 2.82 | 0.26 | 1.31 | 0.19 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 1.87 | 4.29 | 3.53 | 6.71 | 1.26 | 3.50 | 0.80 | 0.14 | 0.75 | 0.12 | 0.72 | 0.21 | 0.57 | 0.10 | 0.36 | 0.05 |
| Float 1.8 | 0.07 | 0.10 | 0.16 | 0.33 | 0.06 | 0.15 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 0.04 | 0.06 | 0.12 | 0.22 | 0.11 | 0.08 | 0.04 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.54 | 0.95 | 1.26 | 2.35 | 0.38 | 1.10 | 0.24 | 0.04 | 0.20 | 0.03 | 0.18 | 0.06 | 0.19 | 0.02 | 0.10 | 0.01 |
| Float 1.8 | 1.10 | 1.60 | 2.53 | 5.14 | 0.85 | 2.50 | 0.50 | 0.08 | 0.41 | 0.06 | 0.36 | 0.14 | 0.42 | 0.04 | 0.18 | 0.01 |
| Sink 1.8 | 7.15 | 10.87 | 19.52 | 38.05 | 7.04 | 17.73 | 3.98 | 0.59 | 3.00 | 0.38 | 2.46 | 0.88 | 2.78 | 0.25 | 1.28 | 0.17 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.09 | 0.18 | 0.13 | 0.26 | 0.05 | 0.14 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 |
| Float 1.8 | 0.02 | 0.03 | 0.05 | 0.10 | 0.02 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.10 | 0.15 | 0.26 | 0.55 | 0.13 | 0.23 | 0.06 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |

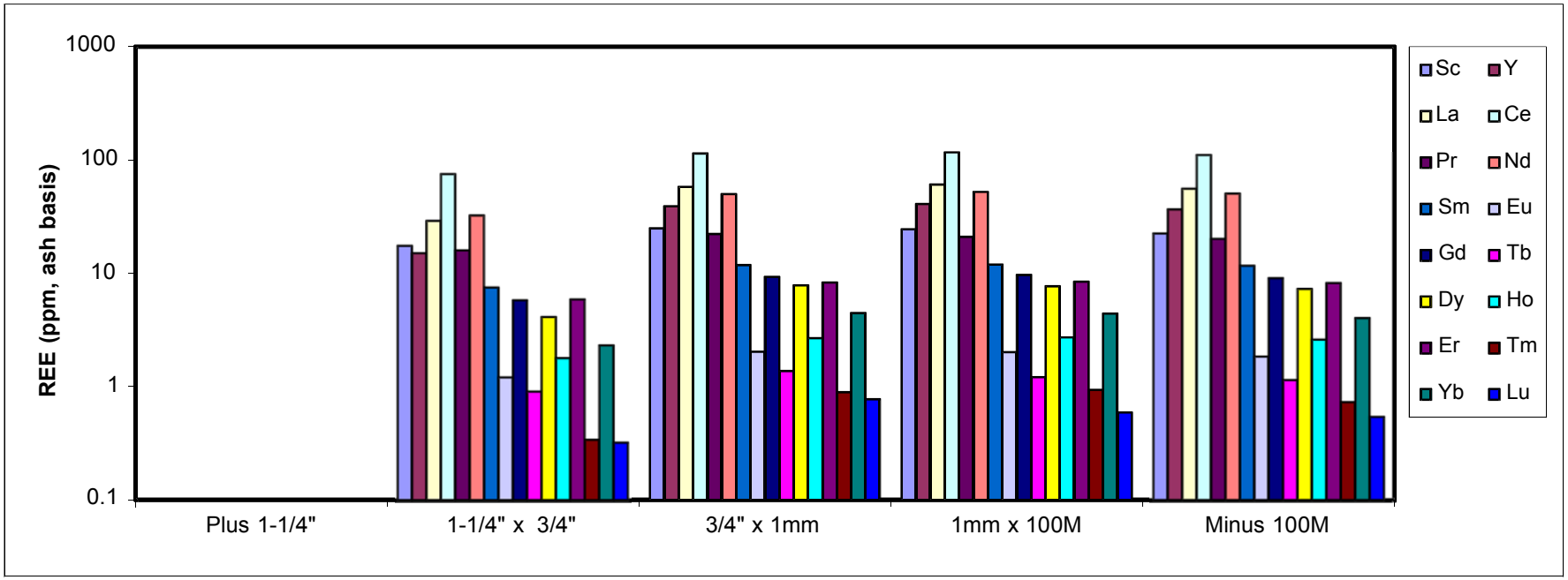
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 30.2 | 50.2 | 75.8 | 147.7 | 27.2 | 70.1 | 15.7 | 2.4 | 12.3 | 1.7 | 10.5 | 3.7 | 11.2 | 1.2 | 5.5 | 0.7 |
| Clean Coal | 5.4 | 12.3 | 10.5 | 20.0 | 3.9 | 10.3 | 2.4 | 0.4 | 2.2 | 0.4 | 2.1 | 0.6 | 1.7 | 0.3 | 1.0 | 0.2 |
| Coarse Refuse | 24.2 | 36.9 | 64.1 | 125.2 | 22.7 | 58.6 | 13.0 | 2.0 | 9.9 | 1.3 | 8.2 | 3.0 | 9.3 | 0.9 | 4.3 | 0.5 |
| Fine Refuse | 0.6 | 1.0 | 1.2 | 2.5 | 0.5 | 1.1 | 0.3 | 0.0 | 0.2 | 0.0 | 0.2 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 0.00% | 0.00% | 0.00 | 0.00% | ########## | 298.11 | 200.00% | 25.08% | 342.49 |
| 1-1/4" x 3/4" | 33.76% | 48.92% | 212.16 | 33.76% | 121.13% | 298.11 | 200.00% | 25.08% | 342.49 |
| 3/4" x 1mm | 51.93% | 35.50% | 357.73 | 85.69% | 28.45% | 356.34 | 166.24% | 20.24% | 406.46 |
| 1mm x 100M | 8.00% | 32.90% | 365.76 | 93.69% | 6.34% | 352.04 | 114.31% | 13.31% | 465.51 |
| Minus 100M | 6.31% | 52.47% | 341.14 | 100.00% | 3.31% | 341.14 | 106.31% | 11.84% | 486.37 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 17.23 | 14.84 | 28.69 | 73.80 | 15.75 | 31.95 | 7.42 | 1.20 | 5.74 | 0.90 | 4.09 | 1.77 | 5.82 | 0.34 | 2.30 | 0.32 |
| 3/4" x 1mm | 24.96 | 38.97 | 57.91 | 114.28 | 22.27 | 49.94 | 11.82 | 2.03 | 9.30 | 1.37 | 7.82 | 2.67 | 8.27 | 0.89 | 4.46 | 0.77 |
| 1mm x 100M | 24.51 | 40.84 | 60.81 | 116.71 | 20.97 | 52.35 | 11.98 | 2.01 | 9.65 | 1.21 | 7.67 | 2.71 | 8.43 | 0.93 | 4.39 | 0.59 |
| Minus 100M | 22.38 | 36.41 | 55.46 | 109.72 | 20.01 | 50.25 | 11.59 | 1.84 | 9.03 | 1.14 | 7.26 | 2.59 | 8.17 | 0.73 | 4.02 | 0.54 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 0.00% | 6.47% | 0.00 | 0.00% | 6.47% | 0.00 | 100.00% | 9.27% | 538.23 |
| 1-1/4" x 3/4" | 13.21% | 6.47% | 714.16 | 13.21% | 6.47% | 714.15 | 100.00% | 9.27% | 538.23 |
| 3/4" x 1mm | 64.63% | 9.07% | 631.12 | 77.84% | 8.63% | 641.69 | 86.79% | 9.70% | 520.37 |
| 1mm x 100M | 17.06% | 9.27% | 430.61 | 94.90% | 8.74% | 601.45 | 22.16% | 11.54% | 266.44 |
| Minus 100M | 5.10% | 19.11% | 0.00 | 100.00% | 9.27% | 538.23 | 5.10% | 19.11% | 0.00 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 100.00% | 6.47% | 714.16 | 100.00% | 6.47% | 714.16 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 100.00% | 6.47% | 714.16 | 100.00% | 6.47% | 714.16 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 100.00% | 6.47% | 714.16 | 100.00% | 6.47% | 714.16 |
| Float/Sink Analysis - 1-1/4" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 100.00% | 6.47% | 714.16 | 100.00% | 6.47% | 714.16 | 100.00% | 6.47% | 714.16 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 100.00% | 6.47% | 714.16 | 0.00% | 0.00% | 0.00 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 100.00% | 6.47% | 714.16 | 0.00% | 0.00% | 0.00 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.58% | 8.58% | 646.19 | 98.58% | 8.58% | 646.19 | 100.00% | 9.07% | 631.12 |
| Float 1.8 | 1.16% | 38.06% | 476.52 | 99.74% | 8.92% | 637.77 | 1.42% | 42.97% | 422.26 |
| Sink 1.8 | 0.26% | 64.85% | 280.18 | 100.00% | 9.07% | 631.12 | 0.26% | 64.85% | 280.18 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 93.89% | 6.55% | 494.58 | 93.89% | 6.55% | 494.58 | 100.00% | 9.27% | 430.61 |
| Float 1.8 | 3.04% | 38.24% | 270.10 | 96.93% | 7.54% | 458.89 | 6.11% | 51.10% | 304.61 |
| Sink 1.8 | 3.07% | 63.83% | 325.09 | 100.00% | 9.27% | 430.61 | 3.07% | 63.83% | 325.09 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 48.13 | 133.51 | 98.40 | 190.46 | 35.75 | 95.69 | 24.16 | 4.71 | 22.79 | 3.07 | 20.18 | 5.74 | 15.86 | 3.81 | 10.28 | 1.62 |
| 3/4" x 1mm | 46.73 | 103.36 | 91.03 | 174.56 | 32.87 | 88.36 | 20.31 | 3.45 | 18.24 | 2.95 | 17.79 | 5.17 | 13.97 | 2.36 | 8.65 | 1.33 |
| 1mm x 100M | 34.43 | 70.60 | 58.94 | 106.07 | 26.63 | 62.01 | 14.66 | 2.78 | 13.16 | 2.91 | 12.88 | 3.87 | 11.67 | 1.73 | 7.11 | 1.17 |
| Minus 100M | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/4" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 48.13 | 133.51 | 98.40 | 190.46 | 35.75 | 95.69 | 24.16 | 4.71 | 22.79 | 3.07 | 20.18 | 5.74 | 15.86 | 3.81 | 10.28 | 1.62 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 48.28 | 107.77 | 92.59 | 177.86 | 32.57 | 90.54 | 20.50 | 3.53 | 18.80 | 3.01 | 18.37 | 5.38 | 14.34 | 2.48 | 8.90 | 1.27 |
| Float 1.8 | 30.28 | 50.89 | 81.00 | 150.65 | 27.81 | 71.39 | 16.44 | 2.68 | 12.15 | 1.61 | 10.07 | 3.35 | 10.84 | 0.85 | 5.64 | 0.87 |
| Sink 1.8 | 12.00 | 19.56 | 38.85 | 71.45 | 61.28 | 23.27 | 21.13 | 1.21 | 6.26 | 3.33 | 8.90 | -0.82 | 3.56 | 0.31 | 4.08 | 5.81 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.06 | 92.84 | 65.51 | 111.34 | 24.44 | 73.06 | 15.41 | 3.41 | 16.04 | 3.55 | 15.89 | 5.04 | 14.14 | 2.27 | 8.80 | 0.78 |
| Float 1.8 | 22.91 | 24.96 | 35.79 | 90.36 | 16.12 | 41.06 | 8.85 | 1.49 | 7.26 | 1.03 | 5.39 | 2.49 | 8.12 | 0.73 | 3.34 | 0.20 |
| Sink 1.8 | 17.31 | 27.87 | 52.07 | 98.86 | 39.75 | 39.77 | 15.73 | 1.56 | 7.60 | 2.04 | 7.88 | 1.04 | 6.02 | 0.61 | 4.03 | 2.95 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 100.00% | 65.79% | 344.18 |
| 1-1/4" x 3/4" | 45.66% | 62.25% | 341.41 | 45.66% | 62.25% | 341.41 | 100.00% | 65.79% | 344.18 |
| 3/4" x 1mm | 50.16% | 68.83% | 348.95 | 95.82% | 65.70% | 345.55 | 54.34% | 68.77% | 346.29 |
| 1mm x 100M | 3.22% | 66.00% | 310.47 | 99.04% | 65.71% | 344.40 | 4.18% | 68.05% | 314.00 |
| Minus 100M | 0.96% | 74.92% | 324.44 | 100.00% | 65.79% | 344.18 | 0.96% | 74.92% | 324.44 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float/Sink Analysis - 1-1/4" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 13.80% | 25.99% | 498.14 | 13.80% | 25.99% | 498.14 | 100.00% | 62.25% | 341.41 |
| Float 1.8 | 12.31% | 43.89% | 251.97 | 26.11% | 34.43% | 350.19 | 86.20% | 68.05% | 331.83 |
| Sink 1.8 | 73.89% | 72.08% | 339.93 | 100.00% | 62.25% | 341.41 | 73.89% | 72.08% | 339.93 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 5.58% | 23.83% | 559.41 | 5.58% | 23.83% | 559.41 | 100.00% | 68.83% | 348.95 |
| Float 1.8 | 19.56% | 42.53% | 449.13 | 25.14% | 38.38% | 464.33 | 94.42% | 71.49% | 344.80 |
| Sink 1.8 | 74.86% | 79.06% | 330.14 | 100.00% | 68.83% | 348.95 | 74.86% | 79.06% | 330.14 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 13.38% | 14.89% | 592.06 | 13.38% | 14.89% | 592.06 | 100.00% | 66.00% | 310.47 |
| Float 1.8 | 10.14% | 41.10% | 448.39 | 23.52% | 26.19% | 494.86 | 86.62% | 73.89% | 301.71 |
| Sink 1.8 | 76.48% | 78.24% | 291.49 | 100.00% | 66.00% | 310.47 | 76.48% | 78.24% | 291.49 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 3/4" | 21.66 | 34.03 | 56.64 | 111.20 | 18.79 | 52.46 | 11.06 | 1.68 | 8.96 | 1.06 | 7.34 | 2.85 | 8.79 | 0.79 | 3.85 | 0.27 |
| 3/4" x 1mm | 21.78 | 32.67 | 58.74 | 113.68 | 21.55 | 53.12 | 12.12 | 1.82 | 8.94 | 1.20 | 7.43 | 2.57 | 8.06 | 0.78 | 3.88 | 0.63 |
| 1mm x 100M | 20.35 | 27.16 | 48.07 | 103.04 | 22.66 | 45.29 | 11.23 | 1.61 | 7.98 | 1.28 | 7.10 | 2.19 | 7.32 | 0.73 | 3.58 | 0.88 |
| Minus 100M | 19.69 | 27.82 | 54.69 | 105.20 | 22.59 | 49.25 | 12.07 | 1.76 | 8.41 | 1.29 | 7.17 | 2.21 | 7.26 | 0.64 | 3.57 | 0.82 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/4" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 34.60 | 63.04 | 81.61 | 153.54 | 24.44 | 71.46 | 15.23 | 2.67 | 13.16 | 1.76 | 11.52 | 4.15 | 12.55 | 1.48 | 6.35 | 0.58 |
| Float 1.8 | 21.62 | 21.46 | 32.84 | 80.20 | 14.88 | 43.63 | 7.77 | 1.08 | 6.51 | 1.04 | 5.92 | 2.73 | 8.61 | 0.71 | 2.97 | 0.00 |
| Sink 1.8 | 20.79 | 33.35 | 57.37 | 111.49 | 18.81 | 52.08 | 11.11 | 1.67 | 8.93 | 1.01 | 7.20 | 2.77 | 8.55 | 0.75 | 3.77 | 0.28 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.28 | 66.89 | 93.35 | 170.57 | 28.39 | 79.98 | 17.65 | 3.44 | 14.94 | 2.31 | 13.36 | 4.55 | 13.01 | 1.60 | 7.18 | 0.91 |
| Float 1.8 | 28.67 | 47.39 | 75.65 | 145.34 | 23.27 | 68.06 | 14.13 | 2.40 | 11.57 | 1.46 | 9.96 | 3.77 | 10.83 | 1.04 | 5.15 | 0.44 |
| Sink 1.8 | 20.37 | 29.83 | 55.58 | 107.95 | 21.15 | 50.42 | 11.71 | 1.70 | 8.43 | 1.14 | 6.94 | 2.36 | 7.56 | 0.72 | 3.63 | 0.65 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 46.96 | 76.86 | 91.71 | 174.27 | 28.53 | 84.89 | 18.67 | 4.13 | 16.96 | 3.06 | 14.99 | 5.12 | 15.02 | 1.81 | 8.32 | 0.76 |
| Float 1.8 | 28.95 | 45.97 | 74.14 | 148.26 | 22.15 | 68.32 | 14.24 | 2.38 | 11.63 | 1.31 | 9.76 | 3.90 | 11.02 | 1.11 | 4.97 | 0.28 |
| Sink 1.8 | 18.86 | 24.20 | 44.80 | 97.52 | 22.50 | 42.37 | 10.77 | 1.47 | 7.43 | 1.22 | 6.65 | 1.97 | 6.81 | 0.67 | 3.32 | 0.93 |

## PLANT 2

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 14.86% | 26.39% | 367.83 | 14.86% | 26.39% | 367.83 | 100.00% | 47.85% | 313.72 |
| Minus 100M | 85.14% | 51.59% | 308.89 | 100.00% | 47.85% | 313.72 | 85.14% | 51.59% | 308.89 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 68.86% | 7.81% | 629.74 | 68.86% | 7.81% | 629.74 | 100.00% | 26.39% | 367.83 |
| Float 1.8 | 7.61% | 39.98% | 325.43 | 76.47% | 11.01% | 519.79 | 31.14% | 67.48% | 300.80 |
| Sink 1.8 | 23.53% | 76.37% | 296.63 | 100.00% | 26.39% | 367.83 | 23.53% | 76.37% | 296.63 |

## PLANT 2

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 26.83 | 44.36 | 54.31 | 113.18 | 24.52 | 50.46 | 12.63 | 2.18 | 10.04 | 1.68 | 8.69 | 2.80 | 9.01 | 1.04 | 5.06 | 1.01 |
| Minus 100M | 20.49 | 27.76 | 47.76 | 104.75 | 20.7 | 45.06 | 11.43 | 1.82 | 8.15 | 1.13 | 6.26 | 2.12 | 6.66 | 0.68 | 3.39 | 0.73 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 56.25 | 111.82 | 80.49 | 160.03 | 31.95 | 82.82 | 19.69 | 4.75 | 20.51 | 3.78 | 18.43 | 6.06 | 17.96 | 3.1 | 11.1 | 1 |
| Float 1.8 | 24.47 | 31.09 | 51.06 | 110.84 | 17.34 | 48.15 | 9.76 | 1.66 | 7.92 | 0.89 | 6.15 | 2.76 | 8.53 | 0.81 | 3.81 | 0.19 |
| Sink 1.8 | 18.43 | 26.42 | 47.03 | 99.56 | 23.51 | 41.17 | 11.01 | 1.5 | 7.27 | 1.19 | 6.21 | 1.83 | 6.42 | 0.46 | 3.47 | 1.15 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1347.9 | TPH |
| Plus 1-1/4" | 283.74 | 209.06 | 103.52 | 283.74 | 209.06 | 103.52 | 1347.93 | 716.94 | 390.76 |
| 1-1/4" x 5/8" | 281.31 | 138.80 | 76.83 | 565.05 | 347.86 | 180.35 | 1064.19 | 507.88 | 287.24 |
| 5/8" x 1mm | 562.22 | 252.94 | 148.33 | 1127.27 | 600.80 | 328.68 | 782.88 | 369.08 | 210.41 |
| 1mm x 100M | 145.44 | 67.72 | 36.71 | 1272.71 | 668.52 | 365.39 | 220.66 | 116.13 | 62.08 |
| Minus 100M | 75.21 | 48.42 | 25.37 | 1347.93 | 716.94 | 390.76 | 75.21 | 48.42 | 25.37 |
| **Clean Coal** | | | | | | | | 572.2 | TPH |
| Plus 1-1/4" | 37.08 | 3.74 | 3.85 | 37.08 | 3.74 | 3.85 | 572.16 | 65.11 | 48.07 |
| 1-1/4" x 5/8" | 135.54 | 15.03 | 15.17 | 172.62 | 18.77 | 19.02 | 535.08 | 61.37 | 44.21 |
| 5/8" x 1mm | 260.50 | 25.24 | 19.26 | 433.12 | 44.01 | 38.28 | 399.54 | 46.34 | 29.05 |
| 1mm x 100M | 104.53 | 9.93 | 9.79 | 537.66 | 53.94 | 48.07 | 139.03 | 21.10 | 9.79 |
| Minus 100M | 34.50 | 11.17 | 0.00 | 572.16 | 65.11 | 48.07 | 34.50 | 11.17 | 0.00 |
| **Coarse Refuse** | | | | | | | | 620.4 | TPH |
| Plus 1-1/4" | 282.33 | 250.58 | 2.11 | 282.33 | 250.58 | 2.11 | 620.37 | 538.49 | 140.34 |
| 1-1/4" x 5/8" | 161.30 | 139.09 | 61.41 | 443.63 | 389.67 | 63.52 | 338.04 | 287.91 | 138.22 |
| 5/8" x 1mm | 140.58 | 117.91 | 61.49 | 584.21 | 507.58 | 125.01 | 176.74 | 148.82 | 76.81 |
| 1mm x 100M | 25.00 | 21.19 | 10.46 | 609.21 | 528.77 | 135.47 | 36.17 | 30.91 | 15.33 |
| Minus 100M | 11.17 | 9.72 | 4.87 | 620.37 | 538.49 | 140.34 | 11.17 | 9.72 | 4.87 |
| **Fine Refuse** | | | | | | | | 155.4 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 155.40 | 112.09 | 55.76 |
| 1-1/4" x 5/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 155.40 | 112.09 | 55.76 |
| 5/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 155.40 | 112.09 | 55.76 |
| 1mm x 100M | 10.41 | 4.75 | 2.16 | 10.41 | 4.75 | 2.16 | 155.40 | 112.09 | 55.76 |
| Minus 100M | 144.98 | 107.33 | 53.60 | 155.40 | 112.09 | 55.76 | 144.98 | 107.33 | 53.60 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 7,413,610 | 3,943,143 | 1,074.6 | 144.95 | 272.52 |
| Clean Coal | 3,146,870 | 358,101 | 132.2 | 42.01 | 369.13 |
| Coarse Refuse | 3,412,062 | 2,961,706 | 385.9 | 113.11 | 130.30 |
| Fine Refuse | 854,678 | 616,476 | 153.3 | 179.40 | 248.72 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 6.52 | 9.98 | 16.39 | 31.56 | 8.63 | 15.75 | 3.88 | 0.56 | 3.08 | 0.43 | 2.16 | 0.69 | 2.20 | 0.12 | 1.20 | 0.33 |
| 1-1/4" x 5/8" | 4.84 | 8.08 | 11.45 | 22.49 | 6.90 | 11.86 | 2.92 | 0.34 | 2.16 | 0.36 | 1.93 | 0.52 | 1.65 | 0.14 | 0.90 | 0.28 |
| 5/8" x 1mm | 9.91 | 15.44 | 22.58 | 42.76 | 14.51 | 22.41 | 5.96 | 0.74 | 4.05 | 0.75 | 3.70 | 0.93 | 1.88 | 0.24 | 1.83 | 0.62 |
| 1mm x 100M | 2.60 | 3.57 | 5.86 | 10.96 | 3.29 | 5.25 | 1.34 | 0.20 | 1.06 | 0.16 | 0.78 | 0.22 | 0.77 | 0.04 | 0.45 | 0.14 |
| Minus 100M | 1.82 | 2.33 | 4.06 | 7.65 | 2.27 | 3.71 | 0.91 | 0.13 | 0.73 | 0.10 | 0.51 | 0.17 | 0.56 | 0.03 | 0.30 | 0.09 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.28 | 0.59 | 0.57 | 1.08 | 0.18 | 0.55 | 0.14 | 0.02 | 0.12 | 0.02 | 0.12 | 0.03 | 0.06 | 0.02 | 0.06 | 0.01 |
| 1-1/4" x 5/8" | 1.15 | 2.51 | 2.05 | 3.95 | 0.87 | 1.97 | 0.68 | 0.10 | 0.51 | 0.10 | 0.52 | 0.10 | 0.24 | 0.07 | 0.26 | 0.09 |
| 5/8" x 1mm | 1.42 | 2.70 | 2.55 | 5.79 | 0.86 | 2.64 | 0.88 | 0.13 | 0.62 | 0.13 | 0.64 | 0.13 | 0.27 | 0.09 | 0.31 | 0.11 |
| 1mm x 100M | 0.81 | 1.61 | 1.29 | 2.53 | 0.54 | 1.34 | 0.39 | 0.07 | 0.34 | 0.06 | 0.32 | 0.07 | 0.16 | 0.04 | 0.16 | 0.04 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.14 | 0.20 | 0.34 | 0.67 | 0.18 | 0.33 | 0.08 | 0.01 | 0.05 | 0.01 | 0.05 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 |
| 1-1/4" x 5/8" | 3.85 | 5.56 | 9.13 | 18.27 | 5.90 | 9.85 | 2.37 | 0.27 | 1.77 | 0.28 | 1.48 | 0.40 | 1.29 | 0.11 | 0.66 | 0.21 |
| 5/8" x 1mm | 3.60 | 5.31 | 10.17 | 19.24 | 5.21 | 9.37 | 2.40 | 0.32 | 1.68 | 0.25 | 1.28 | 0.38 | 1.29 | 0.07 | 0.69 | 0.22 |
| 1mm x 100M | 0.71 | 0.87 | 1.65 | 3.05 | 1.24 | 1.53 | 0.42 | 0.05 | 0.28 | 0.05 | 0.24 | 0.05 | 0.11 | 0.01 | 0.12 | 0.06 |
| Minus 100M | 0.32 | 0.43 | 0.75 | 1.40 | 0.56 | 0.74 | 0.20 | 0.02 | 0.13 | 0.02 | 0.12 | 0.03 | 0.06 | 0.01 | 0.06 | 0.03 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 5/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.16 | 0.20 | 0.32 | 0.62 | 0.23 | 0.30 | 0.08 | 0.01 | 0.06 | 0.01 | 0.05 | 0.01 | 0.05 | 0.00 | 0.03 | 0.01 |
| Minus 100M | 3.74 | 4.45 | 8.08 | 18.07 | 4.11 | 7.90 | 1.92 | 0.28 | 1.40 | 0.21 | 1.02 | 0.35 | 1.23 | 0.05 | 0.64 | 0.17 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 70.7 | 108.3 | 166.0 | 317.4 | 97.9 | 162.2 | 41.3 | 5.4 | 30.5 | 5.0 | 25.0 | 6.9 | 19.4 | 1.6 | 12.9 | 4.0 |
| Clean Coal | 10.1 | 20.4 | 17.7 | 36.7 | 6.7 | 17.9 | 5.7 | 0.9 | 4.4 | 0.9 | 4.4 | 0.9 | 2.0 | 0.6 | 2.2 | 0.7 |
| Coarse Refuse | 23.7 | 34.0 | 60.6 | 117.2 | 36.0 | 60.0 | 15.0 | 1.9 | 10.8 | 1.7 | 8.7 | 2.4 | 7.6 | 0.6 | 4.3 | 1.4 |
| Fine Refuse | 10.7 | 12.8 | 23.1 | 51.4 | 11.9 | 22.5 | 5.5 | 0.8 | 4.0 | 0.6 | 2.9 | 1.0 | 3.5 | 0.2 | 1.8 | 0.5 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1347.9 | TPH |
| Float 1.6 | 533.76 | 48.52 | 46.01 | 533.76 | 48.52 | 46.01 | 1157.28 | 588.71 | 186.98 |
| Float 1.8 | 35.22 | 14.48 | 9.74 | 568.99 | 63.00 | 55.76 | 623.51 | 540.19 | 140.96 |
| Sink 1.8 | 588.29 | 525.71 | 131.22 | 1157.28 | 588.71 | 186.98 | 588.29 | 525.71 | 131.22 |
| **Clean Coal (Plus 100M)** | | | | | | | | 572.2 | TPH |
| Float 1.6 | 518.76 | 45.90 | 44.00 | 518.76 | 45.90 | 44.00 | 537.66 | 55.19 | 49.35 |
| Float 1.8 | 11.95 | 4.67 | 3.14 | 530.71 | 50.56 | 47.14 | 18.89 | 9.29 | 5.35 |
| Sink 1.8 | 6.95 | 4.62 | 2.21 | 537.66 | 55.19 | 49.35 | 6.95 | 4.62 | 2.21 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 620.4 | TPH |
| Float 1.6 | 9.89 | 2.30 | 1.79 | 9.89 | 2.30 | 1.79 | 609.21 | 528.77 | 135.47 |
| Float 1.8 | 22.94 | 9.69 | 6.60 | 32.83 | 11.99 | 8.40 | 599.32 | 526.47 | 133.67 |
| Sink 1.8 | 576.38 | 516.78 | 127.07 | 609.21 | 528.77 | 135.47 | 576.38 | 516.78 | 127.07 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 155.4 | TPH |
| Float 1.6 | 5.11 | 0.32 | 0.22 | 5.11 | 0.32 | 0.22 | 10.41 | 4.75 | 2.16 |
| Float 1.8 | 0.34 | 0.12 | 0.00 | 5.45 | 0.44 | 0.22 | 5.30 | 4.43 | 1.94 |
| Sink 1.8 | 4.96 | 4.31 | 1.94 | 10.41 | 4.75 | 2.16 | 4.96 | 4.31 | 1.94 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 6,365,022 | 3,237,898 | 514.2 | 80.78 | 158.80 |
| Clean Coal | 2,957,114 | 303,518 | 135.7 | 45.89 | 447.15 |
| Coarse Refuse | 3,350,645 | 2,908,230 | 372.5 | 111.18 | 128.10 |
| Fine Refuse | 57,263 | 26,150 | 5.9 | 103.73 | 227.15 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

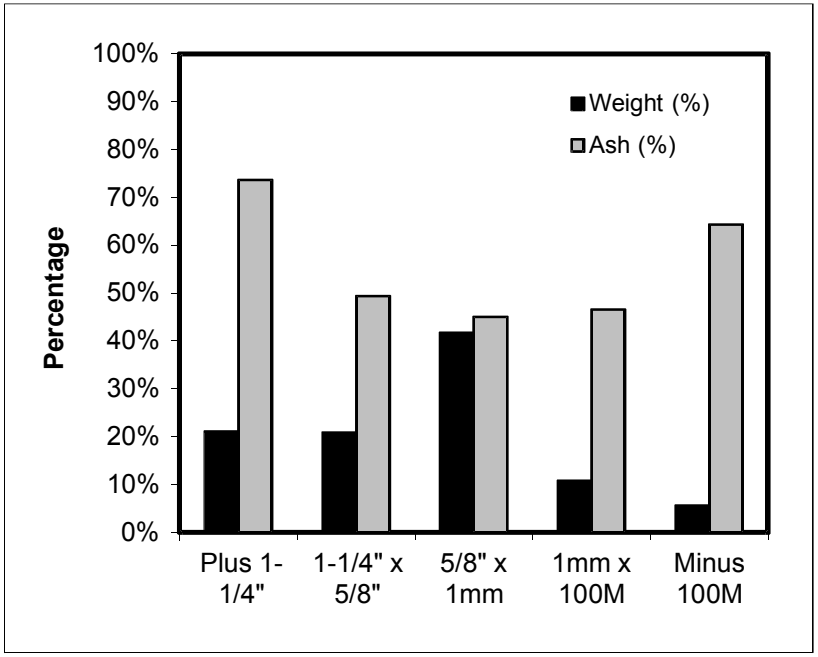
****Unless otherwise noted, REE values reported in ppm*

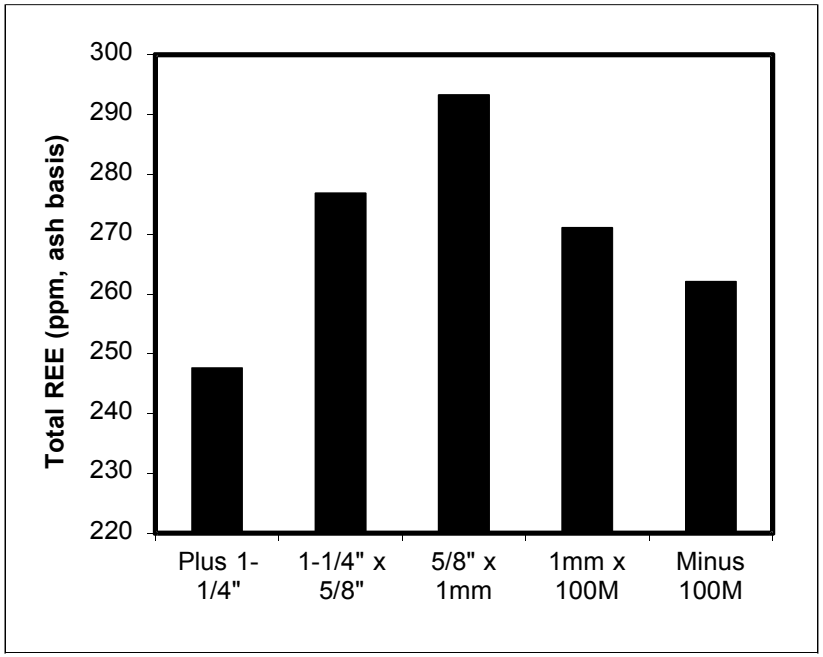
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 3.52 | 7.38 | 6.04 | 12.61 | 2.31 | 6.18 | 1.96 | 0.32 | 1.54 | 0.31 | 1.55 | 0.33 | 0.75 | 0.21 | 0.77 | 0.24 |
| Float 1.8 | 0.65 | 0.91 | 1.64 | 3.06 | 0.72 | 1.42 | 0.37 | 0.05 | 0.25 | 0.04 | 0.22 | 0.07 | 0.17 | 0.02 | 0.12 | 0.04 |
| Sink 1.8 | 8.04 | 11.45 | 20.58 | 39.88 | 12.24 | 20.45 | 5.16 | 0.64 | 3.70 | 0.58 | 2.97 | 0.82 | 2.61 | 0.19 | 1.44 | 0.49 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 3.36 | 7.13 | 5.75 | 12.03 | 2.15 | 5.90 | 1.89 | 0.30 | 1.49 | 0.30 | 1.50 | 0.32 | 0.71 | 0.21 | 0.74 | 0.23 |
| Float 1.8 | 0.23 | 0.30 | 0.53 | 0.99 | 0.17 | 0.47 | 0.13 | 0.02 | 0.09 | 0.02 | 0.08 | 0.02 | 0.03 | 0.01 | 0.04 | 0.01 |
| Sink 1.8 | 0.17 | 0.17 | 0.37 | 0.68 | 0.18 | 0.31 | 0.11 | 0.01 | 0.07 | 0.01 | 0.06 | 0.01 | 0.02 | 0.00 | 0.03 | 0.02 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.13 | 0.21 | 0.27 | 0.53 | 0.14 | 0.25 | 0.06 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.01 | 0.02 | 0.01 |
| Float 1.8 | 0.42 | 0.61 | 1.11 | 2.07 | 0.55 | 0.95 | 0.24 | 0.03 | 0.16 | 0.03 | 0.14 | 0.04 | 0.14 | 0.01 | 0.08 | 0.02 |
| Sink 1.8 | 7.74 | 11.12 | 19.90 | 38.62 | 11.85 | 19.87 | 4.97 | 0.61 | 3.58 | 0.56 | 2.87 | 0.80 | 2.55 | 0.18 | 1.39 | 0.46 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.04 | 0.02 | 0.05 | 0.02 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.13 | 0.16 | 0.31 | 0.58 | 0.21 | 0.27 | 0.07 | 0.01 | 0.06 | 0.01 | 0.04 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |

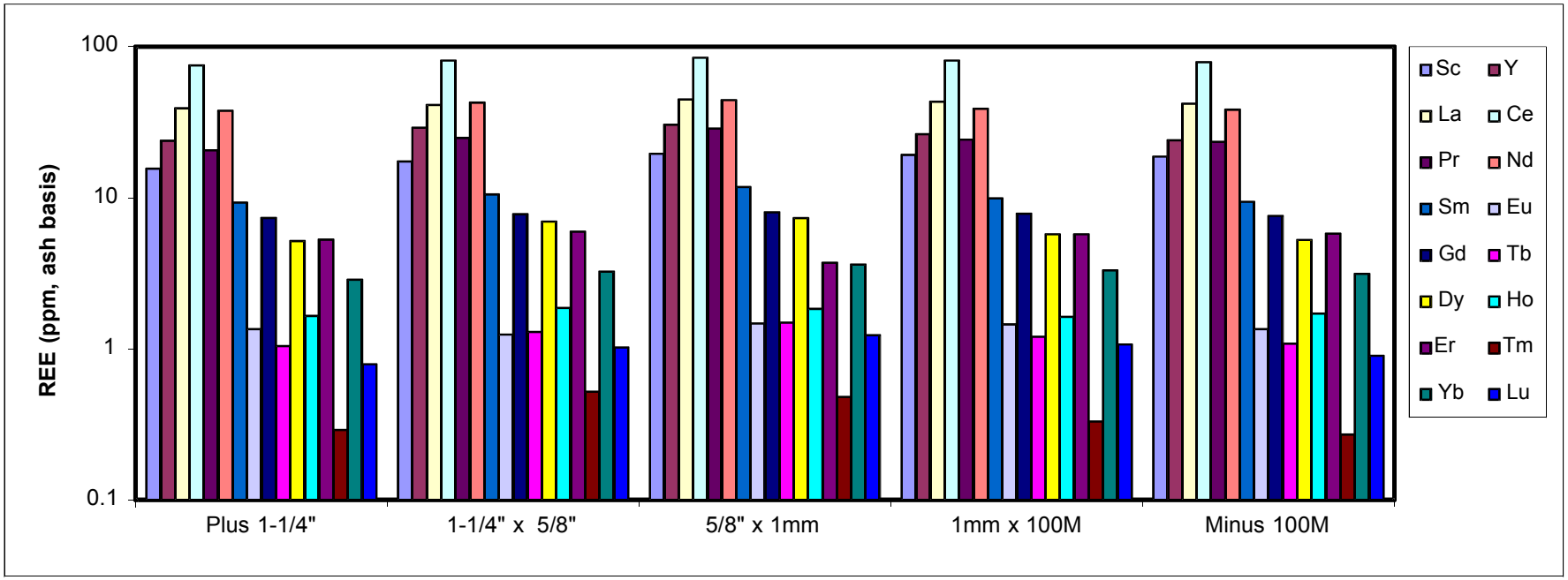
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 33.6 | 54.3 | 77.7 | 152.8 | 42.0 | 77.2 | 20.6 | 2.7 | 15.1 | 2.6 | 13.0 | 3.3 | 9.7 | 1.2 | 6.4 | 2.1 |
| Clean Coal | 10.3 | 20.9 | 18.3 | 37.7 | 6.9 | 18.4 | 5.9 | 0.9 | 4.5 | 0.9 | 4.5 | 0.9 | 2.1 | 0.6 | 2.2 | 0.7 |
| Coarse Refuse | 22.8 | 32.8 | 58.5 | 113.4 | 34.5 | 57.9 | 14.5 | 1.8 | 10.4 | 1.6 | 8.4 | 2.3 | 7.5 | 0.6 | 4.1 | 1.4 |
| Fine Refuse | 0.4 | 0.6 | 0.9 | 1.7 | 0.6 | 0.8 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 21.05% | 73.68% | 247.58 | 21.05% | 255.78% | 275.46 | 200.00% | 32.28% | 289.55 |
| 1-1/4" x 5/8" | 20.87% | 49.34% | 276.77 | 41.92% | 91.44% | 286.74 | 178.95% | 27.41% | 302.81 |
| 5/8" x 1mm | 41.71% | 44.99% | 293.21 | 83.63% | 33.52% | 290.41 | 158.08% | 24.52% | 309.73 |
| 1mm x 100M | 10.79% | 46.56% | 271.03 | 94.42% | 9.82% | 284.73 | 116.37% | 17.18% | 325.24 |
| Minus 100M | 5.58% | 64.37% | 262.02 | 100.00% | 4.25% | 300.95 | 105.58% | 14.18% | 343.43 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 15.60 | 23.87 | 39.21 | 75.49 | 20.64 | 37.68 | 9.29 | 1.35 | 7.37 | 1.04 | 5.17 | 1.65 | 5.27 | 0.29 | 2.87 | 0.79 |
| 1-1/4" x 5/8" | 17.45 | 29.10 | 41.23 | 81.02 | 24.85 | 42.72 | 10.51 | 1.24 | 7.79 | 1.29 | 6.97 | 1.86 | 5.95 | 0.52 | 3.25 | 1.02 |
| 5/8" x 1mm | 19.58 | 30.52 | 44.64 | 84.52 | 28.69 | 44.30 | 11.79 | 1.47 | 8.01 | 1.49 | 7.32 | 1.84 | 3.71 | 0.48 | 3.62 | 1.23 |
| 1mm x 100M | 19.23 | 26.37 | 43.27 | 80.92 | 24.27 | 38.76 | 9.91 | 1.45 | 7.86 | 1.20 | 5.74 | 1.63 | 5.72 | 0.33 | 3.30 | 1.07 |
| Minus 100M | 18.75 | 24.03 | 41.98 | 79.03 | 23.43 | 38.35 | 9.40 | 1.35 | 7.57 | 1.08 | 5.26 | 1.71 | 5.78 | 0.27 | 3.13 | 0.90 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 6.48% | 10.09% | 514.71 | 6.48% | 10.09% | 514.71 | 100.00% | 11.38% | 369.13 |
| 1-1/4" x 5/8" | 23.69% | 11.09% | 504.62 | 30.17% | 10.87% | 506.63 | 93.52% | 11.47% | 360.25 |
| 5/8" x 1mm | 45.53% | 9.69% | 381.57 | 75.70% | 10.16% | 434.91 | 69.83% | 11.60% | 313.43 |
| 1mm x 100M | 18.27% | 9.50% | 492.89 | 93.97% | 10.03% | 445.58 | 24.30% | 15.18% | 231.92 |
| Minus 100M | 6.03% | 32.38% | 0.00 | 100.00% | 11.38% | 369.13 | 6.03% | 32.38% | 0.00 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.50% | 12.71% | 530.76 | 196.84% | 11.80% | 520.34 | 200.00% | 12.27% | 510.15 |
| Float 1.8 | 2.47% | 42.48% | 329.25 | 99.34% | 10.90% | 508.42 | 102.50% | 11.86% | 489.13 |
| Sink 1.8 | 0.03% | 56.89% | 259.21 | 96.87% | 10.09% | 527.64 | 100.03% | 11.10% | 504.24 |
| Float/Sink Analysis - 1-1/4" x 5/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 96.84% | 10.08% | 528.11 | 96.84% | 10.08% | 528.11 | 100.00% | 11.09% | 504.62 |
| Float 1.8 | 2.90% | 40.77% | 336.62 | 99.74% | 10.97% | 507.42 | 3.16% | 41.99% | 331.76 |
| Sink 1.8 | 0.26% | 55.55% | 291.95 | 100.00% | 11.09% | 504.62 | 0.26% | 55.55% | 291.95 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.60% | 8.73% | 393.54 | 97.60% | 8.73% | 393.54 | 100.00% | 9.69% | 381.57 |
| Float 1.8 | 1.51% | 38.55% | 340.36 | 99.11% | 9.18% | 390.14 | 2.40% | 48.66% | 294.23 |
| Sink 1.8 | 0.89% | 65.81% | 248.38 | 100.00% | 9.69% | 381.57 | 0.89% | 65.81% | 248.38 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 92.89% | 6.05% | 653.81 | 92.89% | 6.05% | 653.81 | 100.00% | 9.50% | 492.89 |
| Float 1.8 | 3.03% | 36.58% | 332.74 | 95.92% | 7.01% | 600.92 | 7.11% | 54.53% | 259.64 |
| Sink 1.8 | 4.08% | 67.86% | 230.38 | 100.00% | 9.50% | 492.89 | 4.08% | 67.86% | 230.38 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 37.70 | 78.60 | 76.05 | 144.33 | 23.77 | 73.47 | 18.78 | 3.19 | 16.34 | 2.59 | 15.95 | 4.23 | 8.32 | 2.04 | 7.85 | 1.50 |
| 1-1/4" x 5/8" | 38.28 | 83.57 | 68.13 | 131.39 | 28.84 | 65.65 | 22.64 | 3.26 | 16.94 | 3.44 | 17.37 | 3.34 | 8.04 | 2.23 | 8.51 | 2.99 |
| 5/8" x 1mm | 28.08 | 53.42 | 50.44 | 114.62 | 17.00 | 52.32 | 17.37 | 2.65 | 12.34 | 2.66 | 12.61 | 2.54 | 5.39 | 1.78 | 6.06 | 2.27 |
| 1mm x 100M | 40.76 | 81.15 | 64.90 | 127.35 | 27.36 | 67.25 | 19.53 | 3.45 | 17.25 | 3.27 | 16.20 | 3.74 | 8.24 | 2.03 | 8.29 | 2.12 |
| Minus 100M | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.68 | 82.83 | 78.19 | 147.07 | 24.80 | 75.05 | 19.46 | 3.30 | 17.00 | 2.71 | 16.68 | 4.35 | 8.69 | 2.15 | 8.18 | 1.62 |
| Float 1.8 | 26.38 | 29.54 | 51.38 | 112.81 | 11.80 | 55.30 | 10.88 | 1.96 | 8.74 | 1.22 | 7.44 | 2.84 | 4.03 | 0.81 | 3.98 | 0.14 |
| Sink 1.8 | 18.65 | 20.44 | 41.50 | 88.87 | 10.45 | 43.62 | 11.02 | 1.25 | 6.51 | 1.31 | 6.07 | 1.75 | 2.76 | 0.40 | 3.50 | 1.11 |
| Float/Sink Analysis - 1-1/4" x 5/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 40.22 | 90.64 | 69.74 | 134.90 | 30.40 | 67.57 | 23.97 | 3.47 | 18.02 | 3.70 | 18.62 | 3.48 | 8.62 | 2.42 | 9.09 | 3.25 |
| Float 1.8 | 24.19 | 32.40 | 57.15 | 107.42 | 16.98 | 52.50 | 12.83 | 1.76 | 9.08 | 1.53 | 8.31 | 2.44 | 3.88 | 0.88 | 4.28 | 0.99 |
| Sink 1.8 | 22.26 | 24.39 | 49.07 | 90.30 | 20.61 | 43.47 | 12.71 | 1.45 | 8.15 | 1.63 | 7.36 | 1.59 | 2.96 | 0.68 | 3.75 | 1.57 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.07 | 57.28 | 50.60 | 117.77 | 16.61 | 53.88 | 17.59 | 2.81 | 12.93 | 2.75 | 13.21 | 2.73 | 5.77 | 1.93 | 6.35 | 2.26 |
| Float 1.8 | 24.82 | 31.92 | 56.82 | 105.30 | 21.95 | 47.99 | 16.52 | 1.72 | 9.24 | 2.09 | 9.24 | 1.66 | 3.35 | 0.90 | 4.60 | 2.24 |
| Sink 1.8 | 16.89 | 18.63 | 41.75 | 78.09 | 17.68 | 33.99 | 14.99 | 1.30 | 6.92 | 1.93 | 7.25 | 0.68 | 1.94 | 0.52 | 3.36 | 2.46 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 55.01 | 121.58 | 79.98 | 160.29 | 32.69 | 88.08 | 25.11 | 4.92 | 23.80 | 4.53 | 22.86 | 5.42 | 12.15 | 3.06 | 11.76 | 2.57 |
| Float 1.8 | 25.16 | 33.54 | 56.37 | 103.82 | 19.13 | 48.69 | 12.75 | 1.69 | 9.31 | 1.57 | 8.33 | 2.29 | 3.71 | 0.94 | 4.29 | 1.15 |
| Sink 1.8 | 18.09 | 18.14 | 37.69 | 69.92 | 19.84 | 32.40 | 10.92 | 1.16 | 7.14 | 1.39 | 5.82 | 0.92 | 2.12 | 0.39 | 2.84 | 1.60 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 45.51% | 88.75% | 4.22 | 45.51% | 88.75% | 4.22 | 100.00% | 86.80% | 130.30 |
| 1-1/4" x 5/8" | 26.00% | 86.23% | 220.74 | 71.51% | 87.84% | 81.50 | 54.49% | 85.17% | 240.04 |
| 5/8" x 1mm | 22.66% | 83.87% | 260.75 | 94.17% | 86.88% | 123.14 | 28.49% | 84.20% | 258.09 |
| 1mm x 100M | 4.03% | 84.75% | 246.76 | 98.20% | 86.80% | 128.10 | 5.83% | 85.47% | 247.93 |
| Minus 100M | 1.80% | 87.07% | 250.46 | 100.00% | 86.80% | 130.30 | 1.80% | 87.07% | 250.46 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.87% | 30.21% | 346.92 | 0.87% | 30.21% | 346.92 | 100.00% | 88.75% | 4.22 |
| Float 1.8 | 1.88% | 42.62% | 353.58 | 2.75% | 38.69% | 351.93 | 99.13% | 89.27% | 3.20 |
| Sink 1.8 | 97.25% | 90.17% | 0.00 | 100.00% | 88.75% | 4.22 | 97.25% | 90.17% | 0.00 |
| Float/Sink Analysis - 1-1/4" x 5/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.22% | 22.14% | 407.62 | 2.22% | 22.14% | 407.62 | 100.00% | 86.23% | 220.74 |
| Float 1.8 | 4.64% | 44.10% | 338.62 | 6.86% | 36.99% | 351.98 | 97.78% | 87.69% | 219.67 |
| Sink 1.8 | 93.14% | 89.86% | 216.76 | 100.00% | 86.23% | 220.74 | 93.14% | 89.86% | 216.76 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.14% | 22.40% | 392.64 | 2.14% | 22.40% | 392.64 | 100.00% | 83.87% | 260.75 |
| Float 1.8 | 6.96% | 40.77% | 334.66 | 9.10% | 36.45% | 343.04 | 97.86% | 85.22% | 259.99 |
| Sink 1.8 | 90.90% | 88.62% | 257.36 | 100.00% | 83.87% | 260.75 | 90.90% | 88.62% | 257.36 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 3.39% | 11.03% | 540.62 | 3.39% | 11.03% | 540.62 | 100.00% | 84.75% | 246.76 |
| Float 1.8 | 1.44% | 38.30% | 358.33 | 4.83% | 19.16% | 431.98 | 96.61% | 87.34% | 245.46 |
| Sink 1.8 | 95.17% | 88.08% | 244.72 | 100.00% | 84.75% | 246.76 | 95.17% | 88.08% | 244.72 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 0.27 | 0.39 | 0.68 | 1.33 | 0.36 | 0.65 | 0.16 | 0.02 | 0.10 | 0.02 | 0.10 | 0.03 | 0.05 | 0.01 | 0.05 | 0.01 |
| 1-1/4" x 5/8" | 13.84 | 19.99 | 32.81 | 65.67 | 21.20 | 35.40 | 8.51 | 0.98 | 6.37 | 1.01 | 5.33 | 1.45 | 4.64 | 0.41 | 2.37 | 0.76 |
| 5/8" x 1mm | 15.28 | 22.51 | 43.13 | 81.57 | 22.11 | 39.74 | 10.17 | 1.37 | 7.14 | 1.05 | 5.41 | 1.62 | 5.47 | 0.31 | 2.92 | 0.94 |
| 1mm x 100M | 16.76 | 20.63 | 38.89 | 71.92 | 29.33 | 36.04 | 10.02 | 1.13 | 6.67 | 1.25 | 5.75 | 1.29 | 2.70 | 0.26 | 2.79 | 1.33 |
| Minus 100M | 16.23 | 22.15 | 38.59 | 72.18 | 28.95 | 38.19 | 10.07 | 1.14 | 6.92 | 1.25 | 5.95 | 1.47 | 2.88 | 0.26 | 2.91 | 1.32 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 25.02 | 36.08 | 52.28 | 115.65 | 23.57 | 51.48 | 11.02 | 1.49 | 8.07 | 1.31 | 7.86 | 2.85 | 4.30 | 0.95 | 4.34 | 0.65 |
| Float 1.8 | 21.74 | 31.45 | 57.79 | 109.67 | 32.43 | 55.19 | 13.76 | 1.48 | 8.57 | 1.53 | 8.06 | 2.32 | 3.79 | 0.60 | 3.99 | 1.21 |
| Sink 1.8 | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - 1-1/4" x 5/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 28.60 | 48.17 | 64.88 | 121.45 | 28.48 | 56.08 | 14.05 | 2.21 | 11.21 | 1.86 | 9.74 | 3.11 | 10.01 | 1.11 | 5.42 | 1.24 |
| Float 1.8 | 21.21 | 31.82 | 57.90 | 108.34 | 24.70 | 49.02 | 11.27 | 1.56 | 8.34 | 1.24 | 6.68 | 2.53 | 8.46 | 0.59 | 4.06 | 0.90 |
| Sink 1.8 | 13.57 | 19.54 | 32.01 | 64.30 | 21.07 | 34.95 | 8.41 | 0.96 | 6.29 | 1.00 | 5.27 | 1.41 | 4.52 | 0.40 | 2.31 | 0.75 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.49 | 47.42 | 57.87 | 107.67 | 38.02 | 49.57 | 15.97 | 2.22 | 10.55 | 2.60 | 10.16 | 2.28 | 9.19 | 1.18 | 5.94 | 2.51 |
| Float 1.8 | 22.26 | 31.05 | 56.58 | 103.57 | 28.63 | 45.92 | 12.03 | 1.61 | 8.27 | 1.43 | 7.15 | 2.13 | 7.81 | 0.69 | 4.13 | 1.40 |
| Sink 1.8 | 14.95 | 22.06 | 42.57 | 80.64 | 21.79 | 39.46 | 10.07 | 1.36 | 7.08 | 1.03 | 5.32 | 1.60 | 5.37 | 0.29 | 2.86 | 0.91 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.06 | 87.69 | 70.36 | 136.53 | 41.74 | 74.01 | 19.49 | 3.35 | 16.65 | 3.46 | 16.87 | 4.53 | 9.21 | 2.01 | 8.76 | 1.90 |
| Float 1.8 | 26.12 | 36.46 | 57.89 | 105.99 | 33.15 | 52.44 | 12.32 | 1.50 | 9.22 | 1.49 | 8.46 | 2.61 | 4.33 | 0.85 | 4.32 | 1.18 |
| Sink 1.8 | 16.58 | 20.23 | 38.62 | 71.41 | 29.25 | 35.76 | 9.96 | 1.12 | 6.61 | 1.24 | 5.68 | 1.27 | 2.66 | 0.25 | 2.75 | 1.33 |

## PLANT 3

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 6.70% | 45.67% | 227.15 | 6.70% | 45.67% | 227.15 | 100.00% | 72.13% | 248.72 |
| Minus 100M | 93.30% | 74.03% | 249.68 | 100.00% | 72.13% | 248.72 | 93.30% | 74.03% | 249.68 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 49.07% | 6.29% | 339.45 | 49.07% | 6.29% | 339.45 | 100.00% | 45.67% | 227.15 |
| Float 1.8 | 3.26% | 36.16% | 0.00 | 52.33% | 8.15% | 245.64 | 50.93% | 83.61% | 219.01 |
| Sink 1.8 | 47.67% | 86.85% | 225.25 | 100.00% | 45.67% | 227.15 | 47.67% | 86.85% | 225.25 |

## PLANT 3

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 16.97 | 21.05 | 34.16 | 65.72 | 24.29 | 31.46 | 8.50 | 1.20 | 6.72 | 1.10 | 5.11 | 1.36 | 5.00 | 0.37 | 2.91 | 1.23 |
| Minus 100M | 17.41 | 20.71 | 37.63 | 84.2 | 19.15 | 36.79 | 8.94 | 1.29 | 6.5 | 0.97 | 4.74 | 1.61 | 5.72 | 0.25 | 2.96 | 0.81 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.59 | 57.22 | 23.78 | 71.12 | 29.48 | 45.26 | 11.94 | 2.68 | 12.37 | 3.42 | 11.05 | 3.39 | 12.35 | 2.36 | 7.62 | 1.82 |
| Float 1.8 | | | | | | | | | | | | | | | | |
| Sink 1.8 | 15.47 | 18.95 | 35.91 | 67.19 | 24.6 | 31.33 | 8.49 | 1.12 | 6.49 | 0.96 | 4.81 | 1.25 | 4.59 | 0.23 | 2.64 | 1.22 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 517.9 | TPH |
| Plus 1-1/2" | 118.97 | 100.47 | 57.99 | 118.97 | 100.47 | 57.99 | 517.94 | 335.49 | 193.01 |
| 1-1/2" x 1/2" | 162.32 | 106.00 | 65.54 | 281.29 | 206.47 | 123.53 | 398.97 | 235.02 | 135.02 |
| 1/2" x 1mm | 158.75 | 85.64 | 50.09 | 440.04 | 292.11 | 173.62 | 236.64 | 129.02 | 69.48 |
| 1mm x 100M | 35.01 | 14.50 | 6.18 | 475.05 | 306.60 | 179.81 | 77.90 | 43.38 | 19.38 |
| Minus 100M | 42.89 | 28.88 | 13.20 | 517.94 | 335.49 | 193.01 | 42.89 | 28.88 | 13.20 |
| **Clean Coal** | | | | | | | | 148.3 | TPH |
| Plus 1-1/2" | 2.39 | 0.16 | 0.12 | 2.39 | 0.16 | 0.12 | 148.25 | 11.00 | 8.81 |
| 1-1/2" x 1/2" | 44.09 | 3.22 | 3.11 | 46.48 | 3.38 | 3.23 | 145.87 | 10.85 | 8.69 |
| 1/2" x 1mm | 67.40 | 4.20 | 3.88 | 113.87 | 7.58 | 7.11 | 101.78 | 7.63 | 5.58 |
| 1mm x 100M | 24.19 | 1.53 | 1.70 | 138.07 | 9.11 | 8.81 | 34.38 | 3.43 | 1.70 |
| Minus 100M | 10.19 | 1.89 | 0.00 | 148.25 | 11.00 | 8.81 | 10.19 | 1.89 | 0.00 |
| **Coarse Refuse** | | | | | | | | 287.0 | TPH |
| Plus 1-1/2" | 88.47 | 79.00 | 47.65 | 88.47 | 79.00 | 47.65 | 287.05 | 254.77 | 129.54 |
| 1-1/2" x 1/2" | 85.28 | 76.04 | 32.52 | 173.75 | 155.04 | 80.17 | 198.58 | 175.77 | 81.89 |
| 1/2" x 1mm | 101.53 | 89.67 | 45.62 | 275.28 | 244.71 | 125.79 | 113.30 | 99.74 | 49.37 |
| 1mm x 100M | 7.78 | 6.62 | 3.75 | 283.06 | 251.33 | 129.54 | 11.77 | 10.06 | 3.75 |
| Minus 100M | 3.99 | 3.45 | 0.00 | 287.05 | 254.77 | 129.54 | 3.99 | 3.45 | 0.00 |
| **Fine Refuse** | | | | | | | | 82.6 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 82.63 | 69.69 | 37.27 |
| 1-1/2" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 82.63 | 69.69 | 37.27 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 82.63 | 69.69 | 37.27 |
| 1mm x 100M | 23.40 | 20.46 | 10.99 | 23.40 | 20.46 | 10.99 | 82.63 | 69.69 | 37.27 |
| Minus 100M | 59.23 | 49.23 | 26.27 | 82.63 | 69.69 | 37.27 | 59.23 | 49.23 | 26.27 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 2,848,646 | 1,845,184 | 530.8 | 186.32 | 287.65 |
| Clean Coal | 815,394 | 60,525 | 24.2 | 29.72 | 400.38 |
| Coarse Refuse | 1,578,768 | 1,401,255 | 356.2 | 225.65 | 254.23 |
| Fine Refuse | 454,483 | 383,283 | 102.5 | 225.49 | 267.38 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 3.69 | 4.97 | 9.39 | 18.29 | 4.28 | 9.07 | 2.22 | 0.32 | 1.58 | 0.25 | 1.32 | 0.39 | 1.31 | 0.10 | 0.65 | 0.15 |
| 1-1/2" x 1/2" | 4.08 | 5.99 | 10.68 | 20.23 | 5.15 | 10.08 | 2.53 | 0.35 | 1.78 | 0.29 | 1.49 | 0.40 | 1.41 | 0.11 | 0.76 | 0.22 |
| 1/2" x 1mm | 3.38 | 4.76 | 7.72 | 15.41 | 3.98 | 7.79 | 1.87 | 0.22 | 1.32 | 0.22 | 1.23 | 0.34 | 1.07 | 0.10 | 0.57 | 0.13 |
| 1mm x 100M | 0.53 | 0.64 | 0.86 | 1.55 | 0.60 | 1.01 | 0.24 | 0.03 | 0.18 | 0.04 | 0.17 | 0.05 | 0.16 | 0.02 | 0.08 | 0.02 |
| Minus 100M | 1.01 | 1.29 | 1.97 | 3.58 | 1.14 | 2.23 | 0.50 | 0.06 | 0.39 | 0.06 | 0.34 | 0.10 | 0.32 | 0.02 | 0.16 | 0.03 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.01 | 0.02 | 0.02 | 0.03 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 0.28 | 0.58 | 0.40 | 0.79 | 0.08 | 0.43 | 0.11 | 0.02 | 0.11 | 0.02 | 0.10 | 0.03 | 0.08 | 0.02 | 0.05 | 0.01 |
| 1/2" x 1mm | 0.37 | 0.70 | 0.49 | 0.98 | 0.10 | 0.54 | 0.14 | 0.03 | 0.14 | 0.02 | 0.12 | 0.04 | 0.10 | 0.03 | 0.07 | 0.01 |
| 1mm x 100M | 0.15 | 0.28 | 0.22 | 0.44 | 0.11 | 0.24 | 0.06 | 0.01 | 0.06 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.00 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 2.79 | 4.31 | 7.73 | 14.87 | 3.58 | 7.62 | 1.84 | 0.26 | 1.34 | 0.19 | 1.05 | 0.31 | 1.01 | 0.08 | 0.54 | 0.14 |
| 1-1/2" x 1/2" | 2.35 | 2.46 | 4.41 | 10.33 | 2.90 | 5.31 | 1.27 | 0.13 | 0.86 | 0.14 | 0.82 | 0.24 | 0.81 | 0.06 | 0.36 | 0.08 |
| 1/2" x 1mm | 3.06 | 3.91 | 6.84 | 14.27 | 3.84 | 7.20 | 1.74 | 0.20 | 1.18 | 0.20 | 1.14 | 0.31 | 1.01 | 0.09 | 0.50 | 0.12 |
| 1mm x 100M | 0.25 | 0.31 | 0.61 | 1.18 | 0.29 | 0.58 | 0.14 | 0.02 | 0.10 | 0.02 | 0.08 | 0.02 | 0.08 | 0.01 | 0.04 | 0.01 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.76 | 0.88 | 1.77 | 3.54 | 0.86 | 1.67 | 0.40 | 0.06 | 0.29 | 0.04 | 0.24 | 0.07 | 0.24 | 0.02 | 0.12 | 0.03 |
| Minus 100M | 1.86 | 2.26 | 4.07 | 8.28 | 2.07 | 4.16 | 0.92 | 0.11 | 0.69 | 0.10 | 0.61 | 0.19 | 0.58 | 0.05 | 0.28 | 0.05 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 34.9 | 48.5 | 84.2 | 162.4 | 41.6 | 83.0 | 20.2 | 2.7 | 14.5 | 2.4 | 12.5 | 3.5 | 11.7 | 1.0 | 6.1 | 1.5 |
| Clean Coal | 2.2 | 4.3 | 3.1 | 6.2 | 0.8 | 3.4 | 0.9 | 0.2 | 0.9 | 0.1 | 0.7 | 0.2 | 0.6 | 0.1 | 0.4 | 0.1 |
| Coarse Refuse | 23.2 | 30.2 | 53.9 | 111.8 | 29.2 | 56.9 | 13.7 | 1.7 | 9.6 | 1.5 | 8.5 | 2.4 | 8.0 | 0.6 | 4.0 | 0.9 |
| Fine Refuse | 7.2 | 8.6 | 16.1 | 32.5 | 8.1 | 16.0 | 3.6 | 0.5 | 2.7 | 0.4 | 2.3 | 0.7 | 2.2 | 0.2 | 1.1 | 0.2 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 517.9 | TPH |
| Float 1.6 | 139.07 | 8.33 | 8.28 | 139.07 | 8.33 | 8.28 | 444.53 | 280.92 | 149.37 |
| Float 1.8 | 7.47 | 3.20 | 1.37 | 146.54 | 11.53 | 9.66 | 305.46 | 272.59 | 141.08 |
| Sink 1.8 | 297.99 | 269.39 | 139.71 | 444.53 | 280.92 | 149.37 | 297.99 | 269.39 | 139.71 |
| **Clean Coal (Plus 100M)** | | | | | | | | 148.3 | TPH |
| Float 1.6 | 135.06 | 7.61 | 7.97 | 135.06 | 7.61 | 7.97 | 138.07 | 9.13 | 8.83 |
| Float 1.8 | 1.90 | 0.71 | 0.44 | 136.96 | 8.33 | 8.41 | 3.01 | 1.52 | 0.86 |
| Sink 1.8 | 1.11 | 0.81 | 0.42 | 138.07 | 9.13 | 8.83 | 1.11 | 0.81 | 0.42 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 287.0 | TPH |
| Float 1.6 | 3.41 | 0.65 | 0.31 | 3.41 | 0.65 | 0.31 | 283.06 | 251.33 | 129.54 |
| Float 1.8 | 5.21 | 2.34 | 0.82 | 8.62 | 2.99 | 1.13 | 279.65 | 250.67 | 129.23 |
| Sink 1.8 | 274.44 | 248.33 | 128.41 | 283.06 | 251.33 | 129.54 | 274.44 | 248.33 | 128.41 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 82.6 | TPH |
| Float 1.6 | 0.60 | 0.06 | 0.00 | 0.60 | 0.06 | 0.00 | 23.40 | 20.46 | 10.99 |
| Float 1.8 | 0.36 | 0.15 | 0.11 | 0.96 | 0.21 | 0.11 | 22.80 | 20.40 | 10.99 |
| Sink 1.8 | 22.44 | 20.25 | 10.88 | 23.40 | 20.46 | 10.99 | 22.44 | 20.25 | 10.88 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 2,444,910 | 1,545,064 | 410.8 | 168.01 | 265.85 |
| Clean Coal | 759,377 | 50,232 | 24.3 | 31.97 | 483.36 |
| Coarse Refuse | 1,556,823 | 1,382,299 | 356.2 | 228.83 | 257.72 |
| Fine Refuse | 128,710 | 112,533 | 30.2 | 234.90 | 268.67 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

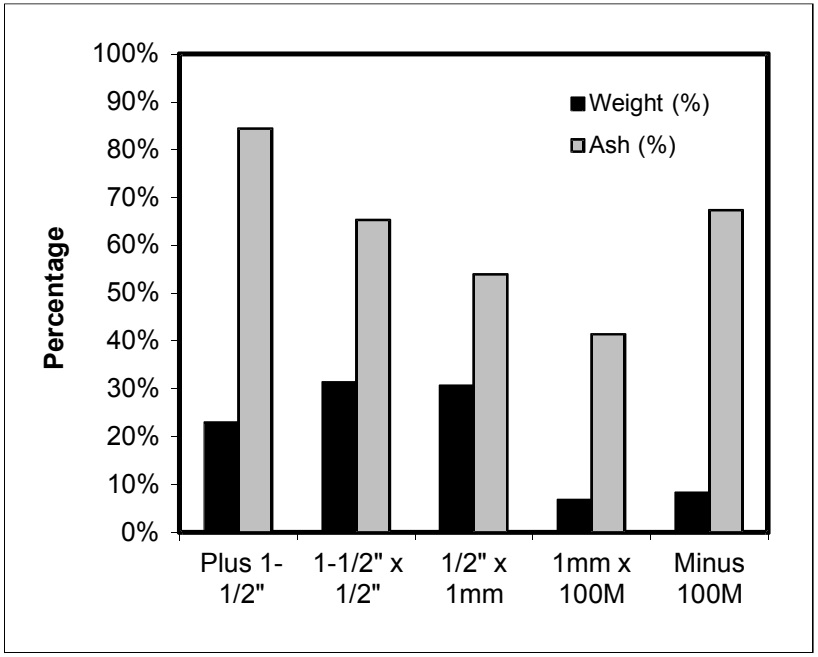
****Unless otherwise noted, REE values reported in ppm*

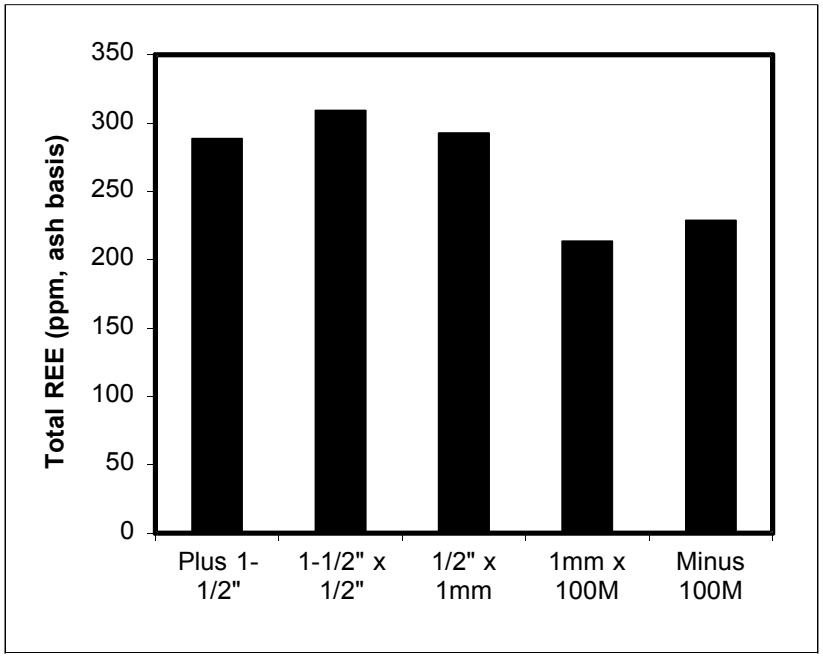
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.76 | 1.54 | 1.03 | 2.07 | 0.26 | 1.15 | 0.29 | 0.06 | 0.30 | 0.05 | 0.26 | 0.07 | 0.21 | 0.05 | 0.14 | 0.02 |
| Float 1.8 | 0.12 | 0.14 | 0.20 | 0.37 | 0.09 | 0.24 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 |
| Sink 1.8 | 9.12 | 11.78 | 21.27 | 44.00 | 11.43 | 22.22 | 5.37 | 0.67 | 3.74 | 0.58 | 3.31 | 0.94 | 3.11 | 0.25 | 1.55 | 0.37 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.73 | 1.50 | 0.99 | 1.98 | 0.24 | 1.10 | 0.28 | 0.06 | 0.29 | 0.05 | 0.25 | 0.07 | 0.20 | 0.05 | 0.14 | 0.02 |
| Float 1.8 | 0.04 | 0.05 | 0.07 | 0.14 | 0.02 | 0.07 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 0.03 | 0.04 | 0.07 | 0.13 | 0.03 | 0.06 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.04 | 0.04 | 0.09 | 0.02 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.08 | 0.08 | 0.11 | 0.19 | 0.06 | 0.16 | 0.03 | 0.00 | 0.02 | 0.00 | 0.02 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 8.34 | 10.87 | 19.45 | 40.37 | 10.54 | 20.50 | 4.95 | 0.61 | 3.44 | 0.54 | 3.06 | 0.87 | 2.87 | 0.23 | 1.42 | 0.34 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.01 | 0.01 | 0.02 | 0.04 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.75 | 0.87 | 1.75 | 3.50 | 0.85 | 1.65 | 0.40 | 0.06 | 0.28 | 0.04 | 0.24 | 0.07 | 0.24 | 0.02 | 0.12 | 0.03 |

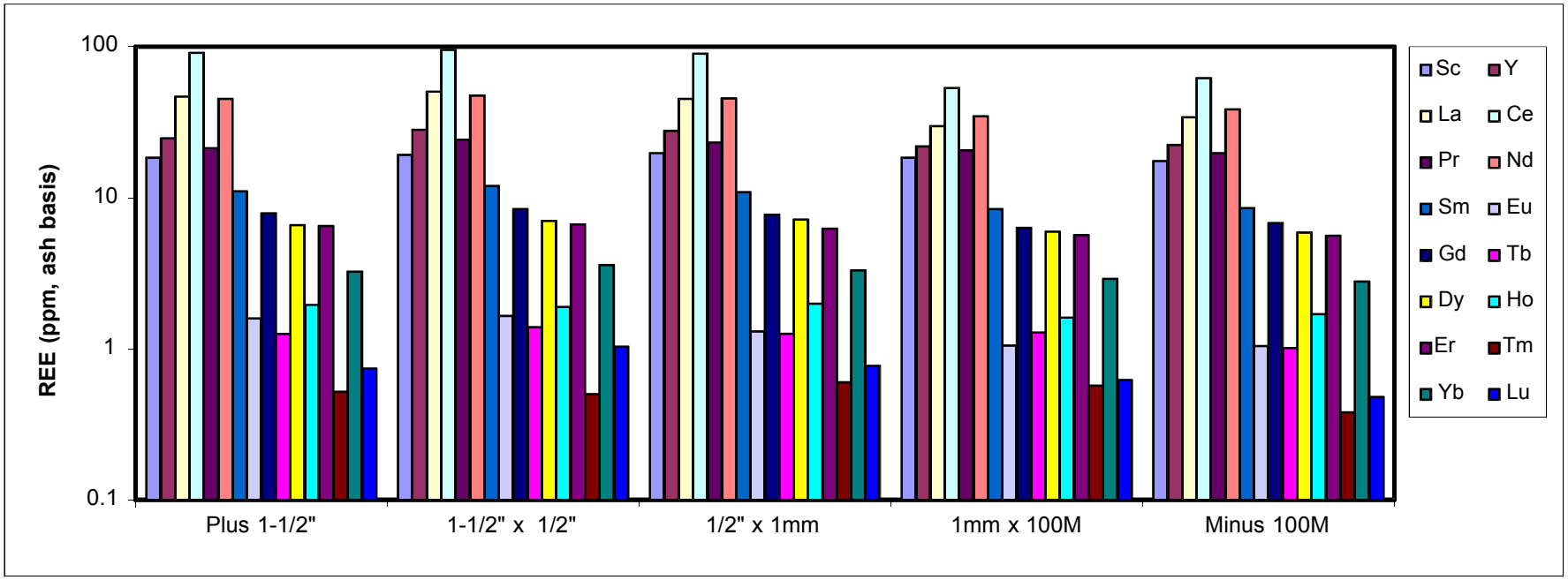
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 27.5 | 37.0 | 61.9 | 127.7 | 32.4 | 64.9 | 15.7 | 2.0 | 11.2 | 1.8 | 9.9 | 2.8 | 9.3 | 0.9 | 4.7 | 1.1 |
| Clean Coal | 2.2 | 4.4 | 3.1 | 6.2 | 0.8 | 3.4 | 0.9 | 0.2 | 0.9 | 0.1 | 0.7 | 0.2 | 0.6 | 0.1 | 0.4 | 0.1 |
| Coarse Refuse | 23.2 | 30.2 | 53.9 | 111.8 | 29.2 | 56.9 | 13.7 | 1.7 | 9.6 | 1.5 | 8.5 | 2.4 | 8.0 | 0.6 | 4.0 | 0.9 |
| Fine Refuse | 2.1 | 2.4 | 4.9 | 9.7 | 2.4 | 4.6 | 1.1 | 0.2 | 0.8 | 0.1 | 0.7 | 0.2 | 0.7 | 0.1 | 0.3 | 0.1 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 22.97% | 84.45% | 288.58 | 22.97% | 282.46% | 287.82 | 200.00% | 36.10% | 299.24 |
| 1-1/2" x 1/2" | 31.34% | 65.30% | 309.17 | 54.31% | 83.75% | 287.50 | 177.03% | 29.82% | 303.16 |
| 1/2" x 1mm | 30.65% | 53.95% | 292.46 | 84.96% | 29.45% | 269.77 | 145.69% | 22.19% | 299.35 |
| 1mm x 100M | 6.76% | 41.40% | 213.34 | 91.72% | 9.25% | 225.53 | 115.04% | 13.73% | 306.56 |
| Minus 100M | 8.28% | 67.35% | 228.47 | 100.00% | 5.68% | 231.53 | 108.28% | 12.01% | 326.63 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 18.38 | 24.74 | 46.73 | 91.03 | 21.29 | 45.13 | 11.03 | 1.59 | 7.88 | 1.25 | 6.57 | 1.95 | 6.50 | 0.52 | 3.25 | 0.74 |
| 1-1/2" x 1/2" | 19.23 | 28.26 | 50.36 | 95.43 | 24.28 | 47.53 | 11.95 | 1.65 | 8.42 | 1.39 | 7.01 | 1.89 | 6.65 | 0.50 | 3.59 | 1.03 |
| 1/2" x 1mm | 19.72 | 27.77 | 45.08 | 89.95 | 23.23 | 45.47 | 10.91 | 1.30 | 7.71 | 1.26 | 7.16 | 1.99 | 6.24 | 0.60 | 3.30 | 0.77 |
| 1mm x 100M | 18.44 | 21.91 | 29.82 | 53.47 | 20.58 | 34.71 | 8.42 | 1.05 | 6.34 | 1.28 | 5.96 | 1.61 | 5.66 | 0.57 | 2.90 | 0.62 |
| Minus 100M | 17.46 | 22.37 | 34.16 | 62.01 | 19.70 | 38.54 | 8.57 | 1.04 | 6.80 | 1.01 | 5.87 | 1.69 | 5.60 | 0.38 | 2.79 | 0.48 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 1.61% | 6.67% | 390.42 | 1.61% | 6.67% | 390.42 | 100.00% | 7.42% | 400.38 |
| 1-1/2" x 1/2" | 29.74% | 7.29% | 483.02 | 31.35% | 7.26% | 478.65 | 98.39% | 7.44% | 400.53 |
| 1/2" x 1mm | 45.46% | 6.23% | 461.48 | 76.81% | 6.65% | 469.13 | 68.65% | 7.50% | 365.76 |
| 1mm x 100M | 16.32% | 6.34% | 554.97 | 93.13% | 6.60% | 483.59 | 23.19% | 9.97% | 248.44 |
| Minus 100M | 6.87% | 18.59% | 0.00 | 100.00% | 7.42% | 400.38 | 6.87% | 18.59% | 0.00 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 100.00% | 7.59% | 390.42 | 198.47% | 7.13% | 444.04 | 200.00% | 7.44% | 435.80 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 98.47% | 6.67% | 505.99 | 100.00% | 7.29% | 483.02 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 98.47% | 6.67% | 505.99 | 100.00% | 7.29% | 483.02 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.47% | 6.67% | 505.99 | 98.47% | 6.67% | 505.99 | 100.00% | 7.29% | 483.02 |
| Float 1.8 | 1.31% | 44.21% | 281.48 | 99.78% | 7.17% | 487.80 | 1.53% | 47.24% | 274.27 |
| Sink 1.8 | 0.22% | 65.30% | 245.20 | 100.00% | 7.29% | 483.02 | 0.22% | 65.30% | 245.20 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.16% | 5.40% | 494.92 | 98.16% | 5.40% | 494.92 | 100.00% | 6.23% | 461.48 |
| Float 1.8 | 1.13% | 36.19% | 308.12 | 99.29% | 5.75% | 481.54 | 1.84% | 50.72% | 271.50 |
| Sink 1.8 | 0.71% | 73.84% | 242.94 | 100.00% | 6.23% | 461.48 | 0.71% | 73.84% | 242.94 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.47% | 4.17% | 705.69 | 95.47% | 4.17% | 705.69 | 100.00% | 6.34% | 554.97 |
| Float 1.8 | 2.32% | 32.14% | 350.61 | 97.79% | 4.84% | 649.71 | 4.53% | 52.07% | 300.44 |
| Sink 1.8 | 2.21% | 73.00% | 277.25 | 100.00% | 6.34% | 554.97 | 2.21% | 73.00% | 277.25 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 30.42 | 67.43 | 50.98 | 104.29 | 9.94 | 60.49 | 14.18 | 2.74 | 13.64 | 1.82 | 10.90 | 3.48 | 10.26 | 3.09 | 5.99 | 0.77 |
| 1-1/2" x 1/2" | 43.18 | 89.86 | 62.33 | 122.13 | 12.36 | 67.17 | 17.56 | 3.54 | 17.53 | 2.74 | 15.27 | 4.24 | 12.22 | 3.21 | 8.23 | 1.44 |
| 1/2" x 1mm | 43.95 | 83.86 | 58.22 | 117.04 | 11.45 | 64.76 | 16.48 | 3.55 | 16.96 | 2.77 | 14.15 | 4.17 | 11.92 | 3.02 | 7.95 | 1.22 |
| 1mm x 100M | 47.43 | 89.86 | 72.99 | 142.57 | 35.99 | 76.99 | 18.74 | 4.12 | 18.31 | 3.20 | 15.42 | 4.66 | 12.25 | 2.30 | 8.67 | 1.47 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 30.42 | 67.43 | 50.98 | 104.29 | 9.94 | 60.49 | 14.18 | 2.74 | 13.64 | 1.82 | 10.90 | 3.48 | 10.26 | 3.09 | 5.99 | 0.77 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 45.20 | 96.87 | 64.13 | 126.05 | 12.98 | 69.62 | 18.45 | 3.76 | 18.58 | 2.94 | 16.38 | 4.46 | 12.79 | 3.46 | 8.76 | 1.57 |
| Float 1.8 | 25.63 | 27.30 | 47.63 | 87.49 | 7.00 | 46.27 | 9.76 | 1.61 | 8.02 | 0.95 | 5.42 | 2.36 | 7.29 | 0.92 | 3.54 | 0.29 |
| Sink 1.8 | 21.49 | 21.64 | 39.32 | 82.41 | 5.88 | 39.60 | 8.40 | 1.36 | 7.96 | 0.82 | 4.56 | 1.97 | 6.20 | 0.62 | 2.75 | 0.22 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 47.79 | 94.09 | 60.40 | 122.39 | 12.12 | 68.50 | 17.57 | 3.90 | 18.51 | 3.07 | 15.68 | 4.56 | 12.86 | 3.42 | 8.75 | 1.31 |
| Float 1.8 | 26.38 | 32.16 | 52.04 | 97.47 | 7.61 | 49.28 | 10.18 | 1.75 | 9.20 | 1.00 | 5.82 | 2.54 | 7.67 | 0.94 | 3.80 | 0.28 |
| Sink 1.8 | 18.78 | 20.83 | 41.02 | 78.17 | 7.68 | 39.10 | 10.38 | 1.41 | 7.31 | 1.22 | 5.20 | 1.55 | 5.72 | 0.55 | 3.04 | 0.98 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 61.48 | 126.49 | 88.29 | 175.36 | 38.38 | 96.41 | 23.63 | 5.70 | 24.08 | 4.36 | 20.69 | 6.32 | 17.51 | 3.35 | 11.82 | 1.81 |
| Float 1.8 | 28.38 | 36.99 | 55.23 | 102.22 | 30.41 | 53.38 | 11.10 | 1.76 | 10.02 | 1.30 | 7.56 | 2.63 | 4.33 | 0.78 | 4.02 | 0.50 |
| Sink 1.8 | 21.52 | 23.85 | 43.42 | 80.25 | 32.67 | 39.93 | 10.21 | 1.30 | 7.87 | 1.22 | 6.04 | 1.52 | 2.94 | 0.40 | 3.04 | 1.07 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 30.82% | 89.30% | 301.60 | 30.82% | 89.30% | 301.60 | 100.00% | 88.76% | 254.23 |
| 1-1/2" x 1/2" | 29.71% | 89.16% | 213.85 | 60.53% | 89.23% | 258.56 | 69.18% | 88.52% | 232.95 |
| 1/2" x 1mm | 35.37% | 88.32% | 254.38 | 95.90% | 88.89% | 257.03 | 39.47% | 88.03% | 247.51 |
| 1mm x 100M | 2.71% | 85.07% | 283.37 | 98.61% | 88.79% | 257.72 | 4.10% | 85.51% | 186.33 |
| Minus 100M | 1.39% | 86.38% | 0.00 | 100.00% | 88.76% | 254.23 | 1.39% | 86.38% | 0.00 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.02% | 17.32% | 0.00 | 0.02% | 17.32% | 0.00 | 100.00% | 89.30% | 301.60 |
| Float 1.8 | 0.65% | 43.71% | 251.45 | 0.67% | 42.92% | 248.42 | 99.98% | 89.31% | 301.61 |
| Sink 1.8 | 99.33% | 89.61% | 301.77 | 100.00% | 89.30% | 301.60 | 99.33% | 89.61% | 301.77 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.89% | 17.74% | 306.37 | 1.89% | 17.74% | 306.37 | 100.00% | 89.16% | 213.85 |
| Float 1.8 | 1.76% | 47.57% | 189.97 | 3.65% | 32.13% | 223.26 | 98.11% | 90.54% | 213.50 |
| Sink 1.8 | 96.35% | 91.32% | 213.72 | 100.00% | 89.16% | 213.85 | 96.35% | 91.32% | 213.72 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.42% | 23.28% | 162.06 | 1.42% | 23.28% | 162.06 | 100.00% | 88.32% | 254.38 |
| Float 1.8 | 2.92% | 44.01% | 142.93 | 4.34% | 37.23% | 146.84 | 98.58% | 89.26% | 254.72 |
| Sink 1.8 | 95.66% | 90.64% | 256.38 | 100.00% | 88.32% | 254.38 | 95.66% | 90.64% | 256.38 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 4.31% | 8.96% | 485.59 | 4.31% | 8.96% | 485.59 | 100.00% | 85.07% | 283.37 |
| Float 1.8 | 2.23% | 40.25% | 360.34 | 6.54% | 19.63% | 398.03 | 95.69% | 88.50% | 282.44 |
| Sink 1.8 | 93.46% | 89.65% | 281.61 | 100.00% | 85.07% | 283.37 | 93.46% | 89.65% | 281.61 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 17.68 | 27.26 | 48.96 | 94.09 | 22.69 | 48.23 | 11.62 | 1.64 | 8.47 | 1.21 | 6.65 | 1.96 | 6.41 | 0.48 | 3.39 | 0.88 |
| 1-1/2" x 1/2" | 15.46 | 16.20 | 28.99 | 67.92 | 19.07 | 34.91 | 8.35 | 0.88 | 5.65 | 0.93 | 5.39 | 1.55 | 5.30 | 0.41 | 2.34 | 0.49 |
| 1/2" x 1mm | 17.07 | 21.81 | 38.15 | 79.57 | 21.42 | 40.17 | 9.72 | 1.11 | 6.58 | 1.09 | 6.36 | 1.75 | 5.61 | 0.50 | 2.81 | 0.65 |
| 1mm x 100M | 18.67 | 23.55 | 46.38 | 89.52 | 22.18 | 43.49 | 10.56 | 1.48 | 7.48 | 1.22 | 6.28 | 1.85 | 6.09 | 0.58 | 3.20 | 0.82 |
| Minus 100M | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 19.50 | 21.91 | 41.81 | 82.03 | 15.76 | 37.34 | 7.86 | 1.18 | 5.65 | 0.87 | 5.16 | 1.87 | 6.37 | 0.76 | 2.94 | 0.44 |
| Sink 1.8 | 17.67 | 27.28 | 48.98 | 94.13 | 22.71 | 48.27 | 11.63 | 1.64 | 8.48 | 1.21 | 6.65 | 1.96 | 6.41 | 0.48 | 3.39 | 0.88 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.72 | 44.80 | 33.83 | 77.75 | 14.76 | 49.33 | 10.03 | 1.84 | 9.87 | 1.77 | 9.64 | 3.23 | 9.16 | 1.69 | 4.69 | 0.25 |
| Float 1.8 | 20.11 | 17.18 | 23.48 | 54.60 | 11.33 | 33.90 | 5.65 | 0.70 | 4.70 | 0.87 | 4.95 | 2.16 | 6.97 | 0.65 | 2.72 | 0.00 |
| Sink 1.8 | 15.35 | 16.08 | 29.02 | 68.01 | 19.16 | 34.86 | 8.37 | 0.88 | 5.64 | 0.93 | 5.38 | 1.54 | 5.27 | 0.40 | 2.33 | 0.50 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 14.05 | 15.37 | 21.73 | 56.11 | 9.42 | 24.14 | 4.45 | 0.68 | 3.63 | 0.61 | 3.61 | 1.45 | 4.20 | 0.51 | 2.00 | 0.10 |
| Float 1.8 | 13.97 | 15.40 | 18.19 | 22.93 | 12.80 | 31.35 | 5.51 | 0.80 | 4.96 | 1.19 | 4.70 | 1.81 | 6.10 | 0.63 | 2.59 | 0.00 |
| Sink 1.8 | 17.13 | 21.93 | 38.51 | 80.50 | 21.59 | 40.36 | 9.80 | 1.12 | 6.62 | 1.09 | 6.39 | 1.75 | 5.61 | 0.50 | 2.82 | 0.66 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.15 | 82.67 | 57.95 | 121.46 | 23.68 | 71.68 | 15.27 | 3.41 | 16.14 | 3.46 | 16.32 | 5.17 | 14.33 | 2.25 | 8.18 | 0.47 |
| Float 1.8 | 27.08 | 33.13 | 59.89 | 112.59 | 25.15 | 55.05 | 11.16 | 1.94 | 9.61 | 1.22 | 7.26 | 2.71 | 8.14 | 0.94 | 4.05 | 0.42 |
| Sink 1.8 | 18.47 | 23.17 | 46.18 | 89.13 | 22.14 | 43.24 | 10.53 | 1.47 | 7.42 | 1.21 | 6.22 | 1.83 | 6.03 | 0.57 | 3.17 | 0.83 |

## PLANT 5

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 28.32% | 87.43% | 268.67 | 28.32% | 87.43% | 268.67 | 100.00% | 84.33% | 267.38 |
| Minus 100M | 71.68% | 83.11% | 266.85 | 100.00% | 84.33% | 267.38 | 71.68% | 83.11% | 266.85 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.57% | 9.82% | 0.00 | 2.57% | 9.82% | 0.00 | 100.00% | 87.43% | 268.67 |
| Float 1.8 | 1.52% | 42.06% | 379.57 | 4.09% | 21.80% | 272.15 | 97.43% | 89.48% | 269.44 |
| Sink 1.8 | 95.91% | 90.23% | 268.63 | 100.00% | 87.43% | 268.67 | 95.91% | 90.23% | 268.63 |

## PLANT 5

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 18.48 | 21.56 | 43.30 | 86.46 | 21.03 | 40.76 | 9.88 | 1.41 | 7.01 | 1.06 | 5.85 | 1.69 | 5.89 | 0.56 | 3.01 | 0.72 |
| Minus 100M | 18.87 | 22.98 | 41.34 | 84.12 | 21.06 | 42.23 | 9.34 | 1.13 | 6.97 | 1.02 | 6.24 | 1.92 | 5.85 | 0.48 | 2.83 | 0.47 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 27.86 | 38 | 63.11 | 117.52 | 24.98 | 57.68 | 11.7 | 2.11 | 10.16 | 1.4 | 7.83 | 2.89 | 8.41 | 1.03 | 4.4 | 0.49 |
| Sink 1.8 | 18.46 | 21.5 | 43.28 | 86.48 | 21.06 | 40.75 | 9.9 | 1.41 | 7.01 | 1.06 | 5.85 | 1.69 | 5.89 | 0.56 | 3.01 | 0.72 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1728.1 | TPH |
| Plus 1-1/4" | 641.11 | 538.92 | 230.88 | 641.11 | 538.92 | 230.88 | 1728.06 | 1094.10 | 534.27 |
| 1-1/4" x 1/2" | 333.52 | 208.91 | 107.19 | 974.63 | 747.83 | 338.07 | 1086.95 | 555.18 | 303.38 |
| 1/2" x 1mm | 518.76 | 235.99 | 137.41 | 1493.39 | 983.82 | 475.48 | 753.43 | 346.27 | 196.19 |
| 1mm x 100M | 122.17 | 45.05 | 19.13 | 1615.56 | 1028.86 | 494.61 | 234.67 | 110.28 | 58.78 |
| Minus 100M | 112.50 | 65.24 | 39.65 | 1728.06 | 1094.10 | 534.27 | 112.50 | 65.24 | 39.65 |
| **Clean Coal** | | | | | | | | 464.4 | TPH |
| Plus 1-1/4" | 1.72 | 0.10 | 0.06 | 1.72 | 0.10 | 0.06 | 464.40 | 30.48 | 22.47 |
| 1-1/4" x 1/2" | 53.55 | 3.53 | 3.38 | 55.26 | 3.63 | 3.44 | 462.68 | 30.38 | 22.41 |
| 1/2" x 1mm | 311.80 | 16.48 | 11.98 | 367.06 | 20.11 | 15.42 | 409.14 | 26.85 | 19.03 |
| 1mm x 100M | 70.22 | 3.52 | 2.60 | 437.28 | 23.63 | 18.02 | 97.34 | 10.37 | 7.05 |
| Minus 100M | 27.12 | 6.85 | 4.45 | 464.40 | 30.48 | 22.47 | 27.12 | 6.85 | 4.45 |
| **Coarse Refuse** | | | | | | | | 1064.6 | TPH |
| Plus 1-1/4" | 397.21 | 351.26 | 130.26 | 397.21 | 351.26 | 130.26 | 1064.61 | 940.06 | 297.26 |
| 1-1/4" x 1/2" | 261.79 | 234.36 | 48.36 | 659.00 | 585.62 | 178.62 | 667.41 | 588.80 | 167.00 |
| 1/2" x 1mm | 333.12 | 292.69 | 103.87 | 992.11 | 878.30 | 282.49 | 405.62 | 354.44 | 118.64 |
| 1mm x 100M | 57.38 | 49.03 | 14.77 | 1049.50 | 927.33 | 297.26 | 72.50 | 61.76 | 14.77 |
| Minus 100M | 15.12 | 12.73 | 0.00 | 1064.61 | 940.06 | 297.26 | 15.12 | 12.73 | 0.00 |
| **Fine Refuse** | | | | | | | | 199.0 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.05 | 123.39 | 65.78 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.05 | 123.39 | 65.78 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.05 | 123.39 | 65.78 |
| 1mm x 100M | 2.53 | 0.14 | 0.11 | 2.53 | 0.14 | 0.11 | 199.05 | 123.39 | 65.78 |
| Minus 100M | 196.52 | 123.26 | 65.67 | 199.05 | 123.39 | 65.78 | 196.52 | 123.26 | 65.67 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 9,504,327 | 6,017,545 | 1,469.2 | 154.59 | 244.16 |
| Clean Coal | 2,554,200 | 167,656 | 61.8 | 24.19 | 368.54 |
| Coarse Refuse | 5,855,375 | 5,170,321 | 817.5 | 139.61 | 158.11 |
| Fine Refuse | 1,094,752 | 678,670 | 180.9 | 165.23 | 266.53 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 18.30 | 20.30 | 27.78 | 73.53 | 19.38 | 33.51 | 9.46 | 1.42 | 7.04 | 1.40 | 6.36 | 1.80 | 6.06 | 0.69 | 3.09 | 0.77 |
| 1-1/4" x 1/2" | 7.68 | 9.74 | 14.97 | 33.66 | 9.10 | 15.45 | 4.32 | 0.63 | 3.03 | 0.58 | 2.75 | 0.77 | 2.44 | 0.26 | 1.38 | 0.41 |
| 1/2" x 1mm | 9.69 | 13.39 | 19.76 | 42.70 | 10.84 | 20.07 | 5.48 | 0.84 | 3.87 | 0.71 | 3.49 | 0.94 | 2.98 | 0.37 | 1.77 | 0.51 |
| 1mm x 100M | 1.68 | 1.63 | 2.26 | 5.89 | 1.64 | 2.88 | 0.79 | 0.12 | 0.57 | 0.13 | 0.45 | 0.15 | 0.52 | 0.06 | 0.27 | 0.07 |
| Minus 100M | 2.64 | 3.44 | 6.16 | 12.61 | 3.10 | 6.00 | 1.52 | 0.23 | 1.10 | 0.17 | 0.92 | 0.28 | 0.82 | 0.08 | 0.46 | 0.12 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 1/2" | 0.27 | 0.65 | 0.34 | 0.83 | 0.20 | 0.45 | 0.13 | 0.03 | 0.12 | 0.02 | 0.12 | 0.03 | 0.09 | 0.03 | 0.06 | 0.01 |
| 1/2" x 1mm | 0.71 | 1.35 | 1.99 | 3.89 | 0.58 | 1.88 | 0.38 | 0.05 | 0.30 | 0.04 | 0.26 | 0.10 | 0.26 | 0.03 | 0.13 | 0.01 |
| 1mm x 100M | 0.17 | 0.28 | 0.43 | 0.84 | 0.15 | 0.40 | 0.09 | 0.01 | 0.07 | 0.01 | 0.06 | 0.02 | 0.05 | 0.01 | 0.03 | 0.00 |
| Minus 100M | 0.31 | 0.55 | 0.59 | 1.28 | 0.38 | 0.62 | 0.18 | 0.03 | 0.14 | 0.03 | 0.12 | 0.03 | 0.10 | 0.01 | 0.06 | 0.02 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 11.19 | 10.54 | 16.34 | 39.13 | 11.64 | 19.55 | 5.75 | 0.78 | 3.97 | 0.86 | 3.10 | 1.10 | 3.64 | 0.31 | 1.83 | 0.53 |
| 1-1/4" x 1/2" | 5.51 | 3.42 | 4.16 | 11.95 | 6.08 | 7.09 | 2.38 | 0.30 | 1.72 | 0.56 | 1.28 | 0.51 | 2.14 | 0.17 | 0.84 | 0.27 |
| 1/2" x 1mm | 9.35 | 9.21 | 12.31 | 30.29 | 9.15 | 15.53 | 4.57 | 0.65 | 3.28 | 0.72 | 2.57 | 0.89 | 3.09 | 0.28 | 1.60 | 0.39 |
| 1mm x 100M | 1.47 | 1.18 | 1.44 | 4.69 | 1.45 | 2.02 | 0.62 | 0.09 | 0.45 | 0.12 | 0.34 | 0.12 | 0.46 | 0.04 | 0.22 | 0.06 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.01 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Minus 100M | 4.96 | 5.47 | 9.67 | 21.95 | 4.29 | 9.90 | 2.37 | 0.40 | 1.78 | 0.29 | 1.50 | 0.52 | 1.48 | 0.16 | 0.79 | 0.12 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 110.0 | 133.4 | 195.1 | 463.1 | 121.2 | 214.2 | 59.3 | 9.0 | 42.9 | 8.2 | 38.4 | 10.8 | 35.2 | 4.0 | 19.2 | 5.2 |
| Clean Coal | 4.0 | 7.8 | 9.2 | 18.8 | 3.6 | 9.2 | 2.2 | 0.3 | 1.7 | 0.3 | 1.5 | 0.5 | 1.4 | 0.2 | 0.8 | 0.1 |
| Coarse Refuse | 75.7 | 67.0 | 94.2 | 236.7 | 77.9 | 121.5 | 36.6 | 5.0 | 25.9 | 6.2 | 20.0 | 7.2 | 25.6 | 2.2 | 12.4 | 3.5 |
| Fine Refuse | 13.7 | 15.1 | 26.6 | 60.4 | 11.8 | 27.3 | 6.5 | 1.1 | 4.9 | 0.8 | 4.1 | 1.4 | 4.1 | 0.4 | 2.2 | 0.3 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1728.1 | TPH |
| Float 1.6 | 436.07 | 20.37 | 14.73 | 436.07 | 20.37 | 14.73 | 1489.30 | 951.26 | 315.48 |
| Float 1.8 | 22.62 | 10.01 | 5.24 | 458.69 | 30.38 | 19.97 | 1053.23 | 930.89 | 300.75 |
| Sink 1.8 | 1030.61 | 920.88 | 295.52 | 1489.30 | 951.26 | 315.48 | 1030.61 | 920.88 | 295.52 |
| **Clean Coal (Plus 100M)** | | | | | | | | 464.4 | TPH |
| Float 1.6 | 428.92 | 19.51 | 14.16 | 428.92 | 19.51 | 14.16 | 437.28 | 23.79 | 18.11 |
| Float 1.8 | 5.52 | 2.24 | 2.43 | 434.44 | 21.75 | 16.58 | 8.36 | 4.28 | 3.96 |
| Sink 1.8 | 2.84 | 2.05 | 1.53 | 437.28 | 23.79 | 18.11 | 2.84 | 2.05 | 1.53 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 1064.6 | TPH |
| Float 1.6 | 4.74 | 0.81 | 0.51 | 4.74 | 0.81 | 0.51 | 1049.50 | 927.33 | 297.26 |
| Float 1.8 | 17.07 | 7.76 | 2.81 | 21.81 | 8.57 | 3.31 | 1044.75 | 926.52 | 296.75 |
| Sink 1.8 | 1027.68 | 918.76 | 293.95 | 1049.50 | 927.33 | 297.26 | 1027.68 | 918.76 | 293.95 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 199.0 | TPH |
| Float 1.6 | 2.41 | 0.05 | 0.07 | 2.41 | 0.05 | 0.07 | 2.53 | 0.14 | 0.11 |
| Float 1.8 | 0.03 | 0.01 | 0.00 | 2.44 | 0.07 | 0.07 | 0.12 | 0.08 | 0.04 |
| Sink 1.8 | 0.09 | 0.07 | 0.04 | 2.53 | 0.14 | 0.11 | 0.09 | 0.07 | 0.04 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 8,191,167 | 5,231,933 | 867.6 | 105.92 | 165.82 |
| Clean Coal | 2,405,035 | 130,860 | 49.8 | 20.71 | 380.63 |
| Coarse Refuse | 5,772,229 | 5,100,312 | 817.5 | 141.62 | 160.28 |
| Fine Refuse | 13,903 | 761 | 0.3 | 21.78 | 397.90 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

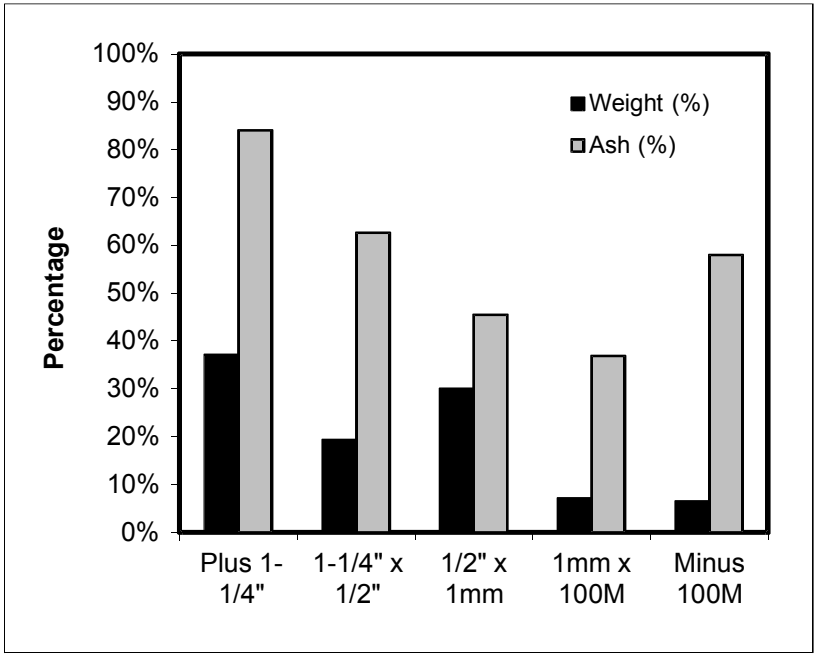
****Unless otherwise noted, REE values reported in ppm*

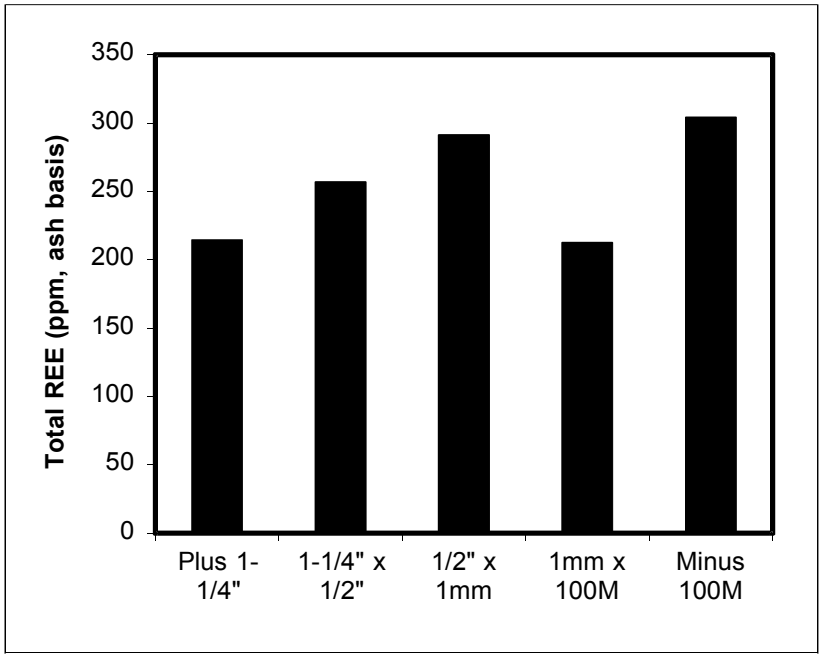
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.95 | 1.79 | 2.28 | 4.59 | 0.79 | 2.23 | 0.49 | 0.08 | 0.40 | 0.06 | 0.35 | 0.12 | 0.33 | 0.05 | 0.19 | 0.03 |
| Float 1.8 | 0.50 | 0.68 | 0.62 | 1.49 | 0.35 | 0.74 | 0.19 | 0.03 | 0.15 | 0.04 | 0.13 | 0.05 | 0.14 | 0.02 | 0.08 | 0.02 |
| Sink 1.8 | 27.24 | 24.19 | 34.13 | 85.61 | 28.13 | 44.00 | 13.24 | 1.80 | 9.35 | 2.24 | 7.24 | 2.60 | 9.26 | 0.79 | 4.45 | 1.25 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.89 | 1.71 | 2.23 | 4.44 | 0.75 | 2.15 | 0.47 | 0.07 | 0.38 | 0.05 | 0.33 | 0.12 | 0.32 | 0.05 | 0.18 | 0.02 |
| Float 1.8 | 0.17 | 0.42 | 0.30 | 0.66 | 0.12 | 0.35 | 0.09 | 0.01 | 0.08 | 0.01 | 0.07 | 0.02 | 0.06 | 0.01 | 0.04 | 0.01 |
| Sink 1.8 | 0.10 | 0.16 | 0.25 | 0.51 | 0.07 | 0.25 | 0.05 | 0.01 | 0.04 | 0.00 | 0.03 | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.05 | 0.07 | 0.05 | 0.14 | 0.04 | 0.06 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.33 | 0.26 | 0.32 | 0.83 | 0.22 | 0.38 | 0.10 | 0.02 | 0.08 | 0.02 | 0.06 | 0.02 | 0.08 | 0.01 | 0.05 | 0.01 |
| Sink 1.8 | 27.13 | 24.02 | 33.88 | 85.09 | 28.05 | 43.75 | 13.20 | 1.79 | 9.31 | 2.23 | 7.20 | 2.59 | 9.23 | 0.79 | 4.44 | 1.25 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

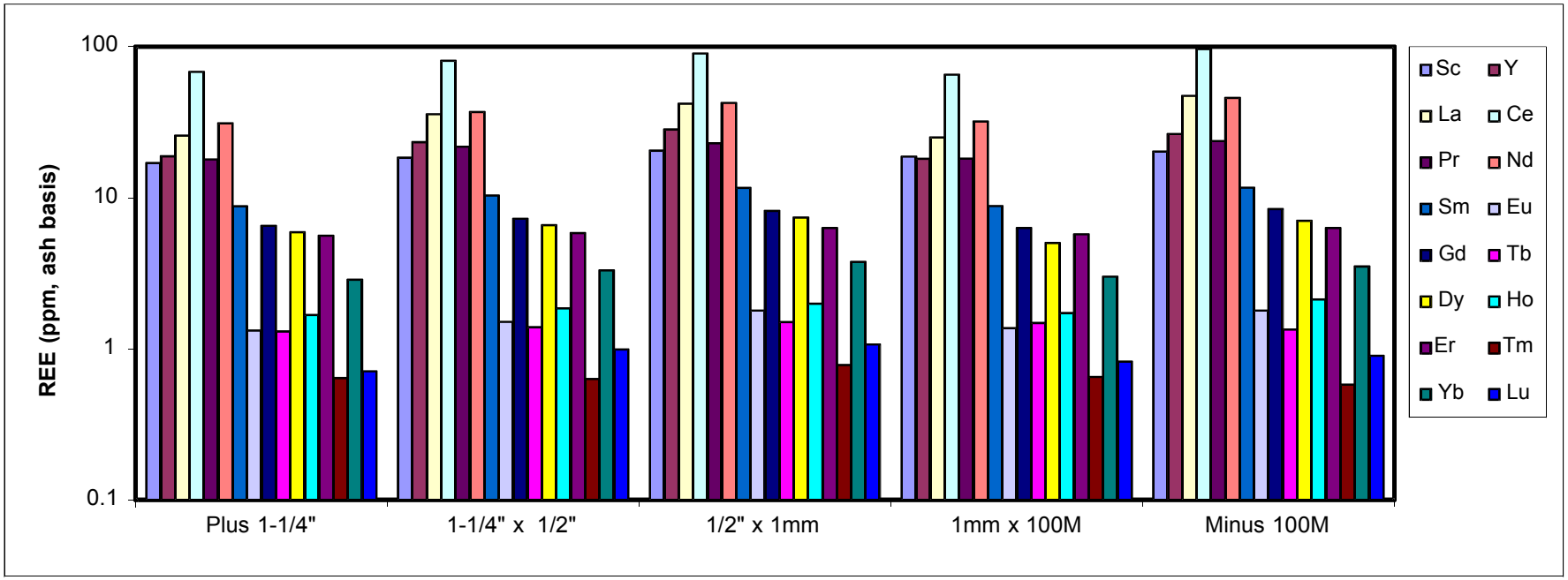
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 78.9 | 73.3 | 101.9 | 252.1 | 80.5 | 129.1 | 38.3 | 5.3 | 27.2 | 6.4 | 21.2 | 7.6 | 26.8 | 2.4 | 13.0 | 3.6 |
| Clean Coal | 3.2 | 6.3 | 7.6 | 15.4 | 2.6 | 7.6 | 1.7 | 0.3 | 1.4 | 0.2 | 1.2 | 0.4 | 1.1 | 0.2 | 0.6 | 0.1 |
| Coarse Refuse | 75.7 | 67.0 | 94.2 | 236.7 | 77.9 | 121.5 | 36.6 | 5.0 | 25.9 | 6.2 | 20.0 | 7.2 | 25.6 | 2.2 | 12.4 | 3.5 |
| Fine Refuse | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 37.10% | 84.06% | 214.21 | 37.10% | 170.71% | 244.18 | 200.00% | 34.94% | 255.84 |
| 1-1/4" x 1/2" | 19.30% | 62.64% | 256.54 | 56.40% | 57.00% | 273.24 | 162.90% | 23.75% | 289.40 |
| 1/2" x 1mm | 30.02% | 45.49% | 291.14 | 86.42% | 23.21% | 283.31 | 143.60% | 18.52% | 304.33 |
| 1mm x 100M | 7.07% | 36.87% | 212.35 | 93.49% | 6.85% | 266.62 | 113.58% | 11.40% | 318.24 |
| Minus 100M | 6.51% | 57.99% | 303.91 | 100.00% | 3.80% | 303.88 | 106.51% | 9.71% | 344.94 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 16.98 | 18.83 | 25.77 | 68.22 | 17.98 | 31.09 | 8.78 | 1.32 | 6.53 | 1.30 | 5.90 | 1.67 | 5.62 | 0.64 | 2.87 | 0.71 |
| 1-1/4" x 1/2" | 18.39 | 23.32 | 35.82 | 80.57 | 21.79 | 36.98 | 10.33 | 1.51 | 7.26 | 1.39 | 6.57 | 1.85 | 5.84 | 0.63 | 3.30 | 0.99 |
| 1/2" x 1mm | 20.54 | 28.36 | 41.87 | 90.47 | 22.97 | 42.53 | 11.61 | 1.79 | 8.19 | 1.50 | 7.40 | 1.99 | 6.31 | 0.78 | 3.76 | 1.07 |
| 1mm x 100M | 18.70 | 18.11 | 25.13 | 65.42 | 18.16 | 31.92 | 8.81 | 1.37 | 6.31 | 1.48 | 5.01 | 1.72 | 5.74 | 0.65 | 3.00 | 0.82 |
| Minus 100M | 20.24 | 26.40 | 47.24 | 96.66 | 23.78 | 45.95 | 11.65 | 1.79 | 8.40 | 1.34 | 7.05 | 2.12 | 6.30 | 0.58 | 3.51 | 0.90 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 0.37% | 5.74% | 298.12 | 0.37% | 5.74% | 298.12 | 100.00% | 6.56% | 368.54 |
| 1-1/4" x 1/2" | 11.53% | 6.59% | 478.59 | 11.90% | 6.57% | 473.68 | 99.63% | 6.57% | 368.76 |
| 1/2" x 1mm | 67.14% | 5.29% | 363.45 | 79.04% | 5.48% | 383.34 | 88.10% | 6.56% | 354.33 |
| 1mm x 100M | 15.12% | 5.01% | 369.01 | 94.16% | 5.40% | 381.20 | 20.96% | 10.66% | 339.84 |
| Minus 100M | 5.84% | 25.27% | 324.86 | 100.00% | 6.56% | 368.54 | 5.84% | 25.27% | 324.86 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 90.58% | 12.38% | 351.04 | 197.80% | 10.54% | 356.71 | 200.00% | 10.92% | 352.60 |
| Float 1.8 | 9.42% | 42.78% | 150.85 | 107.22% | 8.99% | 363.30 | 109.42% | 9.71% | 354.24 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 97.80% | 5.74% | 515.81 | 100.00% | 6.59% | 478.59 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.80% | 5.74% | 515.81 | 97.80% | 5.74% | 515.81 | 100.00% | 6.59% | 478.59 |
| Float 1.8 | 1.98% | 42.11% | 291.51 | 99.78% | 6.46% | 486.80 | 2.20% | 44.45% | 264.92 |
| Sink 1.8 | 0.22% | 65.49% | 111.04 | 100.00% | 6.59% | 478.59 | 0.22% | 65.49% | 111.04 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.45% | 4.60% | 335.77 | 98.45% | 4.60% | 335.77 | 100.00% | 5.29% | 363.45 |
| Float 1.8 | 1.11% | 40.05% | 628.30 | 99.56% | 5.00% | 361.92 | 1.55% | 48.85% | 528.98 |
| Sink 1.8 | 0.44% | 71.06% | 387.76 | 100.00% | 5.29% | 363.45 | 0.44% | 71.06% | 387.76 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 96.89% | 3.22% | 327.91 | 96.89% | 3.22% | 327.91 | 100.00% | 5.01% | 369.01 |
| Float 1.8 | 1.19% | 40.04% | 603.08 | 98.08% | 3.67% | 364.37 | 3.11% | 60.87% | 436.75 |
| Sink 1.8 | 1.92% | 73.78% | 380.81 | 100.00% | 5.01% | 369.01 | 1.92% | 73.78% | 380.81 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 28.99 | 45.45 | 30.78 | 84.72 | 15.49 | 39.88 | 9.93 | 1.99 | 9.28 | 1.85 | 8.18 | 3.12 | 9.35 | 3.21 | 5.42 | 0.48 |
| 1-1/4" x 1/2" | 38.25 | 91.45 | 48.63 | 117.75 | 27.94 | 63.49 | 19.11 | 3.76 | 17.19 | 3.46 | 16.41 | 4.26 | 12.26 | 3.87 | 8.88 | 1.87 |
| 1/2" x 1mm | 21.49 | 40.81 | 60.44 | 117.89 | 17.68 | 57.18 | 11.59 | 1.63 | 9.16 | 1.12 | 7.98 | 3.11 | 8.04 | 0.89 | 4.09 | 0.36 |
| 1mm x 100M | 23.92 | 39.53 | 60.54 | 118.67 | 20.71 | 56.72 | 12.38 | 1.73 | 9.43 | 1.27 | 8.07 | 2.82 | 7.60 | 0.91 | 4.09 | 0.62 |
| Minus 100M | 22.84 | 40.14 | 43.11 | 93.08 | 27.70 | 45.14 | 12.89 | 2.08 | 10.50 | 1.97 | 8.48 | 2.28 | 7.48 | 0.99 | 4.74 | 1.44 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 31.57 | 57.19 | 36.57 | 99.76 | 17.13 | 47.08 | 11.40 | 2.29 | 10.89 | 2.01 | 9.73 | 3.69 | 10.76 | 4.15 | 6.27 | 0.55 |
| Float 1.8 | 21.80 | 12.78 | 14.68 | 42.85 | 10.93 | 19.86 | 5.84 | 1.14 | 4.81 | 1.40 | 3.88 | 1.52 | 5.43 | 0.59 | 3.06 | 0.28 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.15 | 103.58 | 50.13 | 124.89 | 27.12 | 68.33 | 20.16 | 4.16 | 19.05 | 3.68 | 18.13 | 4.84 | 13.50 | 4.50 | 9.79 | 1.80 |
| Float 1.8 | 16.07 | 24.13 | 45.28 | 84.45 | 36.85 | 38.85 | 14.76 | 1.63 | 7.04 | 2.38 | 7.35 | 0.83 | 5.03 | 0.19 | 3.99 | 2.68 |
| Sink 1.8 | 14.61 | 8.21 | 9.45 | 32.48 | 8.53 | 17.44 | 3.58 | 0.59 | 3.49 | 1.03 | 1.90 | 1.60 | 5.83 | 0.40 | 1.90 | 0.00 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 19.05 | 33.22 | 58.76 | 112.14 | 17.02 | 53.31 | 10.49 | 1.41 | 7.95 | 0.95 | 6.83 | 2.77 | 7.28 | 0.71 | 3.58 | 0.30 |
| Float 1.8 | 43.34 | 116.85 | 76.89 | 169.94 | 25.68 | 92.59 | 22.44 | 3.75 | 20.57 | 2.93 | 19.29 | 6.06 | 14.71 | 2.80 | 9.29 | 1.17 |
| Sink 1.8 | 25.76 | 42.71 | 61.39 | 127.12 | 15.84 | 62.87 | 12.07 | 1.74 | 10.45 | 1.09 | 8.56 | 3.81 | 9.49 | 0.80 | 4.06 | 0.00 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 19.59 | 28.71 | 57.21 | 109.50 | 21.71 | 50.33 | 11.28 | 1.41 | 7.66 | 1.07 | 6.39 | 2.13 | 6.19 | 0.60 | 3.35 | 0.78 |
| Float 1.8 | 48.67 | 114.26 | 70.90 | 154.17 | 26.05 | 86.73 | 21.98 | 3.99 | 20.62 | 3.29 | 19.42 | 5.36 | 13.62 | 3.01 | 9.56 | 1.45 |
| Sink 1.8 | 25.13 | 38.24 | 64.39 | 126.94 | 16.72 | 60.70 | 11.56 | 1.68 | 9.55 | 1.02 | 7.95 | 3.47 | 8.68 | 0.89 | 3.89 | 0.00 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 37.31% | 88.43% | 185.41 | 37.31% | 88.43% | 185.41 | 100.00% | 88.30% | 158.11 |
| 1-1/4" x 1/2" | 24.59% | 89.52% | 103.19 | 61.90% | 88.86% | 152.51 | 62.69% | 88.22% | 141.82 |
| 1/2" x 1mm | 31.29% | 87.86% | 177.44 | 93.19% | 88.53% | 160.81 | 38.10% | 87.38% | 167.36 |
| 1mm x 100M | 5.39% | 85.44% | 150.66 | 98.58% | 88.36% | 160.28 | 6.81% | 85.18% | 119.61 |
| Minus 100M | 1.42% | 84.20% | 0.00 | 100.00% | 88.30% | 158.11 | 1.42% | 84.20% | 0.00 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.10% | 23.56% | 188.50 | 0.10% | 23.56% | 188.50 | 100.00% | 88.43% | 185.41 |
| Float 1.8 | 0.38% | 45.74% | 135.85 | 0.48% | 41.12% | 142.13 | 99.90% | 88.50% | 185.41 |
| Sink 1.8 | 99.52% | 88.66% | 185.51 | 100.00% | 88.43% | 185.41 | 99.52% | 88.66% | 185.51 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.26% | 19.03% | 327.53 | 0.26% | 19.03% | 327.53 | 100.00% | 89.52% | 103.19 |
| Float 1.8 | 2.12% | 45.75% | 125.07 | 2.38% | 42.83% | 134.90 | 99.74% | 89.71% | 103.06 |
| Sink 1.8 | 97.62% | 90.66% | 102.82 | 100.00% | 89.52% | 103.19 | 97.62% | 90.66% | 102.82 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.58% | 21.85% | 242.49 | 0.58% | 21.85% | 242.49 | 100.00% | 87.86% | 177.44 |
| Float 1.8 | 2.75% | 45.63% | 221.61 | 3.33% | 41.49% | 223.53 | 99.42% | 88.25% | 177.34 |
| Sink 1.8 | 96.67% | 89.46% | 176.70 | 100.00% | 87.86% | 177.44 | 96.67% | 89.46% | 176.70 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 3.02% | 9.29% | 559.92 | 3.02% | 9.29% | 559.92 | 100.00% | 85.44% | 150.66 |
| Float 1.8 | 1.48% | 41.56% | 189.39 | 4.50% | 19.90% | 305.46 | 96.98% | 87.81% | 149.31 |
| Sink 1.8 | 95.50% | 88.53% | 149.02 | 100.00% | 85.44% | 150.66 | 95.50% | 88.53% | 149.02 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 15.92 | 15.00 | 23.26 | 55.70 | 16.57 | 27.83 | 8.18 | 1.11 | 5.65 | 1.23 | 4.41 | 1.56 | 5.18 | 0.44 | 2.61 | 0.76 |
| 1-1/4" x 1/2" | 11.75 | 7.29 | 8.88 | 25.49 | 12.96 | 15.14 | 5.08 | 0.64 | 3.66 | 1.19 | 2.72 | 1.09 | 4.57 | 0.36 | 1.79 | 0.58 |
| 1/2" x 1mm | 15.97 | 15.74 | 21.03 | 51.75 | 15.62 | 26.53 | 7.81 | 1.11 | 5.60 | 1.23 | 4.39 | 1.51 | 5.28 | 0.49 | 2.74 | 0.67 |
| 1mm x 100M | 14.96 | 12.05 | 14.71 | 47.85 | 14.82 | 20.62 | 6.31 | 0.93 | 4.55 | 1.22 | 3.45 | 1.23 | 4.64 | 0.41 | 2.26 | 0.65 |
| Minus 100M | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 27.47 | 17.39 | 14.92 | 52.82 | 19.11 | 21.49 | 8.01 | 1.73 | 5.47 | 2.36 | 4.83 | 1.28 | 5.34 | 1.08 | 3.91 | 1.29 |
| Float 1.8 | 21.02 | 14.63 | 12.15 | 32.72 | 11.40 | 17.73 | 5.13 | 1.10 | 3.90 | 1.60 | 3.28 | 1.38 | 5.04 | 1.16 | 3.08 | 0.53 |
| Sink 1.8 | 15.91 | 15.00 | 23.28 | 55.75 | 16.58 | 27.85 | 8.19 | 1.11 | 5.65 | 1.23 | 4.41 | 1.56 | 5.18 | 0.44 | 2.61 | 0.76 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 35.99 | 52.12 | 32.01 | 93.32 | 16.80 | 40.19 | 10.85 | 2.40 | 9.84 | 2.28 | 9.57 | 3.20 | 9.36 | 2.37 | 6.40 | 0.83 |
| Float 1.8 | 19.05 | 10.69 | 11.82 | 31.06 | 11.14 | 17.97 | 4.82 | 1.01 | 3.80 | 1.47 | 2.58 | 1.31 | 4.84 | 0.72 | 2.44 | 0.35 |
| Sink 1.8 | 11.66 | 7.23 | 8.83 | 25.39 | 12.98 | 15.09 | 5.08 | 0.63 | 3.66 | 1.19 | 2.72 | 1.09 | 4.56 | 0.35 | 1.78 | 0.58 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 27.75 | 25.79 | 24.76 | 67.77 | 22.54 | 30.06 | 10.09 | 2.09 | 6.86 | 2.65 | 6.36 | 1.75 | 6.61 | 1.23 | 4.71 | 1.47 |
| Float 1.8 | 22.53 | 20.69 | 27.28 | 70.52 | 16.52 | 29.97 | 7.99 | 1.46 | 5.82 | 1.51 | 4.70 | 1.72 | 5.77 | 0.77 | 3.58 | 0.78 |
| Sink 1.8 | 15.86 | 15.65 | 20.93 | 51.45 | 15.60 | 26.47 | 7.80 | 1.10 | 5.59 | 1.22 | 4.38 | 1.51 | 5.27 | 0.48 | 2.72 | 0.67 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.64 | 93.41 | 62.27 | 149.36 | 33.38 | 69.90 | 20.09 | 4.79 | 19.33 | 4.91 | 19.21 | 5.68 | 17.67 | 2.91 | 10.83 | 1.54 |
| Float 1.8 | 18.98 | 15.19 | 20.87 | 59.27 | 17.42 | 26.42 | 7.71 | 1.25 | 5.27 | 1.59 | 4.03 | 1.54 | 5.63 | 0.63 | 2.84 | 0.75 |
| Sink 1.8 | 14.83 | 11.76 | 14.51 | 47.43 | 14.74 | 20.41 | 6.25 | 0.91 | 4.50 | 1.21 | 3.39 | 1.21 | 4.59 | 0.40 | 2.23 | 0.65 |

## PLANT 6

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 1.27% | 5.47% | 397.90 | 1.27% | 5.47% | 397.90 | 100.00% | 61.99% | 266.53 |
| Minus 100M | 98.73% | 62.72% | 266.38 | 100.00% | 61.99% | 266.53 | 98.73% | 62.72% | 266.38 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.15% | 2.28% | 632.43 | 95.15% | 2.28% | 632.43 | 100.00% | 5.47% | 397.90 |
| Float 1.8 | 1.26% | 35.54% | 0.00 | 96.41% | 2.71% | 524.22 | 4.85% | 68.15% | 243.97 |
| Sink 1.8 | 3.59% | 79.60% | 282.20 | 100.00% | 5.47% | 397.90 | 3.59% | 79.60% | 282.20 |

## PLANT 6

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 28.76 | 72.04 | 46.78 | 92.04 | 38.57 | 49.30 | 11.16 | 2.90 | 13.98 | 2.27 | 13.60 | 3.36 | 9.30 | 1.76 | 7.36 | 4.74 |
| Minus 100M | 20.12 | 22.2 | 39.23 | 89.04 | 17.41 | 40.17 | 9.62 | 1.64 | 7.22 | 1.18 | 6.07 | 2.12 | 6.02 | 0.63 | 3.22 | 0.49 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 52.03 | 157.78 | 59.95 | 125.10 | 25.53 | 81.08 | 22.02 | 5.45 | 25.98 | 5.73 | 26.92 | 7.08 | 18.54 | 4.02 | 13.47 | 1.75 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 15.6 | 18.24 | 44.11 | 81.36 | 54.51 | 32.89 | 4.67 | 1.41 | 7.06 | 0 | 5.61 | 1.06 | 3.74 | 0.32 | 3.87 | 7.75 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1232.4 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1232.44 | 601.13 | 395.99 |
| 1-1/2" x 3/4" | 317.48 | 174.26 | 125.66 | 317.48 | 174.26 | 125.66 | 1232.44 | 601.13 | 395.99 |
| 3/4" x 1mm | 632.36 | 286.46 | 182.95 | 949.84 | 460.72 | 308.60 | 914.96 | 426.87 | 270.34 |
| 1mm x 100M | 134.83 | 52.70 | 34.21 | 1084.67 | 513.43 | 342.82 | 282.60 | 140.41 | 87.39 |
| Minus 100M | 147.77 | 87.70 | 53.18 | 1232.44 | 601.13 | 395.99 | 147.77 | 87.70 | 53.18 |
| **Clean Coal** | | | | | | | | 624.8 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 624.78 | 100.07 | 103.02 |
| 1-1/2" x 3/4" | 106.78 | 16.71 | 18.27 | 106.78 | 16.71 | 18.27 | 624.78 | 100.07 | 103.02 |
| 3/4" x 1mm | 398.11 | 67.11 | 68.59 | 504.89 | 83.82 | 86.87 | 518.01 | 83.37 | 84.75 |
| 1mm x 100M | 83.35 | 10.41 | 10.74 | 588.23 | 94.23 | 97.61 | 119.90 | 16.26 | 16.15 |
| Minus 100M | 36.55 | 5.84 | 5.41 | 624.78 | 100.07 | 103.02 | 36.55 | 5.84 | 5.41 |
| **Coarse Refuse** | | | | | | | | 529.7 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 529.71 | 451.24 | 153.42 |
| 1-1/2" x 3/4" | 207.06 | 176.16 | 26.96 | 207.06 | 176.16 | 26.96 | 529.71 | 451.24 | 153.42 |
| 3/4" x 1mm | 264.17 | 226.89 | 100.29 | 471.23 | 403.04 | 127.24 | 322.65 | 275.09 | 126.47 |
| 1mm x 100M | 46.51 | 38.23 | 21.22 | 517.74 | 441.28 | 148.47 | 58.48 | 48.20 | 26.18 |
| Minus 100M | 11.97 | 9.97 | 4.96 | 529.71 | 451.24 | 153.42 | 11.97 | 9.97 | 4.96 |
| **Fine Refuse** | | | | | | | | 77.9 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 77.95 | 49.81 | 28.39 |
| 1-1/2" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 77.95 | 49.81 | 28.39 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 77.95 | 49.81 | 28.39 |
| 1mm x 100M | 2.98 | 0.44 | 0.45 | 2.98 | 0.44 | 0.45 | 77.95 | 49.81 | 28.39 |
| Minus 100M | 74.97 | 49.37 | 27.94 | 77.95 | 49.81 | 28.39 | 74.97 | 49.37 | 27.94 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 6,778,406 | 3,306,209 | 1,089.0 | 160.65 | 329.37 |
| Clean Coal | 3,436,307 | 550,406 | 283.3 | 82.44 | 514.72 |
| Coarse Refuse | 2,913,402 | 2,481,846 | 421.9 | 144.82 | 170.00 |
| Fine Refuse | 428,700 | 273,956 | 78.1 | 182.11 | 284.97 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 7.64 | 11.66 | 22.50 | 41.88 | 7.05 | 18.50 | 4.35 | 0.64 | 3.37 | 0.35 | 2.42 | 0.90 | 2.75 | 0.15 | 1.36 | 0.14 |
| 3/4" x 1mm | 12.80 | 17.35 | 29.79 | 63.25 | 9.77 | 25.84 | 5.92 | 0.92 | 4.77 | 0.53 | 3.56 | 1.45 | 4.35 | 0.37 | 2.13 | 0.14 |
| 1mm x 100M | 2.51 | 3.19 | 5.45 | 12.17 | 1.82 | 4.63 | 1.06 | 0.18 | 0.88 | 0.10 | 0.65 | 0.28 | 0.81 | 0.06 | 0.40 | 0.03 |
| Minus 100M | 3.69 | 4.55 | 8.70 | 18.80 | 2.90 | 7.54 | 1.82 | 0.29 | 1.43 | 0.16 | 1.00 | 0.41 | 1.18 | 0.09 | 0.58 | 0.04 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 1.35 | 2.37 | 3.03 | 5.71 | 0.78 | 2.52 | 0.53 | 0.09 | 0.51 | 0.05 | 0.41 | 0.16 | 0.47 | 0.05 | 0.23 | 0.01 |
| 3/4" x 1mm | 4.78 | 8.01 | 11.94 | 22.13 | 3.03 | 9.71 | 2.06 | 0.36 | 1.83 | 0.18 | 1.39 | 0.57 | 1.59 | 0.17 | 0.81 | 0.02 |
| 1mm x 100M | 0.83 | 1.40 | 1.63 | 3.23 | 0.55 | 1.50 | 0.35 | 0.07 | 0.32 | 0.05 | 0.26 | 0.09 | 0.27 | 0.03 | 0.15 | 0.01 |
| Minus 100M | 0.41 | 0.68 | 0.81 | 1.61 | 0.35 | 0.73 | 0.18 | 0.03 | 0.17 | 0.03 | 0.13 | 0.05 | 0.14 | 0.01 | 0.07 | 0.01 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 4.06 | 1.31 | 1.75 | 7.95 | 2.55 | 4.05 | 0.88 | 0.12 | 0.91 | 0.28 | 0.51 | 0.42 | 1.75 | 0.06 | 0.36 | 0.00 |
| 3/4" x 1mm | 8.14 | 8.68 | 13.24 | 36.32 | 5.85 | 13.56 | 3.37 | 0.51 | 2.75 | 0.38 | 2.09 | 0.91 | 2.88 | 0.22 | 1.30 | 0.08 |
| 1mm x 100M | 1.51 | 1.67 | 3.48 | 7.62 | 1.21 | 3.00 | 0.70 | 0.10 | 0.53 | 0.06 | 0.39 | 0.16 | 0.50 | 0.04 | 0.24 | 0.01 |
| Minus 100M | 0.38 | 0.38 | 0.69 | 1.95 | 0.29 | 0.63 | 0.15 | 0.02 | 0.12 | 0.01 | 0.09 | 0.04 | 0.12 | 0.01 | 0.06 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.03 | 0.06 | 0.07 | 0.14 | 0.02 | 0.06 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Minus 100M | 1.98 | 2.32 | 4.50 | 9.88 | 1.57 | 3.97 | 0.97 | 0.15 | 0.76 | 0.08 | 0.52 | 0.22 | 0.64 | 0.05 | 0.31 | 0.02 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 73.3 | 101.1 | 182.7 | 374.3 | 59.2 | 155.4 | 36.1 | 5.6 | 28.8 | 3.1 | 21.0 | 8.4 | 25.0 | 1.8 | 12.3 | 0.9 |
| Clean Coal | 20.3 | 34.3 | 47.9 | 89.9 | 12.9 | 39.8 | 8.6 | 1.5 | 7.8 | 0.8 | 6.1 | 2.4 | 6.8 | 0.7 | 3.5 | 0.1 |
| Coarse Refuse | 38.7 | 33.1 | 52.7 | 148.1 | 27.2 | 58.4 | 14.0 | 2.1 | 11.9 | 2.0 | 8.5 | 4.2 | 14.4 | 0.9 | 5.4 | 0.3 |
| Fine Refuse | 5.5 | 6.5 | 12.6 | 27.6 | 4.4 | 11.1 | 2.7 | 0.4 | 2.1 | 0.2 | 1.5 | 0.6 | 1.8 | 0.1 | 0.9 | 0.1 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1232.4 | TPH |
| Float 1.6 | 570.73 | 84.43 | 89.91 | 570.73 | 84.43 | 89.91 | 1108.95 | 535.95 | 246.52 |
| Float 1.8 | 37.55 | 16.06 | 12.49 | 608.29 | 100.49 | 102.40 | 538.22 | 451.52 | 156.61 |
| Sink 1.8 | 500.66 | 435.46 | 144.13 | 1108.95 | 535.95 | 246.52 | 500.66 | 435.46 | 144.13 |
| **Clean Coal (Plus 100M)** | | | | | | | | 624.8 | TPH |
| Float 1.6 | 562.94 | 83.20 | 88.61 | 562.94 | 83.20 | 88.61 | 588.23 | 94.23 | 97.61 |
| Float 1.8 | 21.91 | 8.93 | 7.58 | 584.85 | 92.12 | 96.19 | 25.30 | 11.03 | 8.99 |
| Sink 1.8 | 3.38 | 2.11 | 1.41 | 588.23 | 94.23 | 97.61 | 3.38 | 2.11 | 1.41 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 529.7 | TPH |
| Float 1.6 | 5.22 | 1.00 | 1.00 | 5.22 | 1.00 | 1.00 | 517.74 | 441.28 | 148.47 |
| Float 1.8 | 15.41 | 7.04 | 4.84 | 20.63 | 8.04 | 5.83 | 512.52 | 440.28 | 147.47 |
| Sink 1.8 | 497.11 | 433.23 | 142.63 | 517.74 | 441.28 | 148.47 | 497.11 | 433.23 | 142.63 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 77.9 | TPH |
| Float 1.6 | 2.58 | 0.24 | 0.30 | 2.58 | 0.24 | 0.30 | 2.98 | 0.44 | 0.45 |
| Float 1.8 | 0.23 | 0.09 | 0.07 | 2.81 | 0.33 | 0.37 | 0.40 | 0.20 | 0.15 |
| Sink 1.8 | 0.17 | 0.12 | 0.08 | 2.98 | 0.44 | 0.45 | 0.17 | 0.12 | 0.08 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 6,099,216 | 2,947,722 | 677.9 | 111.15 | 229.99 |
| Clean Coal | 3,235,283 | 518,262 | 268.4 | 82.97 | 517.93 |
| Coarse Refuse | 2,847,556 | 2,427,019 | 408.3 | 143.38 | 168.22 |
| Fine Refuse | 16,376 | 2,441 | 1.2 | 74.78 | 501.71 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

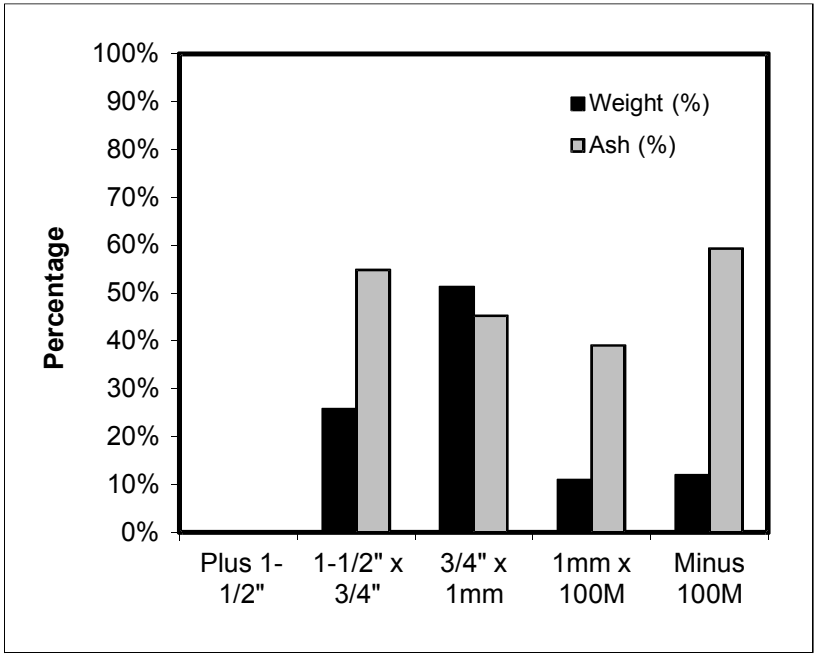
****Unless otherwise noted, REE values reported in ppm*

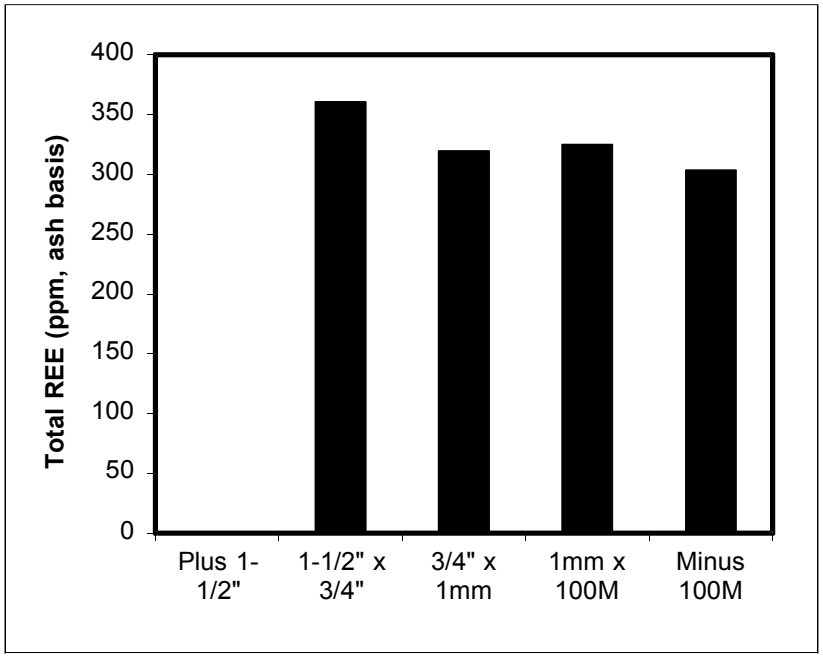
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 6.50 | 11.14 | 15.20 | 28.40 | 3.89 | 12.61 | 2.71 | 0.48 | 2.48 | 0.25 | 1.93 | 0.77 | 2.15 | 0.24 | 1.11 | 0.04 |
| Float 1.8 | 0.81 | 1.08 | 2.21 | 4.40 | 0.61 | 1.85 | 0.36 | 0.05 | 0.30 | 0.02 | 0.21 | 0.11 | 0.32 | 0.02 | 0.13 | 0.00 |
| Sink 1.8 | 13.40 | 11.28 | 17.73 | 50.29 | 9.49 | 19.94 | 4.85 | 0.72 | 4.09 | 0.71 | 2.92 | 1.45 | 4.99 | 0.31 | 1.85 | 0.11 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 6.41 | 11.00 | 14.98 | 27.98 | 3.83 | 12.43 | 2.67 | 0.48 | 2.44 | 0.25 | 1.91 | 0.76 | 2.12 | 0.24 | 1.09 | 0.04 |
| Float 1.8 | 0.47 | 0.66 | 1.38 | 2.65 | 0.37 | 1.13 | 0.22 | 0.03 | 0.18 | 0.01 | 0.13 | 0.06 | 0.18 | 0.01 | 0.08 | 0.00 |
| Sink 1.8 | 0.09 | 0.12 | 0.23 | 0.44 | 0.15 | 0.18 | 0.06 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.07 | 0.10 | 0.18 | 0.33 | 0.05 | 0.14 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.34 | 0.40 | 0.81 | 1.72 | 0.23 | 0.72 | 0.14 | 0.02 | 0.12 | 0.01 | 0.08 | 0.04 | 0.14 | 0.01 | 0.05 | 0.00 |
| Sink 1.8 | 13.30 | 11.16 | 17.48 | 49.83 | 9.34 | 19.75 | 4.79 | 0.71 | 4.05 | 0.70 | 2.89 | 1.44 | 4.96 | 0.31 | 1.83 | 0.10 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.02 | 0.04 | 0.04 | 0.09 | 0.01 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.01 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

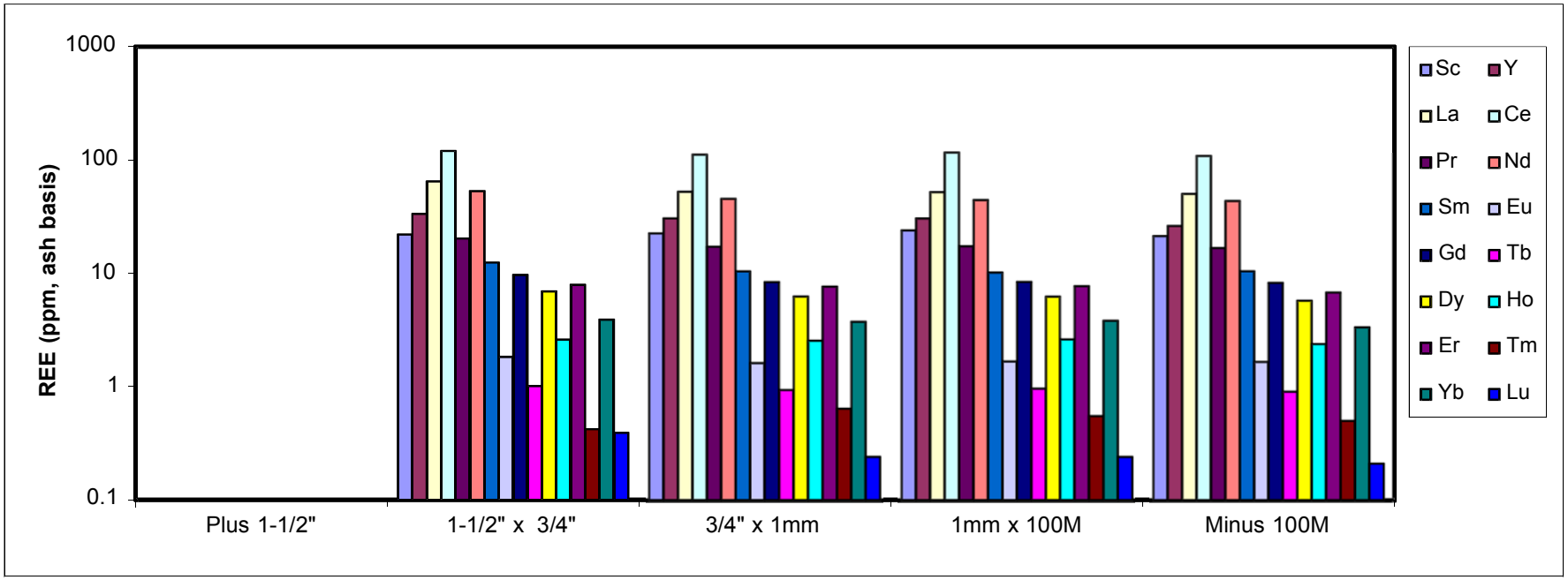
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 56.9 | 64.6 | 96.6 | 228.5 | 38.5 | 94.6 | 21.8 | 3.5 | 18.9 | 2.7 | 13.9 | 6.4 | 20.5 | 1.6 | 8.5 | 0.4 |
| Clean Coal | 19.2 | 32.4 | 45.6 | 85.4 | 12.0 | 37.8 | 8.1 | 1.4 | 7.3 | 0.7 | 5.7 | 2.3 | 6.4 | 0.7 | 3.3 | 0.1 |
| Coarse Refuse | 37.7 | 32.1 | 50.8 | 142.7 | 26.4 | 56.7 | 13.6 | 2.0 | 11.5 | 2.0 | 8.2 | 4.1 | 14.1 | 0.9 | 5.2 | 0.3 |
| Fine Refuse | 0.1 | 0.2 | 0.2 | 0.4 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | #DIV/0! | #DIV/0! | 200.00% | 32.40% | 375.19 |
| 1-1/2" x 3/4" | 25.76% | 54.89% | 360.54 | 25.76% | 189.35% | 329.37 | 200.00% | 32.40% | 375.19 |
| 3/4" x 1mm | 51.31% | 45.30% | 319.32 | 77.07% | 44.94% | 316.65 | 174.24% | 29.07% | 379.28 |
| 1mm x 100M | 10.94% | 39.09% | 324.58 | 88.01% | 12.94% | 311.21 | 122.93% | 22.30% | 430.13 |
| Minus 100M | 11.99% | 59.35% | 303.17 | 100.00% | 7.12% | 303.17 | 111.99% | 20.66% | 449.64 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 21.92 | 33.45 | 64.57 | 120.17 | 20.24 | 53.07 | 12.47 | 1.83 | 9.68 | 1.01 | 6.94 | 2.59 | 7.89 | 0.42 | 3.90 | 0.39 |
| 3/4" x 1mm | 22.34 | 30.28 | 51.99 | 110.40 | 17.06 | 45.10 | 10.33 | 1.61 | 8.33 | 0.93 | 6.22 | 2.53 | 7.60 | 0.64 | 3.72 | 0.24 |
| 1mm x 100M | 23.83 | 30.31 | 51.67 | 115.49 | 17.22 | 43.90 | 10.09 | 1.67 | 8.35 | 0.96 | 6.21 | 2.61 | 7.68 | 0.55 | 3.80 | 0.24 |
| Minus 100M | 21.04 | 25.96 | 49.60 | 107.18 | 16.53 | 43.00 | 10.36 | 1.65 | 8.16 | 0.90 | 5.69 | 2.36 | 6.72 | 0.50 | 3.31 | 0.21 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 15.16% | 0.00 | 0.00% | 15.16% | 0.00 | 100.00% | 16.02% | 514.72 |
| 1-1/2" x 3/4" | 17.09% | 15.65% | 546.92 | 17.09% | 15.65% | 546.92 | 100.00% | 16.02% | 514.72 |
| 3/4" x 1mm | 63.72% | 16.86% | 511.05 | 80.81% | 16.60% | 518.20 | 82.91% | 16.09% | 508.26 |
| 1mm x 100M | 13.34% | 12.49% | 515.83 | 94.15% | 16.02% | 517.93 | 19.19% | 13.56% | 496.79 |
| Minus 100M | 5.85% | 15.99% | 462.85 | 100.00% | 16.02% | 514.72 | 5.85% | 15.99% | 462.85 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 98.06% | 15.16% | 552.66 | 100.00% | 15.65% | 546.92 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 98.06% | 15.16% | 552.66 | 100.00% | 15.65% | 546.92 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 98.06% | 15.16% | 552.66 | 100.00% | 15.65% | 546.92 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.06% | 15.16% | 552.66 | 98.06% | 15.16% | 552.66 | 100.00% | 15.65% | 546.92 |
| Float 1.8 | 1.89% | 39.36% | 443.04 | 99.95% | 15.62% | 547.44 | 1.94% | 40.23% | 437.51 |
| Sink 1.8 | 0.05% | 73.20% | 325.03 | 100.00% | 15.65% | 546.92 | 0.05% | 73.20% | 325.03 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.73% | 15.70% | 522.68 | 95.73% | 15.70% | 522.68 | 100.00% | 16.86% | 511.05 |
| Float 1.8 | 3.89% | 40.95% | 425.14 | 99.62% | 16.69% | 513.33 | 4.27% | 42.79% | 415.34 |
| Sink 1.8 | 0.38% | 61.65% | 348.74 | 100.00% | 16.86% | 511.05 | 0.38% | 61.65% | 348.74 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 92.53% | 9.71% | 568.94 | 92.53% | 9.71% | 568.94 | 100.00% | 12.49% | 515.83 |
| Float 1.8 | 5.29% | 40.64% | 414.05 | 97.82% | 11.38% | 539.03 | 7.47% | 46.99% | 379.89 |
| Sink 1.8 | 2.18% | 62.40% | 325.90 | 100.00% | 12.49% | 515.83 | 2.18% | 62.40% | 325.90 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 40.37 | 71.02 | 90.61 | 170.87 | 23.21 | 75.33 | 15.98 | 2.80 | 15.20 | 1.46 | 12.37 | 4.89 | 14.02 | 1.59 | 6.98 | 0.22 |
| 3/4" x 1mm | 35.65 | 59.66 | 88.95 | 164.88 | 22.54 | 72.38 | 15.34 | 2.66 | 13.66 | 1.31 | 10.39 | 4.26 | 11.88 | 1.27 | 6.02 | 0.18 |
| 1mm x 100M | 39.93 | 67.11 | 78.25 | 155.17 | 26.25 | 72.26 | 16.97 | 3.15 | 15.46 | 2.22 | 12.44 | 4.56 | 12.93 | 1.52 | 7.05 | 0.57 |
| Minus 100M | 35.13 | 57.89 | 68.96 | 137.62 | 29.67 | 62.77 | 15.77 | 2.83 | 14.93 | 2.20 | 11.52 | 3.85 | 11.60 | 1.14 | 6.16 | 0.81 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.03 | 72.66 | 91.42 | 171.58 | 23.37 | 75.98 | 16.21 | 2.86 | 15.43 | 1.50 | 12.63 | 4.93 | 14.10 | 1.63 | 7.10 | 0.23 |
| Float 1.8 | 27.64 | 40.45 | 76.20 | 160.37 | 19.30 | 63.87 | 11.76 | 1.74 | 10.75 | 0.65 | 7.61 | 4.26 | 12.83 | 0.89 | 4.72 | 0.00 |
| Sink 1.8 | 29.81 | 25.05 | 52.37 | 96.97 | 35.89 | 43.18 | 10.44 | 1.66 | 10.30 | 1.35 | 5.60 | 1.80 | 5.77 | 0.38 | 3.50 | 0.96 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.85 | 62.46 | 90.63 | 167.45 | 22.68 | 73.72 | 15.70 | 2.76 | 14.09 | 1.37 | 10.76 | 4.36 | 12.10 | 1.34 | 6.22 | 0.19 |
| Float 1.8 | 26.20 | 37.62 | 77.48 | 148.15 | 20.52 | 63.29 | 12.46 | 1.91 | 10.28 | 0.75 | 7.36 | 3.61 | 10.36 | 0.70 | 4.45 | 0.00 |
| Sink 1.8 | 22.95 | 30.14 | 59.40 | 113.55 | 27.55 | 48.29 | 12.03 | 1.57 | 8.94 | 1.28 | 6.95 | 2.36 | 8.00 | 0.63 | 4.03 | 1.07 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 46.30 | 81.19 | 82.38 | 166.43 | 25.12 | 79.67 | 18.33 | 3.70 | 17.87 | 2.62 | 14.55 | 5.41 | 14.90 | 1.88 | 8.21 | 0.38 |
| Float 1.8 | 25.66 | 34.34 | 77.77 | 144.71 | 21.18 | 62.13 | 12.45 | 1.90 | 9.71 | 0.66 | 6.67 | 3.12 | 8.88 | 0.72 | 4.12 | 0.03 |
| Sink 1.8 | 20.38 | 25.91 | 51.75 | 97.34 | 41.72 | 39.29 | 15.09 | 1.47 | 8.65 | 2.04 | 7.60 | 1.23 | 6.30 | 0.44 | 3.99 | 2.70 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 100.00% | 85.19% | 170.00 |
| 1-1/2" x 3/4" | 39.09% | 85.07% | 76.52 | 39.09% | 85.07% | 76.52 | 100.00% | 85.19% | 170.00 |
| 3/4" x 1mm | 49.87% | 85.89% | 221.01 | 88.96% | 85.53% | 157.85 | 60.91% | 85.26% | 229.86 |
| 1mm x 100M | 8.78% | 82.21% | 277.55 | 97.74% | 85.23% | 168.22 | 11.04% | 82.42% | 271.56 |
| Minus 100M | 2.26% | 83.27% | 248.58 | 100.00% | 85.19% | 170.00 | 2.26% | 83.27% | 248.58 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.14% | 28.55% | 423.90 | 0.14% | 28.55% | 423.90 | 100.00% | 85.07% | 76.52 |
| Float 1.8 | 1.44% | 45.72% | 194.53 | 1.58% | 44.20% | 207.66 | 99.86% | 85.15% | 76.35 |
| Sink 1.8 | 98.42% | 85.73% | 75.43 | 100.00% | 85.07% | 76.52 | 98.42% | 85.73% | 75.43 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.71% | 25.35% | 469.36 | 0.71% | 25.35% | 469.36 | 100.00% | 85.89% | 221.01 |
| Float 1.8 | 4.18% | 46.30% | 375.24 | 4.89% | 43.26% | 383.25 | 99.29% | 86.32% | 220.49 |
| Sink 1.8 | 95.11% | 88.08% | 216.91 | 100.00% | 85.89% | 221.01 | 95.11% | 88.08% | 216.91 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 6.56% | 14.44% | 546.81 | 6.56% | 14.44% | 546.81 | 100.00% | 82.21% | 277.55 |
| Float 1.8 | 2.98% | 40.90% | 412.94 | 9.54% | 22.71% | 471.48 | 93.44% | 86.96% | 274.41 |
| Sink 1.8 | 90.46% | 88.48% | 272.30 | 100.00% | 82.21% | 277.55 | 90.46% | 88.48% | 272.30 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 11.54 | 3.73 | 4.96 | 22.55 | 7.25 | 11.49 | 2.50 | 0.34 | 2.58 | 0.80 | 1.46 | 1.19 | 4.96 | 0.16 | 1.01 | 0.00 |
| 3/4" x 1mm | 17.93 | 19.13 | 29.19 | 80.03 | 12.90 | 29.89 | 7.43 | 1.13 | 6.07 | 0.83 | 4.61 | 2.01 | 6.34 | 0.49 | 2.86 | 0.19 |
| 1mm x 100M | 19.70 | 21.90 | 45.49 | 99.70 | 15.80 | 39.23 | 9.17 | 1.37 | 6.99 | 0.74 | 5.08 | 2.12 | 6.47 | 0.52 | 3.09 | 0.19 |
| Minus 100M | 18.91 | 18.85 | 34.78 | 97.99 | 14.68 | 31.72 | 7.60 | 1.19 | 6.21 | 0.68 | 4.54 | 1.97 | 6.01 | 0.43 | 2.80 | 0.22 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 31.79 | 35.94 | 71.76 | 155.74 | 19.14 | 59.12 | 11.56 | 2.03 | 9.76 | 0.99 | 6.83 | 3.53 | 10.28 | 0.77 | 4.66 | 0.00 |
| Float 1.8 | 21.57 | 13.40 | 20.24 | 67.19 | 8.87 | 32.38 | 4.81 | 0.69 | 5.79 | 0.68 | 3.24 | 2.97 | 10.06 | 0.41 | 2.23 | 0.00 |
| Sink 1.8 | 11.45 | 3.64 | 4.81 | 22.14 | 7.23 | 11.30 | 2.48 | 0.34 | 2.55 | 0.80 | 1.44 | 1.17 | 4.92 | 0.16 | 1.00 | 0.00 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 30.32 | 43.23 | 85.97 | 160.82 | 22.21 | 69.16 | 13.75 | 2.26 | 11.69 | 1.03 | 8.29 | 3.85 | 10.92 | 0.90 | 4.96 | 0.00 |
| Float 1.8 | 24.50 | 32.28 | 65.25 | 134.38 | 18.19 | 54.66 | 10.60 | 1.61 | 8.94 | 0.72 | 6.41 | 3.25 | 9.74 | 0.68 | 4.03 | 0.00 |
| Sink 1.8 | 17.75 | 18.77 | 28.23 | 78.60 | 12.76 | 29.23 | 7.34 | 1.12 | 5.99 | 0.83 | 4.56 | 1.98 | 6.25 | 0.48 | 2.83 | 0.19 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.37 | 61.78 | 93.14 | 176.14 | 24.77 | 78.57 | 16.79 | 3.02 | 14.97 | 1.72 | 11.65 | 4.69 | 13.02 | 1.34 | 6.60 | 0.24 |
| Float 1.8 | 25.50 | 33.87 | 77.84 | 144.42 | 21.72 | 61.61 | 12.31 | 1.83 | 9.58 | 0.69 | 6.67 | 3.07 | 8.86 | 0.71 | 4.14 | 0.12 |
| Sink 1.8 | 19.39 | 21.25 | 44.43 | 98.11 | 15.60 | 38.42 | 9.03 | 1.34 | 6.86 | 0.73 | 4.98 | 2.07 | 6.36 | 0.51 | 3.03 | 0.19 |

## PLANT 7

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 3.82% | 14.91% | 501.71 | 3.82% | 14.91% | 501.71 | 100.00% | 63.90% | 284.97 |
| Minus 100M | 96.18% | 65.85% | 283.02 | 100.00% | 63.90% | 284.97 | 96.18% | 65.85% | 283.02 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 86.66% | 9.27% | 622.51 | 86.66% | 9.27% | 622.51 | 100.00% | 14.91% | 501.71 |
| Float 1.8 | 7.77% | 38.62% | 395.84 | 94.43% | 11.69% | 560.87 | 13.34% | 51.51% | 360.49 |
| Sink 1.8 | 5.57% | 69.50% | 333.08 | 100.00% | 14.91% | 501.71 | 5.57% | 69.50% | 333.08 |

## PLANT 7

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 36.11 | 62.58 | 80.56 | 153.86 | 26.43 | 70.87 | 16.18 | 2.84 | 14.68 | 1.78 | 11.39 | 4.13 | 11.85 | 1.49 | 6.43 | 0.53 |
| Minus 100M | 20.04 | 23.51 | 45.53 | 100.09 | 15.92 | 40.26 | 9.84 | 1.54 | 7.65 | 0.83 | 5.26 | 2.21 | 6.5 | 0.47 | 3.15 | 0.22 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 46.97 | 91.44 | 93.38 | 180.59 | 29.34 | 86.20 | 19.96 | 3.85 | 19.71 | 2.59 | 15.85 | 5.53 | 15.55 | 2.27 | 8.71 | 0.57 |
| Float 1.8 | 25.10 | 32.51 | 74.14 | 138.78 | 19.95 | 59.68 | 11.94 | 1.78 | 9.12 | 0.59 | 6.29 | 2.90 | 8.30 | 0.68 | 3.99 | 0.09 |
| Sink 1.8 | 22.12 | 25.98 | 58.94 | 110.07 | 25.42 | 47.74 | 11.61 | 1.55 | 8.54 | 1.04 | 6.09 | 2.19 | 6.91 | 0.49 | 3.59 | 0.8 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 778.6 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 778.59 | 354.17 | 178.53 |
| 1-1/2" x 1/2" | 275.15 | 212.53 | 106.76 | 275.15 | 212.53 | 106.76 | 778.59 | 354.17 | 178.53 |
| 1/2" x 1mm | 324.28 | 104.09 | 43.10 | 599.44 | 316.62 | 149.87 | 503.44 | 141.64 | 71.77 |
| 1mm x 100M | 103.71 | 16.95 | 15.57 | 703.14 | 333.57 | 165.44 | 179.15 | 37.54 | 28.66 |
| Minus 100M | 75.45 | 20.60 | 13.09 | 778.59 | 354.17 | 178.53 | 75.45 | 20.60 | 13.09 |
| **Clean Coal** | | | | | | | | 384.4 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 384.44 | 24.28 | 24.36 |
| 1-1/2" x 1/2" | 26.68 | 2.42 | 3.33 | 26.68 | 2.42 | 3.33 | 384.44 | 24.28 | 24.36 |
| 1/2" x 1mm | 188.68 | 12.80 | 7.72 | 215.36 | 15.23 | 11.05 | 357.76 | 21.86 | 21.03 |
| 1mm x 100M | 106.57 | 4.68 | 4.80 | 321.93 | 19.90 | 15.85 | 169.07 | 9.05 | 13.31 |
| Minus 100M | 62.51 | 4.38 | 8.51 | 384.44 | 24.28 | 24.36 | 62.51 | 4.38 | 8.51 |
| **Coarse Refuse** | | | | | | | | 346.5 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 346.55 | 302.53 | 129.26 |
| 1-1/2" x 1/2" | 187.59 | 166.41 | 82.13 | 187.59 | 166.41 | 82.13 | 346.55 | 302.53 | 129.26 |
| 1/2" x 1mm | 139.14 | 120.16 | 38.88 | 326.72 | 286.57 | 121.01 | 158.96 | 136.12 | 47.13 |
| 1mm x 100M | 13.58 | 11.21 | 5.66 | 340.31 | 297.78 | 126.66 | 19.82 | 15.96 | 8.26 |
| Minus 100M | 6.24 | 4.75 | 2.60 | 346.55 | 302.53 | 129.26 | 6.24 | 4.75 | 2.60 |
| **Fine Refuse** | | | | | | | | 47.6 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 47.61 | 27.36 | 16.13 |
| 1-1/2" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 47.61 | 27.36 | 16.13 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 47.61 | 27.36 | 16.13 |
| 1mm x 100M | 5.26 | 3.58 | 2.30 | 5.26 | 3.58 | 2.30 | 47.61 | 27.36 | 16.13 |
| Minus 100M | 42.35 | 23.78 | 13.83 | 47.61 | 27.36 | 16.13 | 42.35 | 23.78 | 13.83 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 4,282,245 | 1,947,913 | 490.9 | 114.65 | 252.04 |
| Clean Coal | 2,114,393 | 133,542 | 67.0 | 31.68 | 501.64 |
| Coarse Refuse | 1,906,004 | 1,663,917 | 355.5 | 186.50 | 213.64 |
| Fine Refuse | 261,848 | 150,454 | 44.4 | 169.39 | 294.81 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 6.88 | 9.45 | 16.32 | 33.94 | 7.62 | 17.31 | 4.00 | 0.57 | 2.92 | 0.43 | 2.49 | 0.78 | 2.48 | 0.17 | 1.20 | 0.23 |
| 1/2" x 1mm | 3.47 | 3.07 | 5.82 | 13.51 | 3.47 | 7.34 | 1.63 | 0.23 | 1.17 | 0.22 | 1.01 | 0.36 | 1.15 | 0.11 | 0.47 | 0.08 |
| 1mm x 100M | 0.91 | 1.83 | 2.56 | 4.63 | 1.04 | 2.42 | 0.55 | 0.09 | 0.44 | 0.06 | 0.37 | 0.11 | 0.31 | 0.03 | 0.18 | 0.03 |
| Minus 100M | 0.88 | 1.33 | 2.06 | 3.88 | 1.07 | 2.04 | 0.46 | 0.07 | 0.38 | 0.05 | 0.30 | 0.09 | 0.27 | 0.03 | 0.14 | 0.03 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 0.17 | 0.38 | 0.61 | 1.04 | 0.19 | 0.50 | 0.11 | 0.02 | 0.09 | 0.01 | 0.08 | 0.02 | 0.05 | 0.01 | 0.03 | 0.01 |
| 1/2" x 1mm | 0.66 | 0.85 | 1.01 | 2.00 | 0.55 | 1.35 | 0.30 | 0.05 | 0.24 | 0.05 | 0.22 | 0.07 | 0.21 | 0.04 | 0.11 | 0.02 |
| 1mm x 100M | 0.31 | 0.66 | 0.72 | 1.31 | 0.35 | 0.72 | 0.17 | 0.03 | 0.15 | 0.02 | 0.13 | 0.04 | 0.10 | 0.02 | 0.06 | 0.01 |
| Minus 100M | 0.48 | 1.39 | 1.31 | 2.33 | 0.42 | 1.27 | 0.29 | 0.06 | 0.27 | 0.04 | 0.24 | 0.07 | 0.17 | 0.03 | 0.11 | 0.02 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 5.28 | 7.12 | 12.37 | 25.59 | 6.41 | 13.35 | 3.18 | 0.42 | 2.23 | 0.37 | 1.97 | 0.61 | 1.93 | 0.15 | 0.94 | 0.21 |
| 1/2" x 1mm | 3.30 | 3.01 | 4.68 | 11.60 | 3.43 | 6.47 | 1.55 | 0.20 | 1.14 | 0.24 | 1.03 | 0.37 | 1.20 | 0.08 | 0.50 | 0.08 |
| 1mm x 100M | 0.37 | 0.45 | 0.82 | 1.96 | 0.44 | 0.85 | 0.20 | 0.03 | 0.14 | 0.02 | 0.13 | 0.04 | 0.12 | 0.01 | 0.06 | 0.01 |
| Minus 100M | 0.17 | 0.22 | 0.37 | 0.89 | 0.21 | 0.39 | 0.09 | 0.01 | 0.07 | 0.01 | 0.06 | 0.02 | 0.06 | 0.00 | 0.03 | 0.01 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.14 | 0.21 | 0.38 | 0.71 | 0.18 | 0.37 | 0.08 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.04 | 0.00 | 0.02 | 0.01 |
| Minus 100M | 0.94 | 1.23 | 2.20 | 4.19 | 1.23 | 2.17 | 0.48 | 0.08 | 0.40 | 0.06 | 0.31 | 0.09 | 0.26 | 0.02 | 0.13 | 0.03 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 33.4 | 43.1 | 73.6 | 153.9 | 36.3 | 80.1 | 18.2 | 2.6 | 13.5 | 2.1 | 11.4 | 3.7 | 11.6 | 0.9 | 5.5 | 1.0 |
| Clean Coal | 4.5 | 9.0 | 10.0 | 18.4 | 4.1 | 10.5 | 2.4 | 0.4 | 2.1 | 0.4 | 1.8 | 0.5 | 1.5 | 0.3 | 0.9 | 0.2 |
| Coarse Refuse | 25.1 | 29.7 | 50.2 | 110.1 | 28.9 | 57.9 | 13.8 | 1.8 | 9.8 | 1.8 | 8.7 | 2.9 | 9.1 | 0.7 | 4.2 | 0.9 |
| Fine Refuse | 3.0 | 3.9 | 7.1 | 13.5 | 3.9 | 7.0 | 1.6 | 0.3 | 1.3 | 0.2 | 1.0 | 0.3 | 0.9 | 0.1 | 0.4 | 0.1 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 778.6 | TPH |
| Float 1.6 | 317.69 | 16.09 | 13.89 | 317.69 | 16.09 | 13.89 | 667.50 | 321.26 | 144.81 |
| Float 1.8 | 13.33 | 5.35 | 3.69 | 331.02 | 21.44 | 17.58 | 349.81 | 305.17 | 130.92 |
| Sink 1.8 | 336.48 | 299.83 | 127.23 | 667.50 | 321.26 | 144.81 | 336.48 | 299.83 | 127.23 |
| **Clean Coal (Plus 100M)** | | | | | | | | 384.4 | TPH |
| Float 1.6 | 312.41 | 15.31 | 13.26 | 312.41 | 15.31 | 13.26 | 321.93 | 19.90 | 15.85 |
| Float 1.8 | 6.56 | 2.55 | 1.15 | 318.97 | 17.86 | 14.41 | 9.52 | 4.59 | 2.59 |
| Sink 1.8 | 2.96 | 2.04 | 1.44 | 321.93 | 19.90 | 15.85 | 2.96 | 2.04 | 1.44 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 346.5 | TPH |
| Float 1.6 | 4.12 | 0.70 | 0.53 | 4.12 | 0.70 | 0.53 | 340.31 | 297.78 | 126.66 |
| Float 1.8 | 6.58 | 2.72 | 2.51 | 10.70 | 3.42 | 3.04 | 336.18 | 297.08 | 126.14 |
| Sink 1.8 | 329.60 | 294.36 | 123.62 | 340.31 | 297.78 | 126.66 | 329.60 | 294.36 | 123.62 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 47.6 | TPH |
| Float 1.6 | 1.15 | 0.08 | 0.10 | 1.15 | 0.08 | 0.10 | 5.26 | 3.58 | 2.30 |
| Float 1.8 | 0.19 | 0.08 | 0.03 | 1.34 | 0.15 | 0.13 | 4.11 | 3.50 | 2.20 |
| Sink 1.8 | 3.92 | 3.42 | 2.17 | 5.26 | 3.58 | 2.30 | 3.92 | 3.42 | 2.17 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,671,223 | 1,766,950 | 398.2 | 108.48 | 225.38 |
| Clean Coal | 1,770,593 | 109,476 | 43.6 | 24.62 | 398.17 |
| Coarse Refuse | 1,871,696 | 1,637,802 | 348.3 | 186.10 | 212.68 |
| Fine Refuse | 28,934 | 19,673 | 6.3 | 218.66 | 321.60 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

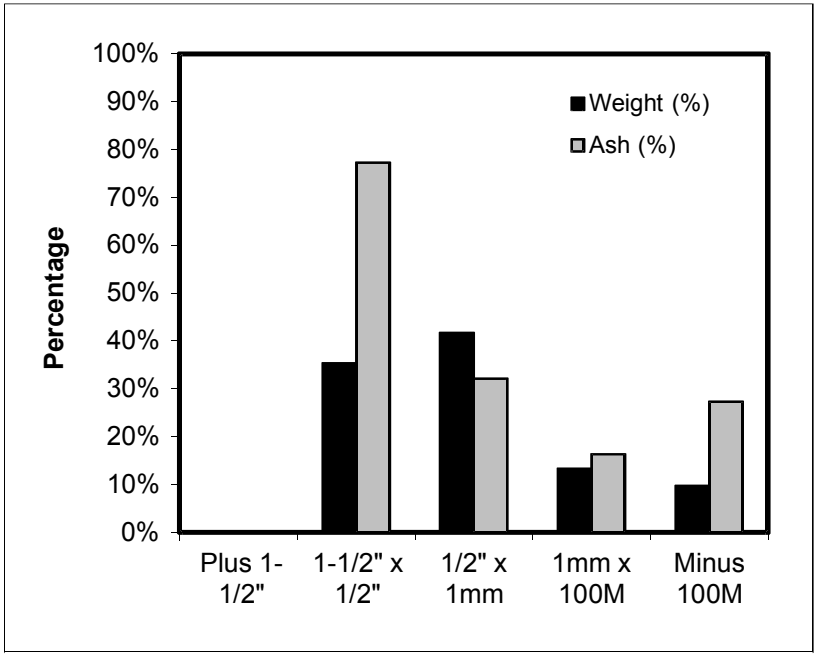
****Unless otherwise noted, REE values reported in ppm*

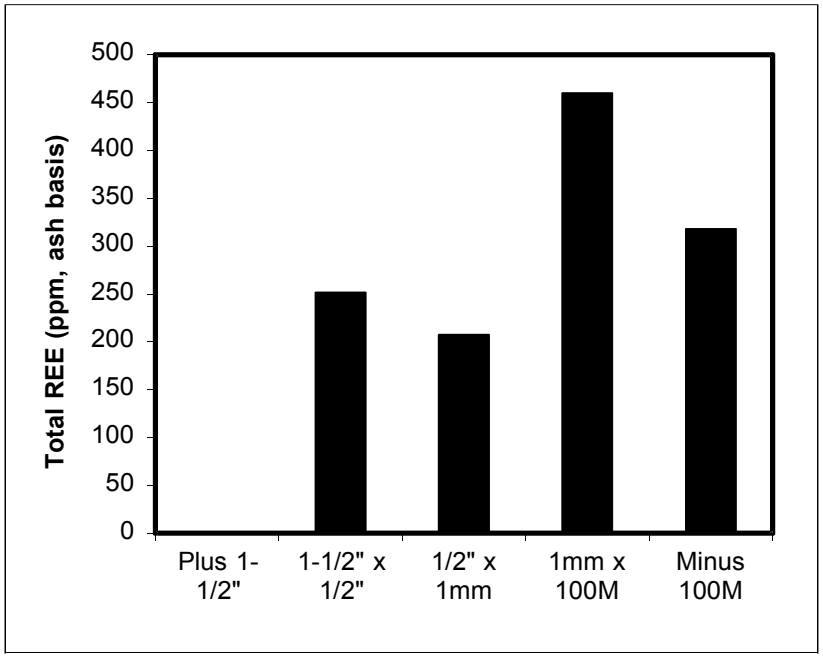
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 1.00 | 1.76 | 2.05 | 3.77 | 0.91 | 2.23 | 0.50 | 0.09 | 0.43 | 0.08 | 0.38 | 0.11 | 0.32 | 0.06 | 0.18 | 0.03 |
| Float 1.8 | 0.29 | 0.30 | 0.60 | 1.15 | 0.22 | 0.63 | 0.12 | 0.02 | 0.10 | 0.01 | 0.08 | 0.03 | 0.10 | 0.01 | 0.04 | 0.00 |
| Sink 1.8 | 8.95 | 10.62 | 17.95 | 39.29 | 10.43 | 20.74 | 4.97 | 0.65 | 3.52 | 0.63 | 3.13 | 1.02 | 3.25 | 0.23 | 1.51 | 0.32 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.95 | 1.69 | 1.95 | 3.58 | 0.87 | 2.13 | 0.48 | 0.09 | 0.42 | 0.07 | 0.36 | 0.11 | 0.30 | 0.06 | 0.17 | 0.03 |
| Float 1.8 | 0.11 | 0.08 | 0.15 | 0.33 | 0.09 | 0.21 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.04 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 0.09 | 0.11 | 0.24 | 0.45 | 0.13 | 0.22 | 0.06 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.05 | 0.05 | 0.08 | 0.16 | 0.03 | 0.09 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.17 | 0.22 | 0.44 | 0.81 | 0.13 | 0.42 | 0.08 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.06 | 0.01 | 0.02 | 0.00 |
| Sink 1.8 | 8.73 | 10.32 | 17.35 | 38.17 | 10.13 | 20.17 | 4.83 | 0.63 | 3.43 | 0.62 | 3.05 | 1.00 | 3.18 | 0.23 | 1.47 | 0.31 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.01 | 0.01 | 0.02 | 0.03 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.13 | 0.19 | 0.36 | 0.67 | 0.18 | 0.35 | 0.08 | 0.01 | 0.06 | 0.01 | 0.05 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |

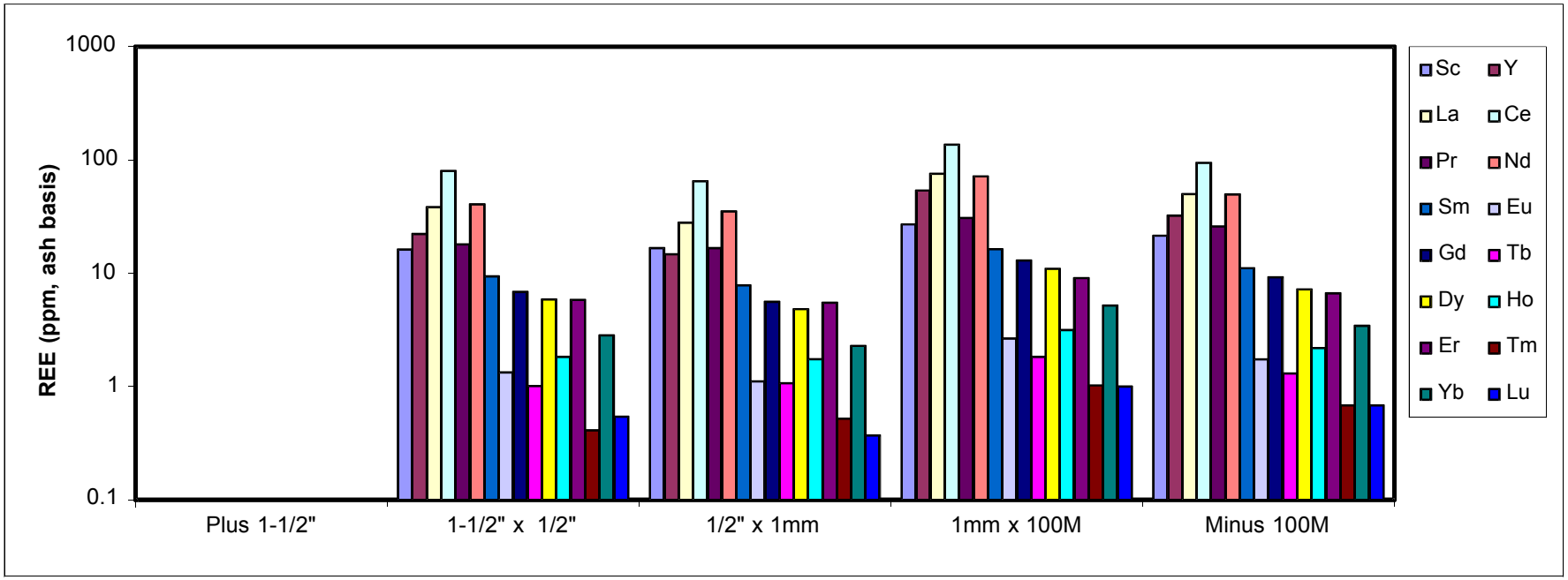
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 28.2 | 34.9 | 56.6 | 121.6 | 31.8 | 64.9 | 15.4 | 2.1 | 11.2 | 2.0 | 9.9 | 3.2 | 10.1 | 0.8 | 4.7 | 1.0 |
| Clean Coal | 3.2 | 5.2 | 6.4 | 12.0 | 3.0 | 7.0 | 1.6 | 0.3 | 1.3 | 0.2 | 1.2 | 0.3 | 1.0 | 0.2 | 0.6 | 0.1 |
| Coarse Refuse | 24.6 | 29.1 | 49.2 | 107.7 | 28.3 | 56.9 | 13.6 | 1.8 | 9.6 | 1.7 | 8.6 | 2.8 | 9.0 | 0.6 | 4.1 | 0.9 |
| Fine Refuse | 0.4 | 0.6 | 1.0 | 1.9 | 0.5 | 1.0 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | #DIV/0! | #DIV/0! | 200.00% | 25.90% | 282.47 |
| 1-1/2" x 1/2" | 35.34% | 77.24% | 251.17 | 35.34% | 128.72% | 252.04 | 200.00% | 25.90% | 282.47 |
| 1/2" x 1mm | 41.65% | 32.10% | 207.04 | 76.99% | 23.63% | 253.34 | 164.66% | 14.88% | 317.33 |
| 1mm x 100M | 13.32% | 16.34% | 459.52 | 90.31% | 5.34% | 381.72 | 123.01% | 9.05% | 449.72 |
| Minus 100M | 9.69% | 27.30% | 317.71 | 100.00% | 2.65% | 317.71 | 109.69% | 8.17% | 447.34 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 16.18 | 22.23 | 38.39 | 79.84 | 17.92 | 40.72 | 9.40 | 1.33 | 6.86 | 1.01 | 5.85 | 1.83 | 5.83 | 0.41 | 2.83 | 0.54 |
| 1/2" x 1mm | 16.68 | 14.73 | 27.96 | 64.90 | 16.65 | 35.28 | 7.82 | 1.11 | 5.60 | 1.07 | 4.83 | 1.74 | 5.50 | 0.52 | 2.28 | 0.37 |
| 1mm x 100M | 26.96 | 53.91 | 75.53 | 136.65 | 30.76 | 71.53 | 16.28 | 2.66 | 12.98 | 1.83 | 10.99 | 3.16 | 9.07 | 1.02 | 5.19 | 1.00 |
| Minus 100M | 21.47 | 32.31 | 49.94 | 94.30 | 25.92 | 49.58 | 11.07 | 1.73 | 9.25 | 1.30 | 7.22 | 2.18 | 6.64 | 0.68 | 3.44 | 0.68 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | #DIV/0! | #DIV/0! | 100.00% | 6.32% | 501.64 |
| 1-1/2" x 1/2" | 6.94% | 9.09% | 687.43 | 6.94% | 9.09% | 687.43 | 100.00% | 6.32% | 501.64 |
| 1/2" x 1mm | 49.08% | 6.79% | 301.38 | 56.02% | 7.07% | 362.84 | 93.06% | 6.11% | 481.03 |
| 1mm x 100M | 27.72% | 4.39% | 513.19 | 83.74% | 6.18% | 398.17 | 43.98% | 5.35% | 735.12 |
| Minus 100M | 16.26% | 7.00% | 972.31 | 100.00% | 6.32% | 501.64 | 16.26% | 7.00% | 972.31 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 99.53% | 8.94% | 694.20 | 100.00% | 9.09% | 687.43 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 99.53% | 8.94% | 694.20 | 100.00% | 9.09% | 687.43 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 99.53% | 8.94% | 694.20 | 100.00% | 9.09% | 687.43 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.53% | 8.94% | 694.20 | 99.53% | 8.94% | 694.20 | 100.00% | 9.09% | 687.43 |
| Float 1.8 | 0.43% | 39.13% | 371.50 | 99.96% | 9.07% | 688.21 | 0.47% | 40.28% | 369.27 |
| Sink 1.8 | 0.04% | 52.65% | 351.48 | 100.00% | 9.09% | 687.43 | 0.04% | 52.65% | 351.48 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 96.35% | 5.24% | 312.47 | 96.35% | 5.24% | 312.47 | 100.00% | 6.79% | 301.38 |
| Float 1.8 | 2.75% | 39.74% | 212.47 | 99.10% | 6.20% | 294.68 | 3.65% | 47.59% | 269.15 |
| Sink 1.8 | 0.90% | 71.58% | 365.29 | 100.00% | 6.79% | 301.38 | 0.90% | 71.58% | 365.29 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.65% | 3.28% | 587.85 | 97.65% | 3.28% | 587.85 | 100.00% | 4.39% | 513.19 |
| Float 1.8 | 1.18% | 35.00% | 273.79 | 98.83% | 3.66% | 551.98 | 2.35% | 50.45% | 311.51 |
| Sink 1.8 | 1.17% | 66.04% | 331.67 | 100.00% | 4.39% | 513.19 | 1.17% | 66.04% | 331.67 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 36.02 | 77.56 | 126.61 | 214.54 | 39.15 | 102.52 | 23.18 | 4.30 | 19.47 | 2.34 | 15.81 | 4.59 | 11.22 | 2.14 | 6.76 | 1.20 |
| 1/2" x 1mm | 25.79 | 33.16 | 39.37 | 78.16 | 21.62 | 52.56 | 11.53 | 2.05 | 9.52 | 1.91 | 8.42 | 2.68 | 8.17 | 1.55 | 4.15 | 0.71 |
| 1mm x 100M | 33.52 | 71.03 | 76.91 | 139.74 | 37.11 | 76.73 | 18.05 | 3.21 | 16.08 | 2.59 | 14.06 | 3.87 | 10.72 | 1.71 | 6.52 | 1.35 |
| Minus 100M | 55.37 | 158.92 | 149.72 | 266.75 | 47.69 | 144.76 | 33.31 | 6.65 | 30.35 | 4.91 | 27.76 | 7.63 | 19.23 | 3.89 | 13.06 | 2.31 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.16 | 78.56 | 127.98 | 216.83 | 39.19 | 103.52 | 23.43 | 4.35 | 19.66 | 2.36 | 15.99 | 4.64 | 11.32 | 2.17 | 6.83 | 1.21 |
| Float 1.8 | 27.49 | 31.62 | 65.55 | 112.15 | 30.01 | 58.44 | 11.61 | 1.99 | 9.88 | 1.29 | 7.44 | 2.43 | 6.76 | 0.66 | 3.70 | 0.48 |
| Sink 1.8 | 46.69 | 23.60 | 35.64 | 66.32 | 96.61 | 31.39 | 11.47 | 1.93 | 15.87 | 2.88 | 7.33 | 0.35 | 3.95 | 0.21 | 3.70 | 3.54 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 27.29 | 37.80 | 38.92 | 77.08 | 22.03 | 54.84 | 12.15 | 2.26 | 10.18 | 2.14 | 9.15 | 2.79 | 8.54 | 1.87 | 4.60 | 0.83 |
| Float 1.8 | 21.50 | 14.63 | 26.78 | 59.82 | 15.72 | 39.99 | 7.51 | 1.09 | 6.31 | 1.15 | 5.35 | 2.35 | 7.17 | 0.65 | 2.45 | 0.00 |
| Sink 1.8 | 21.35 | 28.27 | 64.26 | 117.77 | 28.45 | 56.04 | 13.44 | 2.05 | 9.84 | 1.39 | 7.94 | 2.43 | 6.94 | 0.57 | 3.55 | 1.00 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.19 | 87.66 | 87.41 | 158.12 | 39.20 | 86.81 | 20.12 | 3.79 | 18.75 | 2.99 | 16.53 | 4.60 | 12.40 | 2.11 | 7.74 | 1.43 |
| Float 1.8 | 20.97 | 23.46 | 41.35 | 77.85 | 21.18 | 48.27 | 10.33 | 1.52 | 8.03 | 1.29 | 6.72 | 2.18 | 6.52 | 0.78 | 2.95 | 0.39 |
| Sink 1.8 | 20.86 | 27.52 | 52.37 | 96.64 | 36.94 | 50.17 | 13.61 | 1.70 | 9.34 | 1.65 | 7.72 | 1.72 | 6.01 | 0.54 | 3.35 | 1.53 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | #DIV/0! | #DIV/0! | 100.00% | 87.30% | 213.64 |
| 1-1/2" x 1/2" | 54.13% | 88.71% | 246.77 | 54.13% | 88.71% | 246.77 | 100.00% | 87.30% | 213.64 |
| 1/2" x 1mm | 40.15% | 86.36% | 161.77 | 94.28% | 87.71% | 211.13 | 45.87% | 85.63% | 173.13 |
| 1mm x 100M | 3.92% | 82.54% | 252.21 | 98.20% | 87.50% | 212.68 | 5.72% | 80.52% | 258.63 |
| Minus 100M | 1.80% | 76.12% | 273.77 | 100.00% | 87.30% | 213.64 | 1.80% | 76.12% | 273.77 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.47% | 23.71% | 452.86 | 0.47% | 23.71% | 452.86 | 100.00% | 88.71% | 246.77 |
| Float 1.8 | 1.17% | 40.81% | 331.81 | 1.64% | 35.91% | 354.72 | 99.53% | 89.02% | 246.51 |
| Sink 1.8 | 98.36% | 89.59% | 246.05 | 100.00% | 88.71% | 246.77 | 98.36% | 89.59% | 246.05 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.80% | 16.50% | 319.57 | 1.80% | 16.50% | 319.57 | 100.00% | 86.36% | 161.77 |
| Float 1.8 | 2.91% | 41.89% | 534.03 | 4.71% | 32.19% | 492.02 | 98.20% | 87.64% | 161.23 |
| Sink 1.8 | 95.29% | 89.04% | 155.87 | 100.00% | 86.36% | 161.77 | 95.29% | 89.04% | 155.87 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 5.43% | 10.43% | 475.05 | 5.43% | 10.43% | 475.05 | 100.00% | 82.54% | 252.21 |
| Float 1.8 | 2.48% | 39.21% | 411.64 | 7.91% | 19.45% | 434.98 | 94.57% | 86.68% | 250.67 |
| Sink 1.8 | 92.09% | 87.96% | 248.74 | 100.00% | 82.54% | 252.21 | 92.09% | 87.96% | 248.74 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 1/2" | 15.86 | 21.41 | 37.16 | 76.88 | 19.27 | 40.12 | 9.56 | 1.26 | 6.69 | 1.10 | 5.91 | 1.84 | 5.81 | 0.44 | 2.83 | 0.65 |
| 1/2" x 1mm | 13.73 | 12.52 | 19.49 | 48.27 | 14.28 | 26.93 | 6.45 | 0.84 | 4.72 | 1.01 | 4.27 | 1.55 | 4.98 | 0.32 | 2.07 | 0.34 |
| 1mm x 100M | 16.65 | 20.19 | 36.77 | 87.41 | 19.53 | 37.83 | 8.71 | 1.20 | 6.29 | 0.94 | 5.60 | 1.82 | 5.53 | 0.43 | 2.69 | 0.61 |
| Minus 100M | 18.29 | 23.12 | 38.45 | 93.34 | 22.25 | 40.70 | 9.82 | 1.39 | 7.01 | 1.13 | 6.25 | 1.89 | 5.93 | 0.43 | 3.02 | 0.75 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 34.52 | 42.13 | 78.74 | 143.93 | 21.09 | 73.15 | 14.27 | 2.38 | 11.60 | 1.47 | 10.02 | 3.83 | 9.76 | 1.51 | 4.46 | 0.00 |
| Float 1.8 | 30.99 | 26.89 | 47.44 | 100.13 | 16.13 | 60.30 | 9.28 | 1.16 | 9.25 | 1.06 | 8.41 | 4.20 | 12.10 | 1.02 | 3.45 | 0.00 |
| Sink 1.8 | 15.75 | 21.35 | 37.05 | 76.67 | 19.28 | 39.97 | 9.56 | 1.26 | 6.67 | 1.10 | 5.89 | 1.82 | 5.77 | 0.44 | 2.82 | 0.65 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.39 | 29.57 | 47.40 | 94.16 | 18.55 | 53.69 | 10.68 | 1.91 | 8.80 | 1.53 | 7.71 | 2.94 | 8.39 | 1.21 | 3.56 | 0.08 |
| Float 1.8 | 32.87 | 46.70 | 100.25 | 176.90 | 27.05 | 85.29 | 16.30 | 2.37 | 13.12 | 1.23 | 10.96 | 4.19 | 10.67 | 1.33 | 4.75 | 0.05 |
| Sink 1.8 | 13.40 | 11.97 | 18.23 | 46.26 | 14.08 | 26.00 | 6.29 | 0.81 | 4.59 | 1.00 | 4.16 | 1.51 | 4.89 | 0.30 | 2.03 | 0.35 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.03 | 54.24 | 67.03 | 132.43 | 26.56 | 76.87 | 15.95 | 3.52 | 13.68 | 3.09 | 12.85 | 4.21 | 12.33 | 1.82 | 6.86 | 0.58 |
| Float 1.8 | 27.35 | 34.76 | 71.21 | 133.08 | 24.03 | 67.85 | 13.59 | 2.02 | 10.74 | 1.28 | 8.78 | 3.28 | 8.59 | 1.00 | 3.86 | 0.22 |
| Sink 1.8 | 16.34 | 19.78 | 36.14 | 86.55 | 19.43 | 37.20 | 8.60 | 1.17 | 6.19 | 0.92 | 5.51 | 1.79 | 5.45 | 0.41 | 2.65 | 0.61 |

## PLANT 8

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 11.05% | 67.99% | 321.60 | 11.05% | 67.99% | 321.60 | 100.00% | 57.46% | 294.81 |
| Minus 100M | 88.95% | 56.15% | 290.78 | 100.00% | 57.46% | 294.81 | 88.95% | 56.15% | 290.78 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 21.90% | 6.83% | 645.47 | 21.90% | 6.83% | 645.47 | 100.00% | 67.99% | 321.60 |
| Float 1.8 | 3.63% | 39.82% | 186.90 | 25.53% | 11.52% | 420.11 | 78.10% | 85.14% | 314.32 |
| Sink 1.8 | 74.47% | 87.35% | 317.15 | 100.00% | 67.99% | 321.60 | 74.47% | 87.35% | 317.15 |

## PLANT 8

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 19.74 | 28.85 | 53.10 | 99.01 | 25.67 | 51.75 | 11.72 | 1.64 | 8.79 | 1.23 | 7.09 | 2.17 | 6.26 | 0.51 | 3.29 | 0.78 |
| Minus 100M | 19.79 | 25.79 | 46.2 | 88.08 | 25.85 | 45.59 | 10.19 | 1.69 | 8.41 | 1.16 | 6.55 | 1.92 | 5.57 | 0.5 | 2.82 | 0.67 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.18 | 86.35 | 106.74 | 192.07 | 33.59 | 99.69 | 22.11 | 3.99 | 18.37 | 2.59 | 16.09 | 4.82 | 12.06 | 2.22 | 7.47 | 1.13 |
| Float 1.8 | 18.16 | 13.25 | 24.62 | 53.63 | 13.14 | 35.20 | 6.86 | 0.99 | 5.41 | 0.96 | 4.37 | 1.79 | 5.77 | 0.67 | 2.08 | 0.00 |
| Sink 1.8 | 19.4 | 27.87 | 52.5 | 97.88 | 25.77 | 51.02 | 11.59 | 1.6 | 8.64 | 1.2 | 6.94 | 2.12 | 6.14 | 0.47 | 3.22 | 0.79 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 603.1 | TPH |
| Plus 1" | 182.43 | 166.84 | 70.82 | 182.43 | 166.84 | 70.82 | 603.09 | 409.76 | 192.23 |
| 1" x 5/8" | 62.36 | 52.08 | 21.12 | 244.79 | 218.92 | 91.94 | 420.65 | 242.92 | 121.41 |
| 5/8" x 1mm | 242.68 | 148.79 | 71.36 | 487.48 | 367.71 | 163.30 | 358.30 | 190.84 | 100.29 |
| 1mm x 100M | 65.98 | 18.77 | 14.17 | 553.45 | 386.48 | 177.47 | 115.61 | 42.05 | 28.93 |
| Minus 100M | 49.63 | 23.28 | 14.75 | 603.09 | 409.76 | 192.23 | 49.63 | 23.28 | 14.75 |
| **Clean Coal** | | | | | | | | 156.3 | TPH |
| Plus 1" | 2.00 | 0.17 | 0.24 | 2.00 | 0.17 | 0.24 | 156.26 | 10.77 | 15.22 |
| 1" x 5/8" | 3.61 | 0.32 | 0.45 | 5.61 | 0.49 | 0.69 | 154.26 | 10.60 | 14.98 |
| 5/8" x 1mm | 76.76 | 4.82 | 7.38 | 82.37 | 5.31 | 8.07 | 150.65 | 10.28 | 14.53 |
| 1mm x 100M | 53.57 | 2.74 | 4.69 | 135.93 | 8.06 | 12.76 | 73.90 | 5.46 | 7.15 |
| Minus 100M | 20.33 | 2.72 | 2.46 | 156.26 | 10.77 | 15.22 | 20.33 | 2.72 | 2.46 |
| **Coarse Refuse** | | | | | | | | 402.0 | TPH |
| Plus 1" | 194.60 | 177.98 | 100.98 | 194.60 | 177.98 | 100.98 | 401.98 | 362.56 | 211.36 |
| 1" x 5/8" | 57.24 | 52.42 | 29.41 | 251.84 | 230.40 | 130.39 | 207.38 | 184.58 | 110.39 |
| 5/8" x 1mm | 137.56 | 122.03 | 75.45 | 389.40 | 352.42 | 205.84 | 150.14 | 132.16 | 80.97 |
| 1mm x 100M | 8.40 | 6.79 | 3.75 | 397.80 | 359.22 | 209.59 | 12.58 | 10.14 | 5.52 |
| Minus 100M | 4.18 | 3.34 | 1.77 | 401.98 | 362.56 | 211.36 | 4.18 | 3.34 | 1.77 |
| **Fine Refuse** | | | | | | | | 44.8 | TPH |
| Plus 1" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 44.84 | 31.27 | 17.13 |
| 1" x 5/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 44.84 | 31.27 | 17.13 |
| 5/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 44.84 | 31.27 | 17.13 |
| 1mm x 100M | 8.68 | 7.34 | 4.08 | 8.68 | 7.34 | 4.08 | 44.84 | 31.27 | 17.13 |
| Minus 100M | 36.17 | 23.93 | 13.04 | 44.84 | 31.27 | 17.13 | 36.17 | 23.93 | 13.04 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,316,988 | 2,253,662 | 528.6 | 159.37 | 234.56 |
| Clean Coal | 859,440 | 59,254 | 41.8 | 48.69 | 706.22 |
| Coarse Refuse | 2,210,910 | 1,994,070 | 581.3 | 262.90 | 291.49 |
| Fine Refuse | 246,639 | 172,009 | 47.1 | 190.95 | 273.79 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1" | 5.28 | 5.86 | 9.55 | 20.63 | 6.93 | 11.15 | 3.03 | 0.38 | 2.05 | 0.42 | 1.90 | 0.50 | 1.80 | 0.15 | 0.90 | 0.28 |
| 1" x 5/8" | 1.65 | 1.49 | 2.77 | 6.25 | 2.33 | 3.32 | 0.92 | 0.11 | 0.58 | 0.13 | 0.54 | 0.14 | 0.52 | 0.04 | 0.26 | 0.10 |
| 5/8" x 1mm | 5.23 | 6.09 | 10.14 | 21.05 | 6.96 | 10.87 | 3.00 | 0.37 | 1.97 | 0.42 | 1.82 | 0.46 | 1.65 | 0.14 | 0.89 | 0.30 |
| 1mm x 100M | 0.87 | 1.43 | 2.24 | 4.30 | 1.14 | 2.08 | 0.56 | 0.08 | 0.40 | 0.07 | 0.36 | 0.09 | 0.28 | 0.04 | 0.17 | 0.06 |
| Minus 100M | 0.97 | 1.35 | 2.27 | 4.62 | 1.16 | 2.23 | 0.57 | 0.08 | 0.40 | 0.07 | 0.36 | 0.11 | 0.31 | 0.03 | 0.18 | 0.05 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1" | 0.01 | 0.02 | 0.04 | 0.08 | 0.01 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1" x 5/8" | 0.02 | 0.05 | 0.08 | 0.15 | 0.02 | 0.07 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| 5/8" x 1mm | 0.39 | 1.11 | 1.17 | 2.17 | 0.36 | 1.08 | 0.24 | 0.04 | 0.22 | 0.03 | 0.21 | 0.06 | 0.15 | 0.05 | 0.09 | 0.01 |
| 1mm x 100M | 0.28 | 0.74 | 0.70 | 1.31 | 0.25 | 0.66 | 0.16 | 0.03 | 0.15 | 0.02 | 0.14 | 0.04 | 0.10 | 0.03 | 0.06 | 0.01 |
| Minus 100M | 0.15 | 0.31 | 0.37 | 0.70 | 0.19 | 0.36 | 0.09 | 0.01 | 0.08 | 0.01 | 0.07 | 0.02 | 0.05 | 0.01 | 0.03 | 0.01 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1" | 6.50 | 7.81 | 15.17 | 31.31 | 9.67 | 15.19 | 4.33 | 0.57 | 2.82 | 0.56 | 2.56 | 0.62 | 2.07 | 0.21 | 1.17 | 0.43 |
| 1" x 5/8" | 1.97 | 2.40 | 4.38 | 9.11 | 2.62 | 4.51 | 1.22 | 0.17 | 0.82 | 0.16 | 0.72 | 0.18 | 0.63 | 0.07 | 0.35 | 0.11 |
| 5/8" x 1mm | 4.59 | 6.11 | 12.03 | 23.59 | 6.35 | 11.78 | 3.04 | 0.43 | 2.09 | 0.36 | 1.79 | 0.49 | 1.55 | 0.13 | 0.84 | 0.27 |
| 1mm x 100M | 0.24 | 0.30 | 0.56 | 1.16 | 0.37 | 0.55 | 0.16 | 0.02 | 0.10 | 0.02 | 0.09 | 0.02 | 0.08 | 0.01 | 0.04 | 0.02 |
| Minus 100M | 0.12 | 0.14 | 0.27 | 0.55 | 0.16 | 0.26 | 0.07 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1" x 5/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.26 | 0.32 | 0.63 | 1.27 | 0.39 | 0.61 | 0.17 | 0.02 | 0.11 | 0.02 | 0.10 | 0.02 | 0.08 | 0.01 | 0.05 | 0.02 |
| Minus 100M | 0.89 | 1.11 | 1.98 | 4.10 | 1.14 | 1.99 | 0.50 | 0.06 | 0.34 | 0.06 | 0.30 | 0.08 | 0.28 | 0.01 | 0.15 | 0.04 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 38.5 | 44.6 | 74.2 | 156.4 | 51.0 | 81.5 | 22.2 | 2.8 | 14.9 | 3.1 | 13.7 | 3.6 | 12.5 | 1.1 | 6.6 | 2.1 |
| Clean Coal | 2.4 | 6.1 | 6.5 | 12.1 | 2.3 | 6.1 | 1.4 | 0.2 | 1.3 | 0.2 | 1.2 | 0.3 | 0.9 | 0.3 | 0.5 | 0.1 |
| Coarse Refuse | 36.9 | 46.1 | 89.1 | 180.7 | 52.7 | 88.8 | 24.3 | 3.3 | 16.2 | 3.0 | 14.3 | 3.7 | 12.0 | 1.2 | 6.7 | 2.3 |
| Fine Refuse | 3.2 | 3.9 | 7.2 | 14.8 | 4.2 | 7.1 | 1.9 | 0.2 | 1.2 | 0.2 | 1.1 | 0.3 | 1.0 | 0.1 | 0.5 | 0.2 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 603.1 | TPH |
| Float 1.6 | 140.78 | 8.53 | 13.71 | 140.78 | 8.53 | 13.71 | 542.41 | 374.67 | 226.51 |
| Float 1.8 | 4.80 | 1.87 | 1.31 | 145.58 | 10.40 | 15.02 | 401.63 | 366.14 | 212.80 |
| Sink 1.8 | 396.83 | 364.27 | 211.49 | 542.41 | 374.67 | 226.51 | 396.83 | 364.27 | 211.49 |
| **Clean Coal (Plus 100M)** | | | | | | | | 156.3 | TPH |
| Float 1.6 | 134.30 | 7.28 | 12.31 | 134.30 | 7.28 | 12.31 | 135.93 | 8.11 | 12.84 |
| Float 1.8 | 1.02 | 0.36 | 0.25 | 135.33 | 7.63 | 12.56 | 1.63 | 0.84 | 0.53 |
| Sink 1.8 | 0.61 | 0.48 | 0.27 | 135.93 | 8.11 | 12.84 | 0.61 | 0.48 | 0.27 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 402.0 | TPH |
| Float 1.6 | 5.95 | 1.21 | 1.33 | 5.95 | 1.21 | 1.33 | 397.80 | 359.22 | 209.59 |
| Float 1.8 | 3.68 | 1.48 | 1.04 | 9.63 | 2.69 | 2.37 | 391.85 | 358.00 | 208.26 |
| Sink 1.8 | 388.17 | 356.52 | 207.22 | 397.80 | 359.22 | 209.59 | 388.17 | 356.52 | 207.22 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 44.8 | TPH |
| Float 1.6 | 0.53 | 0.04 | 0.06 | 0.53 | 0.04 | 0.06 | 8.68 | 7.34 | 4.08 |
| Float 1.8 | 0.10 | 0.04 | 0.02 | 0.63 | 0.08 | 0.09 | 8.15 | 7.30 | 4.02 |
| Sink 1.8 | 8.05 | 7.26 | 3.99 | 8.68 | 7.34 | 4.08 | 8.05 | 7.26 | 3.99 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 2,983,267 | 2,060,688 | 622.9 | 208.80 | 302.28 |
| Clean Coal | 747,627 | 44,618 | 35.3 | 47.22 | 791.14 |
| Coarse Refuse | 2,187,916 | 1,975,683 | 576.4 | 263.44 | 291.74 |
| Fine Refuse | 47,725 | 40,387 | 11.2 | 235.15 | 277.87 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

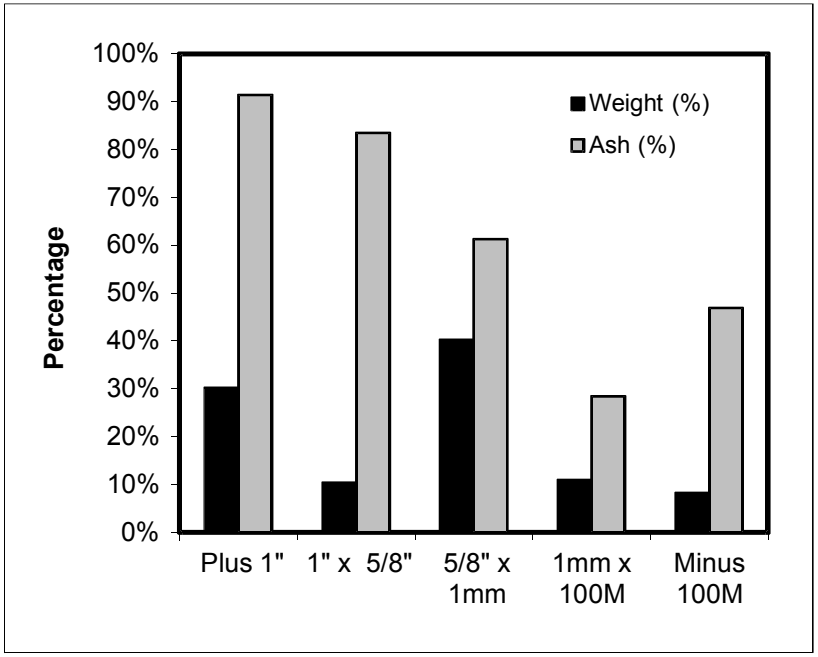
****Unless otherwise noted, REE values reported in ppm*

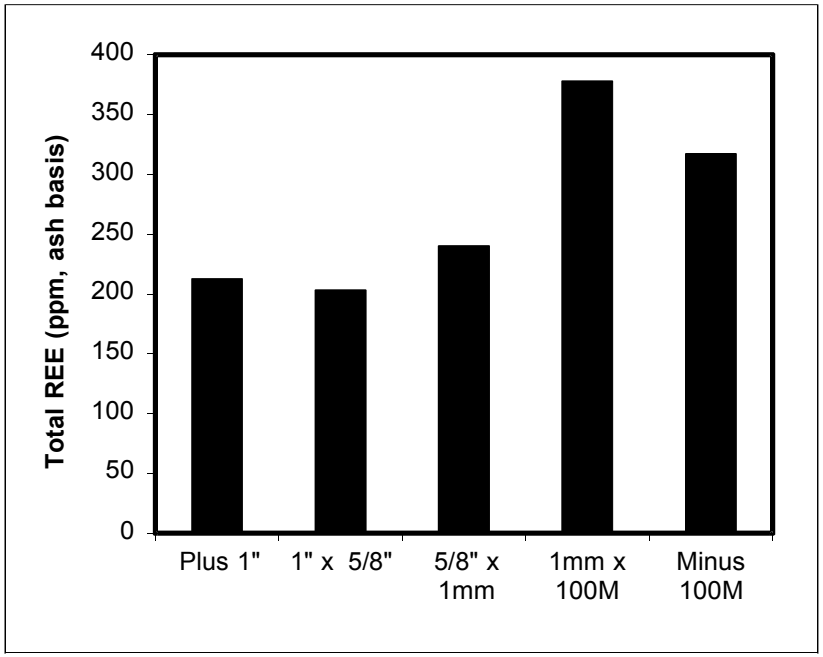
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.76 | 2.04 | 2.18 | 4.03 | 0.64 | 2.01 | 0.44 | 0.08 | 0.41 | 0.06 | 0.38 | 0.11 | 0.28 | 0.09 | 0.17 | 0.02 |
| Float 1.8 | 0.08 | 0.14 | 0.19 | 0.39 | 0.12 | 0.20 | 0.06 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.00 |
| Sink 1.8 | 13.43 | 16.70 | 32.41 | 65.74 | 19.28 | 32.31 | 8.85 | 1.20 | 5.88 | 1.11 | 5.22 | 1.32 | 4.35 | 0.42 | 2.43 | 0.84 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.68 | 1.88 | 1.94 | 3.58 | 0.57 | 1.79 | 0.40 | 0.07 | 0.37 | 0.05 | 0.35 | 0.10 | 0.25 | 0.08 | 0.16 | 0.02 |
| Float 1.8 | 0.01 | 0.03 | 0.04 | 0.07 | 0.02 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.01 | 0.02 | 0.04 | 0.07 | 0.05 | 0.03 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.07 | 0.14 | 0.23 | 0.43 | 0.07 | 0.20 | 0.04 | 0.01 | 0.04 | 0.00 | 0.03 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.06 | 0.11 | 0.15 | 0.31 | 0.09 | 0.16 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 13.16 | 16.37 | 31.75 | 64.43 | 18.85 | 31.69 | 8.66 | 1.18 | 5.77 | 1.08 | 5.11 | 1.30 | 4.26 | 0.41 | 2.38 | 0.82 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.26 | 0.31 | 0.62 | 1.24 | 0.38 | 0.59 | 0.17 | 0.02 | 0.11 | 0.02 | 0.10 | 0.02 | 0.08 | 0.01 | 0.05 | 0.02 |

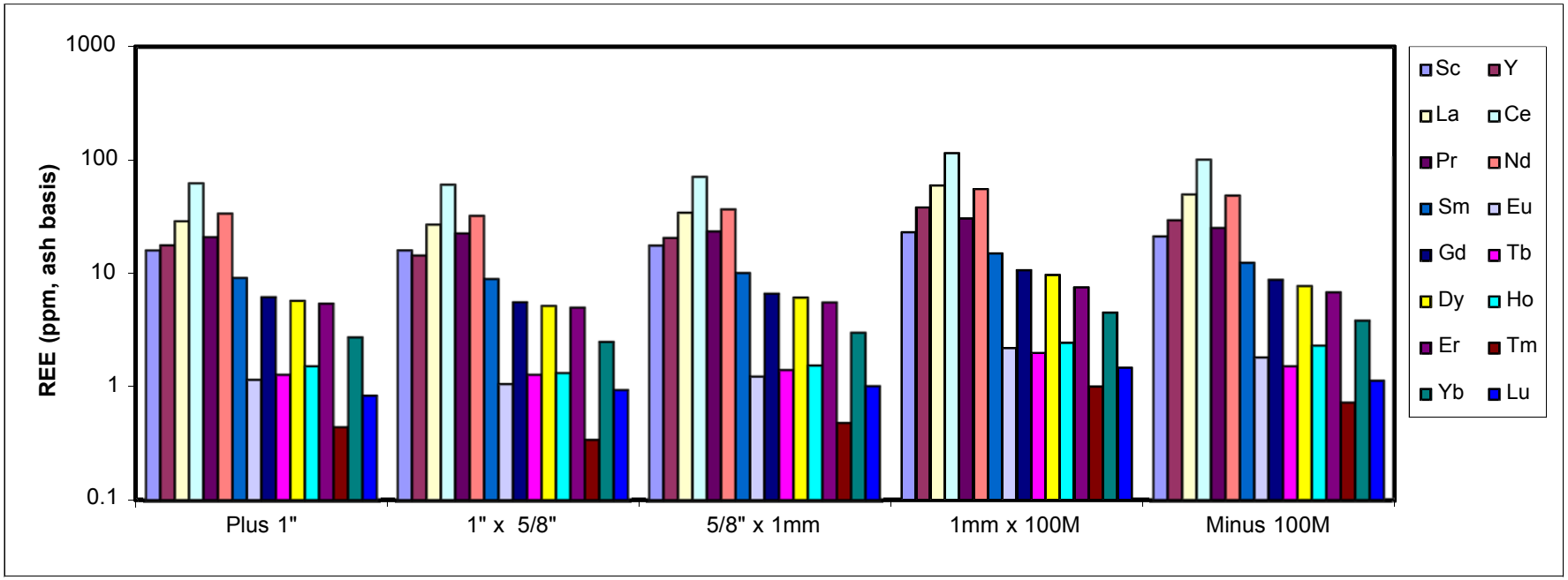
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 39.3 | 51.9 | 95.6 | 192.9 | 55.1 | 94.9 | 25.7 | 3.5 | 17.4 | 3.2 | 15.5 | 4.0 | 12.8 | 1.4 | 7.2 | 2.4 |
| Clean Coal | 2.0 | 5.3 | 5.5 | 10.2 | 1.8 | 5.1 | 1.2 | 0.2 | 1.1 | 0.2 | 1.0 | 0.3 | 0.7 | 0.2 | 0.4 | 0.1 |
| Coarse Refuse | 36.6 | 45.7 | 88.4 | 179.2 | 52.3 | 88.1 | 24.1 | 3.3 | 16.0 | 3.0 | 14.2 | 3.6 | 11.9 | 1.1 | 6.6 | 2.3 |
| Fine Refuse | 0.7 | 0.9 | 1.7 | 3.5 | 1.1 | 1.7 | 0.5 | 0.1 | 0.3 | 0.1 | 0.3 | 0.1 | 0.2 | 0.0 | 0.1 | 0.1 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1" | 30.25% | 91.45% | 212.23 | 30.25% | 224.97% | 235.29 | 200.00% | 37.42% | 278.01 |
| 1" x 5/8" | 10.34% | 83.52% | 202.80 | 40.59% | 99.51% | 251.08 | 169.75% | 27.79% | 316.59 |
| 5/8" x 1mm | 40.24% | 61.31% | 239.80 | 80.83% | 39.29% | 264.21 | 159.41% | 24.18% | 342.09 |
| 1mm x 100M | 10.94% | 28.45% | 377.55 | 91.77% | 7.72% | 349.21 | 119.17% | 11.64% | 524.08 |
| Minus 100M | 8.23% | 46.90% | 316.91 | 100.00% | 3.97% | 327.00 | 108.23% | 9.94% | 566.49 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1" | 15.82 | 17.57 | 28.61 | 61.83 | 20.77 | 33.43 | 9.07 | 1.15 | 6.15 | 1.27 | 5.69 | 1.51 | 5.38 | 0.44 | 2.71 | 0.83 |
| 1" x 5/8" | 15.80 | 14.28 | 26.63 | 59.99 | 22.41 | 31.83 | 8.85 | 1.05 | 5.53 | 1.27 | 5.15 | 1.32 | 4.95 | 0.34 | 2.47 | 0.93 |
| 5/8" x 1mm | 17.56 | 20.47 | 34.09 | 70.75 | 23.40 | 36.53 | 10.08 | 1.23 | 6.63 | 1.40 | 6.10 | 1.54 | 5.54 | 0.48 | 2.99 | 1.01 |
| 1mm x 100M | 23.05 | 38.12 | 59.65 | 114.63 | 30.48 | 55.35 | 14.93 | 2.18 | 10.64 | 1.98 | 9.65 | 2.43 | 7.49 | 1.00 | 4.50 | 1.47 |
| Minus 100M | 20.83 | 29.00 | 48.81 | 99.20 | 24.82 | 47.80 | 12.25 | 1.79 | 8.66 | 1.50 | 7.64 | 2.28 | 6.71 | 0.72 | 3.78 | 1.12 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1" | 1.28% | 8.69% | 676.89 | 1.28% | 8.69% | 676.89 | 100.00% | 6.89% | 706.22 |
| 1" x 5/8" | 2.31% | 8.82% | 713.54 | 3.59% | 8.78% | 700.59 | 98.72% | 6.87% | 706.70 |
| 5/8" x 1mm | 49.12% | 6.28% | 764.82 | 52.71% | 6.45% | 758.87 | 96.41% | 6.82% | 706.49 |
| 1mm x 100M | 34.28% | 5.12% | 856.08 | 86.99% | 5.93% | 791.95 | 47.29% | 7.39% | 654.98 |
| Minus 100M | 13.01% | 13.37% | 452.16 | 100.00% | 6.89% | 706.22 | 13.01% | 13.37% | 452.16 |
| Float/Sink Analysis - Plus 1" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.41% | 11.11% | 703.62 | 199.49% | 10.09% | 698.52 | 200.00% | 10.18% | 692.76 |
| Float 1.8 | 1.50% | 36.51% | 184.47 | 101.08% | 9.11% | 692.47 | 101.59% | 9.29% | 680.19 |
| Sink 1.8 | 0.09% | 75.54% | 346.58 | 99.58% | 8.69% | 724.61 | 100.09% | 8.88% | 710.73 |
| Float/Sink Analysis - 1" x 5/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.49% | 8.63% | 727.60 | 99.49% | 8.63% | 727.60 | 100.00% | 8.82% | 713.54 |
| Float 1.8 | 0.49% | 45.08% | 200.33 | 99.98% | 8.81% | 714.38 | 0.51% | 45.35% | 191.31 |
| Sink 1.8 | 0.02% | 52.07% | 0.00 | 100.00% | 8.82% | 713.54 | 0.02% | 52.07% | 0.00 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.13% | 5.88% | 800.40 | 99.13% | 5.88% | 800.40 | 100.00% | 6.28% | 764.82 |
| Float 1.8 | 0.55% | 34.49% | 339.44 | 99.68% | 6.03% | 785.85 | 0.87% | 52.62% | 312.23 |
| Sink 1.8 | 0.32% | 83.79% | 292.98 | 100.00% | 6.28% | 764.82 | 0.32% | 83.79% | 292.98 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.30% | 4.32% | 965.27 | 98.30% | 4.32% | 965.27 | 100.00% | 5.12% | 856.08 |
| Float 1.8 | 1.03% | 34.81% | 382.39 | 99.33% | 4.64% | 919.93 | 1.70% | 50.99% | 320.64 |
| Sink 1.8 | 0.67% | 75.87% | 277.08 | 100.00% | 5.12% | 856.08 | 0.67% | 75.87% | 277.08 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1" | 29.06 | 71.53 | 125.51 | 225.48 | 35.14 | 104.18 | 20.69 | 3.13 | 17.51 | 1.81 | 15.01 | 5.36 | 13.22 | 2.64 | 6.13 | 0.49 |
| 1" x 5/8" | 33.62 | 79.87 | 131.80 | 231.86 | 35.56 | 107.80 | 22.12 | 3.62 | 19.06 | 2.00 | 16.67 | 5.53 | 13.39 | 3.01 | 6.87 | 0.78 |
| 5/8" x 1mm | 40.86 | 114.78 | 120.84 | 224.84 | 37.27 | 112.26 | 25.29 | 4.40 | 22.78 | 3.14 | 21.28 | 6.19 | 15.36 | 4.79 | 9.43 | 1.30 |
| 1mm x 100M | 51.48 | 134.96 | 128.54 | 238.42 | 45.62 | 120.65 | 29.40 | 5.34 | 26.75 | 4.30 | 26.03 | 6.87 | 17.69 | 6.23 | 11.73 | 2.07 |
| Minus 100M | 27.95 | 56.62 | 67.43 | 128.82 | 35.23 | 65.37 | 16.74 | 2.66 | 13.84 | 2.46 | 12.79 | 3.31 | 9.58 | 1.99 | 5.83 | 1.54 |
| Float/Sink Analysis - Plus 1" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.77 | 74.50 | 131.42 | 234.66 | 36.33 | 107.93 | 21.55 | 3.26 | 18.09 | 1.85 | 15.61 | 5.51 | 13.55 | 2.74 | 6.34 | 0.51 |
| Float 1.8 | 14.00 | 18.37 | 17.67 | 59.46 | 7.28 | 37.10 | 4.88 | 0.69 | 6.26 | 1.03 | 4.04 | 2.89 | 7.56 | 0.95 | 2.29 | 0.00 |
| Sink 1.8 | 36.51 | 22.24 | 44.85 | 86.98 | 67.28 | 41.22 | 10.37 | 1.86 | 14.30 | 1.94 | 7.19 | 1.35 | 5.01 | 0.48 | 3.05 | 1.95 |
| Float/Sink Analysis - 1" x 5/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.79 | 81.51 | 134.89 | 236.58 | 36.20 | 109.97 | 22.56 | 3.69 | 19.43 | 2.02 | 16.97 | 5.62 | 13.57 | 3.06 | 6.96 | 0.79 |
| Float 1.8 | 28.46 | 19.95 | 17.71 | 59.47 | 12.11 | 28.42 | 6.11 | 1.27 | 5.62 | 1.31 | 5.76 | 2.20 | 7.01 | 0.99 | 3.68 | 0.26 |
| Sink 1.8 | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.72 | 121.73 | 126.81 | 235.62 | 36.81 | 117.90 | 25.98 | 4.62 | 23.90 | 3.19 | 22.25 | 6.60 | 16.11 | 5.11 | 9.86 | 1.19 |
| Float 1.8 | 19.28 | 33.56 | 48.19 | 93.56 | 42.97 | 43.69 | 17.05 | 1.77 | 9.74 | 2.78 | 10.10 | 1.56 | 7.24 | 0.98 | 4.50 | 2.47 |
| Sink 1.8 | 15.74 | 21.29 | 42.47 | 83.59 | 43.26 | 38.34 | 16.15 | 1.51 | 7.72 | 2.26 | 8.12 | 0.65 | 4.92 | 0.48 | 3.60 | 2.88 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 59.05 | 156.59 | 145.38 | 268.71 | 45.43 | 137.04 | 31.72 | 6.08 | 30.29 | 4.66 | 29.41 | 8.10 | 20.22 | 7.38 | 13.33 | 1.88 |
| Float 1.8 | 16.91 | 43.36 | 59.40 | 116.70 | 30.03 | 56.85 | 15.65 | 2.24 | 12.09 | 2.05 | 10.44 | 2.60 | 7.58 | 0.95 | 4.41 | 1.13 |
| Sink 1.8 | 12.52 | 18.68 | 36.50 | 70.95 | 58.25 | 28.56 | 19.65 | 1.36 | 7.53 | 2.92 | 8.81 | -0.46 | 3.65 | 0.38 | 3.53 | 4.25 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1" | 48.41% | 91.46% | 283.68 | 48.41% | 91.46% | 283.68 | 100.00% | 90.19% | 291.49 |
| 1" x 5/8" | 14.24% | 91.57% | 280.57 | 62.65% | 91.48% | 282.97 | 51.59% | 89.00% | 299.02 |
| 5/8" x 1mm | 34.22% | 88.71% | 309.16 | 96.87% | 90.50% | 292.04 | 37.35% | 88.03% | 306.34 |
| 1mm x 100M | 2.09% | 80.85% | 276.08 | 98.96% | 90.30% | 291.74 | 3.13% | 80.56% | 272.41 |
| Minus 100M | 1.04% | 79.97% | 264.95 | 100.00% | 90.19% | 291.49 | 1.04% | 79.97% | 264.95 |
| Float/Sink Analysis - Plus 1" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.05% | 28.62% | 573.11 | 0.05% | 28.62% | 573.11 | 100.00% | 91.46% | 283.68 |
| Float 1.8 | 0.20% | 47.05% | 266.37 | 0.25% | 43.36% | 306.86 | 99.95% | 91.49% | 283.63 |
| Sink 1.8 | 99.75% | 91.58% | 283.65 | 100.00% | 91.46% | 283.68 | 99.75% | 91.58% | 283.65 |
| Float/Sink Analysis - 1" x 5/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.41% | 20.37% | 528.45 | 0.41% | 20.37% | 528.45 | 100.00% | 91.57% | 280.57 |
| Float 1.8 | 0.89% | 39.88% | 327.78 | 1.30% | 33.73% | 366.00 | 99.59% | 91.86% | 280.34 |
| Sink 1.8 | 98.70% | 92.33% | 280.16 | 100.00% | 91.57% | 280.57 | 98.70% | 92.33% | 280.16 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 3.39% | 22.13% | 536.30 | 3.39% | 22.13% | 536.30 | 100.00% | 88.71% | 309.16 |
| Float 1.8 | 1.86% | 39.33% | 368.38 | 5.25% | 28.22% | 453.40 | 96.61% | 91.04% | 307.22 |
| Sink 1.8 | 94.75% | 92.06% | 306.71 | 100.00% | 88.71% | 309.16 | 94.75% | 92.06% | 306.71 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 11.42% | 10.80% | 684.22 | 11.42% | 10.80% | 684.22 | 100.00% | 80.85% | 276.08 |
| Float 1.8 | 2.60% | 39.53% | 375.53 | 14.02% | 16.13% | 543.94 | 88.58% | 89.88% | 269.75 |
| Sink 1.8 | 85.98% | 91.40% | 268.37 | 100.00% | 80.85% | 276.08 | 85.98% | 91.40% | 268.37 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1" | 18.26 | 21.94 | 42.62 | 87.95 | 27.16 | 42.68 | 12.16 | 1.61 | 7.91 | 1.56 | 7.20 | 1.75 | 5.80 | 0.60 | 3.28 | 1.20 |
| 1" x 5/8" | 18.75 | 22.91 | 41.77 | 86.89 | 25.01 | 43.06 | 11.61 | 1.61 | 7.82 | 1.50 | 6.85 | 1.75 | 5.98 | 0.62 | 3.32 | 1.09 |
| 5/8" x 1mm | 18.83 | 25.04 | 49.28 | 96.65 | 26.04 | 48.29 | 12.47 | 1.75 | 8.57 | 1.48 | 7.35 | 2.00 | 6.35 | 0.53 | 3.46 | 1.09 |
| 1mm x 100M | 17.82 | 22.07 | 41.18 | 85.73 | 26.88 | 40.76 | 11.70 | 1.56 | 7.51 | 1.52 | 6.91 | 1.55 | 5.68 | 0.62 | 3.27 | 1.31 |
| Minus 100M | 17.81 | 20.91 | 39.77 | 82.57 | 24.25 | 39.56 | 10.90 | 1.52 | 7.23 | 1.49 | 6.51 | 1.73 | 5.78 | 0.63 | 3.18 | 1.11 |
| Float/Sink Analysis - Plus 1" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.40 | 60.98 | 93.01 | 190.53 | 24.95 | 86.64 | 15.14 | 2.43 | 14.84 | 1.45 | 14.11 | 6.25 | 16.50 | 1.69 | 6.19 | 0.00 |
| Float 1.8 | 21.89 | 32.03 | 31.54 | 69.11 | 29.54 | 35.07 | 11.87 | 1.45 | 7.35 | 2.07 | 8.40 | 1.61 | 6.90 | 0.99 | 4.66 | 1.89 |
| Sink 1.8 | 18.25 | 21.92 | 42.62 | 87.95 | 27.16 | 42.68 | 12.16 | 1.61 | 7.91 | 1.56 | 7.20 | 1.75 | 5.80 | 0.60 | 3.28 | 1.20 |
| Float/Sink Analysis - 1" x 5/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 27.91 | 55.74 | 90.65 | 172.29 | 25.55 | 85.01 | 17.04 | 2.72 | 14.50 | 1.62 | 11.78 | 4.56 | 11.59 | 1.89 | 5.32 | 0.26 |
| Float 1.8 | 20.36 | 34.38 | 42.93 | 93.59 | 33.16 | 48.92 | 14.28 | 1.72 | 9.75 | 2.32 | 9.17 | 2.30 | 8.13 | 0.87 | 4.50 | 1.40 |
| Sink 1.8 | 18.74 | 22.84 | 41.72 | 86.79 | 24.98 | 43.00 | 11.59 | 1.61 | 7.81 | 1.50 | 6.84 | 1.75 | 5.97 | 0.62 | 3.31 | 1.09 |
| Float/Sink Analysis - 5/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.54 | 56.05 | 96.14 | 174.74 | 26.69 | 81.75 | 16.12 | 2.63 | 14.05 | 1.75 | 12.30 | 4.73 | 12.26 | 1.81 | 5.63 | 0.12 |
| Float 1.8 | 21.79 | 36.10 | 53.14 | 111.90 | 31.93 | 56.51 | 15.25 | 2.04 | 10.52 | 2.23 | 9.28 | 2.67 | 8.27 | 1.05 | 4.56 | 1.14 |
| Sink 1.8 | 18.71 | 24.68 | 48.84 | 95.85 | 25.98 | 47.93 | 12.42 | 1.74 | 8.51 | 1.47 | 7.29 | 1.97 | 6.28 | 0.51 | 3.43 | 1.10 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.88 | 90.83 | 108.52 | 202.69 | 36.35 | 99.84 | 22.71 | 4.25 | 19.98 | 3.41 | 18.44 | 5.89 | 15.11 | 3.43 | 8.87 | 1.04 |
| Float 1.8 | 18.30 | 40.18 | 59.11 | 116.16 | 27.36 | 58.30 | 14.41 | 2.11 | 11.27 | 1.93 | 9.39 | 2.81 | 8.12 | 0.90 | 4.33 | 0.85 |
| Sink 1.8 | 17.42 | 20.75 | 39.89 | 83.50 | 26.73 | 39.60 | 11.49 | 1.51 | 7.26 | 1.49 | 6.70 | 1.47 | 5.50 | 0.57 | 3.17 | 1.32 |

## PLANT 9

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 19.35% | 84.63% | 277.87 | 19.35% | 84.63% | 277.87 | 100.00% | 69.74% | 273.79 |
| Minus 100M | 80.65% | 66.17% | 272.54 | 100.00% | 69.74% | 273.79 | 80.65% | 66.17% | 272.54 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 6.06% | 7.78% | 777.75 | 6.06% | 7.78% | 777.75 | 100.00% | 84.63% | 277.87 |
| Float 1.8 | 1.16% | 37.07% | 334.16 | 7.22% | 12.48% | 566.12 | 93.94% | 89.58% | 275.07 |
| Sink 1.8 | 92.78% | 90.24% | 274.77 | 100.00% | 84.63% | 277.87 | 92.78% | 90.24% | 274.77 |

## PLANT 9

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 17.77 | 21.72 | 42.97 | 86.25 | 26.39 | 41.31 | 11.76 | 1.57 | 7.54 | 1.46 | 6.79 | 1.62 | 5.66 | 0.56 | 3.21 | 1.29 |
| Minus 100M | 18.51 | 23.18 | 41.37 | 85.62 | 23.91 | 41.53 | 10.46 | 1.33 | 7.17 | 1.23 | 6.25 | 1.77 | 5.85 | 0.31 | 3.11 | 0.94 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.99 | 121.98 | 122.36 | 223.84 | 36.38 | 111.23 | 25.44 | 4.73 | 23.46 | 3.38 | 22.12 | 6.53 | 16.11 | 4.76 | 10.14 | 1.29 |
| Float 1.8 | 18.50 | 37.49 | 47.44 | 100.92 | 24.08 | 52.28 | 12.96 | 1.98 | 10.58 | 1.85 | 9.21 | 2.89 | 8.28 | 1.09 | 4.11 | 0.50 |
| Sink 1.8 | 17.62 | 21.07 | 42.5 | 85.4 | 26.35 | 40.86 | 11.68 | 1.55 | 7.43 | 1.45 | 6.69 | 1.59 | 5.59 | 0.53 | 3.17 | 1.29 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1671.5 | TPH |
| Plus 1-1/4" | 208.44 | 60.09 | 41.51 | 208.44 | 60.09 | 41.51 | 1671.53 | 422.27 | 275.30 |
| 1-1/4" x 1/2" | 420.89 | 132.75 | 87.68 | 629.33 | 192.84 | 129.19 | 1463.09 | 362.18 | 233.80 |
| 1/2" x 1mm | 798.99 | 181.05 | 116.77 | 1428.32 | 373.89 | 245.96 | 1042.20 | 229.43 | 146.12 |
| 1mm x 100M | 174.51 | 31.52 | 20.39 | 1602.83 | 405.41 | 266.35 | 243.21 | 48.38 | 29.34 |
| Minus 100M | 68.70 | 16.87 | 8.96 | 1671.53 | 422.27 | 275.30 | 68.70 | 16.87 | 8.96 |
| **Clean Coal** | | | | | | | | 1239.3 | TPH |
| Plus 1-1/4" | 101.12 | 9.48 | 8.14 | 101.12 | 9.48 | 8.14 | 1239.27 | 105.99 | 84.43 |
| 1-1/4" x 1/2" | 181.31 | 20.20 | 12.43 | 282.43 | 29.69 | 20.57 | 1138.15 | 96.51 | 76.29 |
| 1/2" x 1mm | 706.01 | 53.71 | 45.16 | 988.45 | 83.40 | 65.73 | 956.84 | 76.30 | 63.86 |
| 1mm x 100M | 167.43 | 12.25 | 10.88 | 1155.87 | 95.65 | 76.60 | 250.83 | 22.59 | 18.70 |
| Minus 100M | 83.40 | 10.34 | 7.82 | 1239.27 | 105.99 | 84.43 | 83.40 | 10.34 | 7.82 |
| **Coarse Refuse** | | | | | | | | 119.2 | TPH |
| Plus 1-1/4" | 13.93 | 10.92 | 6.79 | 13.93 | 10.92 | 6.79 | 119.20 | 98.25 | 57.63 |
| 1-1/4" x 1/2" | 37.68 | 31.85 | 19.12 | 51.61 | 42.77 | 25.91 | 105.26 | 87.33 | 50.84 |
| 1/2" x 1mm | 59.41 | 49.14 | 28.17 | 111.02 | 91.91 | 54.09 | 67.59 | 55.48 | 31.71 |
| 1mm x 100M | 6.41 | 4.96 | 2.81 | 117.43 | 96.87 | 56.89 | 8.18 | 6.34 | 3.54 |
| Minus 100M | 1.76 | 1.38 | 0.73 | 119.20 | 98.25 | 57.63 | 1.76 | 1.38 | 0.73 |
| **Fine Refuse** | | | | | | | | 313.1 | TPH |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 313.05 | 149.06 | 61.82 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 313.05 | 149.06 | 61.82 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 313.05 | 149.06 | 61.82 |
| 1mm x 100M | 51.18 | 37.72 | 0.39 | 51.18 | 37.72 | 0.39 | 313.05 | 149.06 | 61.82 |
| Minus 100M | 261.87 | 111.35 | 61.43 | 313.05 | 149.06 | 61.82 | 261.87 | 111.35 | 61.43 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 9,193,397 | 2,322,512 | 757.1 | 82.35 | 325.98 |
| Clean Coal | 6,816,008 | 582,936 | 232.2 | 34.06 | 398.28 |
| Coarse Refuse | 655,595 | 540,384 | 158.5 | 241.73 | 293.26 |
| Fine Refuse | 1,721,795 | 819,852 | 170.0 | 98.74 | 207.36 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 3.37 | 3.89 | 6.44 | 12.13 | 4.25 | 5.68 | 1.41 | 0.22 | 1.26 | 0.18 | 0.88 | 0.25 | 0.84 | 0.08 | 0.47 | 0.15 |
| 1-1/4" x 1/2" | 6.37 | 7.45 | 14.01 | 26.96 | 8.00 | 12.72 | 3.11 | 0.46 | 2.47 | 0.38 | 1.93 | 0.55 | 1.88 | 0.15 | 0.96 | 0.28 |
| 1/2" x 1mm | 9.13 | 10.27 | 18.11 | 35.03 | 11.26 | 16.45 | 4.20 | 0.64 | 3.40 | 0.55 | 2.64 | 0.70 | 2.42 | 0.26 | 1.30 | 0.42 |
| 1mm x 100M | 1.95 | 1.75 | 2.85 | 5.58 | 2.72 | 2.64 | 0.71 | 0.11 | 0.68 | 0.11 | 0.45 | 0.11 | 0.37 | 0.04 | 0.23 | 0.10 |
| Minus 100M | 0.90 | 0.68 | 1.17 | 2.48 | 1.36 | 1.08 | 0.31 | 0.04 | 0.31 | 0.05 | 0.20 | 0.04 | 0.17 | 0.01 | 0.10 | 0.05 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.71 | 0.98 | 1.23 | 2.29 | 0.39 | 1.11 | 0.39 | 0.06 | 0.28 | 0.06 | 0.23 | 0.04 | 0.16 | 0.02 | 0.12 | 0.07 |
| 1-1/4" x 1/2" | 1.05 | 1.05 | 1.46 | 3.84 | 1.71 | 1.41 | 0.55 | 0.07 | 0.37 | 0.09 | 0.29 | 0.04 | 0.22 | 0.03 | 0.15 | 0.11 |
| 1/2" x 1mm | 3.94 | 5.05 | 6.20 | 11.80 | 5.26 | 5.71 | 1.97 | 0.29 | 1.42 | 0.32 | 1.15 | 0.18 | 0.78 | 0.11 | 0.62 | 0.35 |
| 1mm x 100M | 1.04 | 1.24 | 1.43 | 2.75 | 1.35 | 1.38 | 0.42 | 0.07 | 0.36 | 0.07 | 0.26 | 0.05 | 0.19 | 0.03 | 0.15 | 0.07 |
| Minus 100M | 0.87 | 0.73 | 0.95 | 1.81 | 1.41 | 0.85 | 0.29 | 0.04 | 0.30 | 0.06 | 0.18 | 0.03 | 0.12 | 0.01 | 0.10 | 0.06 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.58 | 0.50 | 1.00 | 1.88 | 1.06 | 0.81 | 0.25 | 0.03 | 0.23 | 0.04 | 0.15 | 0.03 | 0.12 | 0.01 | 0.07 | 0.04 |
| 1-1/4" x 1/2" | 1.29 | 1.52 | 3.23 | 6.19 | 1.37 | 3.07 | 0.60 | 0.08 | 0.49 | 0.05 | 0.39 | 0.15 | 0.45 | 0.03 | 0.19 | 0.01 |
| 1/2" x 1mm | 2.08 | 2.34 | 4.74 | 9.05 | 2.25 | 4.07 | 0.90 | 0.14 | 0.76 | 0.08 | 0.53 | 0.20 | 0.64 | 0.05 | 0.29 | 0.04 |
| 1mm x 100M | 0.25 | 0.22 | 0.43 | 0.81 | 0.36 | 0.36 | 0.09 | 0.01 | 0.09 | 0.01 | 0.06 | 0.02 | 0.06 | 0.00 | 0.03 | 0.01 |
| Minus 100M | 0.06 | 0.06 | 0.12 | 0.22 | 0.08 | 0.10 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/4" x 1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/2" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.04 | 0.04 | 0.05 | 0.10 | 0.06 | 0.05 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Minus 100M | 5.42 | 5.28 | 9.57 | 18.65 | 5.86 | 8.51 | 1.90 | 0.31 | 1.85 | 0.22 | 1.16 | 0.43 | 1.38 | 0.10 | 0.66 | 0.12 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 59.7 | 66.1 | 117.1 | 226.0 | 75.9 | 106.1 | 26.8 | 4.0 | 22.3 | 3.5 | 16.8 | 4.6 | 15.6 | 1.5 | 8.4 | 2.8 |
| Clean Coal | 20.9 | 24.9 | 31.0 | 61.8 | 27.8 | 28.8 | 10.0 | 1.4 | 7.5 | 1.7 | 5.8 | 0.9 | 4.1 | 0.6 | 3.1 | 1.8 |
| Coarse Refuse | 11.7 | 12.7 | 26.2 | 49.9 | 14.1 | 23.1 | 5.1 | 0.7 | 4.4 | 0.5 | 3.1 | 1.1 | 3.5 | 0.3 | 1.6 | 0.3 |
| Fine Refuse | 15.0 | 14.6 | 26.4 | 51.6 | 16.3 | 23.5 | 5.3 | 0.9 | 5.1 | 0.6 | 3.2 | 1.2 | 3.8 | 0.3 | 1.8 | 0.3 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1671.5 | TPH |
| Float 1.6 | 1123.87 | 79.24 | 65.90 | 1123.87 | 79.24 | 65.90 | 1324.49 | 231.72 | 135.16 |
| Float 1.8 | 24.86 | 9.20 | 7.42 | 1148.73 | 88.44 | 73.32 | 200.62 | 152.48 | 69.27 |
| Sink 1.8 | 175.76 | 143.28 | 61.85 | 1324.49 | 231.72 | 135.16 | 175.76 | 143.28 | 61.85 |
| **Clean Coal (Plus 100M)** | | | | | | | | 1239.3 | TPH |
| Float 1.6 | 1119.33 | 78.75 | 65.46 | 1119.33 | 78.75 | 65.46 | 1155.87 | 97.14 | 77.88 |
| Float 1.8 | 20.03 | 7.22 | 5.73 | 1139.36 | 85.97 | 71.19 | 36.54 | 18.38 | 12.42 |
| Sink 1.8 | 16.51 | 11.16 | 6.69 | 1155.87 | 97.14 | 77.88 | 16.51 | 11.16 | 6.69 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 119.2 | TPH |
| Float 1.6 | 1.14 | 0.21 | 0.20 | 1.14 | 0.21 | 0.20 | 117.43 | 96.87 | 56.89 |
| Float 1.8 | 4.19 | 1.75 | 1.54 | 5.33 | 1.97 | 1.74 | 116.29 | 96.66 | 56.69 |
| Sink 1.8 | 112.10 | 94.90 | 55.15 | 117.43 | 96.87 | 56.89 | 112.10 | 94.90 | 55.15 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 313.1 | TPH |
| Float 1.6 | 3.40 | 0.28 | 0.24 | 3.40 | 0.28 | 0.24 | 51.18 | 37.72 | 0.39 |
| Float 1.8 | 0.64 | 0.22 | 0.15 | 4.04 | 0.50 | 0.39 | 47.78 | 37.44 | 0.15 |
| Sink 1.8 | 47.14 | 37.22 | 0.00 | 51.18 | 37.72 | 0.39 | 47.14 | 37.22 | 0.00 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 7,284,696 | 1,274,474 | 371.7 | 51.02 | 291.65 |
| Clean Coal | 6,357,290 | 534,247 | 214.2 | 33.69 | 400.89 |
| Coarse Refuse | 645,892 | 532,783 | 156.5 | 242.23 | 293.66 |
| Fine Refuse | 281,513 | 207,444 | 1.1 | 3.78 | 5.12 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

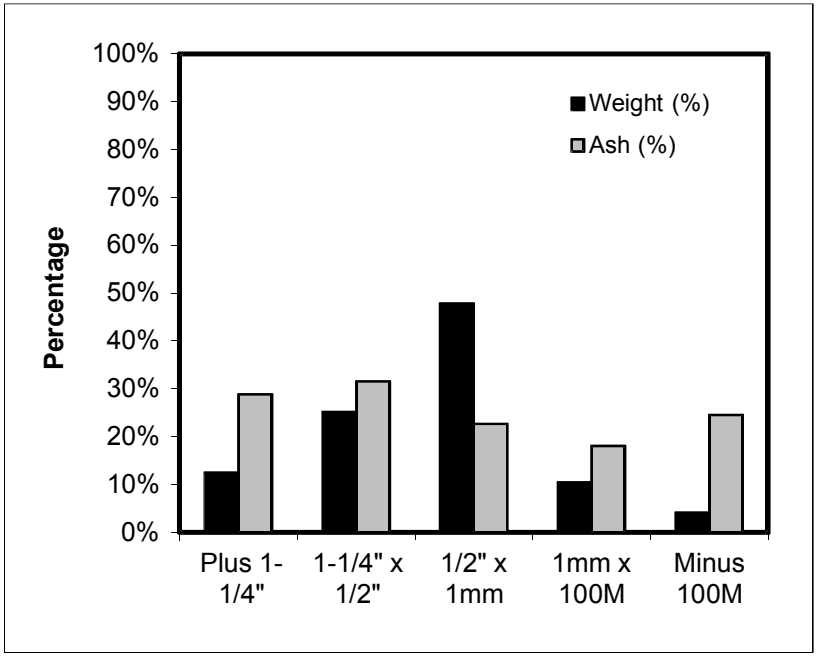
****Unless otherwise noted, REE values reported in ppm*

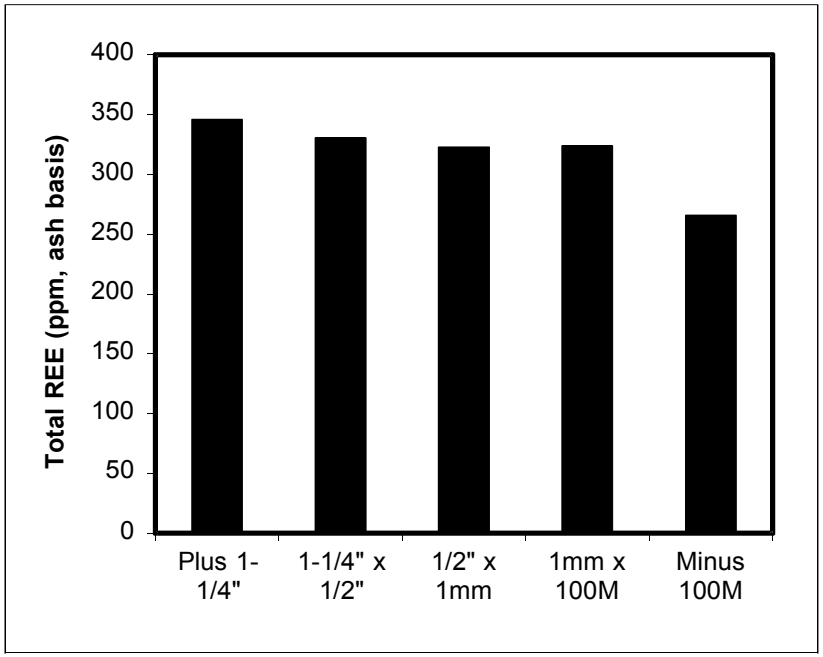
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 5.71 | 7.51 | 8.89 | 17.72 | 7.19 | 8.26 | 2.91 | 0.43 | 2.04 | 0.48 | 1.69 | 0.27 | 1.17 | 0.17 | 0.92 | 0.52 |
| Float 1.8 | 0.71 | 0.63 | 0.98 | 2.01 | 1.07 | 0.95 | 0.28 | 0.04 | 0.26 | 0.05 | 0.16 | 0.03 | 0.12 | 0.01 | 0.08 | 0.05 |
| Sink 1.8 | 4.68 | 4.94 | 10.09 | 19.34 | 5.60 | 8.93 | 2.07 | 0.29 | 1.77 | 0.22 | 1.25 | 0.42 | 1.36 | 0.10 | 0.63 | 0.15 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 5.67 | 7.47 | 8.83 | 17.61 | 7.15 | 8.20 | 2.89 | 0.42 | 2.02 | 0.48 | 1.68 | 0.27 | 1.17 | 0.17 | 0.92 | 0.51 |
| Float 1.8 | 0.55 | 0.50 | 0.74 | 1.53 | 0.85 | 0.71 | 0.22 | 0.03 | 0.20 | 0.04 | 0.13 | 0.02 | 0.09 | 0.01 | 0.07 | 0.04 |
| Sink 1.8 | 0.64 | 0.51 | 0.94 | 1.90 | 0.77 | 0.87 | 0.29 | 0.03 | 0.26 | 0.04 | 0.16 | 0.03 | 0.12 | 0.01 | 0.07 | 0.05 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.02 | 0.02 | 0.03 | 0.05 | 0.02 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.14 | 0.13 | 0.22 | 0.44 | 0.19 | 0.22 | 0.06 | 0.01 | 0.05 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 |
| Sink 1.8 | 4.05 | 4.43 | 9.15 | 17.44 | 4.83 | 8.06 | 1.78 | 0.25 | 1.52 | 0.18 | 1.09 | 0.39 | 1.24 | 0.09 | 0.56 | 0.10 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.02 | 0.03 | 0.03 | 0.06 | 0.03 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.02 | 0.01 | 0.02 | 0.04 | 0.03 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

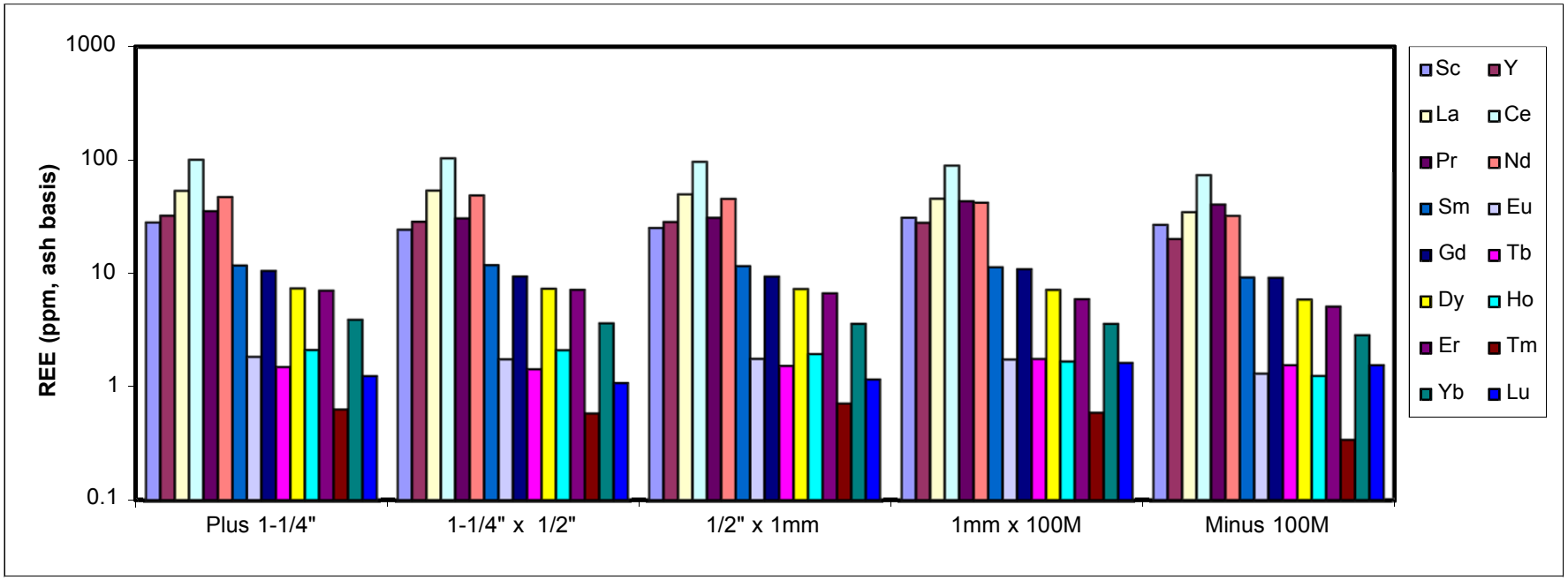
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 30.5 | 36.0 | 54.9 | 107.4 | 38.1 | 49.9 | 14.5 | 2.1 | 11.2 | 2.0 | 8.5 | 2.0 | 7.3 | 0.8 | 4.5 | 2.0 |
| Clean Coal | 18.9 | 23.3 | 28.9 | 57.9 | 24.1 | 26.9 | 9.3 | 1.4 | 6.8 | 1.5 | 5.4 | 0.9 | 3.8 | 0.5 | 2.9 | 1.7 |
| Coarse Refuse | 11.6 | 12.6 | 25.8 | 49.3 | 13.9 | 22.8 | 5.1 | 0.7 | 4.3 | 0.5 | 3.1 | 1.1 | 3.5 | 0.3 | 1.6 | 0.3 |
| Fine Refuse | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 12.47% | 28.83% | 345.36 | 12.47% | 208.72% | 329.01 | 200.00% | 16.91% | 344.26 |
| 1-1/4" x 1/2" | 25.18% | 31.54% | 330.24 | 37.65% | 59.58% | 326.39 | 187.53% | 16.11% | 344.13 |
| 1/2" x 1mm | 47.80% | 22.66% | 322.49 | 85.45% | 16.96% | 324.28 | 162.35% | 13.72% | 349.09 |
| 1mm x 100M | 10.44% | 18.06% | 323.44 | 95.89% | 3.82% | 329.59 | 114.55% | 9.99% | 374.25 |
| Minus 100M | 4.11% | 24.55% | 265.51 | 100.00% | 1.77% | 336.12 | 104.11% | 9.18% | 384.27 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 28.05 | 32.36 | 53.57 | 100.90 | 35.40 | 47.22 | 11.76 | 1.84 | 10.50 | 1.49 | 7.36 | 2.11 | 7.03 | 0.63 | 3.90 | 1.24 |
| 1-1/4" x 1/2" | 23.99 | 28.07 | 52.75 | 101.54 | 30.12 | 47.92 | 11.71 | 1.73 | 9.30 | 1.42 | 7.26 | 2.09 | 7.09 | 0.58 | 3.60 | 1.07 |
| 1/2" x 1mm | 25.21 | 28.37 | 50.00 | 96.73 | 31.09 | 45.43 | 11.60 | 1.76 | 9.38 | 1.53 | 7.30 | 1.94 | 6.68 | 0.71 | 3.60 | 1.16 |
| 1mm x 100M | 30.88 | 27.73 | 45.26 | 88.50 | 43.11 | 41.88 | 11.28 | 1.73 | 10.84 | 1.75 | 7.14 | 1.67 | 5.89 | 0.59 | 3.57 | 1.62 |
| Minus 100M | 26.67 | 20.03 | 34.65 | 73.58 | 40.45 | 32.05 | 9.19 | 1.30 | 9.14 | 1.55 | 5.85 | 1.24 | 5.07 | 0.34 | 2.85 | 1.55 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 8.16% | 9.38% | 429.24 | 8.16% | 9.38% | 429.24 | 100.00% | 8.55% | 398.28 |
| 1-1/4" x 1/2" | 14.63% | 11.14% | 307.54 | 22.79% | 10.51% | 346.41 | 91.84% | 8.48% | 395.24 |
| 1/2" x 1mm | 56.97% | 7.61% | 420.38 | 79.76% | 8.44% | 394.05 | 77.21% | 7.97% | 418.47 |
| 1mm x 100M | 13.51% | 7.32% | 444.02 | 93.27% | 8.27% | 400.45 | 20.24% | 9.01% | 413.92 |
| Minus 100M | 6.73% | 12.40% | 378.27 | 100.00% | 8.55% | 398.28 | 6.73% | 12.40% | 378.27 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.51% | 8.97% | 391.81 | 194.50% | 9.76% | 374.82 | 200.00% | 11.00% | 367.57 |
| Float 1.8 | 3.99% | 37.53% | 671.21 | 99.99% | 10.50% | 361.11 | 105.49% | 12.81% | 352.37 |
| Sink 1.8 | 1.50% | 58.32% | 377.75 | 96.00% | 9.38% | 309.52 | 101.50% | 11.84% | 312.65 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.50% | 8.60% | 302.18 | 94.50% | 8.60% | 302.18 | 100.00% | 11.14% | 307.54 |
| Float 1.8 | 2.72% | 36.97% | 262.87 | 97.22% | 9.39% | 297.85 | 5.50% | 54.85% | 321.97 |
| Sink 1.8 | 2.78% | 72.35% | 351.52 | 100.00% | 11.14% | 307.54 | 2.78% | 72.35% | 351.52 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.04% | 6.76% | 441.09 | 98.04% | 6.76% | 441.09 | 100.00% | 7.61% | 420.38 |
| Float 1.8 | 1.15% | 35.90% | 357.51 | 99.19% | 7.10% | 436.19 | 1.96% | 50.00% | 280.34 |
| Sink 1.8 | 0.81% | 70.03% | 224.17 | 100.00% | 7.61% | 420.38 | 0.81% | 70.03% | 224.17 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.71% | 5.40% | 494.58 | 95.71% | 5.40% | 494.58 | 100.00% | 7.32% | 444.02 |
| Float 1.8 | 1.76% | 32.91% | 336.85 | 97.47% | 5.90% | 478.68 | 4.29% | 50.06% | 322.35 |
| Sink 1.8 | 2.53% | 61.99% | 316.99 | 100.00% | 7.32% | 444.02 | 2.53% | 61.99% | 316.99 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 37.63 | 51.55 | 64.81 | 120.86 | 20.58 | 58.66 | 20.58 | 2.91 | 14.82 | 3.19 | 12.31 | 2.07 | 8.36 | 1.06 | 6.35 | 3.49 |
| 1-1/4" x 1/2" | 25.86 | 25.99 | 36.14 | 95.02 | 42.23 | 34.85 | 13.60 | 1.71 | 9.13 | 2.23 | 7.15 | 1.05 | 5.57 | 0.64 | 3.73 | 2.65 |
| 1/2" x 1mm | 36.70 | 47.00 | 57.73 | 109.81 | 48.95 | 53.17 | 18.36 | 2.68 | 13.26 | 3.00 | 10.68 | 1.70 | 7.27 | 1.05 | 5.77 | 3.25 |
| 1mm x 100M | 42.63 | 50.79 | 58.52 | 112.18 | 55.00 | 56.52 | 17.32 | 2.86 | 14.77 | 2.95 | 10.66 | 2.08 | 7.73 | 1.18 | 6.00 | 2.82 |
| Minus 100M | 41.98 | 35.49 | 45.76 | 87.52 | 68.24 | 41.22 | 14.16 | 2.06 | 14.51 | 2.73 | 8.76 | 1.34 | 6.03 | 0.71 | 4.68 | 3.08 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.15 | 49.67 | 59.26 | 107.62 | 13.85 | 51.98 | 20.28 | 2.68 | 14.38 | 3.24 | 12.06 | 1.75 | 7.86 | 1.05 | 6.18 | 3.80 |
| Float 1.8 | 53.51 | 74.55 | 103.09 | 193.59 | 50.70 | 97.55 | 25.08 | 4.66 | 19.56 | 3.79 | 16.32 | 3.95 | 11.83 | 1.45 | 8.79 | 2.79 |
| Sink 1.8 | 24.77 | 30.44 | 53.02 | 124.62 | 34.23 | 56.80 | 15.82 | 2.19 | 11.00 | 1.71 | 7.93 | 1.93 | 7.23 | 0.52 | 3.82 | 1.72 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 25.57 | 26.40 | 32.95 | 94.07 | 43.40 | 31.49 | 14.37 | 1.71 | 8.60 | 2.49 | 7.27 | 0.79 | 5.34 | 0.68 | 3.93 | 3.12 |
| Float 1.8 | 25.89 | 16.05 | 27.34 | 80.73 | 46.36 | 28.20 | 10.43 | 1.24 | 8.83 | 1.86 | 5.17 | 0.72 | 4.59 | 0.35 | 2.75 | 2.36 |
| Sink 1.8 | 27.03 | 29.29 | 53.42 | 106.03 | 35.44 | 51.74 | 12.06 | 1.92 | 11.43 | 1.34 | 7.67 | 2.29 | 6.97 | 0.60 | 3.40 | 0.89 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.57 | 50.71 | 60.76 | 115.20 | 51.18 | 56.03 | 19.01 | 2.86 | 13.46 | 3.09 | 11.19 | 1.85 | 7.65 | 1.16 | 6.11 | 3.26 |
| Float 1.8 | 38.76 | 28.03 | 43.98 | 86.18 | 66.33 | 42.23 | 13.16 | 1.90 | 13.96 | 2.32 | 7.32 | 1.09 | 5.25 | 0.47 | 3.81 | 2.72 |
| Sink 1.8 | 25.00 | 17.46 | 32.28 | 64.09 | 10.31 | 27.71 | 14.52 | 1.20 | 10.35 | 2.44 | 7.18 | 0.34 | 4.31 | 0.24 | 3.21 | 3.53 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.94 | 63.17 | 66.85 | 127.61 | 48.63 | 65.94 | 19.64 | 3.47 | 15.32 | 3.31 | 12.29 | 2.62 | 9.15 | 1.51 | 7.23 | 2.90 |
| Float 1.8 | 37.40 | 24.79 | 38.84 | 76.22 | 72.95 | 35.43 | 13.95 | 1.65 | 13.54 | 2.59 | 7.30 | 0.59 | 4.12 | 0.45 | 3.64 | 3.39 |
| Sink 1.8 | 36.95 | 19.60 | 38.35 | 74.63 | 69.37 | 33.27 | 10.90 | 1.30 | 13.43 | 1.91 | 6.54 | 0.83 | 4.37 | 0.38 | 2.83 | 2.33 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/4" | 11.69% | 78.37% | 310.89 | 11.69% | 78.37% | 310.89 | 100.00% | 82.43% | 293.26 |
| 1-1/4" x 1/2" | 31.61% | 84.54% | 300.19 | 43.30% | 82.87% | 302.92 | 88.31% | 82.96% | 291.06 |
| 1/2" x 1mm | 49.84% | 82.71% | 286.67 | 93.14% | 82.79% | 294.23 | 56.70% | 82.09% | 285.81 |
| 1mm x 100M | 5.38% | 77.33% | 283.05 | 98.52% | 82.49% | 293.66 | 6.86% | 77.54% | 279.18 |
| Minus 100M | 1.48% | 78.34% | 265.29 | 100.00% | 82.43% | 293.26 | 1.48% | 78.34% | 265.29 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.20% | 16.78% | 408.26 | 0.20% | 16.78% | 408.26 | 100.00% | 78.37% | 310.89 |
| Float 1.8 | 3.64% | 42.59% | 602.94 | 3.84% | 41.25% | 598.81 | 99.80% | 78.49% | 310.85 |
| Sink 1.8 | 96.16% | 79.85% | 304.95 | 100.00% | 78.37% | 310.89 | 96.16% | 79.85% | 304.95 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.57% | 22.77% | 526.39 | 0.57% | 22.77% | 526.39 | 100.00% | 84.54% | 300.19 |
| Float 1.8 | 2.99% | 43.35% | 439.05 | 3.56% | 40.05% | 447.00 | 99.43% | 84.89% | 299.84 |
| Sink 1.8 | 96.44% | 86.18% | 297.67 | 100.00% | 84.54% | 300.19 | 96.44% | 86.18% | 297.67 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.00% | 17.70% | 485.35 | 1.00% | 17.70% | 485.35 | 100.00% | 82.71% | 286.67 |
| Float 1.8 | 4.08% | 41.21% | 409.11 | 5.08% | 36.58% | 416.37 | 99.00% | 83.37% | 286.25 |
| Sink 1.8 | 94.92% | 85.18% | 283.69 | 100.00% | 82.71% | 286.67 | 94.92% | 85.18% | 283.69 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 4.77% | 18.09% | 375.37 | 4.77% | 18.09% | 375.37 | 100.00% | 77.33% | 283.05 |
| Float 1.8 | 2.05% | 38.62% | 335.85 | 6.82% | 24.26% | 356.46 | 95.23% | 80.29% | 282.00 |
| Sink 1.8 | 93.18% | 81.21% | 281.44 | 100.00% | 77.33% | 283.05 | 93.18% | 81.21% | 281.44 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/4" | 26.62 | 22.95 | 45.67 | 86.04 | 48.35 | 37.29 | 11.38 | 1.38 | 10.33 | 1.61 | 6.65 | 1.41 | 5.62 | 0.44 | 3.18 | 1.98 |
| 1-1/4" x 1/2" | 20.31 | 23.85 | 50.69 | 97.17 | 21.51 | 48.15 | 9.40 | 1.29 | 7.77 | 0.86 | 6.19 | 2.37 | 6.99 | 0.53 | 2.95 | 0.18 |
| 1/2" x 1mm | 21.14 | 23.80 | 48.23 | 92.10 | 22.93 | 41.37 | 9.20 | 1.41 | 7.75 | 0.86 | 5.39 | 2.01 | 6.54 | 0.50 | 2.96 | 0.45 |
| 1mm x 100M | 25.65 | 21.77 | 43.01 | 81.55 | 36.56 | 36.38 | 9.04 | 1.32 | 9.17 | 1.20 | 5.65 | 1.67 | 5.72 | 0.43 | 2.87 | 1.08 |
| Minus 100M | 22.03 | 20.74 | 42.55 | 81.01 | 27.39 | 36.09 | 8.56 | 1.25 | 7.68 | 1.05 | 5.21 | 1.79 | 5.95 | 0.47 | 2.79 | 0.73 |
| Float/Sink Analysis - Plus 1-1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 80.93 | 28.11 | 30.24 | 61.90 | 113.60 | 40.40 | 4.33 | 2.41 | 23.82 | 3.11 | 5.47 | 1.47 | 5.31 | 0.58 | 4.47 | 2.11 |
| Float 1.8 | 46.00 | 50.33 | 96.16 | 187.01 | 52.46 | 91.97 | 21.93 | 3.94 | 18.07 | 2.34 | 11.41 | 3.27 | 9.27 | 0.93 | 6.05 | 1.80 |
| Sink 1.8 | 26.21 | 22.39 | 44.66 | 84.01 | 48.24 | 36.18 | 11.17 | 1.33 | 10.17 | 1.59 | 6.55 | 1.37 | 5.55 | 0.43 | 3.12 | 1.98 |
| Float/Sink Analysis - 1-1/4" x 1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 64.20 | 50.10 | 68.58 | 139.20 | 56.57 | 72.67 | 18.64 | 4.09 | 16.73 | 3.71 | 10.15 | 2.63 | 8.58 | 1.04 | 7.00 | 2.50 |
| Float 1.8 | 37.53 | 33.97 | 60.89 | 133.81 | 48.54 | 66.81 | 15.68 | 2.42 | 13.14 | 1.92 | 8.68 | 2.29 | 6.94 | 0.62 | 4.19 | 1.62 |
| Sink 1.8 | 19.97 | 23.65 | 50.50 | 96.53 | 21.03 | 47.82 | 9.29 | 1.27 | 7.67 | 0.84 | 6.14 | 2.37 | 6.99 | 0.53 | 2.92 | 0.15 |
| Float/Sink Analysis - 1/2" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 57.90 | 49.17 | 60.20 | 120.88 | 50.67 | 72.12 | 19.11 | 4.30 | 14.28 | 4.56 | 9.27 | 2.31 | 9.02 | 1.00 | 7.62 | 2.94 |
| Float 1.8 | 39.63 | 33.79 | 55.25 | 110.41 | 57.24 | 55.85 | 15.07 | 2.37 | 14.47 | 2.12 | 8.02 | 1.70 | 6.22 | 0.63 | 4.20 | 2.14 |
| Sink 1.8 | 20.68 | 23.54 | 48.06 | 91.66 | 22.16 | 41.00 | 9.06 | 1.38 | 7.60 | 0.83 | 5.33 | 2.02 | 6.54 | 0.50 | 2.92 | 0.41 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.19 | 39.35 | 53.00 | 103.11 | 30.13 | 57.70 | 12.40 | 2.96 | 10.58 | 2.74 | 6.56 | 2.52 | 8.52 | 0.80 | 5.60 | 1.21 |
| Float 1.8 | 30.58 | 28.28 | 47.94 | 93.28 | 41.44 | 46.69 | 12.54 | 1.93 | 10.32 | 1.98 | 6.41 | 1.64 | 6.52 | 0.58 | 3.93 | 1.79 |
| Sink 1.8 | 25.46 | 21.50 | 42.84 | 81.18 | 36.58 | 36.03 | 8.96 | 1.29 | 9.14 | 1.17 | 5.63 | 1.66 | 5.68 | 0.42 | 2.83 | 1.07 |

## PLANT 12

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 16.35% | 73.69% | 5.12 | 16.35% | 73.69% | 5.12 | 100.00% | 47.62% | 207.36 |
| Minus 100M | 83.65% | 42.52% | 275.86 | 100.00% | 47.62% | 207.36 | 83.65% | 42.52% | 275.86 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 6.65% | 8.19% | 423.93 | 6.65% | 8.19% | 423.93 | 100.00% | 73.69% | 5.12 |
| Float 1.8 | 1.25% | 34.51% | 339.99 | 7.90% | 12.35% | 386.83 | 93.35% | 78.35% | 2.01 |
| Sink 1.8 | 92.10% | 78.95% | 0.00 | 100.00% | 73.69% | 5.12 | 92.10% | 78.95% | 0.00 |

## PLANT 12

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 0.48 | 0.50 | 0.67 | 1.30 | 0.75 | 0.64 | 0.22 | 0.03 | 0.17 | 0.04 | 0.12 | 0.02 | 0.08 | 0.01 | 0.06 | 0.04 |
| Minus 100M | 24.34 | 23.69 | 42.96 | 83.76 | 26.33 | 38.22 | 8.52 | 1.41 | 8.32 | 0.99 | 5.22 | 1.92 | 6.21 | 0.46 | 2.98 | 0.53 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.60 | 47.78 | 58.01 | 111.27 | 47.91 | 55.98 | 18.52 | 2.81 | 12.68 | 2.99 | 10.14 | 1.73 | 7.38 | 1.12 | 5.91 | 3.10 |
| Float 1.8 | 35.21 | 25.14 | 41.47 | 81.41 | 67.77 | 38.01 | 14.41 | 1.72 | 12.92 | 2.45 | 7.23 | 0.56 | 4.33 | 0.48 | 3.64 | 3.24 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 174.6 | TPH |
| Plus 3/4" | 17.60 | 10.37 | 6.42 | 17.60 | 10.37 | 6.42 | 174.62 | 40.54 | 28.05 |
| 3/4" x 1/4" | 45.17 | 15.29 | 10.11 | 62.78 | 25.66 | 16.53 | 157.02 | 30.17 | 21.63 |
| 1/4" x 1mm | 62.02 | 9.19 | 6.94 | 124.80 | 34.84 | 23.47 | 111.84 | 14.88 | 11.52 |
| 1mm x 100M | 39.74 | 4.18 | 3.50 | 164.54 | 39.02 | 26.97 | 49.82 | 5.69 | 4.58 |
| Minus 100M | 10.08 | 1.52 | 1.08 | 174.62 | 40.54 | 28.05 | 10.08 | 1.52 | 1.08 |
| **Clean Coal** | | | | | | | | 130.4 | TPH |
| Plus 3/4" | 3.72 | 0.31 | 0.28 | 3.72 | 0.31 | 0.28 | 130.36 | 8.04 | 8.42 |
| 3/4" x 1/4" | 16.63 | 1.45 | 1.36 | 20.35 | 1.76 | 1.65 | 126.64 | 7.74 | 8.14 |
| 1/4" x 1mm | 48.92 | 3.31 | 3.53 | 69.27 | 5.07 | 5.18 | 110.01 | 6.28 | 6.77 |
| 1mm x 100M | 41.68 | 1.83 | 2.10 | 110.95 | 6.91 | 7.28 | 61.09 | 2.97 | 3.24 |
| Minus 100M | 19.41 | 1.14 | 1.14 | 130.36 | 8.04 | 8.42 | 19.41 | 1.14 | 1.14 |
| **Coarse Refuse** | | | | | | | | 38.7 | TPH |
| Plus 3/4" | 13.77 | 11.65 | 7.00 | 13.77 | 11.65 | 7.00 | 38.73 | 31.02 | 18.89 |
| 3/4" x 1/4" | 15.19 | 12.23 | 7.70 | 28.96 | 23.88 | 14.69 | 24.96 | 19.37 | 11.90 |
| 1/4" x 1mm | 6.53 | 5.04 | 3.02 | 35.50 | 28.91 | 17.72 | 9.77 | 7.14 | 4.20 |
| 1mm x 100M | 2.68 | 1.76 | 0.99 | 38.18 | 30.67 | 18.71 | 3.23 | 2.10 | 1.18 |
| Minus 100M | 0.56 | 0.34 | 0.18 | 38.73 | 31.02 | 18.89 | 0.56 | 0.34 | 0.18 |
| **Fine Refuse** | | | | | | | | 5.5 | TPH |
| Plus 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.53 | 1.37 | 0.89 |
| 3/4" x 1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.53 | 1.37 | 0.89 |
| 1/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.53 | 1.37 | 0.89 |
| 1mm x 100M | 0.21 | 0.02 | 0.00 | 0.21 | 0.02 | 0.00 | 5.53 | 1.37 | 0.89 |
| Minus 100M | 5.32 | 1.35 | 0.89 | 5.53 | 1.37 | 0.89 | 5.32 | 1.35 | 0.89 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 960,402 | 222,964 | 77.1 | 80.31 | 345.94 |
| Clean Coal | 716,979 | 44,237 | 23.2 | 32.29 | 523.39 |
| Coarse Refuse | 213,031 | 170,583 | 52.0 | 243.86 | 304.55 |
| Fine Refuse | 30,393 | 7,514 | 2.5 | 80.63 | 326.12 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.40 | 0.52 | 1.08 | 2.08 | 0.53 | 0.93 | 0.25 | 0.03 | 0.16 | 0.03 | 0.13 | 0.04 | 0.14 | 0.01 | 0.07 | 0.03 |
| 3/4" x 1/4" | 0.68 | 0.93 | 1.66 | 3.14 | 0.86 | 1.43 | 0.39 | 0.05 | 0.25 | 0.05 | 0.21 | 0.06 | 0.22 | 0.02 | 0.12 | 0.04 |
| 1/4" x 1mm | 0.49 | 0.83 | 1.03 | 1.98 | 0.64 | 0.92 | 0.28 | 0.04 | 0.20 | 0.04 | 0.18 | 0.04 | 0.15 | 0.02 | 0.09 | 0.04 |
| 1mm x 100M | 0.32 | 0.43 | 0.45 | 0.89 | 0.44 | 0.42 | 0.13 | 0.02 | 0.12 | 0.02 | 0.09 | 0.02 | 0.07 | 0.01 | 0.04 | 0.02 |
| Minus 100M | 0.11 | 0.11 | 0.13 | 0.26 | 0.17 | 0.12 | 0.04 | 0.01 | 0.04 | 0.01 | 0.03 | 0.00 | 0.02 | 0.00 | 0.01 | 0.01 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.02 | 0.03 | 0.04 | 0.08 | 0.02 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 1/4" | 0.11 | 0.20 | 0.18 | 0.37 | 0.10 | 0.20 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.01 | 0.02 | 0.00 | 0.02 | 0.00 |
| 1/4" x 1mm | 0.28 | 0.58 | 0.45 | 0.91 | 0.26 | 0.51 | 0.13 | 0.02 | 0.11 | 0.02 | 0.11 | 0.03 | 0.06 | 0.01 | 0.05 | 0.01 |
| 1mm x 100M | 0.18 | 0.36 | 0.24 | 0.54 | 0.15 | 0.28 | 0.07 | 0.02 | 0.08 | 0.01 | 0.06 | 0.02 | 0.05 | 0.01 | 0.03 | 0.01 |
| Minus 100M | 0.10 | 0.17 | 0.13 | 0.28 | 0.13 | 0.14 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.46 | 0.54 | 1.12 | 2.43 | 0.48 | 1.05 | 0.25 | 0.04 | 0.17 | 0.02 | 0.13 | 0.04 | 0.16 | 0.01 | 0.07 | 0.01 |
| 3/4" x 1/4" | 0.49 | 0.59 | 1.28 | 2.42 | 0.75 | 1.17 | 0.32 | 0.04 | 0.18 | 0.04 | 0.17 | 0.04 | 0.08 | 0.01 | 0.08 | 0.03 |
| 1/4" x 1mm | 0.19 | 0.22 | 0.48 | 0.93 | 0.37 | 0.42 | 0.14 | 0.01 | 0.07 | 0.02 | 0.07 | 0.01 | 0.03 | 0.00 | 0.03 | 0.02 |
| 1mm x 100M | 0.09 | 0.07 | 0.14 | 0.27 | 0.17 | 0.11 | 0.04 | 0.00 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.01 |
| Minus 100M | 0.02 | 0.01 | 0.02 | 0.03 | 0.06 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 1/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Minus 100M | 0.06 | 0.09 | 0.14 | 0.27 | 0.07 | 0.12 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 5.5 | 7.8 | 12.0 | 23.0 | 7.3 | 10.5 | 3.0 | 0.4 | 2.1 | 0.4 | 1.7 | 0.5 | 1.7 | 0.2 | 0.9 | 0.4 |
| Clean Coal | 1.9 | 3.7 | 2.9 | 6.0 | 1.8 | 3.2 | 0.8 | 0.1 | 0.8 | 0.1 | 0.7 | 0.2 | 0.4 | 0.1 | 0.3 | 0.1 |
| Coarse Refuse | 3.4 | 3.9 | 8.4 | 16.7 | 5.0 | 7.6 | 2.1 | 0.2 | 1.3 | 0.2 | 1.1 | 0.3 | 0.8 | 0.1 | 0.6 | 0.2 |
| Fine Refuse | 0.2 | 0.3 | 0.4 | 0.8 | 0.2 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 174.6 | TPH |
| Float 1.6 | 110.50 | 6.54 | 7.11 | 110.50 | 6.54 | 7.11 | 149.33 | 37.71 | 26.09 |
| Float 1.8 | 3.75 | 1.52 | 0.95 | 114.25 | 8.06 | 8.06 | 38.83 | 31.17 | 18.98 |
| Sink 1.8 | 35.09 | 29.65 | 18.03 | 149.33 | 37.71 | 26.09 | 35.09 | 29.65 | 18.03 |
| **Clean Coal (Plus 100M)** | | | | | | | | 130.4 | TPH |
| Float 1.6 | 109.32 | 6.31 | 6.96 | 109.32 | 6.31 | 6.96 | 110.95 | 7.02 | 7.38 |
| Float 1.8 | 1.10 | 0.42 | 0.26 | 110.43 | 6.73 | 7.22 | 1.63 | 0.71 | 0.42 |
| Sink 1.8 | 0.52 | 0.29 | 0.16 | 110.95 | 7.02 | 7.38 | 0.52 | 0.29 | 0.16 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 38.7 | TPH |
| Float 1.6 | 0.98 | 0.22 | 0.15 | 0.98 | 0.22 | 0.15 | 38.18 | 30.67 | 18.71 |
| Float 1.8 | 2.64 | 1.10 | 0.69 | 3.62 | 1.32 | 0.84 | 37.20 | 30.45 | 18.56 |
| Sink 1.8 | 34.56 | 29.35 | 17.87 | 38.18 | 30.67 | 18.71 | 34.56 | 29.35 | 17.87 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 5.5 | TPH |
| Float 1.6 | 0.20 | 0.01 | 0.00 | 0.20 | 0.01 | 0.00 | 0.21 | 0.02 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.20 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 |
| Sink 1.8 | 0.01 | 0.00 | 0.00 | 0.21 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 821,327 | 207,404 | 71.7 | 87.35 | 345.93 |
| Clean Coal | 610,221 | 38,611 | 20.3 | 33.26 | 525.67 |
| Coarse Refuse | 209,963 | 168,694 | 51.5 | 245.04 | 304.99 |
| Fine Refuse | 1,143 | 99 | 0.0 | 0.00 | 0.00 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

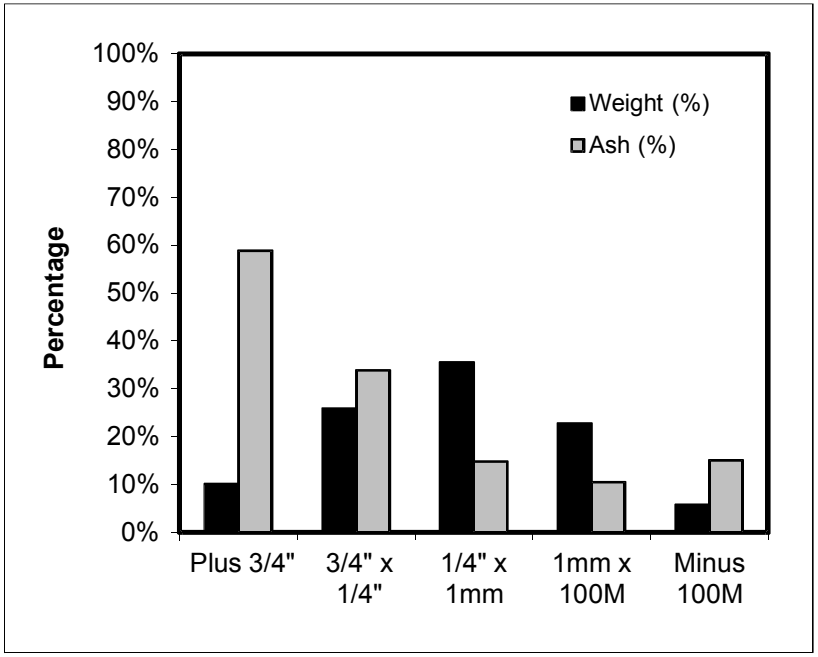
****Unless otherwise noted, REE values reported in ppm*

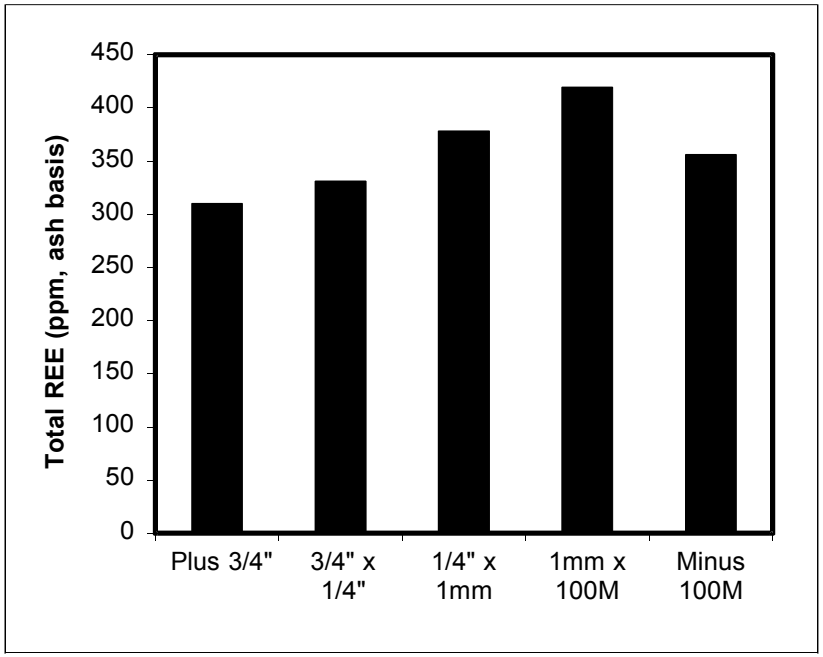
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.57 | 1.16 | 0.89 | 1.86 | 0.50 | 1.01 | 0.25 | 0.04 | 0.23 | 0.04 | 0.21 | 0.06 | 0.13 | 0.03 | 0.10 | 0.02 |
| Float 1.8 | 0.09 | 0.10 | 0.15 | 0.28 | 0.08 | 0.12 | 0.03 | 0.00 | 0.02 | 0.00 | 0.02 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 1.16 | 1.34 | 2.92 | 5.85 | 1.72 | 2.66 | 0.73 | 0.09 | 0.44 | 0.08 | 0.38 | 0.10 | 0.27 | 0.03 | 0.19 | 0.07 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.56 | 1.14 | 0.87 | 1.82 | 0.49 | 0.99 | 0.24 | 0.04 | 0.23 | 0.04 | 0.21 | 0.06 | 0.13 | 0.03 | 0.10 | 0.02 |
| Float 1.8 | 0.02 | 0.03 | 0.04 | 0.07 | 0.03 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.01 | 0.01 | 0.02 | 0.04 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.01 | 0.02 | 0.02 | 0.04 | 0.01 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.07 | 0.07 | 0.11 | 0.21 | 0.06 | 0.09 | 0.02 | 0.00 | 0.02 | 0.00 | 0.02 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 |
| Sink 1.8 | 1.15 | 1.33 | 2.90 | 5.80 | 1.69 | 2.64 | 0.72 | 0.09 | 0.44 | 0.08 | 0.37 | 0.10 | 0.27 | 0.03 | 0.19 | 0.07 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

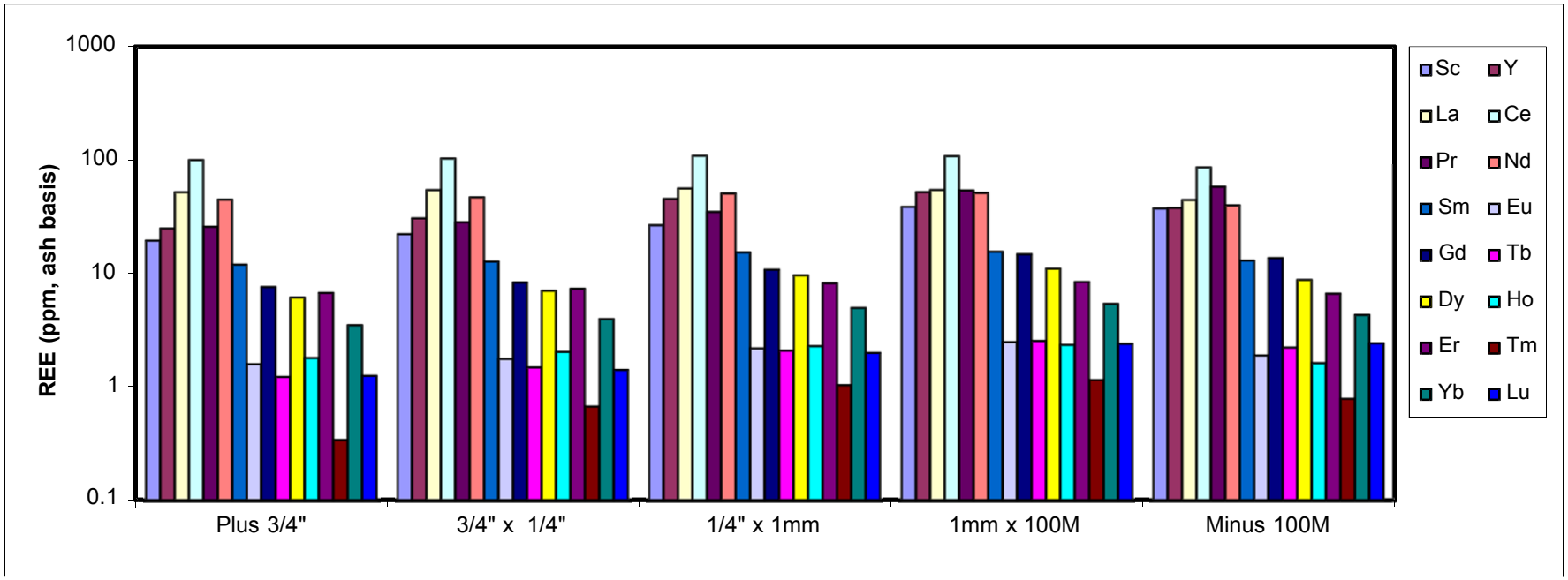
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 5.0 | 7.2 | 10.9 | 22.0 | 6.3 | 10.4 | 2.8 | 0.4 | 1.9 | 0.3 | 1.7 | 0.5 | 1.1 | 0.2 | 0.8 | 0.3 |
| Clean Coal | 1.6 | 3.3 | 2.6 | 5.3 | 1.5 | 2.9 | 0.7 | 0.1 | 0.7 | 0.1 | 0.6 | 0.2 | 0.4 | 0.1 | 0.3 | 0.1 |
| Coarse Refuse | 3.4 | 3.9 | 8.3 | 16.6 | 4.9 | 7.6 | 2.1 | 0.2 | 1.2 | 0.2 | 1.1 | 0.3 | 0.8 | 0.1 | 0.6 | 0.2 |
| Fine Refuse | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 10.08% | 58.90% | 309.41 | 10.08% | 232.66% | 347.07 | 200.00% | 14.69% | 383.20 |
| 3/4" x 1/4" | 25.87% | 33.85% | 330.57 | 35.95% | 48.72% | 359.84 | 189.92% | 12.35% | 401.88 |
| 1/4" x 1mm | 35.52% | 14.81% | 377.88 | 71.47% | 12.25% | 389.11 | 164.05% | 8.96% | 444.39 |
| 1mm x 100M | 22.76% | 10.51% | 419.17 | 94.23% | 3.71% | 406.00 | 128.53% | 7.34% | 481.49 |
| Minus 100M | 5.77% | 15.06% | 355.56 | 100.00% | 1.10% | 377.48 | 105.77% | 6.65% | 502.67 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 19.52 | 24.86 | 52.09 | 100.34 | 25.79 | 44.77 | 11.92 | 1.58 | 7.60 | 1.22 | 6.12 | 1.80 | 6.72 | 0.34 | 3.49 | 1.25 |
| 3/4" x 1/4" | 22.08 | 30.52 | 54.16 | 102.65 | 28.05 | 46.62 | 12.64 | 1.75 | 8.27 | 1.48 | 7.02 | 2.02 | 7.30 | 0.67 | 3.94 | 1.40 |
| 1/4" x 1mm | 26.44 | 45.01 | 55.81 | 107.80 | 34.57 | 50.21 | 15.22 | 2.17 | 10.69 | 2.07 | 9.55 | 2.27 | 8.14 | 1.03 | 4.92 | 1.98 |
| 1mm x 100M | 38.04 | 51.49 | 53.95 | 106.58 | 53.18 | 50.53 | 15.41 | 2.46 | 14.62 | 2.52 | 10.88 | 2.32 | 8.32 | 1.14 | 5.35 | 2.38 |
| Minus 100M | 37.03 | 37.41 | 43.90 | 85.45 | 57.53 | 39.41 | 12.87 | 1.88 | 13.54 | 2.21 | 8.70 | 1.61 | 6.56 | 0.78 | 4.27 | 2.41 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 2.85% | 8.28% | 458.16 | 2.85% | 8.28% | 458.16 | 100.00% | 6.17% | 523.39 |
| 3/4" x 1/4" | 12.76% | 8.72% | 470.00 | 15.61% | 8.64% | 467.93 | 97.15% | 6.11% | 525.98 |
| 1/4" x 1mm | 37.53% | 6.78% | 532.78 | 53.14% | 7.32% | 510.30 | 84.39% | 5.71% | 538.91 |
| 1mm x 100M | 31.97% | 4.40% | 572.47 | 85.11% | 6.22% | 526.79 | 46.86% | 4.86% | 545.76 |
| Minus 100M | 14.89% | 5.86% | 502.75 | 100.00% | 6.17% | 523.39 | 14.89% | 5.86% | 502.75 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.48% | 11.21% | 461.31 | 198.49% | 9.81% | 466.20 | 200.00% | 10.04% | 463.30 |
| Float 1.8 | 0.43% | 36.21% | 301.66 | 99.01% | 8.40% | 472.75 | 100.52% | 8.89% | 465.79 |
| Sink 1.8 | 0.09% | 64.24% | 272.91 | 98.58% | 8.28% | 476.01 | 100.09% | 8.77% | 468.70 |
| Float/Sink Analysis - 3/4" x 1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.49% | 8.23% | 477.46 | 98.49% | 8.23% | 477.46 | 100.00% | 8.72% | 470.00 |
| Float 1.8 | 1.25% | 39.17% | 374.23 | 99.74% | 8.62% | 471.58 | 1.51% | 41.00% | 372.27 |
| Sink 1.8 | 0.26% | 49.77% | 364.84 | 100.00% | 8.72% | 470.00 | 0.26% | 49.77% | 364.84 |
| Float/Sink Analysis - 1/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.98% | 6.03% | 568.44 | 97.98% | 6.03% | 568.44 | 100.00% | 6.78% | 532.78 |
| Float 1.8 | 1.45% | 37.96% | 296.20 | 99.43% | 6.50% | 545.24 | 2.02% | 42.94% | 289.86 |
| Sink 1.8 | 0.57% | 55.61% | 278.84 | 100.00% | 6.78% | 532.78 | 0.57% | 55.61% | 278.84 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.12% | 4.00% | 606.45 | 99.12% | 4.00% | 606.45 | 100.00% | 4.40% | 572.47 |
| Float 1.8 | 0.41% | 38.50% | 247.40 | 99.53% | 4.14% | 592.70 | 0.88% | 48.90% | 259.44 |
| Sink 1.8 | 0.47% | 57.98% | 266.41 | 100.00% | 4.40% | 572.47 | 0.47% | 57.98% | 266.41 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 33.39 | 55.83 | 69.53 | 134.89 | 33.11 | 69.37 | 15.25 | 2.15 | 12.04 | 1.90 | 11.69 | 3.93 | 6.67 | 1.39 | 6.09 | 0.93 |
| 3/4" x 1/4" | 36.61 | 69.63 | 63.22 | 127.15 | 34.95 | 68.38 | 16.66 | 2.64 | 14.04 | 2.37 | 13.60 | 4.00 | 7.26 | 1.55 | 6.68 | 1.26 |
| 1/4" x 1mm | 42.19 | 87.37 | 67.82 | 136.94 | 39.84 | 76.32 | 19.18 | 3.26 | 16.91 | 2.82 | 16.02 | 4.46 | 8.48 | 1.94 | 7.66 | 1.55 |
| 1mm x 100M | 48.32 | 97.18 | 65.38 | 148.51 | 41.22 | 76.49 | 20.33 | 4.12 | 20.76 | 3.31 | 16.98 | 4.47 | 13.15 | 2.29 | 8.28 | 1.71 |
| Minus 100M | 44.25 | 73.26 | 55.38 | 124.96 | 57.72 | 61.91 | 20.16 | 3.36 | 18.62 | 3.49 | 14.61 | 2.89 | 10.62 | 1.60 | 6.98 | 2.94 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.67 | 56.35 | 70.18 | 135.76 | 33.20 | 69.84 | 15.29 | 2.16 | 12.10 | 1.90 | 11.78 | 3.97 | 6.65 | 1.40 | 6.14 | 0.92 |
| Float 1.8 | 19.12 | 31.96 | 36.83 | 95.43 | 19.70 | 51.47 | 11.95 | 1.80 | 9.23 | 1.23 | 6.67 | 2.69 | 8.85 | 0.84 | 3.61 | 0.28 |
| Sink 1.8 | 17.93 | 20.16 | 32.59 | 72.58 | 52.46 | 27.50 | 17.39 | 1.55 | 8.45 | 2.84 | 7.78 | -0.08 | 3.94 | 0.23 | 3.56 | 4.03 |
| Float/Sink Analysis - 3/4" x 1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.07 | 72.28 | 63.55 | 128.66 | 34.45 | 69.91 | 16.77 | 2.71 | 14.47 | 2.38 | 13.93 | 4.15 | 7.52 | 1.62 | 6.81 | 1.18 |
| Float 1.8 | 33.20 | 37.91 | 60.49 | 110.03 | 32.41 | 51.87 | 12.95 | 1.70 | 8.46 | 1.92 | 9.03 | 2.51 | 4.46 | 0.79 | 5.07 | 1.43 |
| Sink 1.8 | 20.94 | 23.72 | 52.92 | 97.16 | 75.87 | 34.95 | 23.78 | 1.82 | 7.94 | 3.59 | 10.07 | 0.00 | 1.45 | 0.00 | 4.95 | 5.68 |
| Float/Sink Analysis - 1/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.96 | 96.16 | 71.49 | 145.16 | 40.14 | 82.32 | 19.98 | 3.54 | 18.47 | 2.95 | 17.25 | 4.95 | 9.32 | 2.12 | 8.19 | 1.44 |
| Float 1.8 | 25.91 | 30.56 | 44.66 | 84.54 | 32.02 | 37.50 | 12.06 | 1.36 | 6.52 | 1.74 | 7.61 | 1.62 | 3.31 | 0.82 | 4.23 | 1.74 |
| Sink 1.8 | 18.84 | 22.15 | 39.72 | 74.61 | 47.85 | 32.00 | 16.71 | 1.34 | 5.98 | 2.30 | 7.60 | 0.30 | 1.82 | 0.53 | 3.76 | 3.33 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 51.48 | 104.96 | 68.21 | 156.60 | 42.19 | 81.33 | 21.29 | 4.43 | 22.36 | 3.48 | 18.12 | 4.85 | 14.21 | 2.47 | 8.79 | 1.68 |
| Float 1.8 | 18.46 | 23.84 | 36.31 | 74.03 | 28.12 | 29.32 | 10.62 | 1.20 | 5.97 | 1.65 | 5.94 | 0.94 | 5.07 | 0.56 | 3.41 | 1.96 |
| Sink 1.8 | 19.58 | 26.41 | 40.97 | 73.97 | 34.68 | 33.40 | 11.95 | 1.28 | 6.02 | 1.82 | 6.71 | 0.96 | 2.34 | 0.61 | 3.67 | 2.04 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 35.56% | 84.57% | 300.30 | 35.56% | 84.57% | 300.30 | 100.00% | 80.07% | 304.55 |
| 3/4" x 1/4" | 39.22% | 80.49% | 314.75 | 74.78% | 82.43% | 307.70 | 64.44% | 77.59% | 307.10 |
| 1/4" x 1mm | 16.87% | 77.06% | 300.13 | 91.65% | 81.44% | 306.38 | 25.22% | 73.09% | 294.00 |
| 1mm x 100M | 6.91% | 65.80% | 282.15 | 98.56% | 80.34% | 304.99 | 8.35% | 65.07% | 279.32 |
| Minus 100M | 1.44% | 61.57% | 264.80 | 100.00% | 80.07% | 304.55 | 1.44% | 61.57% | 264.80 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.45% | 32.93% | 322.62 | 1.45% | 32.93% | 322.62 | 100.00% | 84.57% | 300.30 |
| Float 1.8 | 5.73% | 42.27% | 312.70 | 7.18% | 40.38% | 314.33 | 98.55% | 85.33% | 300.17 |
| Sink 1.8 | 92.82% | 87.99% | 299.80 | 100.00% | 84.57% | 300.30 | 92.82% | 87.99% | 299.80 |
| Float/Sink Analysis - 3/4" x 1/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.96% | 29.28% | 325.58 | 1.96% | 29.28% | 325.58 | 100.00% | 80.49% | 314.75 |
| Float 1.8 | 7.99% | 41.85% | 321.15 | 9.95% | 39.37% | 321.80 | 98.04% | 81.51% | 314.67 |
| Sink 1.8 | 90.05% | 85.03% | 314.39 | 100.00% | 80.49% | 314.75 | 90.05% | 85.03% | 314.39 |
| Float/Sink Analysis - 1/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.54% | 18.29% | 370.36 | 2.54% | 18.29% | 370.36 | 100.00% | 77.06% | 300.13 |
| Float 1.8 | 6.60% | 42.54% | 304.92 | 9.14% | 35.80% | 314.21 | 97.46% | 78.59% | 299.71 |
| Sink 1.8 | 90.86% | 81.21% | 299.51 | 100.00% | 77.06% | 300.13 | 90.86% | 81.21% | 299.51 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 11.74% | 11.08% | 437.35 | 11.74% | 11.08% | 437.35 | 100.00% | 65.80% | 282.15 |
| Float 1.8 | 7.64% | 37.20% | 282.56 | 19.38% | 21.38% | 331.16 | 88.26% | 73.08% | 279.02 |
| Sink 1.8 | 80.62% | 76.48% | 278.86 | 100.00% | 65.80% | 282.15 | 80.62% | 76.48% | 278.86 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 19.79 | 23.32 | 48.10 | 104.29 | 20.44 | 45.10 | 10.67 | 1.51 | 7.43 | 0.98 | 5.52 | 1.93 | 6.84 | 0.55 | 3.19 | 0.64 |
| 3/4" x 1/4" | 20.14 | 24.08 | 52.51 | 98.83 | 30.69 | 47.79 | 13.08 | 1.48 | 7.39 | 1.44 | 7.04 | 1.84 | 3.22 | 0.48 | 3.43 | 1.31 |
| 1/4" x 1mm | 18.68 | 21.62 | 47.92 | 92.70 | 36.74 | 41.48 | 14.22 | 1.39 | 6.83 | 1.68 | 7.09 | 1.26 | 2.71 | 0.44 | 3.39 | 2.00 |
| 1mm x 100M | 25.77 | 19.31 | 40.04 | 77.01 | 47.48 | 31.77 | 11.20 | 1.24 | 9.04 | 1.69 | 6.06 | 0.97 | 4.90 | 0.35 | 3.05 | 2.27 |
| Minus 100M | 31.74 | 13.28 | 26.58 | 48.77 | 82.07 | 16.35 | 14.11 | 0.93 | 11.16 | 2.79 | 6.84 | -0.51 | 2.85 | 0.24 | 3.05 | 4.55 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.83 | 37.97 | 48.48 | 95.11 | 26.13 | 41.58 | 10.63 | 1.43 | 7.28 | 1.60 | 8.45 | 2.55 | 4.53 | 1.02 | 4.91 | 1.12 |
| Float 1.8 | 32.19 | 33.20 | 48.83 | 92.11 | 24.47 | 41.29 | 9.92 | 1.36 | 6.94 | 1.52 | 7.76 | 2.49 | 4.15 | 0.95 | 4.56 | 0.96 |
| Sink 1.8 | 19.36 | 22.94 | 48.08 | 104.70 | 20.29 | 45.23 | 10.69 | 1.51 | 7.45 | 0.96 | 5.44 | 1.91 | 6.93 | 0.54 | 3.14 | 0.63 |
| Float/Sink Analysis - 3/4" x 1/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.72 | 36.48 | 48.04 | 101.46 | 24.52 | 43.14 | 10.11 | 1.37 | 7.28 | 1.47 | 8.20 | 2.69 | 4.44 | 1.08 | 4.72 | 0.86 |
| Float 1.8 | 31.36 | 33.47 | 48.88 | 94.93 | 27.97 | 42.24 | 11.05 | 1.37 | 7.13 | 1.58 | 8.08 | 2.38 | 4.05 | 0.93 | 4.58 | 1.15 |
| Sink 1.8 | 19.58 | 23.58 | 52.70 | 98.98 | 30.85 | 48.07 | 13.19 | 1.49 | 7.40 | 1.43 | 6.99 | 1.81 | 3.17 | 0.46 | 3.37 | 1.32 |
| Float/Sink Analysis - 1/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 29.92 | 45.43 | 56.72 | 105.38 | 29.83 | 47.63 | 13.53 | 2.18 | 9.58 | 2.08 | 8.93 | 2.41 | 8.60 | 1.16 | 5.30 | 1.68 |
| Float 1.8 | 27.79 | 30.44 | 45.83 | 94.87 | 25.92 | 36.89 | 10.56 | 1.47 | 6.87 | 1.50 | 6.73 | 1.89 | 7.50 | 0.84 | 4.32 | 1.50 |
| Sink 1.8 | 18.26 | 21.13 | 47.94 | 92.54 | 37.20 | 41.62 | 14.36 | 1.38 | 6.81 | 1.68 | 7.09 | 1.23 | 2.49 | 0.42 | 3.34 | 2.02 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 34.40 | 61.59 | 59.04 | 117.35 | 38.17 | 56.00 | 16.66 | 2.86 | 12.88 | 2.94 | 11.93 | 2.88 | 10.41 | 1.46 | 6.59 | 2.19 |
| Float 1.8 | 22.99 | 28.36 | 46.66 | 83.34 | 25.87 | 35.29 | 10.49 | 1.42 | 6.52 | 1.51 | 6.18 | 1.55 | 6.21 | 0.74 | 3.85 | 1.58 |
| Sink 1.8 | 25.72 | 18.00 | 39.33 | 75.87 | 48.67 | 31.10 | 11.12 | 1.20 | 9.08 | 1.67 | 5.93 | 0.90 | 4.72 | 0.31 | 2.94 | 2.30 |

## PLANT 13

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 3.76% | 8.68% | 0.00 | 3.76% | 8.68% | 0.00 | 100.00% | 24.72% | 326.12 |
| Minus 100M | 96.24% | 25.35% | 330.49 | 100.00% | 24.72% | 326.12 | 96.24% | 25.35% | 330.49 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.92% | 6.31% | 0.00 | 95.92% | 6.31% | 0.00 | 100.00% | 8.68% | 0.00 |
| Float 1.8 | 1.02% | 39.10% | 0.00 | 96.94% | 6.66% | 0.00 | 4.08% | 64.52% | 0.00 |
| Sink 1.8 | 3.06% | 72.99% | 0.00 | 100.00% | 8.68% | 0.00 | 3.06% | 72.99% | 0.00 |

## PLANT 13

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Minus 100M | 23.23 | 33.75 | 50.74 | 101.66 | 27.03 | 46.07 | 12.79 | 1.88 | 8.7 | 1.54 | 7.42 | 2.06 | 7.33 | 0.74 | 4.14 | 1.41 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1819.4 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1819.42 | 519.74 | 321.37 |
| 1-1/2" x 3/4" | 433.93 | 141.42 | 97.31 | 433.93 | 141.42 | 97.31 | 1819.42 | 519.74 | 321.37 |
| 3/4" x 1mm | 1077.10 | 290.92 | 179.89 | 1511.03 | 432.34 | 277.20 | 1385.49 | 378.32 | 224.06 |
| 1mm x 100M | 241.80 | 64.59 | 36.00 | 1752.83 | 496.93 | 313.19 | 308.39 | 87.39 | 44.17 |
| Minus 100M | 66.59 | 22.81 | 8.17 | 1819.42 | 519.74 | 321.37 | 66.59 | 22.81 | 8.17 |
| **Clean Coal** | | | | | | | | 1268.6 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1268.62 | 102.90 | 79.13 |
| 1-1/2" x 3/4" | 267.55 | 22.82 | 20.11 | 267.55 | 22.82 | 20.11 | 1268.62 | 102.90 | 79.13 |
| 3/4" x 1mm | 773.09 | 58.59 | 43.31 | 1040.65 | 81.41 | 63.42 | 1001.06 | 80.08 | 59.03 |
| 1mm x 100M | 157.69 | 12.45 | 9.81 | 1198.33 | 93.85 | 73.23 | 227.97 | 21.49 | 15.71 |
| Minus 100M | 70.28 | 9.05 | 5.90 | 1268.62 | 102.90 | 79.13 | 70.28 | 9.05 | 5.90 |
| **Coarse Refuse** | | | | | | | | 403.8 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 403.81 | 338.64 | 203.03 |
| 1-1/2" x 3/4" | 133.90 | 112.44 | 73.44 | 133.90 | 112.44 | 73.44 | 403.81 | 338.64 | 203.03 |
| 3/4" x 1mm | 243.17 | 205.40 | 119.12 | 377.08 | 317.83 | 192.56 | 269.90 | 226.20 | 129.58 |
| 1mm x 100M | 22.37 | 17.38 | 8.55 | 399.45 | 335.21 | 201.11 | 26.73 | 20.81 | 10.46 |
| Minus 100M | 4.36 | 3.43 | 1.91 | 403.81 | 338.64 | 203.03 | 4.36 | 3.43 | 1.91 |
| **Fine Refuse** | | | | | | | | 147.0 | TPH |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 147.00 | 78.20 | 43.19 |
| 1-1/2" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 147.00 | 78.20 | 43.19 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 147.00 | 78.20 | 43.19 |
| 1mm x 100M | 30.34 | 14.33 | 6.55 | 30.34 | 14.33 | 6.55 | 147.00 | 78.20 | 43.19 |
| Minus 100M | 116.66 | 63.87 | 36.64 | 147.00 | 78.20 | 43.19 | 116.66 | 63.87 | 36.64 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 10,006,825 | 2,858,544 | 883.8 | 88.32 | 309.16 |
| Clean Coal | 6,977,385 | 565,946 | 217.6 | 31.19 | 384.52 |
| Coarse Refuse | 2,220,940 | 1,862,509 | 558.3 | 251.39 | 299.77 |
| Fine Refuse | 808,502 | 430,089 | 118.8 | 146.90 | 276.15 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 8.02 | 9.38 | 15.14 | 29.42 | 8.05 | 14.20 | 3.11 | 0.53 | 3.01 | 0.32 | 1.96 | 0.71 | 2.08 | 0.19 | 1.06 | 0.15 |
| 3/4" x 1mm | 15.11 | 16.95 | 27.74 | 53.72 | 16.12 | 25.59 | 5.86 | 0.98 | 5.39 | 0.68 | 3.69 | 1.28 | 3.93 | 0.35 | 2.05 | 0.45 |
| 1mm x 100M | 3.41 | 3.04 | 5.17 | 11.10 | 3.90 | 4.65 | 1.08 | 0.18 | 1.10 | 0.14 | 0.67 | 0.22 | 0.76 | 0.06 | 0.39 | 0.12 |
| Minus 100M | 0.79 | 0.51 | 0.99 | 2.89 | 0.94 | 0.98 | 0.24 | 0.04 | 0.24 | 0.04 | 0.14 | 0.06 | 0.21 | 0.01 | 0.08 | 0.03 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 1.67 | 2.68 | 2.70 | 5.15 | 1.95 | 2.71 | 0.79 | 0.13 | 0.64 | 0.13 | 0.55 | 0.12 | 0.41 | 0.06 | 0.29 | 0.11 |
| 3/4" x 1mm | 3.92 | 5.33 | 5.63 | 11.40 | 4.74 | 5.46 | 1.70 | 0.28 | 1.33 | 0.29 | 1.10 | 0.23 | 0.87 | 0.13 | 0.62 | 0.28 |
| 1mm x 100M | 0.97 | 1.19 | 1.26 | 2.51 | 1.13 | 1.24 | 0.37 | 0.06 | 0.32 | 0.07 | 0.23 | 0.05 | 0.19 | 0.03 | 0.14 | 0.06 |
| Minus 100M | 0.61 | 0.57 | 0.75 | 1.50 | 0.89 | 0.68 | 0.23 | 0.03 | 0.20 | 0.04 | 0.14 | 0.02 | 0.11 | 0.01 | 0.08 | 0.04 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 5.58 | 6.26 | 12.26 | 23.62 | 5.32 | 11.14 | 2.26 | 0.38 | 2.10 | 0.18 | 1.32 | 0.56 | 1.61 | 0.14 | 0.71 | 0.02 |
| 3/4" x 1mm | 9.23 | 10.13 | 19.65 | 37.74 | 9.20 | 17.69 | 3.62 | 0.60 | 3.40 | 0.34 | 2.28 | 0.90 | 2.79 | 0.23 | 1.23 | 0.09 |
| 1mm x 100M | 0.79 | 0.60 | 1.19 | 2.83 | 1.00 | 1.05 | 0.24 | 0.04 | 0.26 | 0.03 | 0.16 | 0.05 | 0.19 | 0.01 | 0.08 | 0.03 |
| Minus 100M | 0.15 | 0.15 | 0.30 | 0.55 | 0.25 | 0.23 | 0.08 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.65 | 0.48 | 0.85 | 2.05 | 0.88 | 0.75 | 0.20 | 0.03 | 0.20 | 0.03 | 0.13 | 0.04 | 0.14 | 0.01 | 0.07 | 0.03 |
| Minus 100M | 2.96 | 3.14 | 6.17 | 11.55 | 2.86 | 5.29 | 1.09 | 0.19 | 1.02 | 0.10 | 0.68 | 0.28 | 0.81 | 0.07 | 0.38 | 0.03 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 75.2 | 82.2 | 134.9 | 267.1 | 79.8 | 124.9 | 28.3 | 4.8 | 26.8 | 3.2 | 17.8 | 6.2 | 19.2 | 1.7 | 9.8 | 2.0 |
| Clean Coal | 19.7 | 26.9 | 28.4 | 56.6 | 23.9 | 27.7 | 8.5 | 1.4 | 6.8 | 1.5 | 5.5 | 1.1 | 4.3 | 0.7 | 3.1 | 1.4 |
| Coarse Refuse | 43.3 | 47.1 | 91.8 | 178.0 | 43.3 | 82.8 | 17.1 | 2.8 | 16.0 | 1.5 | 10.4 | 4.2 | 12.7 | 1.1 | 5.6 | 0.4 |
| Fine Refuse | 9.9 | 10.0 | 19.3 | 37.4 | 10.3 | 16.6 | 3.6 | 0.6 | 3.4 | 0.4 | 2.2 | 0.9 | 2.6 | 0.2 | 1.2 | 0.2 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1819.4 | TPH |
| Float 1.6 | 1192.68 | 84.52 | 68.77 | 1192.68 | 84.52 | 68.77 | 1628.12 | 443.39 | 280.90 |
| Float 1.8 | 26.27 | 10.42 | 5.71 | 1218.95 | 94.94 | 74.48 | 435.44 | 358.88 | 212.13 |
| Sink 1.8 | 409.18 | 348.45 | 206.42 | 1628.12 | 443.39 | 280.90 | 409.18 | 348.45 | 206.42 |
| **Clean Coal (Plus 100M)** | | | | | | | | 1268.6 | TPH |
| Float 1.6 | 1175.51 | 83.23 | 67.70 | 1175.51 | 83.23 | 67.70 | 1198.33 | 93.85 | 73.23 |
| Float 1.8 | 15.31 | 5.62 | 2.97 | 1190.82 | 88.84 | 70.67 | 22.82 | 10.63 | 5.53 |
| Sink 1.8 | 7.51 | 5.01 | 2.56 | 1198.33 | 93.85 | 73.23 | 7.51 | 5.01 | 2.56 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 403.8 | TPH |
| Float 1.6 | 3.50 | 0.49 | 0.35 | 3.50 | 0.49 | 0.35 | 399.45 | 335.21 | 201.11 |
| Float 1.8 | 10.44 | 4.61 | 2.66 | 13.94 | 5.10 | 3.01 | 395.95 | 334.73 | 200.76 |
| Sink 1.8 | 385.51 | 330.12 | 198.11 | 399.45 | 335.21 | 201.11 | 385.51 | 330.12 | 198.11 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 147.0 | TPH |
| Float 1.6 | 13.66 | 0.80 | 0.72 | 13.66 | 0.80 | 0.72 | 30.34 | 14.33 | 6.55 |
| Float 1.8 | 0.52 | 0.20 | 0.08 | 14.18 | 1.00 | 0.80 | 16.68 | 13.52 | 5.84 |
| Sink 1.8 | 16.16 | 13.33 | 5.75 | 30.34 | 14.33 | 6.55 | 16.16 | 13.33 | 5.75 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 8,954,665 | 2,438,666 | 772.5 | 86.26 | 316.76 |
| Clean Coal | 6,590,838 | 516,197 | 201.4 | 30.56 | 390.13 |
| Coarse Refuse | 2,196,952 | 1,843,671 | 553.1 | 251.74 | 299.98 |
| Fine Refuse | 166,875 | 78,798 | 18.0 | 107.97 | 228.65 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

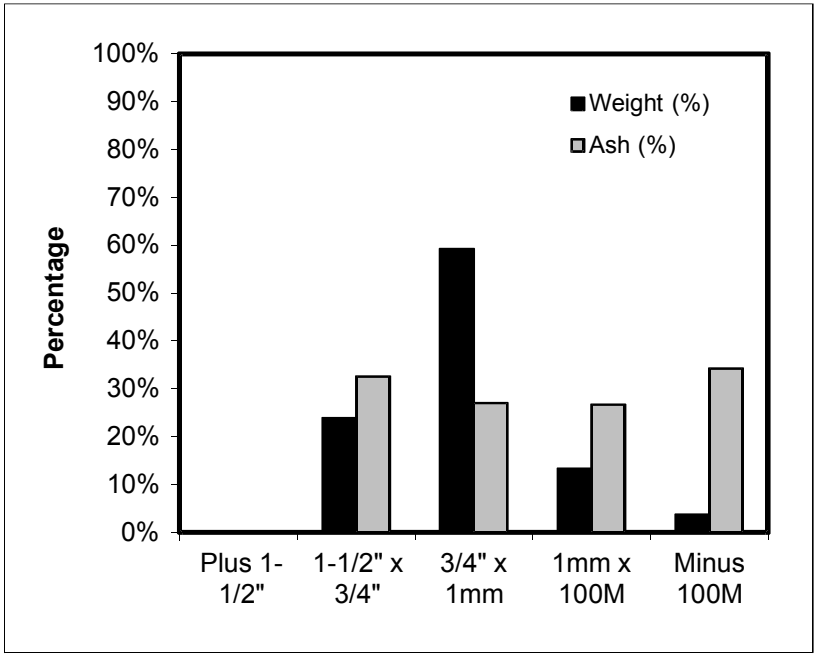
****Unless otherwise noted, REE values reported in ppm*

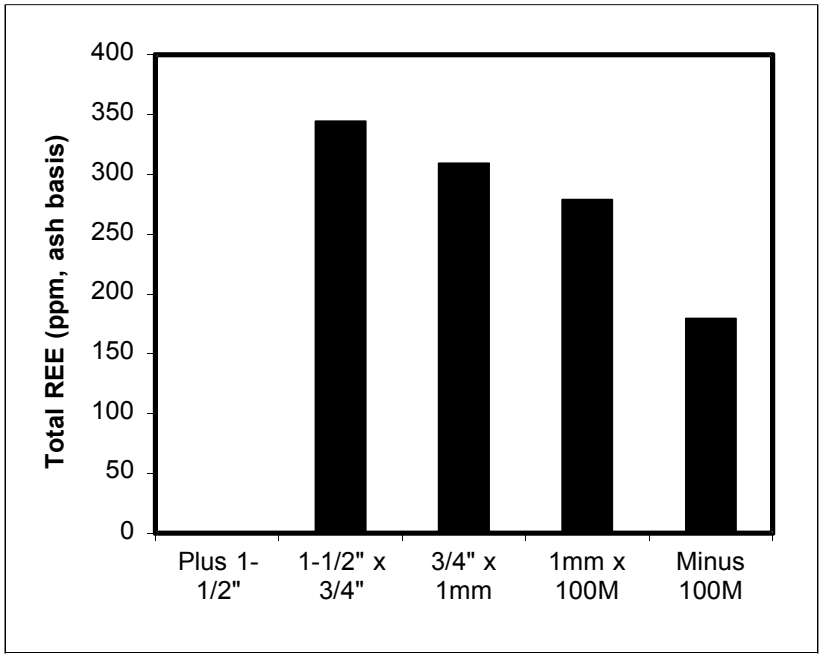
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 6.08 | 8.93 | 9.03 | 17.77 | 7.03 | 8.92 | 2.72 | 0.45 | 2.13 | 0.47 | 1.80 | 0.38 | 1.39 | 0.22 | 1.02 | 0.42 |
| Float 1.8 | 0.58 | 0.46 | 0.74 | 1.58 | 0.82 | 0.71 | 0.20 | 0.03 | 0.19 | 0.03 | 0.11 | 0.03 | 0.12 | 0.01 | 0.07 | 0.03 |
| Sink 1.8 | 16.14 | 17.28 | 33.77 | 65.94 | 16.37 | 30.41 | 6.27 | 1.03 | 5.93 | 0.57 | 3.85 | 1.54 | 4.69 | 0.39 | 2.07 | 0.17 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 5.98 | 8.80 | 8.89 | 17.50 | 6.93 | 8.78 | 2.67 | 0.44 | 2.10 | 0.46 | 1.78 | 0.37 | 1.37 | 0.22 | 1.00 | 0.42 |
| Float 1.8 | 0.31 | 0.23 | 0.37 | 0.80 | 0.49 | 0.33 | 0.11 | 0.01 | 0.10 | 0.02 | 0.06 | 0.01 | 0.05 | 0.00 | 0.04 | 0.02 |
| Sink 1.8 | 0.27 | 0.18 | 0.33 | 0.76 | 0.40 | 0.29 | 0.07 | 0.01 | 0.09 | 0.01 | 0.05 | 0.01 | 0.05 | 0.00 | 0.02 | 0.01 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.04 | 0.05 | 0.09 | 0.04 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.26 | 0.23 | 0.36 | 0.75 | 0.31 | 0.36 | 0.09 | 0.01 | 0.09 | 0.01 | 0.05 | 0.02 | 0.06 | 0.00 | 0.03 | 0.01 |
| Sink 1.8 | 15.30 | 16.72 | 32.69 | 63.34 | 15.16 | 29.47 | 6.03 | 1.00 | 5.66 | 0.53 | 3.70 | 1.50 | 4.52 | 0.38 | 1.99 | 0.13 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.07 | 0.09 | 0.09 | 0.18 | 0.07 | 0.10 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Float 1.8 | 0.01 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.57 | 0.38 | 0.75 | 1.84 | 0.80 | 0.64 | 0.17 | 0.02 | 0.18 | 0.03 | 0.11 | 0.03 | 0.13 | 0.01 | 0.06 | 0.03 |

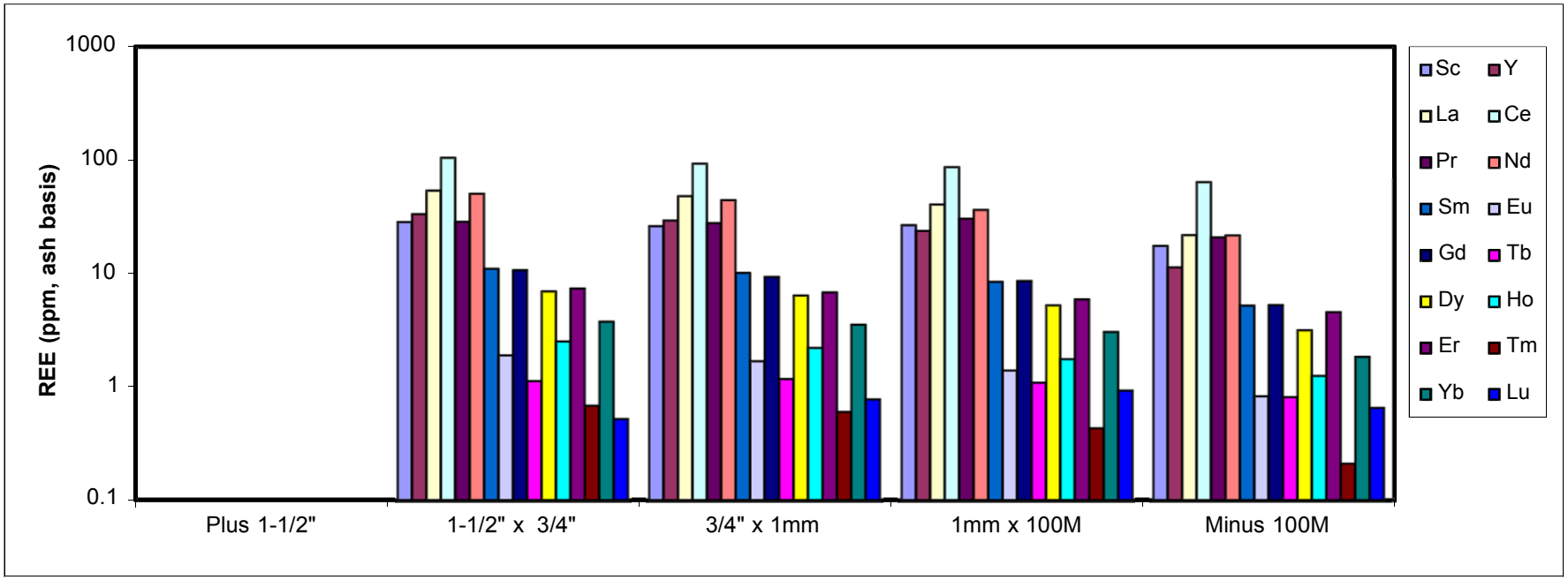
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 62.7 | 73.3 | 119.7 | 234.6 | 66.6 | 110.1 | 25.3 | 4.2 | 22.7 | 2.9 | 15.9 | 5.4 | 17.1 | 1.7 | 8.7 | 1.7 |
| Clean Coal | 18.0 | 25.3 | 26.4 | 52.4 | 21.5 | 25.9 | 7.9 | 1.3 | 6.3 | 1.4 | 5.2 | 1.1 | 4.0 | 0.6 | 2.9 | 1.2 |
| Coarse Refuse | 42.9 | 46.7 | 91.0 | 176.5 | 42.7 | 82.2 | 16.9 | 2.8 | 15.8 | 1.5 | 10.3 | 4.2 | 12.6 | 1.1 | 5.6 | 0.4 |
| Fine Refuse | 1.8 | 1.3 | 2.3 | 5.6 | 2.4 | 2.1 | 0.6 | 0.1 | 0.6 | 0.1 | 0.4 | 0.1 | 0.4 | 0.0 | 0.2 | 0.1 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | #DIV/0! | #DIV/0! | 200.00% | 18.34% | 325.83 |
| 1-1/2" x 3/4" | 23.85% | 32.59% | 344.04 | 23.85% | 119.77% | 309.16 | 200.00% | 18.34% | 325.83 |
| 3/4" x 1mm | 59.20% | 27.01% | 309.17 | 83.05% | 25.04% | 296.13 | 176.15% | 16.41% | 320.93 |
| 1mm x 100M | 13.29% | 26.71% | 278.67 | 96.34% | 4.99% | 252.71 | 116.95% | 11.04% | 335.50 |
| Minus 100M | 3.66% | 34.25% | 179.21 | 100.00% | 1.25% | 179.21 | 103.66% | 9.03% | 357.04 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 28.36 | 33.16 | 53.53 | 104.00 | 28.45 | 50.19 | 10.99 | 1.89 | 10.64 | 1.12 | 6.92 | 2.50 | 7.35 | 0.68 | 3.74 | 0.52 |
| 3/4" x 1mm | 25.97 | 29.13 | 47.68 | 92.32 | 27.71 | 43.98 | 10.07 | 1.68 | 9.27 | 1.17 | 6.34 | 2.20 | 6.76 | 0.60 | 3.52 | 0.77 |
| 1mm x 100M | 26.43 | 23.56 | 40.04 | 85.90 | 30.19 | 35.99 | 8.39 | 1.39 | 8.53 | 1.08 | 5.20 | 1.74 | 5.86 | 0.43 | 3.02 | 0.92 |
| Minus 100M | 17.36 | 11.23 | 21.64 | 63.27 | 20.67 | 21.41 | 5.16 | 0.82 | 5.24 | 0.81 | 3.14 | 1.24 | 4.53 | 0.21 | 1.83 | 0.65 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 8.20% | 0.00 | 0.00% | 8.20% | 0.00 | 100.00% | 8.11% | 384.52 |
| 1-1/2" x 3/4" | 21.09% | 8.53% | 440.63 | 21.09% | 8.53% | 440.63 | 100.00% | 8.11% | 384.52 |
| 3/4" x 1mm | 60.94% | 7.58% | 369.63 | 82.03% | 7.82% | 389.53 | 78.91% | 8.00% | 368.53 |
| 1mm x 100M | 12.43% | 7.89% | 394.08 | 94.46% | 7.83% | 390.13 | 17.97% | 9.43% | 365.54 |
| Minus 100M | 5.54% | 12.87% | 326.26 | 100.00% | 8.11% | 384.52 | 5.54% | 12.87% | 326.26 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 99.06% | 8.20% | 445.86 | 100.00% | 8.53% | 440.63 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 99.06% | 8.20% | 445.86 | 100.00% | 8.53% | 440.63 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 99.06% | 8.20% | 445.86 | 100.00% | 8.53% | 440.63 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 99.06% | 8.20% | 445.86 | 99.06% | 8.20% | 445.86 | 100.00% | 8.53% | 440.63 |
| Float 1.8 | 0.78% | 39.50% | 338.65 | 99.84% | 8.44% | 441.94 | 0.94% | 43.04% | 335.56 |
| Sink 1.8 | 0.16% | 60.28% | 325.68 | 100.00% | 8.53% | 440.63 | 0.16% | 60.28% | 325.68 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.32% | 6.99% | 381.61 | 98.32% | 6.99% | 381.61 | 100.00% | 7.58% | 369.63 |
| Float 1.8 | 1.38% | 36.57% | 245.66 | 99.70% | 7.40% | 372.31 | 1.68% | 42.04% | 253.09 |
| Sink 1.8 | 0.30% | 67.19% | 271.70 | 100.00% | 7.58% | 369.63 | 0.30% | 67.19% | 271.70 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.36% | 5.56% | 464.69 | 95.36% | 5.56% | 464.69 | 100.00% | 7.89% | 394.08 |
| Float 1.8 | 1.62% | 34.87% | 276.24 | 96.98% | 6.05% | 446.55 | 4.64% | 55.85% | 249.63 |
| Sink 1.8 | 3.02% | 67.11% | 242.21 | 100.00% | 7.89% | 394.08 | 3.02% | 67.11% | 242.21 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 36.58 | 58.82 | 59.21 | 112.88 | 42.81 | 59.41 | 17.28 | 2.84 | 14.03 | 2.93 | 12.02 | 2.58 | 9.04 | 1.39 | 6.42 | 2.39 |
| 3/4" x 1mm | 33.45 | 45.47 | 48.04 | 97.30 | 40.43 | 46.58 | 14.49 | 2.35 | 11.38 | 2.50 | 9.40 | 1.92 | 7.43 | 1.14 | 5.33 | 2.41 |
| 1mm x 100M | 38.89 | 47.85 | 50.52 | 100.80 | 45.47 | 49.62 | 14.84 | 2.56 | 12.68 | 2.67 | 9.27 | 2.02 | 7.59 | 1.17 | 5.66 | 2.48 |
| Minus 100M | 33.77 | 31.77 | 41.24 | 83.05 | 48.96 | 37.44 | 12.54 | 1.81 | 11.10 | 2.27 | 7.52 | 1.36 | 5.96 | 0.81 | 4.22 | 2.44 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.03 | 60.24 | 59.39 | 113.41 | 43.58 | 59.97 | 17.60 | 2.89 | 14.29 | 3.00 | 12.31 | 2.60 | 9.12 | 1.43 | 6.54 | 2.46 |
| Float 1.8 | 28.71 | 30.86 | 56.60 | 102.08 | 28.12 | 47.86 | 10.62 | 1.88 | 8.84 | 1.49 | 6.03 | 2.21 | 7.50 | 0.62 | 4.22 | 1.01 |
| Sink 1.8 | 23.76 | 28.34 | 52.07 | 103.04 | 25.12 | 48.87 | 11.92 | 1.80 | 8.84 | 1.26 | 6.41 | 2.19 | 7.03 | 0.45 | 3.63 | 0.95 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 34.16 | 48.28 | 49.86 | 100.05 | 40.16 | 48.47 | 15.04 | 2.47 | 11.67 | 2.58 | 9.85 | 2.03 | 7.71 | 1.23 | 5.59 | 2.46 |
| Float 1.8 | 26.50 | 17.46 | 27.67 | 65.98 | 45.34 | 26.00 | 9.63 | 1.23 | 8.40 | 1.94 | 5.01 | 0.61 | 4.42 | 0.29 | 2.92 | 2.26 |
| Sink 1.8 | 26.77 | 19.97 | 37.13 | 81.88 | 37.17 | 33.48 | 8.01 | 1.20 | 9.09 | 1.04 | 5.00 | 1.60 | 5.39 | 0.36 | 2.59 | 1.02 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 44.23 | 62.87 | 60.41 | 115.86 | 45.87 | 60.91 | 18.55 | 3.32 | 14.36 | 3.36 | 11.56 | 2.47 | 9.11 | 1.58 | 7.25 | 2.98 |
| Float 1.8 | 31.45 | 21.78 | 33.47 | 67.40 | 52.96 | 29.48 | 9.68 | 1.29 | 10.28 | 1.83 | 5.41 | 0.85 | 4.54 | 0.41 | 3.15 | 2.26 |
| Sink 1.8 | 26.99 | 15.82 | 29.39 | 70.70 | 42.35 | 25.70 | 6.59 | 0.94 | 8.96 | 1.11 | 4.34 | 1.15 | 4.46 | 0.29 | 2.20 | 1.22 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 1-1/2" | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 100.00% | 83.86% | 299.77 |
| 1-1/2" x 3/4" | 33.16% | 83.97% | 326.60 | 33.16% | 83.97% | 326.60 | 100.00% | 83.86% | 299.77 |
| 3/4" x 1mm | 60.22% | 84.47% | 289.97 | 93.38% | 84.29% | 302.93 | 66.84% | 83.81% | 286.43 |
| 1mm x 100M | 5.54% | 77.69% | 246.02 | 98.92% | 83.92% | 299.98 | 6.62% | 77.83% | 251.48 |
| Minus 100M | 1.08% | 78.54% | 279.15 | 100.00% | 83.86% | 299.77 | 1.08% | 78.54% | 279.15 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Sink 1.8 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 | 0.00% | 0.00% | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.29% | 20.07% | 355.83 | 0.29% | 20.07% | 355.83 | 100.00% | 83.97% | 326.60 |
| Float 1.8 | 3.13% | 45.10% | 267.09 | 3.42% | 42.98% | 270.60 | 99.71% | 84.15% | 326.58 |
| Sink 1.8 | 96.58% | 85.42% | 327.60 | 100.00% | 83.97% | 326.60 | 96.58% | 85.42% | 327.60 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.61% | 14.08% | 349.12 | 0.61% | 14.08% | 349.12 | 100.00% | 84.47% | 289.97 |
| Float 1.8 | 2.46% | 43.82% | 306.28 | 3.07% | 37.91% | 309.44 | 99.39% | 84.90% | 289.91 |
| Sink 1.8 | 96.93% | 85.94% | 289.70 | 100.00% | 84.47% | 289.97 | 96.93% | 85.94% | 289.70 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 7.28% | 12.30% | 374.89 | 7.28% | 12.30% | 374.89 | 100.00% | 77.69% | 246.02 |
| Float 1.8 | 1.19% | 37.08% | 204.87 | 8.47% | 15.78% | 318.77 | 92.72% | 82.83% | 244.52 |
| Sink 1.8 | 91.53% | 83.42% | 244.75 | 100.00% | 77.69% | 246.02 | 91.53% | 83.42% | 244.75 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 1-1/2" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-1/2" x 3/4" | 24.81 | 27.82 | 54.52 | 105.03 | 23.65 | 49.54 | 10.05 | 1.69 | 9.34 | 0.78 | 5.87 | 2.50 | 7.14 | 0.63 | 3.16 | 0.09 |
| 3/4" x 1mm | 22.46 | 24.65 | 47.84 | 91.88 | 22.39 | 43.06 | 8.82 | 1.45 | 8.27 | 0.82 | 5.55 | 2.19 | 6.80 | 0.56 | 3.00 | 0.23 |
| 1mm x 100M | 22.82 | 17.33 | 34.12 | 81.29 | 28.80 | 30.34 | 7.02 | 1.07 | 7.46 | 0.88 | 4.52 | 1.54 | 5.41 | 0.37 | 2.35 | 0.72 |
| Minus 100M | 21.84 | 21.97 | 43.08 | 80.69 | 36.38 | 34.29 | 11.04 | 1.47 | 7.96 | 1.73 | 6.16 | 1.28 | 5.60 | 0.47 | 3.38 | 1.81 |
| Float/Sink Analysis - Plus 1-1/2" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1-1/2" x 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 35.75 | 39.55 | 43.69 | 88.41 | 44.68 | 43.72 | 16.28 | 2.33 | 10.83 | 2.94 | 9.39 | 1.69 | 7.32 | 0.90 | 5.43 | 2.92 |
| Float 1.8 | 27.27 | 24.82 | 35.70 | 77.46 | 21.94 | 40.92 | 8.17 | 1.57 | 8.40 | 1.19 | 5.35 | 2.37 | 7.58 | 0.58 | 3.53 | 0.24 |
| Sink 1.8 | 24.76 | 27.86 | 54.85 | 105.51 | 23.66 | 49.69 | 10.08 | 1.69 | 9.35 | 0.77 | 5.88 | 2.50 | 7.13 | 0.63 | 3.15 | 0.09 |
| Float/Sink Analysis - 3/4" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.99 | 36.73 | 49.25 | 94.09 | 35.09 | 48.43 | 12.48 | 2.38 | 9.97 | 2.44 | 7.00 | 1.97 | 7.56 | 0.86 | 5.11 | 1.77 |
| Float 1.8 | 29.89 | 24.61 | 42.14 | 85.60 | 42.66 | 39.15 | 10.16 | 1.54 | 10.07 | 1.59 | 5.83 | 1.55 | 6.01 | 0.45 | 3.48 | 1.55 |
| Sink 1.8 | 22.35 | 24.64 | 47.91 | 91.96 | 22.11 | 43.11 | 8.80 | 1.45 | 8.25 | 0.81 | 5.54 | 2.20 | 6.81 | 0.56 | 2.99 | 0.21 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 31.76 | 41.31 | 53.61 | 102.27 | 34.76 | 53.36 | 14.51 | 2.55 | 10.82 | 2.67 | 8.96 | 2.20 | 7.94 | 1.02 | 5.28 | 1.87 |
| Float 1.8 | 19.92 | 12.45 | 21.34 | 64.53 | 34.94 | 21.33 | 8.29 | 0.97 | 5.82 | 1.60 | 3.84 | 0.63 | 4.42 | 0.30 | 2.46 | 2.03 |
| Sink 1.8 | 22.73 | 17.08 | 33.97 | 81.14 | 28.69 | 30.12 | 6.92 | 1.05 | 7.43 | 0.85 | 4.47 | 1.54 | 5.39 | 0.36 | 2.31 | 0.70 |

## PLANT 14

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 20.64% | 47.22% | 228.65 | 20.64% | 47.22% | 228.65 | 100.00% | 53.20% | 276.15 |
| Minus 100M | 79.36% | 54.75% | 286.81 | 100.00% | 53.20% | 276.15 | 79.36% | 54.75% | 286.81 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 45.03% | 5.89% | 445.01 | 45.03% | 5.89% | 445.01 | 100.00% | 47.22% | 228.65 |
| Float 1.8 | 1.71% | 37.67% | 215.77 | 46.74% | 7.05% | 400.21 | 54.97% | 81.08% | 215.77 |
| Sink 1.8 | 53.26% | 82.47% | 215.77 | 100.00% | 47.22% | 228.65 | 53.26% | 82.47% | 215.77 |

## PLANT 14

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 22.67 | 16.79 | 29.71 | 71.55 | 30.78 | 26.13 | 7.11 | 1.01 | 7.07 | 1.13 | 4.51 | 1.32 | 4.96 | 0.40 | 2.37 | 1.14 |
| Minus 100M | 23.14 | 24.6 | 48.29 | 90.43 | 22.42 | 41.45 | 8.56 | 1.45 | 8 | 0.82 | 5.3 | 2.16 | 6.38 | 0.53 | 3.01 | 0.27 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.26 | 58.83 | 58.59 | 112.62 | 42.38 | 59.82 | 17.44 | 3.15 | 13.72 | 3.03 | 10.74 | 2.34 | 9.00 | 1.34 | 6.94 | 2.81 |
| Float 1.8 | 21.50 | 14.29 | 27.99 | 69.11 | 30.09 | 24.13 | 6.49 | 0.88 | 6.67 | 1.02 | 4.14 | 1.26 | 4.72 | 0.34 | 2.10 | 1.04 |
| Sink 1.8 | 21.50 | 14.29 | 27.99 | 69.11 | 30.09 | 24.13 | 6.49 | 0.88 | 6.67 | 1.02 | 4.14 | 1.26 | 4.72 | 0.34 | 2.10 | 1.04 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 288.5 | TPH |
| Plus 3/4" | 53.48 | 40.54 | 22.47 | 53.48 | 40.54 | 22.47 | 288.46 | 113.82 | 65.54 |
| 3/4" x 3/8" | 41.94 | 23.53 | 13.62 | 95.42 | 64.06 | 36.09 | 234.98 | 73.29 | 43.07 |
| 3/8" x 1mm | 120.66 | 36.28 | 22.60 | 216.08 | 100.35 | 58.69 | 193.04 | 49.76 | 29.45 |
| 1mm x 100M | 56.34 | 10.15 | 4.83 | 272.42 | 110.50 | 63.52 | 72.37 | 13.48 | 6.85 |
| Minus 100M | 16.04 | 3.33 | 2.02 | 288.46 | 113.82 | 65.54 | 16.04 | 3.33 | 2.02 |
| **Clean Coal** | | | | | | | | 148.0 | TPH |
| Plus 3/4" | 4.06 | 0.64 | 0.33 | 4.06 | 0.64 | 0.33 | 148.03 | 12.64 | 9.10 |
| 3/4" x 3/8" | 8.66 | 1.43 | 1.05 | 12.72 | 2.07 | 1.38 | 143.97 | 12.00 | 8.77 |
| 3/8" x 1mm | 54.78 | 5.76 | 3.88 | 67.50 | 7.83 | 5.25 | 135.31 | 10.57 | 7.72 |
| 1mm x 100M | 59.83 | 3.56 | 3.00 | 127.33 | 11.39 | 8.25 | 80.53 | 4.81 | 3.85 |
| Minus 100M | 20.69 | 1.25 | 0.85 | 148.03 | 12.64 | 9.10 | 20.69 | 1.25 | 0.85 |
| **Coarse Refuse** | | | | | | | | 128.6 | TPH |
| Plus 3/4" | 39.66 | 33.65 | 31.46 | 39.66 | 33.65 | 31.46 | 128.64 | 97.25 | 68.11 |
| 3/4" x 3/8" | 28.55 | 24.16 | 14.02 | 68.21 | 57.81 | 45.47 | 88.98 | 63.61 | 36.66 |
| 3/8" x 1mm | 32.15 | 26.20 | 15.15 | 100.35 | 84.01 | 60.62 | 60.44 | 39.45 | 22.64 |
| 1mm x 100M | 16.52 | 9.03 | 5.25 | 116.87 | 93.04 | 65.87 | 28.29 | 13.24 | 7.49 |
| Minus 100M | 11.77 | 4.21 | 2.24 | 128.64 | 97.25 | 68.11 | 11.77 | 4.21 | 2.24 |
| **Fine Refuse** | | | | | | | | 11.8 | TPH |
| Plus 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.79 | 3.81 | 2.29 |
| 3/4" x 3/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.79 | 3.81 | 2.29 |
| 3/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.79 | 3.81 | 2.29 |
| 1mm x 100M | 3.05 | 1.11 | 0.79 | 3.05 | 1.11 | 0.79 | 11.79 | 3.81 | 2.29 |
| Minus 100M | 8.74 | 2.70 | 1.49 | 11.79 | 3.81 | 2.29 | 8.74 | 2.70 | 1.49 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 1,586,527 | 626,036 | 180.2 | 113.60 | 287.89 |
| Clean Coal | 814,151 | 69,528 | 25.0 | 30.74 | 359.97 |
| Coarse Refuse | 707,536 | 534,898 | 187.3 | 264.73 | 350.17 |
| Fine Refuse | 64,839 | 20,980 | 6.3 | 96.93 | 299.56 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 1.64 | 2.06 | 3.64 | 6.94 | 0.79 | 3.62 | 1.13 | 0.15 | 0.76 | 0.14 | 0.57 | 0.12 | 0.46 | 0.04 | 0.28 | 0.13 |
| 3/4" x 3/8" | 1.00 | 1.23 | 2.24 | 4.22 | 0.46 | 2.23 | 0.66 | 0.10 | 0.45 | 0.08 | 0.33 | 0.08 | 0.28 | 0.03 | 0.17 | 0.06 |
| 3/8" x 1mm | 1.80 | 2.21 | 3.68 | 6.84 | 0.79 | 3.57 | 1.08 | 0.16 | 0.74 | 0.13 | 0.56 | 0.12 | 0.46 | 0.05 | 0.29 | 0.12 |
| 1mm x 100M | 0.44 | 0.56 | 0.74 | 1.37 | 0.17 | 0.71 | 0.23 | 0.04 | 0.18 | 0.04 | 0.13 | 0.03 | 0.10 | 0.01 | 0.07 | 0.03 |
| Minus 100M | 0.23 | 0.23 | 0.29 | 0.56 | 0.06 | 0.29 | 0.09 | 0.01 | 0.09 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.04 | 0.03 | 0.04 | 0.09 | 0.04 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| 3/4" x 3/8" | 0.09 | 0.11 | 0.16 | 0.30 | 0.09 | 0.15 | 0.04 | 0.01 | 0.03 | 0.01 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| 3/8" x 1mm | 0.39 | 0.48 | 0.58 | 1.07 | 0.15 | 0.59 | 0.15 | 0.03 | 0.12 | 0.02 | 0.10 | 0.03 | 0.09 | 0.01 | 0.06 | 0.02 |
| 1mm x 100M | 0.28 | 0.44 | 0.43 | 0.78 | 0.23 | 0.38 | 0.10 | 0.02 | 0.09 | 0.02 | 0.07 | 0.02 | 0.06 | 0.01 | 0.05 | 0.01 |
| Minus 100M | 0.05 | 0.08 | 0.14 | 0.26 | 0.08 | 0.12 | 0.04 | 0.01 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 3.14 | 4.68 | 4.22 | 7.77 | 2.81 | 3.76 | 1.18 | 0.22 | 0.96 | 0.22 | 0.84 | 0.18 | 0.66 | 0.11 | 0.51 | 0.19 |
| 3/4" x 3/8" | 0.95 | 1.16 | 2.06 | 4.29 | 1.27 | 2.14 | 0.63 | 0.10 | 0.42 | 0.08 | 0.32 | 0.08 | 0.28 | 0.03 | 0.16 | 0.06 |
| 3/8" x 1mm | 1.07 | 1.36 | 2.46 | 4.67 | 0.54 | 2.48 | 0.78 | 0.11 | 0.52 | 0.09 | 0.38 | 0.08 | 0.30 | 0.03 | 0.18 | 0.08 |
| 1mm x 100M | 0.41 | 0.50 | 0.83 | 1.57 | 0.20 | 0.80 | 0.29 | 0.04 | 0.19 | 0.04 | 0.14 | 0.02 | 0.10 | 0.01 | 0.07 | 0.04 |
| Minus 100M | 0.24 | 0.22 | 0.32 | 0.67 | 0.07 | 0.31 | 0.10 | 0.02 | 0.10 | 0.02 | 0.06 | 0.01 | 0.05 | 0.00 | 0.03 | 0.02 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/4" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/4" x 3/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/8" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.05 | 0.07 | 0.11 | 0.22 | 0.10 | 0.11 | 0.04 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| Minus 100M | 0.14 | 0.15 | 0.23 | 0.45 | 0.05 | 0.22 | 0.07 | 0.01 | 0.06 | 0.01 | 0.04 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 14.1 | 17.3 | 29.1 | 54.8 | 6.2 | 28.6 | 8.8 | 1.3 | 6.1 | 1.1 | 4.5 | 1.0 | 3.7 | 0.4 | 2.3 | 1.0 |
| Clean Coal | 2.3 | 3.1 | 3.7 | 6.9 | 1.6 | 3.5 | 1.0 | 0.2 | 0.7 | 0.1 | 0.6 | 0.2 | 0.5 | 0.1 | 0.4 | 0.1 |
| Coarse Refuse | 16.0 | 21.8 | 27.2 | 52.2 | 13.5 | 26.1 | 8.2 | 1.3 | 6.0 | 1.2 | 4.8 | 1.0 | 3.8 | 0.5 | 2.6 | 1.1 |
| Fine Refuse | 0.5 | 0.6 | 0.9 | 1.8 | 0.4 | 0.9 | 0.3 | 0.0 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 288.5 | TPH |
| Float 1.6 | 129.81 | 10.43 | 7.77 | 129.81 | 10.43 | 7.77 | 247.26 | 105.65 | 74.98 |
| Float 1.8 | 6.62 | 2.43 | 1.41 | 136.42 | 12.86 | 9.17 | 117.45 | 95.23 | 67.21 |
| Sink 1.8 | 110.83 | 92.80 | 65.81 | 247.26 | 105.65 | 74.98 | 110.83 | 92.80 | 65.81 |
| **Clean Coal (Plus 100M)** | | | | | | | | 148.0 | TPH |
| Float 1.6 | 123.37 | 9.83 | 7.31 | 123.37 | 9.83 | 7.31 | 127.33 | 11.50 | 8.31 |
| Float 1.8 | 2.75 | 1.00 | 0.62 | 126.12 | 10.83 | 7.93 | 3.97 | 1.67 | 1.00 |
| Sink 1.8 | 1.21 | 0.67 | 0.38 | 127.33 | 11.50 | 8.31 | 1.21 | 0.67 | 0.38 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 128.6 | TPH |
| Float 1.6 | 4.66 | 0.46 | 0.34 | 4.66 | 0.46 | 0.34 | 116.87 | 93.04 | 65.87 |
| Float 1.8 | 3.79 | 1.40 | 0.77 | 8.45 | 1.86 | 1.11 | 112.21 | 92.58 | 65.54 |
| Sink 1.8 | 108.42 | 91.18 | 64.77 | 116.87 | 93.04 | 65.87 | 108.42 | 91.18 | 64.77 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 11.8 | TPH |
| Float 1.6 | 1.78 | 0.14 | 0.12 | 1.78 | 0.14 | 0.12 | 3.05 | 1.11 | 0.79 |
| Float 1.8 | 0.07 | 0.03 | 0.02 | 1.85 | 0.16 | 0.13 | 1.27 | 0.98 | 0.68 |
| Sink 1.8 | 1.20 | 0.95 | 0.66 | 3.05 | 1.11 | 0.79 | 1.20 | 0.95 | 0.66 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 1,359,903 | 581,102 | 206.2 | 151.63 | 354.84 |
| Clean Coal | 700,333 | 63,261 | 22.9 | 32.64 | 361.38 |
| Coarse Refuse | 642,797 | 511,727 | 181.2 | 281.82 | 354.01 |
| Fine Refuse | 16,774 | 6,114 | 2.2 | 130.14 | 357.06 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

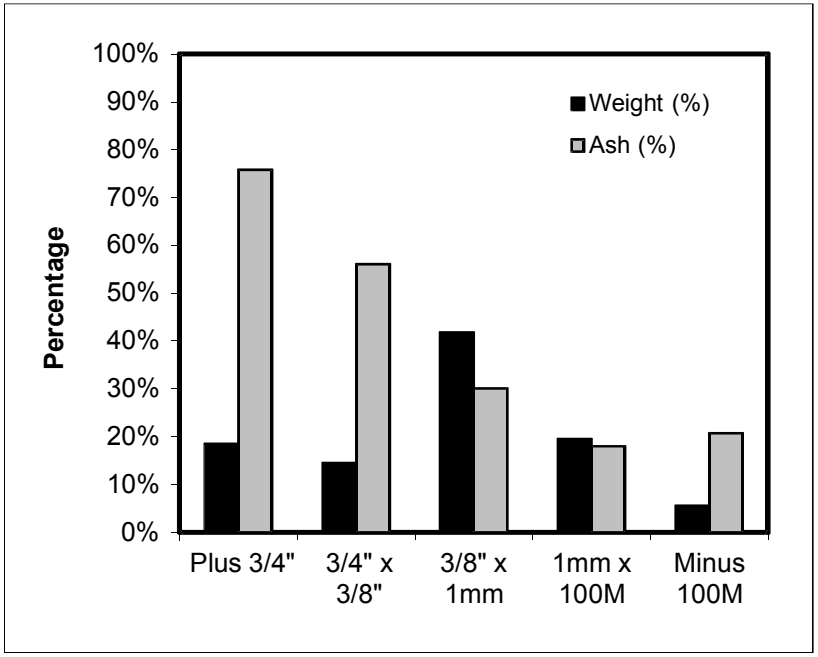
****Unless otherwise noted, REE values reported in ppm*

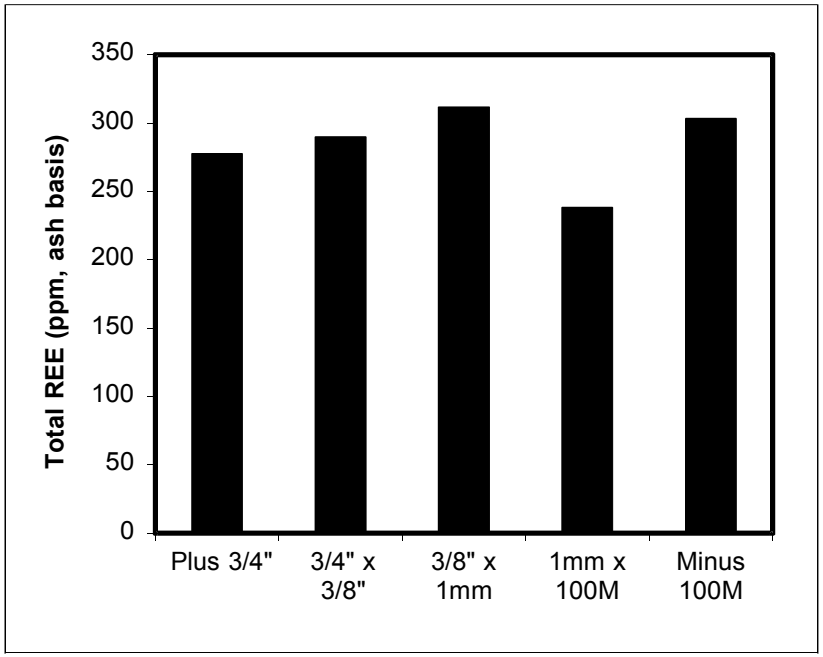
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.77 | 1.03 | 1.15 | 2.12 | 0.39 | 1.11 | 0.28 | 0.05 | 0.23 | 0.04 | 0.19 | 0.05 | 0.17 | 0.03 | 0.12 | 0.03 |
| Float 1.8 | 0.13 | 0.14 | 0.20 | 0.39 | 0.11 | 0.19 | 0.07 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 |
| Sink 1.8 | 5.52 | 7.67 | 9.55 | 18.27 | 4.93 | 9.15 | 2.88 | 0.47 | 2.08 | 0.43 | 1.69 | 0.36 | 1.33 | 0.17 | 0.92 | 0.38 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.73 | 0.97 | 1.08 | 1.99 | 0.37 | 1.05 | 0.26 | 0.05 | 0.22 | 0.04 | 0.18 | 0.05 | 0.16 | 0.03 | 0.11 | 0.03 |
| Float 1.8 | 0.05 | 0.06 | 0.09 | 0.17 | 0.07 | 0.08 | 0.03 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| Sink 1.8 | 0.02 | 0.03 | 0.05 | 0.10 | 0.06 | 0.04 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.04 | 0.05 | 0.10 | 0.01 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.08 | 0.08 | 0.11 | 0.22 | 0.04 | 0.11 | 0.04 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.01 |
| Sink 1.8 | 5.46 | 7.58 | 9.41 | 17.99 | 4.77 | 9.02 | 2.82 | 0.46 | 2.05 | 0.42 | 1.66 | 0.36 | 1.32 | 0.17 | 0.91 | 0.37 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.01 | 0.02 | 0.02 | 0.03 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.04 | 0.06 | 0.09 | 0.18 | 0.10 | 0.09 | 0.03 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |

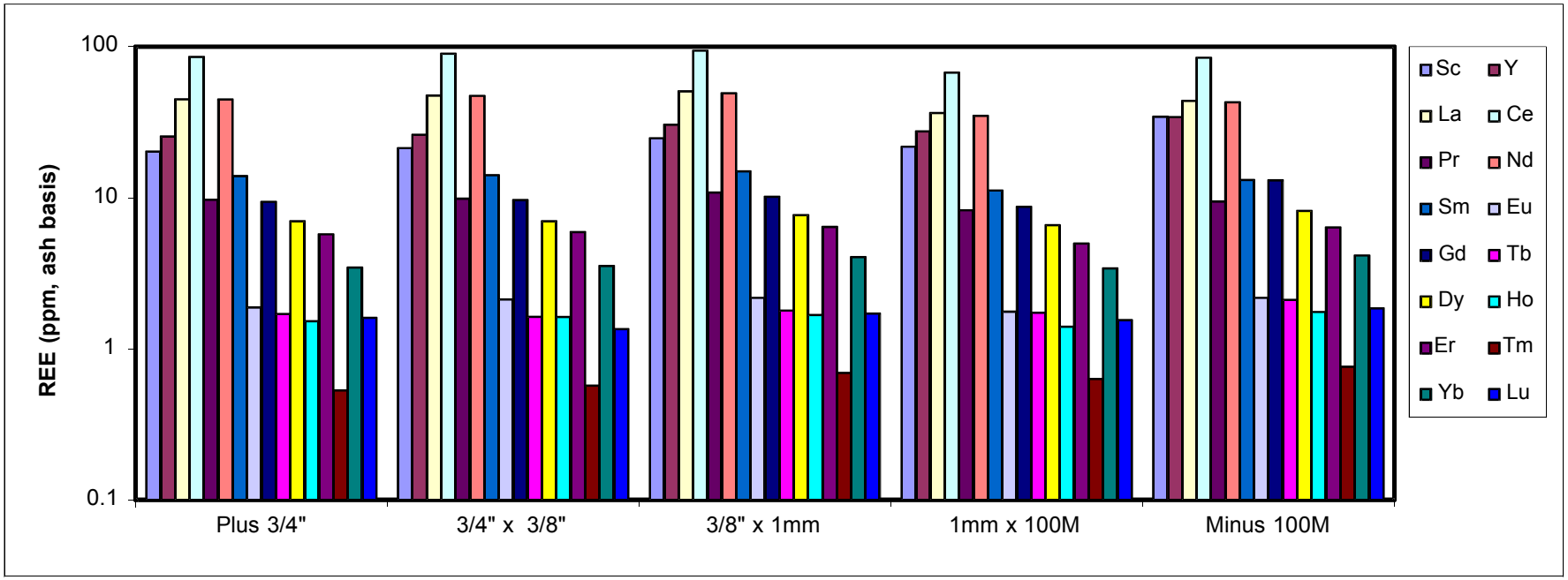
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 17.7 | 24.3 | 30.0 | 57.2 | 14.9 | 28.7 | 8.9 | 1.5 | 6.5 | 1.3 | 5.3 | 1.1 | 4.2 | 0.6 | 2.9 | 1.2 |
| Clean Coal | 2.2 | 2.9 | 3.3 | 6.2 | 1.4 | 3.2 | 0.9 | 0.2 | 0.7 | 0.1 | 0.6 | 0.1 | 0.5 | 0.1 | 0.3 | 0.1 |
| Coarse Refuse | 15.3 | 21.2 | 26.3 | 50.3 | 13.3 | 25.2 | 7.9 | 1.3 | 5.7 | 1.2 | 4.7 | 1.0 | 3.7 | 0.5 | 2.5 | 1.0 |
| Fine Refuse | 0.1 | 0.2 | 0.3 | 0.6 | 0.3 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 18.54% | 75.80% | 277.14 | 18.54% | 215.17% | 287.53 | 200.00% | 24.00% | 300.72 |
| 3/4" x 3/8" | 14.54% | 56.09% | 289.54 | 33.08% | 78.11% | 293.18 | 181.46% | 18.71% | 310.48 |
| 3/8" x 1mm | 41.83% | 30.07% | 311.40 | 74.91% | 23.61% | 294.86 | 166.92% | 15.45% | 317.10 |
| 1mm x 100M | 19.53% | 18.02% | 238.00 | 94.44% | 5.41% | 254.13 | 125.09% | 10.56% | 322.52 |
| Minus 100M | 5.56% | 20.74% | 303.06 | 100.00% | 1.59% | 289.91 | 105.56% | 9.18% | 353.20 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 20.21 | 25.41 | 44.84 | 85.66 | 9.69 | 44.65 | 13.90 | 1.88 | 9.39 | 1.70 | 7.00 | 1.52 | 5.72 | 0.53 | 3.44 | 1.60 |
| 3/4" x 3/8" | 21.32 | 26.15 | 47.56 | 89.77 | 9.88 | 47.33 | 14.12 | 2.12 | 9.67 | 1.63 | 6.99 | 1.62 | 5.93 | 0.57 | 3.53 | 1.35 |
| 3/8" x 1mm | 24.75 | 30.46 | 50.67 | 94.26 | 10.83 | 49.17 | 14.95 | 2.17 | 10.15 | 1.79 | 7.69 | 1.67 | 6.40 | 0.69 | 4.04 | 1.71 |
| 1mm x 100M | 21.79 | 27.45 | 36.38 | 67.31 | 8.28 | 34.90 | 11.15 | 1.76 | 8.71 | 1.73 | 6.58 | 1.40 | 4.98 | 0.63 | 3.40 | 1.55 |
| Minus 100M | 34.44 | 34.24 | 43.82 | 84.74 | 9.43 | 42.92 | 13.11 | 2.17 | 13.04 | 2.11 | 8.19 | 1.75 | 6.35 | 0.76 | 4.14 | 1.85 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 2.74% | 15.83% | 254.95 | 2.74% | 15.83% | 254.95 | 100.00% | 8.54% | 359.97 |
| 3/4" x 3/8" | 5.85% | 16.48% | 368.49 | 8.59% | 16.27% | 333.26 | 97.26% | 8.33% | 365.59 |
| 3/8" x 1mm | 37.01% | 10.52% | 336.36 | 45.60% | 11.60% | 335.54 | 91.41% | 7.81% | 365.20 |
| 1mm x 100M | 40.42% | 5.95% | 421.69 | 86.02% | 8.94% | 362.45 | 54.40% | 5.97% | 399.74 |
| Minus 100M | 13.98% | 6.06% | 337.48 | 100.00% | 8.54% | 359.97 | 13.98% | 6.06% | 337.48 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 89.39% | 16.76% | 245.76 | 194.67% | 16.97% | 306.67 | 200.00% | 17.56% | 308.20 |
| Float 1.8 | 8.58% | 32.12% | 295.95 | 105.28% | 17.15% | 357.20 | 110.61% | 18.21% | 354.64 |
| Sink 1.8 | 2.03% | 45.00% | 281.88 | 96.70% | 15.83% | 368.23 | 102.03% | 17.04% | 363.94 |
| Float/Sink Analysis - 3/4" x 3/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.67% | 15.20% | 373.71 | 94.67% | 15.20% | 373.71 | 100.00% | 16.48% | 368.49 |
| Float 1.8 | 4.61% | 36.72% | 302.44 | 99.28% | 16.20% | 366.21 | 5.33% | 39.13% | 332.47 |
| Sink 1.8 | 0.72% | 54.56% | 461.86 | 100.00% | 16.48% | 368.49 | 0.72% | 54.56% | 461.86 |
| Float/Sink Analysis - 3/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 96.53% | 9.35% | 340.62 | 96.53% | 9.35% | 340.62 | 100.00% | 10.52% | 336.36 |
| Float 1.8 | 2.57% | 38.01% | 318.44 | 99.10% | 10.09% | 338.45 | 3.47% | 42.98% | 310.60 |
| Sink 1.8 | 0.90% | 57.16% | 295.72 | 100.00% | 10.52% | 336.36 | 0.90% | 57.16% | 295.72 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.04% | 5.17% | 447.44 | 98.04% | 5.17% | 447.44 | 100.00% | 5.95% | 421.69 |
| Float 1.8 | 1.00% | 34.84% | 300.72 | 99.04% | 5.47% | 438.00 | 1.96% | 44.72% | 272.76 |
| Sink 1.8 | 0.96% | 55.01% | 254.31 | 100.00% | 5.95% | 421.69 | 0.96% | 55.01% | 254.31 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 28.57 | 22.64 | 29.61 | 69.98 | 28.56 | 32.89 | 11.58 | 1.83 | 7.18 | 2.26 | 6.18 | 1.21 | 5.91 | 0.67 | 3.93 | 1.93 |
| 3/4" x 3/8" | 30.83 | 38.21 | 55.80 | 105.86 | 31.77 | 53.37 | 14.13 | 2.03 | 9.45 | 2.08 | 8.69 | 1.97 | 7.14 | 0.83 | 4.63 | 1.69 |
| 3/8" x 1mm | 33.56 | 42.06 | 50.08 | 92.50 | 12.60 | 51.07 | 13.20 | 2.32 | 10.70 | 1.96 | 8.39 | 2.30 | 7.94 | 1.22 | 5.05 | 1.43 |
| 1mm x 100M | 39.87 | 62.27 | 60.98 | 110.29 | 31.89 | 53.04 | 14.62 | 2.88 | 12.05 | 2.43 | 10.33 | 2.55 | 8.47 | 1.37 | 6.57 | 2.07 |
| Minus 100M | 19.77 | 30.34 | 54.43 | 102.87 | 31.44 | 48.52 | 15.34 | 2.18 | 9.48 | 1.73 | 7.71 | 1.64 | 5.92 | 0.64 | 3.73 | 1.74 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 26.07 | 22.03 | 29.82 | 71.72 | 22.35 | 34.95 | 9.76 | 1.65 | 7.15 | 1.68 | 5.57 | 1.51 | 6.21 | 0.72 | 3.44 | 1.13 |
| Float 1.8 | 42.07 | 25.15 | 27.68 | 60.76 | 56.04 | 23.64 | 19.67 | 2.76 | 7.31 | 5.06 | 8.80 | 0.00 | 4.70 | 0.47 | 6.34 | 5.50 |
| Sink 1.8 | 28.79 | 25.07 | 31.98 | 69.33 | 47.54 | 27.06 | 17.08 | 1.91 | 7.37 | 3.35 | 8.32 | 0.00 | 4.54 | 0.43 | 4.79 | 4.32 |
| Float/Sink Analysis - 3/4" x 3/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 31.76 | 39.90 | 57.51 | 108.51 | 29.89 | 54.46 | 13.21 | 1.94 | 9.42 | 1.90 | 8.67 | 2.22 | 7.43 | 0.87 | 4.63 | 1.39 |
| Float 1.8 | 25.30 | 26.72 | 38.43 | 73.90 | 49.57 | 35.94 | 16.95 | 1.96 | 7.51 | 3.31 | 8.60 | 0.19 | 5.27 | 0.59 | 4.66 | 3.54 |
| Sink 1.8 | 20.62 | 25.98 | 67.91 | 146.59 | 24.00 | 88.44 | 35.59 | 5.79 | 18.73 | 3.55 | 9.95 | 0.34 | 4.76 | 0.34 | 4.53 | 4.74 |
| Float/Sink Analysis - 3/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 35.35 | 44.00 | 50.76 | 93.33 | 8.94 | 52.78 | 13.04 | 2.37 | 11.05 | 1.90 | 8.53 | 2.49 | 8.29 | 1.32 | 5.20 | 1.27 |
| Float 1.8 | 25.33 | 31.95 | 47.70 | 90.80 | 31.09 | 43.08 | 13.26 | 2.12 | 8.51 | 2.26 | 7.34 | 1.51 | 6.45 | 0.67 | 4.38 | 1.99 |
| Sink 1.8 | 17.76 | 27.13 | 42.63 | 81.07 | 41.65 | 36.30 | 15.95 | 1.86 | 8.62 | 2.44 | 7.84 | 0.52 | 4.63 | 0.42 | 3.77 | 3.13 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.86 | 68.09 | 65.05 | 117.52 | 29.91 | 57.09 | 14.36 | 3.06 | 12.67 | 2.40 | 10.76 | 2.95 | 9.28 | 1.55 | 7.07 | 1.82 |
| Float 1.8 | 21.66 | 34.45 | 45.04 | 82.53 | 30.99 | 38.95 | 13.33 | 2.14 | 9.32 | 2.05 | 7.40 | 1.27 | 5.24 | 0.58 | 3.81 | 1.96 |
| Sink 1.8 | 13.58 | 24.71 | 32.41 | 59.18 | 51.51 | 23.51 | 17.97 | 1.65 | 7.93 | 2.99 | 8.16 | -0.45 | 2.83 | 0.14 | 3.64 | 4.55 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/4" | 30.83% | 84.84% | 467.44 | 30.83% | 84.84% | 467.44 | 100.00% | 75.60% | 350.17 |
| 3/4" x 3/8" | 22.19% | 84.64% | 290.08 | 53.02% | 84.75% | 393.31 | 69.17% | 71.48% | 288.14 |
| 3/8" x 1mm | 24.99% | 81.51% | 289.10 | 78.01% | 83.71% | 360.81 | 46.98% | 65.27% | 286.95 |
| 1mm x 100M | 12.84% | 54.67% | 290.76 | 90.85% | 79.61% | 354.01 | 21.99% | 46.82% | 282.69 |
| Minus 100M | 9.15% | 35.79% | 265.40 | 100.00% | 75.60% | 350.17 | 9.15% | 35.79% | 265.40 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.05% | 17.95% | 368.20 | 0.05% | 17.95% | 368.20 | 100.00% | 84.84% | 467.44 |
| Float 1.8 | 0.30% | 38.50% | 328.24 | 0.35% | 35.56% | 331.12 | 99.95% | 84.87% | 467.45 |
| Sink 1.8 | 99.65% | 85.01% | 467.64 | 100.00% | 84.84% | 467.44 | 99.65% | 85.01% | 467.64 |
| Float/Sink Analysis - 3/4" x 3/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.43% | 16.79% | 349.85 | 0.43% | 16.79% | 349.85 | 100.00% | 84.64% | 290.08 |
| Float 1.8 | 1.23% | 38.43% | 272.35 | 1.66% | 32.82% | 282.62 | 99.57% | 84.93% | 290.03 |
| Sink 1.8 | 98.34% | 85.51% | 290.13 | 100.00% | 84.64% | 290.08 | 98.34% | 85.51% | 290.13 |
| Float/Sink Analysis - 3/8" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.96% | 13.07% | 343.42 | 0.96% | 13.07% | 343.42 | 100.00% | 81.51% | 289.10 |
| Float 1.8 | 3.50% | 40.78% | 266.25 | 4.46% | 34.82% | 272.49 | 99.04% | 82.17% | 289.01 |
| Sink 1.8 | 95.54% | 83.69% | 289.42 | 100.00% | 81.51% | 289.10 | 95.54% | 83.69% | 289.42 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 25.49% | 9.41% | 370.70 | 25.49% | 9.41% | 370.70 | 100.00% | 54.67% | 290.76 |
| Float 1.8 | 13.30% | 34.71% | 276.63 | 38.79% | 18.08% | 308.79 | 74.51% | 70.16% | 287.09 |
| Sink 1.8 | 61.21% | 77.86% | 288.10 | 100.00% | 54.67% | 290.76 | 61.21% | 77.86% | 288.10 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/4" | 46.71 | 69.56 | 62.67 | 115.42 | 41.70 | 55.86 | 17.53 | 3.34 | 14.31 | 3.25 | 12.54 | 2.73 | 9.81 | 1.63 | 7.58 | 2.78 |
| 3/4" x 3/8" | 19.66 | 24.08 | 42.56 | 88.87 | 26.24 | 44.20 | 13.13 | 1.99 | 8.64 | 1.57 | 6.65 | 1.56 | 5.74 | 0.57 | 3.32 | 1.30 |
| 3/8" x 1mm | 20.34 | 25.96 | 47.02 | 89.18 | 10.36 | 47.37 | 14.79 | 2.12 | 9.85 | 1.78 | 7.33 | 1.55 | 5.80 | 0.52 | 3.52 | 1.60 |
| 1mm x 100M | 22.57 | 27.70 | 46.12 | 87.05 | 11.16 | 44.15 | 15.81 | 2.10 | 10.72 | 2.12 | 7.98 | 1.24 | 5.48 | 0.51 | 3.73 | 2.32 |
| Minus 100M | 29.07 | 26.21 | 37.49 | 79.09 | 8.65 | 37.20 | 12.21 | 1.87 | 11.60 | 1.94 | 7.30 | 1.52 | 5.41 | 0.56 | 3.44 | 1.84 |
| Float/Sink Analysis - Plus 3/4" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 71.89 | 41.30 | 32.37 | 63.88 | 55.44 | 29.36 | 20.40 | 3.87 | 9.51 | 6.03 | 11.43 | 0.43 | 6.82 | 1.10 | 8.84 | 5.53 |
| Float 1.8 | 32.79 | 30.32 | 44.33 | 84.28 | 43.77 | 36.35 | 16.76 | 2.66 | 8.58 | 3.73 | 8.49 | 0.70 | 5.68 | 0.64 | 5.52 | 3.64 |
| Sink 1.8 | 46.73 | 69.62 | 62.70 | 115.47 | 41.70 | 55.89 | 17.53 | 3.34 | 14.32 | 3.25 | 12.55 | 2.73 | 9.82 | 1.63 | 7.58 | 2.78 |
| Float/Sink Analysis - 3/4" x 3/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.85 | 37.62 | 54.30 | 98.27 | 29.95 | 45.40 | 13.03 | 2.18 | 8.74 | 2.08 | 7.67 | 1.87 | 7.12 | 0.93 | 4.96 | 1.88 |
| Float 1.8 | 30.64 | 22.60 | 28.26 | 65.80 | 48.68 | 25.17 | 15.18 | 2.32 | 8.31 | 3.90 | 7.41 | 0.16 | 4.77 | 0.38 | 4.82 | 3.95 |
| Sink 1.8 | 19.59 | 24.08 | 42.63 | 88.99 | 26.11 | 44.31 | 13.12 | 1.99 | 8.64 | 1.56 | 6.64 | 1.57 | 5.74 | 0.57 | 3.31 | 1.28 |
| Float/Sink Analysis - 3/8" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 35.14 | 41.40 | 53.60 | 96.35 | 9.88 | 50.47 | 13.88 | 2.62 | 10.92 | 2.47 | 8.52 | 2.20 | 7.76 | 1.08 | 5.33 | 1.80 |
| Float 1.8 | 25.43 | 27.88 | 40.38 | 76.03 | 9.36 | 36.98 | 14.38 | 2.07 | 9.43 | 2.60 | 7.63 | 1.13 | 5.67 | 0.51 | 4.14 | 2.63 |
| Sink 1.8 | 20.23 | 25.90 | 47.13 | 89.40 | 10.38 | 47.55 | 14.80 | 2.12 | 9.86 | 1.76 | 7.32 | 1.56 | 5.80 | 0.52 | 3.51 | 1.58 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.22 | 46.61 | 57.35 | 107.11 | 10.02 | 55.11 | 13.46 | 2.69 | 12.15 | 2.05 | 8.92 | 2.71 | 8.42 | 1.27 | 5.33 | 1.28 |
| Float 1.8 | 27.40 | 29.62 | 40.64 | 79.52 | 9.34 | 40.83 | 12.95 | 2.04 | 11.68 | 1.93 | 7.53 | 1.54 | 5.65 | 0.58 | 3.62 | 1.76 |
| Sink 1.8 | 21.41 | 26.56 | 46.09 | 86.77 | 11.39 | 43.92 | 16.20 | 2.08 | 10.55 | 2.14 | 7.98 | 1.14 | 5.32 | 0.46 | 3.66 | 2.43 |

## PLANT 15

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 25.87% | 36.45% | 357.06 | 25.87% | 36.45% | 357.06 | 100.00% | 32.36% | 299.56 |
| Minus 100M | 74.13% | 30.93% | 275.92 | 100.00% | 32.36% | 299.56 | 74.13% | 30.93% | 275.92 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 58.24% | 7.67% | 432.32 | 58.24% | 7.67% | 432.32 | 100.00% | 36.45% | 357.06 |
| Float 1.8 | 2.40% | 35.40% | 294.21 | 60.64% | 8.77% | 410.25 | 41.76% | 76.58% | 346.55 |
| Sink 1.8 | 39.36% | 79.09% | 347.98 | 100.00% | 36.45% | 357.06 | 39.36% | 79.09% | 347.98 |

## PLANT 15

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 23.88 | 32.99 | 51.71 | 98.85 | 44.69 | 48.48 | 17.89 | 2.11 | 10.65 | 2.41 | 9.24 | 0.98 | 5.67 | 0.70 | 4.10 | 2.72 |
| Minus 100M | 25.79 | 27.93 | 41.64 | 82.6 | 9.03 | 41.06 | 12.88 | 2 | 10.62 | 1.85 | 7.29 | 1.55 | 5.88 | 0.6 | 3.59 | 1.61 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.41 | 59.70 | 65.42 | 119.24 | 11.87 | 63.52 | 15.62 | 3.12 | 14.00 | 2.45 | 10.90 | 3.17 | 9.91 | 1.69 | 6.63 | 1.67 |
| Float 1.8 | 21.91 | 26.23 | 46.43 | 88.51 | 12.22 | 43.81 | 17.78 | 2.14 | 10.88 | 2.33 | 8.51 | 0.96 | 5.29 | 0.47 | 3.84 | 2.90 |
| Sink 1.8 | 21.13 | 29.34 | 49.89 | 96.21 | 50.29 | 46.45 | 18.22 | 1.96 | 10.16 | 2.41 | 9.02 | 0.67 | 5.07 | 0.56 | 3.74 | 2.86 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 599.6 | TPH |
| Plus 5/16" | 355.47 | 266.24 | 155.64 | 355.47 | 266.24 | 155.64 | 599.64 | 363.48 | 217.31 |
| 5/16" x 1mm | 153.99 | 56.08 | 36.84 | 509.45 | 322.33 | 192.47 | 244.17 | 97.23 | 61.67 |
| 1mm x 28M | 19.31 | 7.15 | 4.49 | 528.76 | 329.47 | 196.97 | 90.19 | 41.15 | 24.83 |
| 28M x 100M | 29.74 | 10.69 | 6.78 | 558.50 | 340.16 | 203.75 | 70.88 | 34.00 | 20.34 |
| Minus 100M | 41.14 | 23.32 | 13.56 | 599.64 | 363.48 | 217.31 | 41.14 | 23.32 | 13.56 |
| **Clean Coal** | | | | | | | | 204.2 | TPH |
| Plus 5/16" | 69.67 | 7.17 | 7.10 | 69.67 | 7.17 | 7.10 | 204.24 | 25.00 | 23.49 |
| 5/16" x 1mm | 61.54 | 6.95 | 6.80 | 131.20 | 14.12 | 13.90 | 134.57 | 17.83 | 16.38 |
| 1mm x 28M | 11.48 | 1.02 | 1.03 | 142.68 | 15.14 | 14.94 | 73.04 | 10.88 | 9.58 |
| 28M x 100M | 31.02 | 3.65 | 3.57 | 173.71 | 18.79 | 18.51 | 61.56 | 9.86 | 8.55 |
| Minus 100M | 30.53 | 6.21 | 4.98 | 204.24 | 25.00 | 23.49 | 30.53 | 6.21 | 4.98 |
| **Coarse Refuse** | | | | | | | | 356.4 | TPH |
| Plus 5/16" | 293.21 | 253.65 | 153.91 | 293.21 | 253.65 | 153.91 | 356.44 | 307.00 | 182.12 |
| 5/16" x 1mm | 52.40 | 44.20 | 24.33 | 345.61 | 297.85 | 178.24 | 63.23 | 53.35 | 28.21 |
| 1mm x 28M | 3.42 | 2.89 | 1.68 | 349.03 | 300.73 | 179.92 | 10.84 | 9.15 | 3.88 |
| 28M x 100M | 4.49 | 3.74 | 2.20 | 353.52 | 304.47 | 182.12 | 7.41 | 6.26 | 2.20 |
| Minus 100M | 2.92 | 2.53 | 0.00 | 356.44 | 307.00 | 182.12 | 2.92 | 2.53 | 0.00 |
| **Fine Refuse** | | | | | | | | 39.0 | TPH |
| Plus 5/16" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 29.33 | 17.14 |
| 5/16" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 29.33 | 17.14 |
| 1mm x 28M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 29.33 | 17.14 |
| 28M x 100M | 1.50 | 0.48 | 0.34 | 1.50 | 0.48 | 0.34 | 38.95 | 29.33 | 17.14 |
| Minus 100M | 37.45 | 28.84 | 16.80 | 38.95 | 29.33 | 17.14 | 37.45 | 28.84 | 16.80 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,298,006 | 1,999,129 | 597.6 | 181.20 | 298.93 |
| Clean Coal | 1,123,328 | 137,503 | 64.6 | 57.49 | 469.70 |
| Coarse Refuse | 1,960,428 | 1,688,481 | 500.8 | 255.47 | 296.61 |
| Fine Refuse | 214,250 | 161,308 | 47.1 | 220.03 | 292.25 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 5/16" | 9.15 | 14.38 | 25.01 | 49.17 | 11.76 | 24.13 | 5.84 | 0.79 | 4.37 | 0.60 | 3.39 | 1.08 | 3.53 | 0.22 | 1.77 | 0.45 |
| 5/16" x 1mm | 2.52 | 3.46 | 6.14 | 11.37 | 2.77 | 5.53 | 1.23 | 0.18 | 1.04 | 0.13 | 0.78 | 0.28 | 0.86 | 0.07 | 0.40 | 0.07 |
| 1mm x 28M | 0.31 | 0.43 | 0.74 | 1.38 | 0.35 | 0.67 | 0.15 | 0.02 | 0.13 | 0.02 | 0.09 | 0.03 | 0.10 | 0.01 | 0.05 | 0.01 |
| 28M x 100M | 0.50 | 0.65 | 1.10 | 2.03 | 0.57 | 0.99 | 0.22 | 0.03 | 0.20 | 0.02 | 0.14 | 0.05 | 0.16 | 0.01 | 0.08 | 0.02 |
| Minus 100M | 1.02 | 1.27 | 2.09 | 3.91 | 1.38 | 1.95 | 0.46 | 0.07 | 0.44 | 0.06 | 0.29 | 0.09 | 0.30 | 0.00 | 0.16 | 0.04 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 5/16" | 0.55 | 0.71 | 1.18 | 2.12 | 0.62 | 1.02 | 0.18 | 0.03 | 0.21 | 0.02 | 0.15 | 0.06 | 0.15 | 0.02 | 0.07 | 0.01 |
| 5/16" x 1mm | 0.52 | 0.72 | 1.12 | 2.01 | 0.56 | 0.97 | 0.19 | 0.03 | 0.21 | 0.02 | 0.15 | 0.05 | 0.15 | 0.02 | 0.07 | 0.01 |
| 1mm x 28M | 0.08 | 0.11 | 0.17 | 0.31 | 0.08 | 0.15 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| 28M x 100M | 0.28 | 0.38 | 0.59 | 1.06 | 0.29 | 0.50 | 0.10 | 0.02 | 0.11 | 0.01 | 0.08 | 0.03 | 0.08 | 0.01 | 0.04 | 0.00 |
| Minus 100M | 0.39 | 0.50 | 0.78 | 1.45 | 0.47 | 0.71 | 0.14 | 0.02 | 0.16 | 0.02 | 0.11 | 0.04 | 0.11 | 0.01 | 0.06 | 0.01 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 5/16" | 9.27 | 13.38 | 25.39 | 49.80 | 10.57 | 24.18 | 5.56 | 0.77 | 4.11 | 0.56 | 3.28 | 1.12 | 3.60 | 0.30 | 1.71 | 0.32 |
| 5/16" x 1mm | 1.54 | 2.08 | 3.90 | 7.78 | 1.73 | 3.89 | 0.87 | 0.12 | 0.65 | 0.09 | 0.52 | 0.19 | 0.59 | 0.05 | 0.27 | 0.05 |
| 1mm x 28M | 0.11 | 0.15 | 0.28 | 0.54 | 0.12 | 0.26 | 0.06 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 |
| 28M x 100M | 0.15 | 0.19 | 0.36 | 0.68 | 0.18 | 0.34 | 0.07 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.05 | 0.00 | 0.02 | 0.00 |
| Minus 100M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 5/16" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" x 1mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 28M | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 28M x 100M | 0.03 | 0.03 | 0.06 | 0.10 | 0.03 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Minus 100M | 1.20 | 1.50 | 2.65 | 5.01 | 1.63 | 2.44 | 0.60 | 0.08 | 0.51 | 0.08 | 0.37 | 0.10 | 0.36 | 0.02 | 0.19 | 0.06 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 37.1 | 55.6 | 96.5 | 186.6 | 46.3 | 91.5 | 21.7 | 3.0 | 17.0 | 2.3 | 12.9 | 4.2 | 13.6 | 0.9 | 6.7 | 1.6 |
| Clean Coal | 5.0 | 6.6 | 10.5 | 19.1 | 5.5 | 9.2 | 1.8 | 0.3 | 2.0 | 0.2 | 1.4 | 0.5 | 1.4 | 0.2 | 0.7 | 0.1 |
| Coarse Refuse | 30.4 | 43.5 | 82.3 | 161.7 | 34.6 | 78.8 | 18.1 | 2.5 | 13.4 | 1.8 | 10.7 | 3.7 | 11.8 | 1.0 | 5.6 | 1.0 |
| Fine Refuse | 3.4 | 4.2 | 7.4 | 14.1 | 4.6 | 6.8 | 1.7 | 0.2 | 1.4 | 0.2 | 1.0 | 0.3 | 1.0 | 0.0 | 0.5 | 0.2 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 599.6 | TPH |
| Float 1.6 | 167.59 | 16.48 | 17.77 | 167.59 | 16.48 | 17.77 | 528.73 | 325.90 | 203.10 |
| 1.6 x 1.9 | 11.44 | 4.90 | 3.66 | 179.03 | 21.38 | 21.43 | 361.14 | 309.41 | 185.33 |
| Sink 1.9 | 349.70 | 304.52 | 181.66 | 528.73 | 325.90 | 203.10 | 349.70 | 304.52 | 181.66 |
| **Clean Coal (Plus 100M)** | | | | | | | | 204.2 | TPH |
| Float 1.6 | 164.32 | 16.00 | 17.34 | 164.32 | 16.00 | 17.34 | 173.71 | 20.94 | 20.64 |
| 1.6 x 1.9 | 6.28 | 2.57 | 1.81 | 170.60 | 18.57 | 19.14 | 9.39 | 4.94 | 3.31 |
| Sink 1.9 | 3.11 | 2.37 | 1.50 | 173.71 | 20.94 | 20.64 | 3.11 | 2.37 | 1.50 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 356.4 | TPH |
| Float 1.6 | 2.32 | 0.40 | 0.34 | 2.32 | 0.40 | 0.34 | 353.52 | 304.47 | 182.12 |
| 1.6 x 1.9 | 5.01 | 2.26 | 1.81 | 7.33 | 2.66 | 2.15 | 351.19 | 304.07 | 181.78 |
| Sink 1.9 | 346.19 | 301.81 | 179.97 | 353.52 | 304.47 | 182.12 | 346.19 | 301.81 | 179.97 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 39.0 | TPH |
| Float 1.6 | 0.95 | 0.09 | 0.09 | 0.95 | 0.09 | 0.09 | 1.50 | 0.48 | 0.34 |
| 1.6 x 1.9 | 0.15 | 0.06 | 0.05 | 1.10 | 0.15 | 0.14 | 0.55 | 0.40 | 0.24 |
| Sink 1.9 | 0.40 | 0.33 | 0.19 | 1.50 | 0.48 | 0.34 | 0.40 | 0.33 | 0.19 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 2,907,992 | 1,792,433 | 558.5 | 192.06 | 311.60 |
| Clean Coal | 955,391 | 115,182 | 56.8 | 59.41 | 492.82 |
| Coarse Refuse | 1,944,353 | 1,674,585 | 500.8 | 257.58 | 299.08 |
| Fine Refuse | 8,249 | 2,667 | 0.9 | 112.69 | 348.57 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

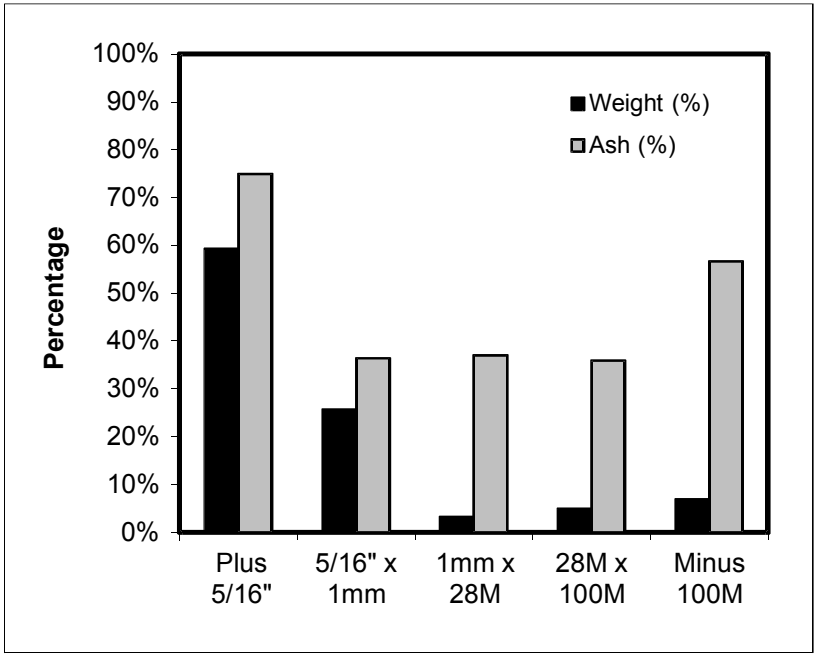
****Unless otherwise noted, REE values reported in ppm*

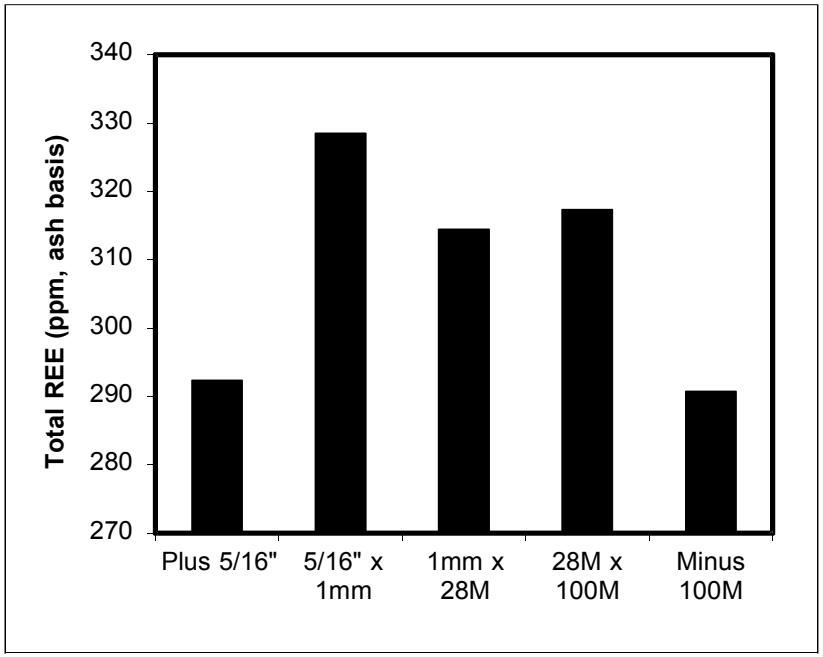
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 1.37 | 1.87 | 2.95 | 5.28 | 1.49 | 2.51 | 0.48 | 0.09 | 0.53 | 0.06 | 0.38 | 0.14 | 0.38 | 0.04 | 0.18 | 0.02 |
| 1.6 x 1.9 | 0.27 | 0.36 | 0.61 | 1.14 | 0.24 | 0.56 | 0.10 | 0.02 | 0.10 | 0.01 | 0.08 | 0.03 | 0.10 | 0.01 | 0.04 | 0.00 |
| Sink 1.9 | 11.05 | 15.74 | 29.84 | 58.62 | 12.63 | 28.59 | 6.55 | 0.91 | 4.86 | 0.67 | 3.87 | 1.33 | 4.26 | 0.35 | 2.02 | 0.38 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 1.34 | 1.82 | 2.88 | 5.14 | 1.46 | 2.45 | 0.47 | 0.08 | 0.52 | 0.05 | 0.37 | 0.13 | 0.37 | 0.04 | 0.18 | 0.02 |
| 1.6 x 1.9 | 0.13 | 0.17 | 0.30 | 0.56 | 0.12 | 0.28 | 0.05 | 0.01 | 0.05 | 0.01 | 0.04 | 0.02 | 0.05 | 0.00 | 0.02 | 0.00 |
| Sink 1.9 | 0.13 | 0.13 | 0.23 | 0.44 | 0.14 | 0.22 | 0.04 | 0.01 | 0.05 | 0.00 | 0.03 | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.03 | 0.05 | 0.11 | 0.02 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.9 | 0.14 | 0.18 | 0.30 | 0.56 | 0.11 | 0.27 | 0.05 | 0.01 | 0.05 | 0.00 | 0.04 | 0.02 | 0.05 | 0.00 | 0.02 | 0.00 |
| Sink 1.9 | 10.91 | 15.59 | 29.58 | 58.12 | 12.46 | 28.34 | 6.51 | 0.90 | 4.81 | 0.66 | 3.84 | 1.31 | 4.22 | 0.35 | 2.00 | 0.37 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.01 | 0.01 | 0.02 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.9 | 0.00 | 0.00 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.9 | 0.02 | 0.02 | 0.03 | 0.06 | 0.02 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

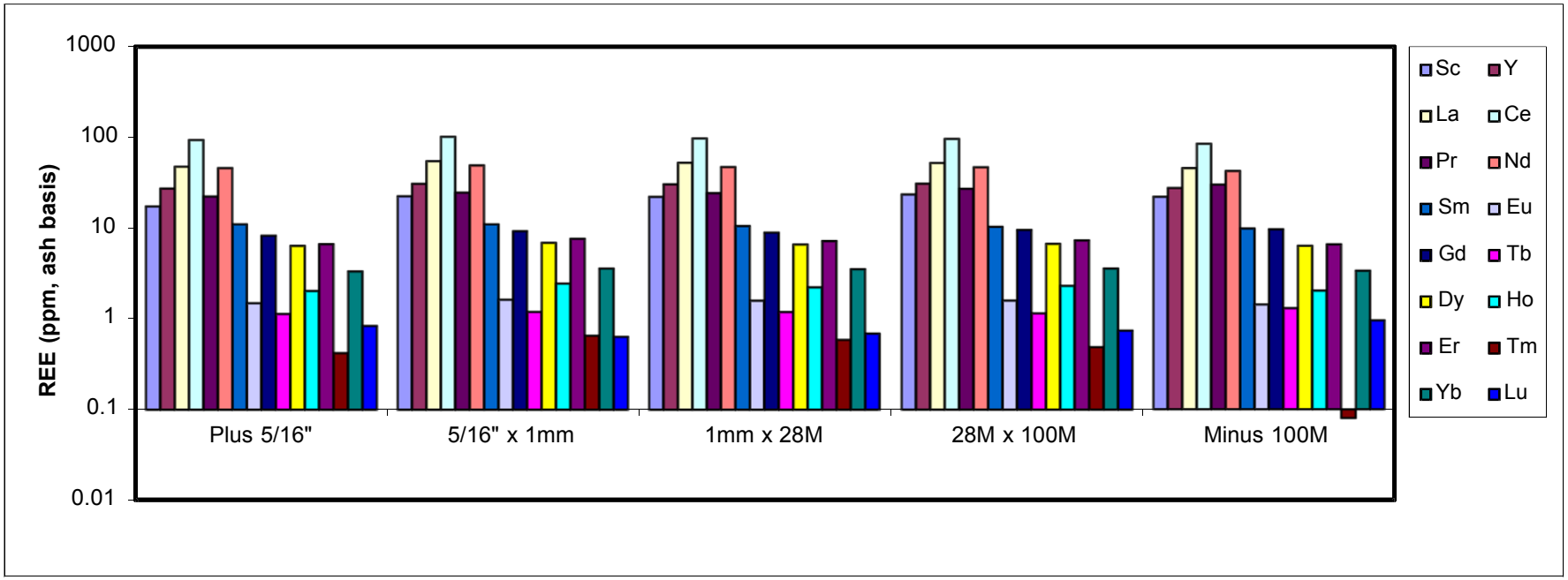
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 34.9 | 49.4 | 91.9 | 178.9 | 39.5 | 87.1 | 19.6 | 2.8 | 15.1 | 2.0 | 11.9 | 4.1 | 13.0 | 1.1 | 6.2 | 1.1 |
| Clean Coal | 4.4 | 5.9 | 9.4 | 16.9 | 4.8 | 8.1 | 1.5 | 0.3 | 1.7 | 0.2 | 1.2 | 0.4 | 1.2 | 0.1 | 0.6 | 0.1 |
| Coarse Refuse | 30.4 | 43.5 | 82.3 | 161.7 | 34.6 | 78.8 | 18.1 | 2.5 | 13.4 | 1.8 | 10.7 | 3.7 | 11.8 | 1.0 | 5.6 | 1.0 |
| Fine Refuse | 0.1 | 0.1 | 0.2 | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 5/16" | 59.28% | 74.90% | 292.28 | 59.28% | 108.17% | 309.68 | 200.00% | 36.43% | 327.62 |
| 5/16" x 1mm | 25.68% | 36.42% | 328.44 | 84.96% | 23.22% | 348.85 | 140.72% | 20.22% | 382.76 |
| 1mm x 28M | 3.22% | 37.02% | 314.40 | 88.18% | 11.76% | 367.25 | 115.04% | 16.61% | 409.35 |
| 28M x 100M | 4.96% | 35.94% | 317.29 | 93.14% | 9.86% | 374.11 | 111.82% | 16.02% | 415.67 |
| Minus 100M | 6.86% | 56.68% | 290.70 | 100.00% | 7.40% | 387.80 | 106.86% | 15.09% | 426.55 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 5/16" | 17.18 | 27.01 | 46.96 | 92.34 | 22.09 | 45.32 | 10.97 | 1.49 | 8.20 | 1.13 | 6.36 | 2.02 | 6.63 | 0.42 | 3.32 | 0.84 |
| 5/16" x 1mm | 22.47 | 30.88 | 54.73 | 101.37 | 24.70 | 49.27 | 11.00 | 1.63 | 9.29 | 1.20 | 6.92 | 2.46 | 7.63 | 0.65 | 3.59 | 0.64 |
| 1mm x 28M | 21.93 | 30.15 | 51.92 | 96.53 | 24.18 | 46.70 | 10.50 | 1.59 | 8.91 | 1.19 | 6.59 | 2.22 | 7.19 | 0.59 | 3.52 | 0.69 |
| 28M x 100M | 23.29 | 30.55 | 51.61 | 95.18 | 26.87 | 46.23 | 10.27 | 1.59 | 9.47 | 1.15 | 6.69 | 2.31 | 7.27 | 0.49 | 3.58 | 0.74 |
| Minus 100M | 21.89 | 27.34 | 44.92 | 83.75 | 29.67 | 41.88 | 9.79 | 1.42 | 9.54 | 1.30 | 6.30 | 2.02 | 6.51 | 0.08 | 3.34 | 0.95 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 5/16" | 34.11% | 10.29% | 495.38 | 34.11% | 10.29% | 495.38 | 100.00% | 12.24% | 469.70 |
| 5/16" x 1mm | 30.13% | 11.29% | 489.36 | 64.24% | 10.76% | 492.42 | 65.89% | 13.25% | 459.37 |
| 1mm x 28M | 5.62% | 8.90% | 506.22 | 69.86% | 10.61% | 493.35 | 35.76% | 14.90% | 440.22 |
| 28M x 100M | 15.19% | 11.76% | 489.12 | 85.05% | 10.82% | 492.53 | 30.14% | 16.02% | 433.38 |
| Minus 100M | 14.95% | 20.34% | 400.63 | 100.00% | 12.24% | 469.70 | 14.95% | 20.34% | 400.63 |
| Float/Sink Analysis - Plus 5/16" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 93.85% | 10.95% | 540.54 | 195.48% | 11.35% | 511.51 | 200.00% | 12.34% | 492.62 |
| 1.6 x 1.9 | 4.59% | 41.84% | 319.56 | 101.63% | 11.71% | 486.45 | 106.15% | 13.56% | 458.42 |
| Sink 1.9 | 1.56% | 75.75% | 388.40 | 97.04% | 10.29% | 518.55 | 101.56% | 12.28% | 479.79 |
| Float/Sink Analysis - 5/16" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 95.48% | 9.22% | 536.02 | 95.48% | 9.22% | 536.02 | 100.00% | 11.29% | 489.36 |
| 1.6 x 1.9 | 2.71% | 40.29% | 369.90 | 98.19% | 10.08% | 517.69 | 4.52% | 55.12% | 324.50 |
| Sink 1.9 | 1.81% | 77.33% | 289.07 | 100.00% | 11.29% | 489.36 | 1.81% | 77.33% | 289.07 |
| Float/Sink Analysis - 1mm x 28M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.25% | 7.79% | 547.42 | 97.25% | 7.79% | 547.42 | 100.00% | 8.90% | 506.22 |
| 1.6 x 1.9 | 2.15% | 40.10% | 416.37 | 99.40% | 8.49% | 534.03 | 2.75% | 48.21% | 270.79 |
| Sink 1.9 | 0.60% | 77.25% | 0.00 | 100.00% | 8.90% | 506.22 | 0.60% | 77.25% | 0.00 |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 93.52% | 8.80% | 555.46 | 93.52% | 8.80% | 555.46 | 100.00% | 11.76% | 489.12 |
| 1.6 x 1.9 | 3.77% | 39.63% | 403.11 | 97.29% | 9.99% | 532.05 | 6.48% | 54.52% | 334.57 |
| Sink 1.9 | 2.71% | 75.23% | 284.34 | 100.00% | 11.76% | 489.12 | 2.71% | 75.23% | 284.34 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 5/16" | 38.52 | 49.45 | 82.44 | 148.21 | 43.21 | 71.47 | 12.75 | 2.25 | 14.53 | 1.33 | 10.20 | 3.94 | 10.78 | 1.08 | 4.80 | 0.43 |
| 5/16" x 1mm | 37.55 | 51.62 | 80.34 | 144.84 | 40.26 | 69.83 | 13.85 | 2.45 | 14.81 | 1.68 | 10.58 | 3.78 | 10.69 | 1.22 | 5.14 | 0.72 |
| 1mm x 28M | 37.89 | 55.30 | 84.62 | 150.49 | 39.82 | 71.20 | 14.45 | 2.58 | 15.21 | 1.73 | 10.93 | 3.79 | 10.78 | 1.29 | 5.36 | 0.77 |
| 28M x 100M | 38.13 | 51.77 | 80.33 | 145.75 | 39.06 | 69.19 | 13.51 | 2.45 | 14.90 | 1.64 | 10.53 | 3.82 | 10.95 | 1.26 | 5.23 | 0.59 |
| Minus 100M | 31.62 | 40.26 | 62.42 | 117.05 | 37.49 | 57.08 | 11.45 | 1.93 | 12.83 | 1.42 | 8.60 | 3.14 | 9.21 | 0.97 | 4.43 | 0.73 |
| Float/Sink Analysis - Plus 5/16" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.50 | 54.33 | 90.52 | 160.99 | 48.77 | 76.50 | 13.60 | 2.44 | 16.05 | 1.42 | 11.01 | 4.20 | 11.39 | 1.20 | 5.12 | 0.50 |
| 1.6 x 1.9 | 20.85 | 30.34 | 52.76 | 98.54 | 21.63 | 52.26 | 10.15 | 1.54 | 8.43 | 1.06 | 6.96 | 2.70 | 7.97 | 0.51 | 3.55 | 0.31 |
| Sink 1.9 | 32.63 | 38.07 | 60.38 | 117.79 | 29.88 | 58.92 | 9.64 | 1.76 | 11.20 | 1.03 | 8.38 | 3.68 | 10.03 | 0.95 | 4.06 | 0.00 |
| Float/Sink Analysis - 5/16" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.30 | 57.61 | 88.25 | 157.61 | 44.78 | 75.47 | 15.13 | 2.72 | 16.41 | 1.88 | 11.61 | 4.06 | 11.36 | 1.39 | 5.60 | 0.85 |
| 1.6 x 1.9 | 29.47 | 35.63 | 60.29 | 115.53 | 26.39 | 54.85 | 9.24 | 1.57 | 10.66 | 0.86 | 7.65 | 3.40 | 9.82 | 0.70 | 3.84 | 0.00 |
| Sink 1.9 | 20.25 | 26.44 | 46.23 | 87.42 | 22.61 | 46.05 | 9.46 | 1.43 | 7.99 | 1.07 | 6.38 | 2.34 | 7.13 | 0.53 | 3.27 | 0.47 |
| Float/Sink Analysis - 1mm x 28M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 40.88 | 60.41 | 91.46 | 162.01 | 43.47 | 76.62 | 15.79 | 2.84 | 16.51 | 1.92 | 11.91 | 4.02 | 11.45 | 1.41 | 5.81 | 0.91 |
| 1.6 x 1.9 | 31.98 | 40.14 | 70.06 | 130.16 | 29.17 | 61.86 | 10.43 | 1.73 | 11.98 | 0.99 | 8.17 | 3.78 | 10.69 | 0.93 | 4.30 | 0.00 |
| Sink 1.9 | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.08 | 61.91 | 92.52 | 165.95 | 40.19 | 79.23 | 15.92 | 2.93 | 16.50 | 1.94 | 12.35 | 4.30 | 12.31 | 1.51 | 6.08 | 0.74 |
| 1.6 x 1.9 | 29.37 | 39.96 | 68.66 | 126.69 | 26.38 | 60.04 | 10.47 | 1.75 | 11.18 | 1.02 | 8.16 | 3.66 | 10.46 | 0.98 | 4.33 | 0.00 |
| Sink 1.9 | 32.66 | 19.51 | 39.69 | 78.15 | 43.79 | 35.34 | 5.99 | 1.05 | 11.14 | 0.87 | 4.93 | 2.01 | 5.83 | 0.47 | 2.47 | 0.44 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 5/16" | 82.26% | 86.51% | 303.39 | 82.26% | 86.51% | 303.39 | 100.00% | 86.13% | 296.61 |
| 5/16" x 1mm | 14.70% | 84.36% | 275.24 | 96.96% | 86.18% | 299.22 | 17.74% | 84.37% | 264.39 |
| 1mm x 28M | 0.96% | 84.36% | 291.08 | 97.92% | 86.16% | 299.14 | 3.04% | 84.43% | 211.94 |
| 28M x 100M | 1.26% | 83.17% | 294.13 | 99.18% | 86.13% | 299.08 | 2.08% | 84.46% | 175.45 |
| Minus 100M | 0.82% | 86.44% | 0.00 | 100.00% | 86.13% | 296.61 | 0.82% | 86.44% | 0.00 |
| Float/Sink Analysis - Plus 5/16" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.42% | 14.71% | 352.54 | 0.42% | 14.71% | 352.54 | 100.00% | 86.51% | 303.39 |
| 1.6 x 1.9 | 0.86% | 46.67% | 397.35 | 1.28% | 36.18% | 391.37 | 99.58% | 86.81% | 303.36 |
| Sink 1.9 | 98.72% | 87.16% | 302.92 | 100.00% | 86.51% | 303.39 | 98.72% | 87.16% | 302.92 |
| Float/Sink Analysis - 5/16" x 1mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.51% | 19.66% | 502.48 | 1.51% | 19.66% | 502.48 | 100.00% | 84.36% | 275.24 |
| 1.6 x 1.9 | 3.76% | 43.50% | 408.27 | 5.27% | 36.67% | 422.74 | 98.49% | 85.35% | 274.44 |
| Sink 1.9 | 94.73% | 87.01% | 271.78 | 100.00% | 84.36% | 275.24 | 94.73% | 87.01% | 271.78 |
| Float/Sink Analysis - 1mm x 28M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 4.24% | 20.71% | 459.97 | 4.24% | 20.71% | 459.97 | 100.00% | 84.36% | 291.08 |
| 1.6 x 1.9 | 7.44% | 44.76% | 347.95 | 11.68% | 36.03% | 371.32 | 95.76% | 87.18% | 289.31 |
| Sink 1.9 | 88.32% | 90.75% | 286.87 | 100.00% | 84.36% | 291.08 | 88.32% | 90.75% | 286.87 |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 3.49% | 18.37% | 500.94 | 3.49% | 18.37% | 500.94 | 100.00% | 83.17% | 294.13 |
| 1.6 x 1.9 | 5.82% | 43.53% | 404.92 | 9.31% | 34.10% | 424.31 | 96.51% | 85.52% | 292.52 |
| Sink 1.9 | 90.69% | 88.21% | 288.96 | 100.00% | 83.17% | 294.13 | 90.69% | 88.21% | 288.96 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 5/16" | 18.28 | 26.38 | 50.05 | 98.16 | 20.84 | 47.67 | 10.96 | 1.51 | 8.09 | 1.11 | 6.47 | 2.21 | 7.09 | 0.58 | 3.37 | 0.63 |
| 5/16" x 1mm | 17.45 | 23.56 | 44.15 | 88.01 | 19.53 | 43.97 | 9.88 | 1.38 | 7.39 | 1.04 | 5.87 | 2.11 | 6.71 | 0.55 | 3.10 | 0.55 |
| 1mm x 28M | 18.30 | 25.73 | 48.14 | 93.33 | 20.80 | 44.76 | 10.16 | 1.42 | 7.90 | 1.09 | 6.18 | 2.13 | 6.74 | 0.61 | 3.23 | 0.57 |
| 28M x 100M | 20.14 | 25.31 | 48.68 | 91.25 | 23.57 | 45.02 | 9.99 | 1.43 | 8.32 | 1.05 | 6.21 | 2.14 | 6.60 | 0.59 | 3.20 | 0.61 |
| Minus 100M | | | | | | | | | | | | | | | | |
| Float/Sink Analysis - Plus 5/16" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 28.98 | 28.86 | 49.34 | 123.41 | 28.85 | 48.26 | 8.13 | 1.46 | 10.26 | 0.87 | 6.78 | 3.35 | 9.84 | 0.85 | 3.26 | 0.04 |
| 1.6 x 1.9 | 28.90 | 41.13 | 66.43 | 124.34 | 22.76 | 60.95 | 11.02 | 1.87 | 10.84 | 1.12 | 8.19 | 3.65 | 10.55 | 1.06 | 4.54 | 0.00 |
| Sink 1.9 | 18.22 | 26.31 | 49.97 | 98.02 | 20.83 | 47.61 | 10.96 | 1.51 | 8.08 | 1.11 | 6.46 | 2.20 | 7.07 | 0.58 | 3.36 | 0.63 |
| Float/Sink Analysis - 5/16" x 1mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.29 | 52.47 | 85.05 | 158.51 | 30.26 | 73.33 | 13.27 | 2.28 | 13.92 | 1.30 | 10.57 | 4.57 | 13.02 | 1.24 | 5.37 | 0.03 |
| 1.6 x 1.9 | 32.06 | 40.40 | 67.38 | 126.58 | 27.08 | 60.63 | 10.73 | 1.84 | 11.66 | 1.06 | 8.55 | 3.80 | 11.02 | 1.04 | 4.45 | 0.00 |
| Sink 1.9 | 17.09 | 23.12 | 43.54 | 86.99 | 19.34 | 43.53 | 9.85 | 1.36 | 7.29 | 1.03 | 5.80 | 2.07 | 6.60 | 0.54 | 3.07 | 0.56 |
| Float/Sink Analysis - 1mm x 28M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.41 | 48.89 | 77.59 | 144.32 | 27.07 | 67.23 | 12.82 | 2.21 | 12.63 | 1.33 | 10.05 | 4.12 | 11.88 | 1.16 | 5.14 | 0.12 |
| 1.6 x 1.9 | 27.23 | 33.01 | 55.22 | 109.51 | 20.64 | 54.25 | 9.42 | 1.57 | 9.76 | 1.02 | 7.39 | 3.49 | 10.57 | 0.92 | 3.95 | 0.00 |
| Sink 1.9 | 17.76 | 25.17 | 47.52 | 92.10 | 20.74 | 44.12 | 10.16 | 1.41 | 7.77 | 1.09 | 6.09 | 2.05 | 6.52 | 0.59 | 3.18 | 0.60 |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.29 | 57.81 | 82.45 | 154.80 | 26.68 | 72.69 | 13.90 | 2.62 | 13.99 | 1.74 | 11.46 | 4.64 | 13.34 | 1.46 | 5.99 | 0.08 |
| 1.6 x 1.9 | 28.19 | 39.20 | 69.95 | 130.86 | 21.48 | 61.77 | 11.25 | 1.89 | 10.62 | 1.01 | 8.40 | 3.73 | 11.08 | 1.04 | 4.45 | 0.00 |
| Sink 1.9 | 19.75 | 24.61 | 47.74 | 89.49 | 23.61 | 44.27 | 9.92 | 1.41 | 8.20 | 1.05 | 6.10 | 2.07 | 6.40 | 0.57 | 3.14 | 0.63 |

## PLANT 16

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 3.85% | 32.33% | 348.57 | 3.85% | 32.33% | 348.57 | 100.00% | 75.29% | 292.25 |
| Minus 100M | 96.15% | 77.01% | 291.30 | 100.00% | 75.29% | 292.25 | 96.15% | 77.01% | 291.30 |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 63.31% | 9.36% | 527.95 | 63.31% | 9.36% | 527.95 | 100.00% | 32.33% | 348.57 |
| 1.6 x 1.9 | 10.08% | 41.64% | 393.57 | 73.39% | 13.79% | 472.23 | 36.69% | 71.96% | 308.31 |
| Sink 1.9 | 26.61% | 83.45% | 292.20 | 100.00% | 32.33% | 348.57 | 26.61% | 83.45% | 292.20 |

## PLANT 16

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 26.63 | 32.49 | 57.06 | 105.01 | 30.15 | 50.39 | 10.54 | 1.66 | 10.46 | 1.22 | 7.27 | 2.63 | 7.95 | 0.74 | 3.75 | 0.61 |
| Minus 100M | 20.8 | 26.05 | 46 | 86.91 | 28.2 | 42.3 | 10.44 | 1.46 | 8.85 | 1.31 | 6.36 | 1.82 | 6.25 | 0.27 | 3.29 | 0.99 |
| Float/Sink Analysis - 28M x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 39.04 | 58.99 | 88.34 | 158.05 | 38.37 | 74.11 | 15.39 | 2.76 | 15.50 | 1.86 | 11.57 | 4.11 | 11.86 | 1.36 | 5.86 | 0.78 |
| 1.6 x 1.9 | 27.08 | 37.69 | 69.12 | 127.19 | 21.43 | 59.63 | 11.01 | 1.80 | 10.20 | 1.02 | 7.97 | 3.63 | 10.49 | 1.02 | 4.29 | 0.00 |
| Sink 1.9 | 23.23 | 24.44 | 46.44 | 86.66 | 29.61 | 42.32 | 9.16 | 1.34 | 9.17 | 1.08 | 5.99 | 2.04 | 6.43 | 0.52 | 3.09 | 0.68 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 1044.1 | TPH |
| Plus 7/8" | 261.97 | 202.66 | 69.48 | 261.97 | 202.66 | 69.48 | 1044.11 | 499.79 | 231.01 |
| 7/8" x 1/8" | 395.78 | 181.82 | 93.87 | 657.74 | 384.48 | 163.34 | 782.15 | 297.13 | 161.54 |
| 1/8" x 1 mm | 151.86 | 50.16 | 29.04 | 809.61 | 434.64 | 192.38 | 386.37 | 115.31 | 67.67 |
| 1 mm x 100M | 149.31 | 38.04 | 21.70 | 958.91 | 472.68 | 214.08 | 234.51 | 65.15 | 38.63 |
| Minus 100M | 85.20 | 27.11 | 16.93 | 1044.11 | 499.79 | 231.01 | 85.20 | 27.11 | 16.93 |
| **Clean Coal** | | | | | | | | 415.1 | TPH |
| Plus 7/8" | 4.52 | 0.49 | 0.30 | 4.52 | 0.49 | 0.30 | 415.12 | 37.01 | 53.86 |
| 7/8" x 1/8" | 101.78 | 11.01 | 14.31 | 106.30 | 11.50 | 14.61 | 410.60 | 36.52 | 53.56 |
| 1/8" x 1 mm | 84.11 | 6.58 | 10.13 | 190.42 | 18.08 | 24.75 | 308.82 | 25.51 | 39.25 |
| 1 mm x 100M | 142.97 | 10.43 | 18.44 | 333.38 | 28.51 | 43.18 | 224.70 | 18.93 | 29.11 |
| Minus 100M | 81.74 | 8.50 | 10.67 | 415.12 | 37.01 | 53.86 | 81.74 | 8.50 | 10.67 |
| **Coarse Refuse** | | | | | | | | 532.8 | TPH |
| Plus 7/8" | 180.45 | 155.13 | 94.25 | 180.45 | 155.13 | 94.25 | 532.78 | 400.18 | 230.27 |
| 7/8" x 1/8" | 258.95 | 181.51 | 111.66 | 439.41 | 336.65 | 205.91 | 352.33 | 245.05 | 136.02 |
| 1/8" x 1 mm | 52.22 | 35.57 | 13.69 | 491.62 | 372.22 | 219.60 | 93.37 | 63.53 | 24.36 |
| 1 mm x 100M | 34.86 | 24.06 | 8.68 | 526.48 | 396.28 | 228.28 | 41.15 | 27.96 | 10.67 |
| Minus 100M | 6.30 | 3.90 | 2.00 | 532.78 | 400.18 | 230.27 | 6.30 | 3.90 | 2.00 |
| **Fine Refuse** | | | | | | | | 96.2 | TPH |
| Plus 7/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 96.21 | 62.33 | 35.58 |
| 7/8" x 1/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 96.21 | 62.33 | 35.58 |
| 1/8" x 1 mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 96.21 | 62.33 | 35.58 |
| 1 mm x 100M | 14.19 | 8.26 | 5.31 | 14.19 | 8.26 | 5.31 | 96.21 | 62.33 | 35.58 |
| Minus 100M | 82.02 | 54.07 | 30.27 | 96.21 | 62.33 | 35.58 | 82.02 | 54.07 | 30.27 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 5,742,630 | 2,748,859 | 635.3 | 110.63 | 231.11 |
| Clean Coal | 2,283,163 | 203,577 | 148.1 | 64.87 | 727.54 |
| Coarse Refuse | 2,930,286 | 2,201,000 | 633.3 | 216.11 | 287.71 |
| Fine Refuse | 529,180 | 342,794 | 97.8 | 184.89 | 285.41 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 7/8" | 6.64 | 5.43 | 7.45 | 23.41 | 5.27 | 10.25 | 2.63 | 0.39 | 2.11 | 0.38 | 1.44 | 0.66 | 2.19 | 0.19 | 0.92 | 0.12 |
| 7/8" x 1/8" | 8.18 | 8.13 | 12.76 | 29.63 | 6.41 | 14.86 | 3.41 | 0.55 | 2.79 | 0.42 | 1.92 | 0.81 | 2.49 | 0.24 | 1.15 | 0.11 |
| 1/8" x 1 mm | 2.60 | 2.78 | 3.80 | 8.83 | 1.96 | 4.57 | 1.08 | 0.18 | 0.92 | 0.14 | 0.66 | 0.26 | 0.75 | 0.08 | 0.38 | 0.04 |
| 1 mm x 100M | 2.02 | 2.29 | 2.73 | 6.25 | 1.71 | 3.25 | 0.76 | 0.14 | 0.74 | 0.12 | 0.51 | 0.20 | 0.57 | 0.07 | 0.30 | 0.04 |
| Minus 100M | 1.76 | 1.73 | 2.03 | 5.00 | 1.95 | 2.08 | 0.47 | 0.09 | 0.65 | 0.07 | 0.35 | 0.12 | 0.36 | 0.04 | 0.19 | 0.04 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 7/8" | 0.03 | 0.04 | 0.04 | 0.06 | 0.03 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| 7/8" x 1/8" | 0.85 | 2.02 | 2.24 | 4.09 | 0.98 | 2.09 | 0.47 | 0.07 | 0.45 | 0.06 | 0.37 | 0.11 | 0.28 | 0.04 | 0.16 | 0.03 |
| 1/8" x 1 mm | 0.58 | 1.57 | 1.58 | 2.85 | 0.58 | 1.46 | 0.35 | 0.06 | 0.32 | 0.05 | 0.29 | 0.08 | 0.20 | 0.03 | 0.13 | 0.02 |
| 1 mm x 100M | 1.26 | 2.95 | 2.66 | 5.19 | 0.97 | 2.52 | 0.63 | 0.13 | 0.62 | 0.09 | 0.53 | 0.15 | 0.39 | 0.06 | 0.27 | 0.04 |
| Minus 100M | 0.85 | 1.58 | 1.43 | 2.97 | 0.80 | 1.40 | 0.34 | 0.07 | 0.39 | 0.05 | 0.28 | 0.08 | 0.23 | 0.03 | 0.15 | 0.03 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 7/8" | 6.05 | 8.10 | 14.85 | 31.32 | 6.34 | 14.70 | 3.58 | 0.50 | 2.56 | 0.35 | 1.83 | 0.65 | 2.00 | 0.16 | 1.03 | 0.22 |
| 7/8" x 1/8" | 8.23 | 9.72 | 16.85 | 39.36 | 6.72 | 16.45 | 3.56 | 0.54 | 2.90 | 0.33 | 2.02 | 0.89 | 2.54 | 0.23 | 1.21 | 0.12 |
| 1/8" x 1 mm | 1.31 | 0.96 | 1.74 | 4.60 | 0.98 | 2.11 | 0.47 | 0.07 | 0.39 | 0.06 | 0.26 | 0.13 | 0.41 | 0.03 | 0.16 | 0.01 |
| 1 mm x 100M | 0.91 | 0.61 | 1.03 | 2.69 | 0.77 | 1.34 | 0.30 | 0.05 | 0.28 | 0.05 | 0.17 | 0.08 | 0.26 | 0.02 | 0.10 | 0.01 |
| Minus 100M | 0.20 | 0.17 | 0.26 | 0.59 | 0.22 | 0.28 | 0.06 | 0.01 | 0.07 | 0.01 | 0.04 | 0.02 | 0.05 | 0.00 | 0.02 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 7/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/8" x 1/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/8" x 1 mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 mm x 100M | 0.48 | 0.48 | 0.77 | 1.60 | 0.48 | 0.77 | 0.17 | 0.03 | 0.17 | 0.02 | 0.10 | 0.04 | 0.11 | 0.01 | 0.06 | 0.01 |
| Minus 100M | 2.78 | 2.71 | 3.90 | 8.93 | 3.39 | 4.18 | 1.01 | 0.16 | 1.09 | 0.14 | 0.62 | 0.21 | 0.66 | 0.06 | 0.34 | 0.09 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 58.3 | 56.0 | 79.2 | 201.1 | 47.6 | 96.3 | 23.0 | 3.7 | 19.8 | 3.1 | 13.4 | 5.6 | 17.5 | 1.7 | 8.1 | 0.9 |
| Clean Coal | 9.8 | 22.4 | 21.9 | 41.7 | 9.2 | 20.7 | 4.9 | 0.9 | 4.9 | 0.7 | 4.1 | 1.2 | 3.0 | 0.5 | 1.9 | 0.3 |
| Coarse Refuse | 45.9 | 53.8 | 95.5 | 216.1 | 41.3 | 95.9 | 21.9 | 3.2 | 17.0 | 2.2 | 11.9 | 4.8 | 14.4 | 1.2 | 6.9 | 1.0 |
| Fine Refuse | 8.9 | 8.8 | 12.8 | 29.0 | 10.6 | 13.6 | 3.3 | 0.5 | 3.5 | 0.4 | 2.0 | 0.7 | 2.1 | 0.2 | 1.1 | 0.3 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 1044.1 | TPH |
| Float 1.6 | 362.29 | 33.45 | 48.80 | 362.29 | 33.45 | 48.80 | 874.06 | 433.32 | 276.94 |
| 1.6 x 1.8 | 49.22 | 19.48 | 17.82 | 411.51 | 52.93 | 66.62 | 511.77 | 399.87 | 228.14 |
| Sink 1.8 | 462.55 | 380.39 | 210.32 | 874.06 | 433.32 | 276.94 | 462.55 | 380.39 | 210.32 |
| **Clean Coal (Plus 100M)** | | | | | | | | 415.1 | TPH |
| Float 1.6 | 324.03 | 24.67 | 40.00 | 324.03 | 24.67 | 40.00 | 333.38 | 28.78 | 43.35 |
| 1.6 x 1.8 | 6.06 | 2.18 | 2.07 | 330.09 | 26.85 | 42.07 | 9.36 | 4.12 | 3.35 |
| Sink 1.8 | 3.30 | 1.94 | 1.28 | 333.38 | 28.78 | 43.35 | 3.30 | 1.94 | 1.28 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 532.8 | TPH |
| Float 1.6 | 34.31 | 8.45 | 8.50 | 34.31 | 8.45 | 8.50 | 526.48 | 396.28 | 228.28 |
| 1.6 x 1.8 | 42.27 | 16.95 | 15.56 | 76.58 | 25.41 | 24.06 | 492.18 | 387.83 | 219.78 |
| Sink 1.8 | 449.91 | 370.87 | 204.22 | 526.48 | 396.28 | 228.28 | 449.91 | 370.87 | 204.22 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 96.2 | TPH |
| Float 1.6 | 3.96 | 0.33 | 0.31 | 3.96 | 0.33 | 0.31 | 14.19 | 8.26 | 5.31 |
| 1.6 x 1.8 | 0.89 | 0.34 | 0.19 | 4.84 | 0.67 | 0.50 | 10.24 | 7.92 | 5.00 |
| Sink 1.8 | 9.35 | 7.58 | 4.81 | 14.19 | 8.26 | 5.31 | 9.35 | 7.58 | 4.81 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 4,807,314 | 2,383,265 | 761.6 | 158.42 | 319.55 |
| Clean Coal | 1,833,608 | 158,311 | 119.2 | 65.02 | 753.04 |
| Coarse Refuse | 2,895,651 | 2,179,543 | 627.8 | 216.80 | 288.03 |
| Fine Refuse | 78,054 | 45,412 | 14.6 | 187.04 | 321.49 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

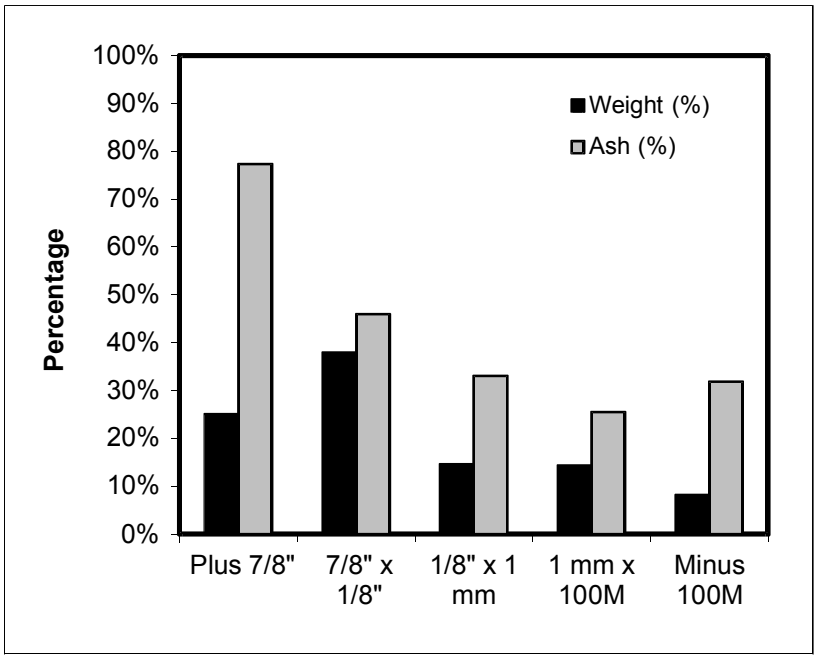
****Unless otherwise noted, REE values reported in ppm*

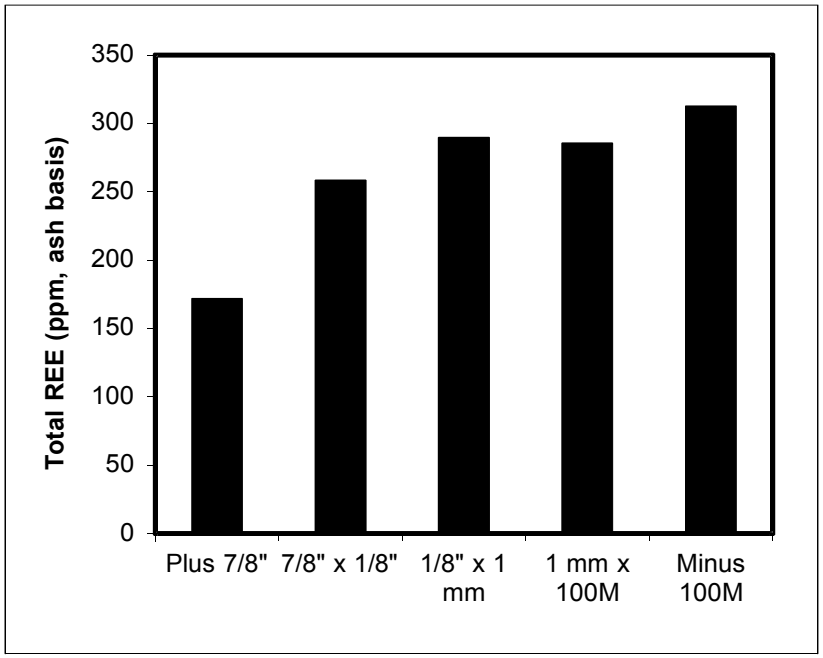
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 3.12 | 7.22 | 7.51 | 13.88 | 2.81 | 6.97 | 1.62 | 0.28 | 1.55 | 0.21 | 1.34 | 0.39 | 1.01 | 0.16 | 0.62 | 0.09 |
| 1.6 x 1.8 | 1.30 | 1.79 | 2.92 | 5.91 | 0.93 | 2.69 | 0.49 | 0.08 | 0.49 | 0.04 | 0.35 | 0.17 | 0.46 | 0.04 | 0.18 | 0.00 |
| Sink 1.8 | 15.30 | 17.45 | 31.36 | 72.03 | 14.13 | 31.86 | 7.43 | 1.09 | 5.66 | 0.75 | 3.90 | 1.57 | 4.73 | 0.40 | 2.32 | 0.36 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 2.48 | 6.27 | 6.00 | 11.17 | 2.33 | 5.64 | 1.37 | 0.24 | 1.31 | 0.18 | 1.14 | 0.31 | 0.80 | 0.14 | 0.53 | 0.09 |
| 1.6 x 1.8 | 0.15 | 0.21 | 0.35 | 0.66 | 0.13 | 0.31 | 0.06 | 0.01 | 0.06 | 0.00 | 0.04 | 0.02 | 0.05 | 0.00 | 0.02 | 0.00 |
| Sink 1.8 | 0.10 | 0.11 | 0.19 | 0.40 | 0.12 | 0.20 | 0.03 | 0.00 | 0.04 | 0.00 | 0.03 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.61 | 0.91 | 1.47 | 2.63 | 0.47 | 1.29 | 0.25 | 0.04 | 0.23 | 0.03 | 0.20 | 0.08 | 0.19 | 0.02 | 0.09 | 0.00 |
| 1.6 x 1.8 | 1.13 | 1.57 | 2.55 | 5.18 | 0.78 | 2.35 | 0.43 | 0.07 | 0.42 | 0.04 | 0.30 | 0.15 | 0.41 | 0.03 | 0.16 | 0.00 |
| Sink 1.8 | 14.77 | 16.91 | 30.46 | 70.17 | 13.56 | 30.96 | 7.24 | 1.06 | 5.47 | 0.73 | 3.78 | 1.52 | 4.60 | 0.39 | 2.25 | 0.35 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.03 | 0.04 | 0.04 | 0.08 | 0.02 | 0.05 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| 1.6 x 1.8 | 0.02 | 0.02 | 0.02 | 0.06 | 0.01 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Sink 1.8 | 0.43 | 0.42 | 0.71 | 1.46 | 0.45 | 0.70 | 0.16 | 0.03 | 0.16 | 0.02 | 0.09 | 0.03 | 0.10 | 0.01 | 0.05 | 0.01 |

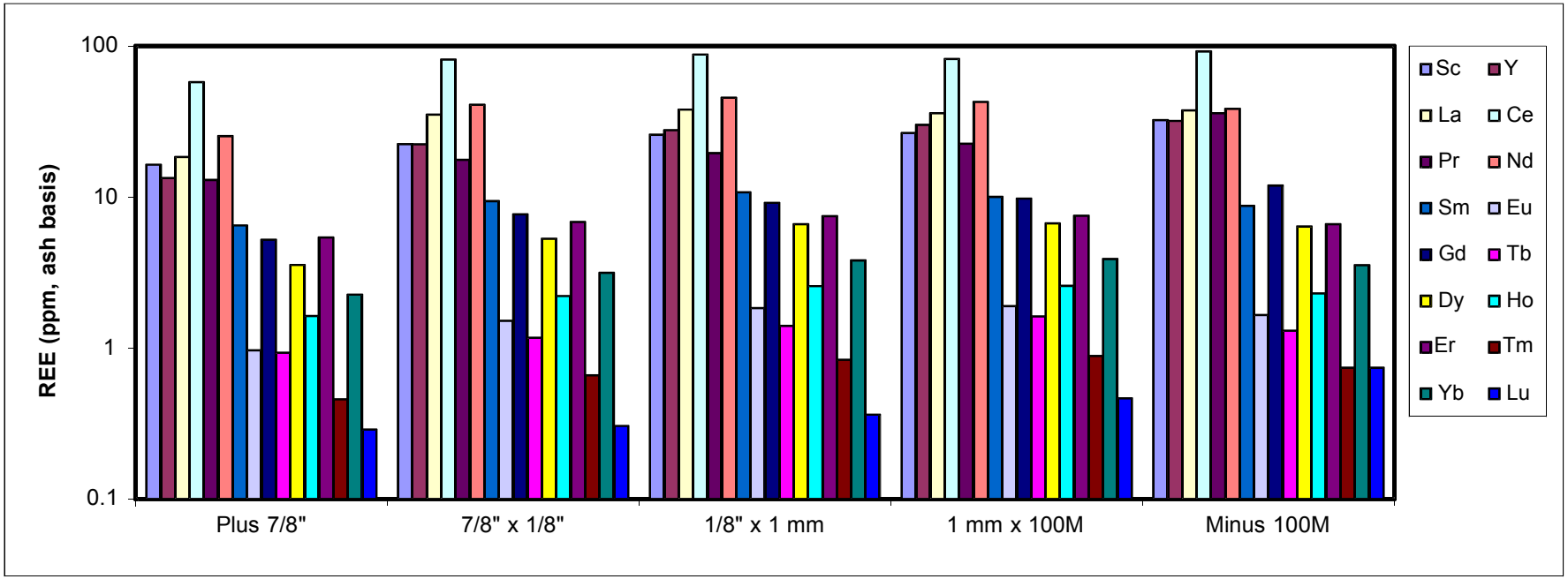
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 54.2 | 72.8 | 114.9 | 252.5 | 49.1 | 114.2 | 26.2 | 4.0 | 21.2 | 2.8 | 15.3 | 5.9 | 17.0 | 1.6 | 8.6 | 1.3 |
| Clean Coal | 7.5 | 18.1 | 18.0 | 33.6 | 7.1 | 16.9 | 4.0 | 0.7 | 3.9 | 0.5 | 3.3 | 0.9 | 2.4 | 0.4 | 1.5 | 0.2 |
| Coarse Refuse | 45.4 | 53.3 | 94.8 | 214.5 | 40.7 | 95.2 | 21.8 | 3.2 | 16.8 | 2.2 | 11.8 | 4.8 | 14.3 | 1.2 | 6.9 | 1.0 |
| Fine Refuse | 1.3 | 1.3 | 2.1 | 4.4 | 1.3 | 2.1 | 0.5 | 0.1 | 0.5 | 0.1 | 0.3 | 0.1 | 0.3 | 0.0 | 0.2 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 7/8" | 25.09% | 77.36% | 171.41 | 25.09% | 191.26% | 231.30 | 200.00% | 28.39% | 309.06 |
| 7/8" x 1/8" | 37.91% | 45.94% | 258.14 | 63.00% | 45.36% | 271.97 | 174.91% | 21.37% | 380.55 |
| 1/8" x 1 mm | 14.54% | 33.03% | 289.44 | 77.54% | 14.40% | 293.55 | 137.00% | 14.57% | 487.34 |
| 1 mm x 100M | 14.30% | 25.48% | 285.19 | 91.84% | 6.92% | 296.65 | 122.46% | 12.38% | 550.06 |
| Minus 100M | 8.16% | 31.82% | 312.30 | 100.00% | 2.72% | 312.03 | 108.16% | 10.64% | 633.89 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 7/8" | 16.38 | 13.40 | 18.39 | 57.75 | 13.00 | 25.30 | 6.49 | 0.97 | 5.21 | 0.93 | 3.55 | 1.63 | 5.40 | 0.46 | 2.26 | 0.29 |
| 7/8" x 1/8" | 22.48 | 22.36 | 35.10 | 81.49 | 17.64 | 40.85 | 9.39 | 1.51 | 7.68 | 1.17 | 5.29 | 2.21 | 6.84 | 0.66 | 3.15 | 0.30 |
| 1/8" x 1 mm | 25.87 | 27.68 | 37.92 | 88.04 | 19.56 | 45.53 | 10.76 | 1.84 | 9.17 | 1.40 | 6.62 | 2.57 | 7.48 | 0.83 | 3.80 | 0.36 |
| 1 mm x 100M | 26.55 | 30.04 | 35.93 | 82.08 | 22.54 | 42.67 | 10.05 | 1.89 | 9.78 | 1.62 | 6.70 | 2.58 | 7.52 | 0.89 | 3.88 | 0.46 |
| Minus 100M | 32.37 | 31.91 | 37.49 | 92.15 | 35.99 | 38.43 | 8.75 | 1.66 | 11.94 | 1.30 | 6.39 | 2.30 | 6.61 | 0.74 | 3.53 | 0.74 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 7/8" | 1.09% | 10.91% | 306.22 | 1.09% | 10.91% | 306.22 | 100.00% | 8.92% | 727.54 |
| 7/8" x 1/8" | 24.52% | 10.82% | 649.84 | 25.61% | 10.82% | 635.10 | 98.91% | 8.89% | 733.23 |
| 1/8" x 1 mm | 20.26% | 7.82% | 770.04 | 45.87% | 9.50% | 684.20 | 74.39% | 8.26% | 769.22 |
| 1 mm x 100M | 34.44% | 7.30% | 883.99 | 80.31% | 8.55% | 757.28 | 54.13% | 8.42% | 768.94 |
| Minus 100M | 19.69% | 10.40% | 627.78 | 100.00% | 8.92% | 727.54 | 19.69% | 10.40% | 627.78 |
| Float/Sink Analysis - Plus 7/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.01% | 15.34% | 300.16 | 197.67% | 13.46% | 444.36 | 200.00% | 13.85% | 440.40 |
| 1.6 x 1.8 | 3.93% | 33.20% | 304.74 | 103.66% | 11.75% | 615.06 | 105.99% | 12.53% | 592.64 |
| Sink 1.8 | 2.06% | 56.34% | 383.19 | 99.73% | 10.91% | 652.27 | 102.06% | 11.74% | 624.00 |
| Float/Sink Analysis - 7/8" x 1/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.67% | 9.95% | 684.41 | 97.67% | 9.95% | 684.41 | 100.00% | 10.82% | 649.84 |
| 1.6 x 1.8 | 1.10% | 36.89% | 423.94 | 98.77% | 10.25% | 673.99 | 2.33% | 47.23% | 344.38 |
| Sink 1.8 | 1.23% | 56.45% | 298.04 | 100.00% | 10.82% | 649.84 | 1.23% | 56.45% | 298.04 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 98.22% | 7.24% | 805.03 | 98.22% | 7.24% | 805.03 | 100.00% | 7.82% | 770.04 |
| 1.6 x 1.8 | 1.72% | 39.21% | 442.59 | 99.94% | 7.79% | 773.60 | 1.78% | 39.97% | 420.18 |
| Sink 1.8 | 0.06% | 62.94% | 0.00 | 100.00% | 7.82% | 770.04 | 0.06% | 62.94% | 0.00 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 96.35% | 5.91% | 1009.38 | 96.35% | 5.91% | 1009.38 | 100.00% | 7.30% | 883.99 |
| 1.6 x 1.8 | 2.32% | 34.46% | 517.16 | 98.67% | 6.58% | 948.78 | 3.65% | 43.86% | 437.94 |
| Sink 1.8 | 1.33% | 60.25% | 358.89 | 100.00% | 7.30% | 883.99 | 1.33% | 60.25% | 358.89 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 7/8" | 27.45 | 35.92 | 42.11 | 64.65 | 31.89 | 55.03 | 9.06 | 1.23 | 11.53 | 1.46 | 8.18 | 3.27 | 9.44 | 1.02 | 3.90 | 0.07 |
| 7/8" x 1/8" | 38.72 | 91.70 | 101.83 | 185.70 | 44.53 | 94.82 | 21.19 | 3.23 | 20.41 | 2.53 | 16.99 | 4.96 | 12.56 | 2.01 | 7.40 | 1.27 |
| 1/8" x 1 mm | 43.90 | 119.37 | 120.06 | 216.62 | 43.78 | 110.70 | 26.50 | 4.31 | 24.34 | 3.48 | 22.07 | 5.98 | 14.99 | 2.61 | 9.65 | 1.67 |
| 1 mm x 100M | 60.37 | 141.22 | 127.46 | 248.60 | 46.67 | 120.78 | 30.09 | 6.06 | 29.65 | 4.26 | 25.20 | 7.19 | 18.63 | 3.11 | 12.74 | 1.94 |
| Minus 100M | 49.89 | 93.19 | 83.94 | 174.86 | 46.85 | 82.29 | 20.17 | 4.04 | 22.66 | 2.98 | 16.49 | 4.92 | 13.26 | 2.05 | 8.65 | 1.54 |
| Float/Sink Analysis - Plus 7/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 23.60 | 38.48 | 43.34 | 63.74 | 23.24 | 57.09 | 9.64 | 1.31 | 10.52 | 1.55 | 8.75 | 3.47 | 10.14 | 1.12 | 4.16 | 0.00 |
| 1.6 x 1.8 | 78.59 | 7.10 | 11.90 | 21.80 | 139.87 | 12.33 | 0.00 | 0.22 | 24.10 | 1.03 | 2.95 | 0.83 | 1.99 | 0.19 | 0.93 | 0.91 |
| Sink 1.8 | 17.75 | 36.56 | 60.77 | 124.07 | 17.94 | 77.47 | 12.09 | 1.38 | 9.93 | 0.85 | 7.00 | 3.52 | 9.12 | 0.65 | 4.06 | 0.04 |
| Float/Sink Analysis - 7/8" x 1/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 39.95 | 98.51 | 107.73 | 194.65 | 46.35 | 99.15 | 22.64 | 3.47 | 21.56 | 2.73 | 18.13 | 5.14 | 12.97 | 2.15 | 7.86 | 1.41 |
| 1.6 x 1.8 | 34.79 | 42.77 | 66.74 | 124.48 | 32.12 | 66.71 | 11.00 | 1.48 | 12.79 | 1.14 | 9.65 | 4.18 | 10.95 | 0.96 | 4.19 | 0.00 |
| Sink 1.8 | 23.80 | 25.08 | 39.85 | 96.19 | 26.21 | 50.52 | 6.85 | 0.85 | 8.91 | 0.55 | 5.33 | 2.88 | 7.66 | 0.59 | 2.76 | 0.00 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 45.37 | 126.97 | 125.19 | 224.68 | 46.05 | 115.15 | 27.96 | 4.58 | 25.64 | 3.72 | 23.30 | 6.17 | 15.43 | 2.78 | 10.20 | 1.84 |
| 1.6 x 1.8 | 30.81 | 45.73 | 72.46 | 143.31 | 22.18 | 69.84 | 12.51 | 1.68 | 11.91 | 1.06 | 10.25 | 4.35 | 11.13 | 0.99 | 4.37 | 0.00 |
| Sink 1.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 68.57 | 169.22 | 142.38 | 279.09 | 50.81 | 136.61 | 35.02 | 7.22 | 34.44 | 5.16 | 29.94 | 8.27 | 21.34 | 3.74 | 15.16 | 2.42 |
| 1.6 x 1.8 | 33.98 | 51.39 | 91.67 | 172.49 | 28.91 | 75.31 | 15.04 | 2.56 | 14.20 | 1.19 | 9.39 | 4.00 | 10.73 | 1.05 | 5.03 | 0.20 |
| Sink 1.8 | 28.42 | 31.91 | 57.15 | 107.83 | 35.02 | 53.69 | 10.13 | 1.32 | 11.05 | 0.94 | 7.31 | 2.72 | 7.26 | 0.65 | 3.23 | 0.27 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 7/8" | 33.87% | 85.97% | 303.77 | 33.87% | 85.97% | 303.77 | 100.00% | 75.11% | 287.71 |
| 7/8" x 1/8" | 48.60% | 70.10% | 307.59 | 82.47% | 76.61% | 305.83 | 66.13% | 69.55% | 277.55 |
| 1/8" x 1 mm | 9.80% | 68.11% | 192.41 | 92.28% | 75.71% | 294.99 | 17.53% | 68.04% | 191.73 |
| 1 mm x 100M | 6.54% | 69.03% | 180.33 | 98.82% | 75.27% | 288.03 | 7.72% | 67.95% | 190.86 |
| Minus 100M | 1.18% | 61.95% | 255.83 | 100.00% | 75.11% | 287.71 | 1.18% | 61.95% | 255.83 |
| Float/Sink Analysis - Plus 7/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.88% | 28.40% | 704.06 | 0.88% | 28.40% | 704.06 | 100.00% | 85.97% | 303.77 |
| 1.6 x 1.8 | 4.40% | 39.86% | 514.39 | 5.29% | 37.94% | 538.11 | 99.12% | 86.48% | 302.60 |
| Sink 1.8 | 94.71% | 88.65% | 298.17 | 100.00% | 85.97% | 303.77 | 94.71% | 88.65% | 298.17 |
| Float/Sink Analysis - 7/8" x 1/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 7.96% | 27.83% | 511.15 | 7.96% | 27.83% | 511.15 | 100.00% | 70.10% | 307.59 |
| 1.6 x 1.8 | 9.12% | 40.72% | 484.22 | 17.08% | 34.71% | 494.29 | 92.04% | 73.75% | 300.94 |
| Sink 1.8 | 82.92% | 77.38% | 290.34 | 100.00% | 70.10% | 307.59 | 82.92% | 77.38% | 290.34 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 13.37% | 21.60% | 596.28 | 13.37% | 21.60% | 596.28 | 100.00% | 68.11% | 192.41 |
| 1.6 x 1.8 | 13.97% | 38.70% | 396.30 | 27.35% | 30.34% | 465.93 | 86.63% | 75.29% | 174.52 |
| Sink 1.8 | 72.65% | 82.33% | 154.47 | 100.00% | 68.11% | 192.41 | 72.65% | 82.33% | 154.47 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 14.68% | 14.73% | 129.83 | 14.68% | 14.73% | 129.83 | 100.00% | 69.03% | 180.33 |
| 1.6 x 1.8 | 9.82% | 39.47% | 278.83 | 24.50% | 24.65% | 225.48 | 85.32% | 78.38% | 181.96 |
| Sink 1.8 | 75.50% | 83.44% | 176.00 | 100.00% | 69.03% | 180.33 | 75.50% | 83.44% | 176.00 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 7/8" | 19.51 | 26.10 | 47.85 | 100.94 | 20.44 | 47.39 | 11.55 | 1.61 | 8.26 | 1.13 | 5.89 | 2.11 | 6.46 | 0.52 | 3.31 | 0.70 |
| 7/8" x 1/8" | 22.66 | 26.77 | 46.42 | 108.43 | 18.50 | 45.30 | 9.80 | 1.50 | 7.98 | 0.92 | 5.57 | 2.45 | 7.00 | 0.63 | 3.34 | 0.32 |
| 1/8" x 1 mm | 18.43 | 13.43 | 24.47 | 64.72 | 13.80 | 29.64 | 6.64 | 0.98 | 5.44 | 0.91 | 3.64 | 1.77 | 5.71 | 0.44 | 2.21 | 0.18 |
| 1 mm x 100M | 19.00 | 12.71 | 21.49 | 55.99 | 16.05 | 27.92 | 6.23 | 0.98 | 5.78 | 0.95 | 3.52 | 1.64 | 5.30 | 0.44 | 2.11 | 0.21 |
| Minus 100M | 25.36 | 21.87 | 32.80 | 75.84 | 28.51 | 35.24 | 8.00 | 1.34 | 9.11 | 1.12 | 4.92 | 1.96 | 5.80 | 0.54 | 2.85 | 0.56 |
| Float/Sink Analysis - Plus 7/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 38.69 | 63.92 | 148.23 | 248.76 | 31.77 | 97.67 | 17.33 | 2.84 | 16.23 | 0.71 | 11.30 | 5.55 | 14.20 | 1.28 | 5.60 | 0.00 |
| 1.6 x 1.8 | 34.22 | 53.45 | 86.02 | 173.63 | 24.23 | 77.54 | 14.24 | 2.28 | 13.78 | 1.16 | 9.29 | 4.84 | 13.31 | 1.07 | 5.32 | 0.00 |
| Sink 1.8 | 19.14 | 25.41 | 46.76 | 98.98 | 20.32 | 46.61 | 11.48 | 1.60 | 8.12 | 1.13 | 5.81 | 2.04 | 6.29 | 0.50 | 3.26 | 0.72 |
| Float/Sink Analysis - 7/8" x 1/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 37.39 | 54.37 | 86.67 | 155.37 | 29.87 | 79.16 | 14.87 | 2.22 | 14.43 | 1.68 | 12.07 | 4.63 | 11.88 | 1.23 | 5.30 | 0.03 |
| 1.6 x 1.8 | 35.11 | 49.69 | 79.89 | 161.17 | 25.15 | 71.78 | 13.14 | 2.14 | 13.15 | 1.02 | 9.38 | 4.53 | 12.13 | 1.06 | 4.87 | 0.00 |
| Sink 1.8 | 21.43 | 24.49 | 43.10 | 103.76 | 17.72 | 42.60 | 9.43 | 1.44 | 7.46 | 0.89 | 5.12 | 2.25 | 6.53 | 0.59 | 3.18 | 0.35 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 40.91 | 67.66 | 105.15 | 187.43 | 29.35 | 88.10 | 17.52 | 2.69 | 15.79 | 1.87 | 14.00 | 5.06 | 12.74 | 1.46 | 6.27 | 0.27 |
| 1.6 x 1.8 | 30.56 | 36.76 | 63.19 | 130.75 | 19.04 | 62.89 | 11.22 | 1.67 | 10.68 | 1.05 | 8.26 | 4.10 | 11.19 | 0.91 | 4.02 | 0.00 |
| Sink 1.8 | 16.25 | 8.70 | 17.07 | 52.83 | 12.57 | 23.81 | 5.70 | 0.83 | 4.47 | 0.85 | 2.72 | 1.40 | 4.88 | 0.34 | 1.86 | 0.19 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 14.28 | 13.71 | 15.61 | 38.27 | 7.08 | 19.43 | 4.00 | 0.94 | 4.21 | 0.85 | 3.06 | 1.46 | 4.48 | 0.50 | 1.95 | 0.00 |
| 1.6 x 1.8 | 24.13 | 23.53 | 40.98 | 91.76 | 13.50 | 45.49 | 7.45 | 1.13 | 7.78 | 0.95 | 5.40 | 3.33 | 9.90 | 0.72 | 2.78 | 0.00 |
| Sink 1.8 | 18.85 | 12.01 | 20.49 | 54.40 | 16.52 | 27.13 | 6.23 | 0.97 | 5.71 | 0.95 | 3.42 | 1.55 | 5.05 | 0.42 | 2.07 | 0.23 |

## PLANT 17

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 14.75% | 58.18% | 321.49 | 14.75% | 58.18% | 321.49 | 100.00% | 64.78% | 285.41 |
| Minus 100M | 85.25% | 65.92% | 279.90 | 100.00% | 64.78% | 285.41 | 85.25% | 65.92% | 279.90 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 27.87% | 8.40% | 463.12 | 27.87% | 8.40% | 463.12 | 100.00% | 58.18% | 321.49 |
| 1.6 x 1.8 | 6.26% | 38.52% | 274.80 | 34.13% | 13.92% | 367.57 | 72.13% | 77.41% | 315.55 |
| Sink 1.8 | 65.87% | 81.11% | 317.39 | 100.00% | 58.18% | 321.49 | 65.87% | 81.11% | 317.39 |

## PLANT 17

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 29.00 | 29.31 | 46.38 | 97.19 | 29.00 | 46.77 | 10.48 | 1.75 | 10.45 | 1.22 | 6.12 | 2.33 | 6.69 | 0.69 | 3.54 | 0.55 |
| Minus 100M | 25.661 | 25.085 | 36.101 | 82.623 | 31.309 | 38.697 | 9.3416 | 1.4887 | 10.095 | 1.2654 | 5.7036 | 1.9446 | 6.1223 | 0.549 | 3.117 | 0.8002 |
| Float/Sink Analysis - 1 mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 43.69 | 65.57 | 53.95 | 123.88 | 25.68 | 68.37 | 16.56 | 3.68 | 16.35 | 3.08 | 13.43 | 4.67 | 13.54 | 2.22 | 7.73 | 0.71 |
| 1.6 x 1.8 | 26.69 | 23.71 | 35.26 | 87.74 | 15.01 | 45.47 | 8.76 | 1.54 | 8.35 | 1.03 | 4.98 | 2.99 | 9.23 | 0.75 | 3.30 | 0.00 |
| Sink 1.8 | 28.46 | 27.97 | 46.55 | 96.45 | 29.78 | 45.89 | 10.29 | 1.68 | 10.29 | 1.15 | 5.85 | 2.20 | 6.27 | 0.62 | 3.37 | 0.57 |

| Size | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed*** | | | | | | | | 599.6 | TPH |
| Plus 3/8" | 290.82 | 199.80 | 44.08 | 290.82 | 199.80 | 44.08 | 599.64 | 319.90 | 113.49 |
| 3/8" x 1/8" | 157.07 | 62.39 | 35.81 | 447.90 | 262.19 | 79.89 | 308.81 | 120.11 | 69.41 |
| 1/8" x 1 mm | 66.65 | 22.96 | 12.88 | 514.55 | 285.15 | 92.76 | 151.74 | 57.72 | 33.60 |
| 1mm x 100M | 46.17 | 15.42 | 9.57 | 560.72 | 300.56 | 102.34 | 85.09 | 34.75 | 20.73 |
| Minus 100M | 38.92 | 19.34 | 11.15 | 599.64 | 319.90 | 113.49 | 38.92 | 19.34 | 11.15 |
| **Clean Coal** | | | | | | | | 204.2 | TPH |
| Plus 3/8" | 33.35 | 2.75 | 2.19 | 33.35 | 2.75 | 2.19 | 204.24 | 17.71 | 17.45 |
| 3/8" x 1/8" | 50.36 | 4.65 | 5.18 | 83.72 | 7.40 | 7.37 | 170.89 | 14.96 | 15.25 |
| 1/8" x 1 mm | 51.98 | 4.78 | 4.14 | 135.70 | 12.18 | 11.51 | 120.53 | 10.31 | 10.08 |
| 1mm x 100M | 47.47 | 2.94 | 3.69 | 183.16 | 15.12 | 15.20 | 68.54 | 5.53 | 5.93 |
| Minus 100M | 21.08 | 2.59 | 2.24 | 204.24 | 17.71 | 17.45 | 21.08 | 2.59 | 2.24 |
| **Coarse Refuse** | | | | | | | | 356.4 | TPH |
| Plus 3/8" | 285.76 | 254.36 | 102.07 | 285.76 | 254.36 | 102.07 | 356.44 | 315.61 | 127.96 |
| 3/8" x 1/8" | 40.85 | 35.64 | 15.64 | 326.61 | 290.00 | 117.72 | 70.68 | 61.26 | 25.89 |
| 1/8" x 1 mm | 13.94 | 12.16 | 3.87 | 340.54 | 302.16 | 121.58 | 29.84 | 25.61 | 10.24 |
| 1mm x 100M | 12.94 | 11.09 | 5.08 | 353.48 | 313.25 | 126.67 | 15.90 | 13.46 | 6.38 |
| Minus 100M | 2.96 | 2.37 | 1.29 | 356.44 | 315.61 | 127.96 | 2.96 | 2.37 | 1.29 |
| **Fine Refuse** | | | | | | | | 39.0 | TPH |
| Plus 3/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 28.42 | 16.34 |
| 3/8" x 1/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 28.42 | 16.34 |
| 1/8" x 1 mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.95 | 28.42 | 16.34 |
| 1mm x 100M | 4.64 | 3.55 | 2.02 | 4.64 | 3.55 | 2.02 | 38.95 | 28.42 | 16.34 |
| Minus 100M | 34.32 | 24.86 | 14.31 | 38.95 | 28.42 | 16.34 | 34.32 | 24.86 | 14.31 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 3,298,006 | 1,759,459 | 312.1 | 94.63 | 177.38 |
| Clean Coal | 1,123,328 | 97,400 | 48.0 | 42.71 | 492.55 |
| Coarse Refuse | 1,960,428 | 1,735,878 | 351.9 | 179.50 | 202.72 |
| Fine Refuse | 214,250 | 156,288 | 44.9 | 209.70 | 287.47 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

****Unless otherwise noted, REE values reported in ppm*

*****Assumes 5,500 hours per year operation*

| | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed*** | | | | | | | | | | | | | | | | |
| Plus 3/8" | 4.64 | 2.47 | 4.62 | 12.86 | 5.44 | 6.45 | 1.76 | 0.22 | 1.22 | 0.38 | 1.10 | 0.35 | 1.60 | 0.13 | 0.62 | 0.21 |
| 3/8" x 1/8" | 2.57 | 3.37 | 5.49 | 11.10 | 2.68 | 5.41 | 1.36 | 0.21 | 1.02 | 0.17 | 0.84 | 0.23 | 0.75 | 0.08 | 0.43 | 0.11 |
| 1/8" x 1 mm | 0.90 | 1.28 | 1.89 | 4.19 | 0.90 | 1.86 | 0.47 | 0.08 | 0.35 | 0.06 | 0.31 | 0.09 | 0.27 | 0.03 | 0.16 | 0.04 |
| 1mm x 100M | 0.67 | 0.96 | 1.54 | 2.89 | 0.71 | 1.42 | 0.36 | 0.06 | 0.27 | 0.05 | 0.23 | 0.06 | 0.19 | 0.02 | 0.12 | 0.03 |
| Minus 100M | 0.99 | 1.03 | 1.63 | 3.09 | 1.27 | 1.55 | 0.37 | 0.06 | 0.39 | 0.05 | 0.25 | 0.07 | 0.22 | 0.02 | 0.13 | 0.04 |
| **Clean Coal** | | | | | | | | | | | | | | | | |
| Plus 3/8" | 0.15 | 0.23 | 0.36 | 0.70 | 0.12 | 0.34 | 0.07 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.04 | 0.01 | 0.03 | 0.00 |
| 3/8" x 1/8" | 0.34 | 0.89 | 0.73 | 1.37 | 0.27 | 0.74 | 0.18 | 0.03 | 0.16 | 0.03 | 0.15 | 0.04 | 0.11 | 0.02 | 0.08 | 0.01 |
| 1/8" x 1 mm | 0.28 | 0.74 | 0.57 | 1.07 | 0.23 | 0.58 | 0.15 | 0.03 | 0.13 | 0.02 | 0.13 | 0.03 | 0.09 | 0.02 | 0.06 | 0.01 |
| 1mm x 100M | 0.23 | 0.61 | 0.48 | 0.96 | 0.26 | 0.53 | 0.14 | 0.02 | 0.13 | 0.02 | 0.12 | 0.03 | 0.08 | 0.01 | 0.05 | 0.01 |
| Minus 100M | 0.17 | 0.33 | 0.30 | 0.57 | 0.20 | 0.31 | 0.08 | 0.02 | 0.08 | 0.01 | 0.07 | 0.02 | 0.05 | 0.01 | 0.03 | 0.01 |
| **Coarse Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/8" | 8.09 | 8.11 | 13.43 | 31.93 | 9.91 | 15.19 | 4.11 | 0.57 | 2.70 | 0.60 | 2.56 | 0.64 | 2.34 | 0.19 | 1.25 | 0.45 |
| 3/8" x 1/8" | 1.19 | 1.31 | 2.10 | 5.10 | 1.28 | 2.37 | 0.59 | 0.09 | 0.41 | 0.08 | 0.38 | 0.11 | 0.36 | 0.04 | 0.19 | 0.05 |
| 1/8" x 1 mm | 0.35 | 0.31 | 0.44 | 1.20 | 0.37 | 0.58 | 0.15 | 0.02 | 0.11 | 0.02 | 0.10 | 0.03 | 0.11 | 0.01 | 0.05 | 0.01 |
| 1mm x 100M | 0.38 | 0.41 | 0.70 | 1.70 | 0.43 | 0.74 | 0.19 | 0.03 | 0.13 | 0.02 | 0.12 | 0.03 | 0.11 | 0.01 | 0.06 | 0.02 |
| Minus 100M | 0.09 | 0.12 | 0.20 | 0.38 | 0.12 | 0.20 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 |
| **Fine Refuse** | | | | | | | | | | | | | | | | |
| Plus 3/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3/8" x 1/8" | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1/8" x 1 mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1mm x 100M | 0.14 | 0.18 | 0.33 | 0.61 | 0.17 | 0.31 | 0.08 | 0.01 | 0.05 | 0.01 | 0.05 | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 |
| Minus 100M | 1.11 | 1.21 | 2.20 | 4.40 | 1.34 | 2.12 | 0.49 | 0.08 | 0.41 | 0.06 | 0.31 | 0.09 | 0.27 | 0.03 | 0.15 | 0.04 |

| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 26.8 | 25.0 | 41.7 | 93.8 | 30.3 | 45.9 | 11.9 | 1.7 | 8.9 | 1.9 | 7.5 | 2.2 | 8.3 | 0.8 | 4.0 | 1.2 |
| Clean Coal | 3.2 | 7.7 | 6.7 | 12.8 | 3.0 | 6.9 | 1.7 | 0.3 | 1.5 | 0.3 | 1.4 | 0.4 | 1.0 | 0.2 | 0.7 | 0.1 |
| Coarse Refuse | 27.8 | 28.2 | 46.4 | 110.9 | 33.3 | 52.5 | 14.0 | 2.0 | 9.3 | 2.0 | 8.8 | 2.3 | 8.1 | 0.7 | 4.3 | 1.4 |
| Fine Refuse | 3.4 | 3.8 | 7.0 | 13.8 | 4.2 | 6.7 | 1.5 | 0.2 | 1.3 | 0.2 | 1.0 | 0.3 | 0.9 | 0.1 | 0.5 | 0.1 |

| SG | Individual | | | Cumulative Float | | | Cumulative Sink | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr | Mass TPH | Ash TPH | REE lb/hr |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | 599.6 | TPH |
| Float 1.6 | 178.50 | 12.70 | 14.90 | 178.50 | 12.70 | 14.90 | 541.28 | 333.21 | 144.92 |
| 1.6 x 1.9 | 7.58 | 3.44 | 2.30 | 186.08 | 16.14 | 17.20 | 362.78 | 320.51 | 130.02 |
| Sink 1.9 | 355.20 | 317.07 | 127.73 | 541.28 | 333.21 | 144.92 | 355.20 | 317.07 | 127.73 |
| **Clean Coal (Plus 100M)** | | | | | | | | 204.2 | TPH |
| Float 1.6 | 176.02 | 12.40 | 14.59 | 176.02 | 12.40 | 14.59 | 183.16 | 16.41 | 16.23 |
| 1.6 x 1.9 | 4.37 | 1.85 | 1.36 | 180.39 | 14.25 | 15.94 | 7.14 | 4.01 | 1.64 |
| Sink 1.9 | 2.77 | 2.16 | 0.29 | 183.16 | 16.41 | 16.23 | 2.77 | 2.16 | 0.29 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | 356.4 | TPH |
| Float 1.6 | 1.85 | 0.24 | 0.25 | 1.85 | 0.24 | 0.25 | 353.48 | 313.25 | 126.67 |
| 1.6 x 1.9 | 3.06 | 1.53 | 0.89 | 4.90 | 1.77 | 1.14 | 351.63 | 313.01 | 126.42 |
| Sink 1.9 | 348.58 | 311.48 | 125.53 | 353.48 | 313.25 | 126.67 | 348.58 | 311.48 | 125.53 |
| **Fine Refuse (Plus 100M)** | | | | | | | | 39.0 | TPH |
| Float 1.6 | 0.63 | 0.06 | 0.06 | 0.63 | 0.06 | 0.06 | 4.64 | 3.55 | 2.02 |
| 1.6 x 1.9 | 0.16 | 0.07 | 0.05 | 0.78 | 0.13 | 0.11 | 4.01 | 3.49 | 1.96 |
| Sink 1.9 | 3.85 | 3.42 | 1.91 | 4.64 | 3.55 | 2.02 | 3.85 | 3.42 | 1.91 |

| Stream | Mass TPY | Ash TPY | REE TPY** | REE/Whole** | REE/Ash*** |
|---|---|---|---|---|---|
| Plant Feed | 2,977,053 | 1,832,658 | 398.5 | 133.87 | 217.47 |
| Clean Coal | 1,007,401 | 90,260 | 44.6 | 44.31 | 494.55 |
| Coarse Refuse | 1,944,157 | 1,722,862 | 348.3 | 179.17 | 202.19 |
| Fine Refuse | 25,496 | 19,536 | 5.6 | 218.22 | 284.80 |

Notes:

**Size-by-size values do not sum due to size degradation*

***REE do not sum due to missing samples/analytical errors*

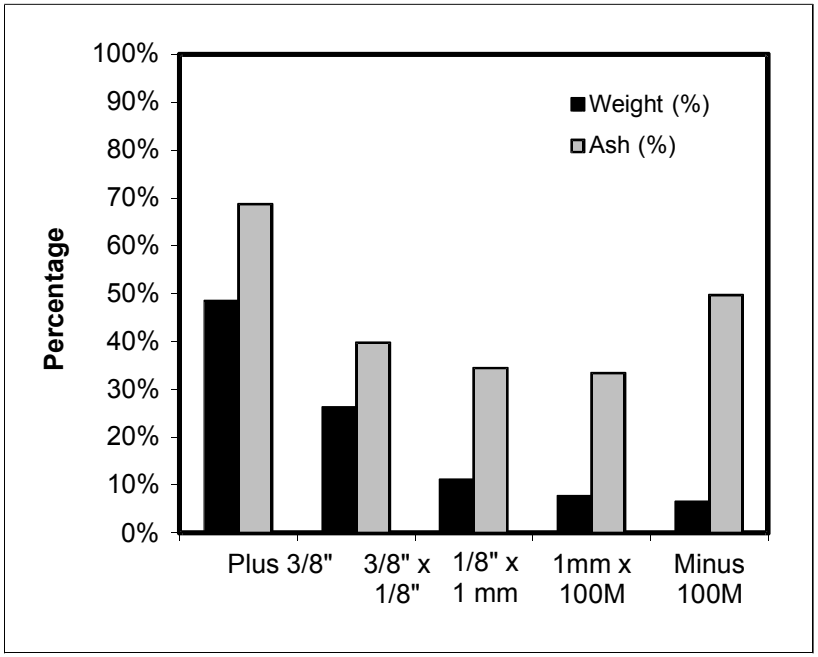
****Unless otherwise noted, REE values reported in ppm*

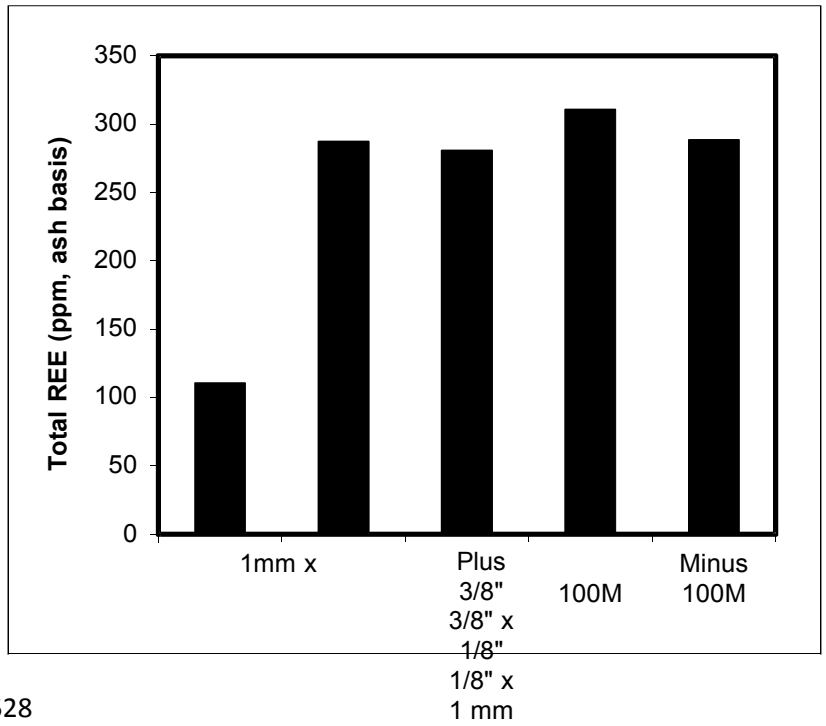
*****Assumes 5,500 hours per year operation*

| SG | REE (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| **Plant Feed (Reconstituted Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.99 | 2.48 | 2.08 | 4.01 | 0.83 | 2.14 | 0.52 | 0.09 | 0.47 | 0.08 | 0.44 | 0.12 | 0.32 | 0.06 | 0.22 | 0.04 |
| 1.6 x 1.9 | 0.15 | 0.22 | 0.37 | 0.72 | 0.16 | 0.36 | 0.08 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.05 | 0.00 | 0.03 | 0.01 |
| Sink 1.9 | 10.09 | 10.21 | 16.87 | 40.25 | 12.11 | 19.04 | 5.08 | 0.71 | 3.38 | 0.73 | 3.19 | 0.81 | 2.94 | 0.25 | 1.56 | 0.52 |
| **Clean Coal (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.97 | 2.43 | 2.04 | 3.93 | 0.81 | 2.10 | 0.51 | 0.09 | 0.46 | 0.08 | 0.43 | 0.12 | 0.31 | 0.06 | 0.21 | 0.04 |
| 1.6 x 1.9 | 0.09 | 0.13 | 0.23 | 0.42 | 0.10 | 0.21 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.02 | 0.00 |
| Sink 1.9 | 0.02 | 0.02 | 0.05 | 0.09 | 0.03 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Coarse Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.02 | 0.04 | 0.04 | 0.07 | 0.01 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.9 | 0.06 | 0.08 | 0.13 | 0.28 | 0.06 | 0.14 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| Sink 1.9 | 9.94 | 10.03 | 16.51 | 39.58 | 11.91 | 18.71 | 4.99 | 0.70 | 3.32 | 0.72 | 3.14 | 0.80 | 2.90 | 0.24 | 1.54 | 0.52 |
| **Fine Refuse (Plus 100M)** | | | | | | | | | | | | | | | | |
| Float 1.6 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.6 x 1.9 | 0.00 | 0.00 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sink 1.9 | 0.13 | 0.17 | 0.31 | 0.58 | 0.17 | 0.29 | 0.07 | 0.01 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.00 | 0.02 | 0.01 |

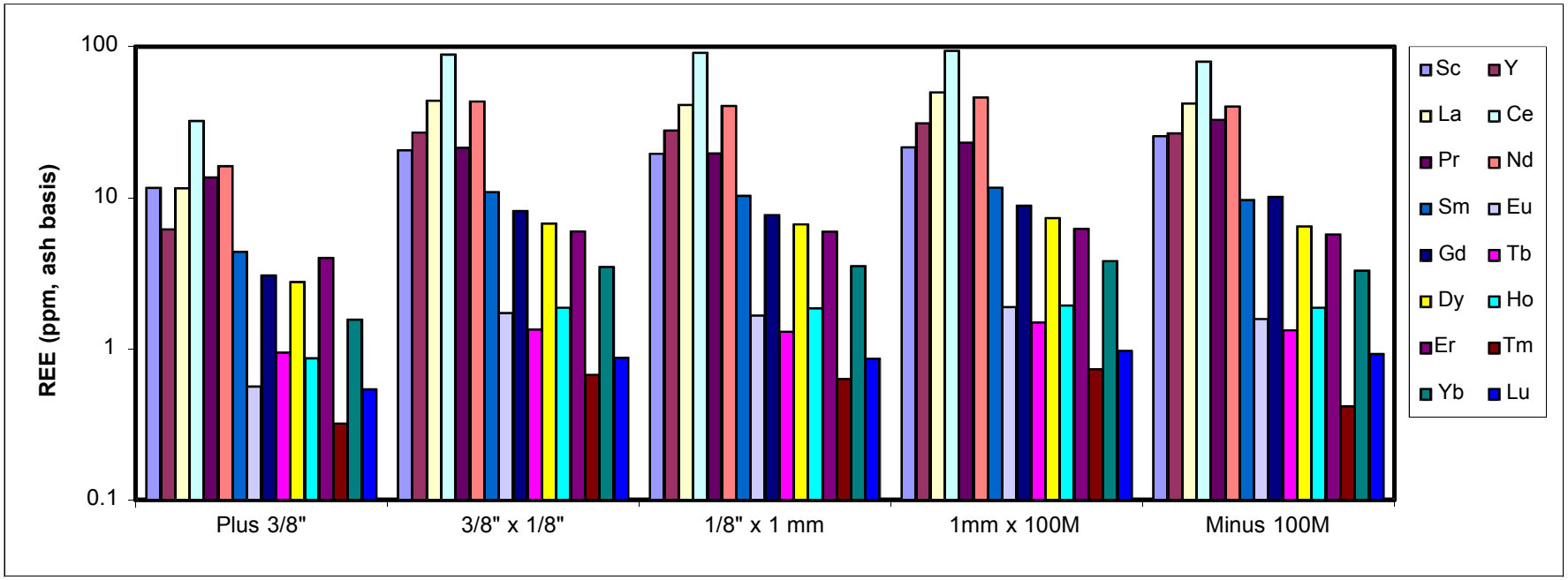
| TPY >>> | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Feed | 30.9 | 35.5 | 53.1 | 123.7 | 36.0 | 59.2 | 15.6 | 2.2 | 10.8 | 2.2 | 10.1 | 2.6 | 9.1 | 0.9 | 5.0 | 1.6 |
| Clean Coal | 2.9 | 7.1 | 6.4 | 12.2 | 2.6 | 6.5 | 1.6 | 0.3 | 1.4 | 0.2 | 1.3 | 0.4 | 0.9 | 0.2 | 0.6 | 0.1 |
| Coarse Refuse | 27.5 | 27.9 | 45.9 | 109.8 | 33.0 | 51.9 | 13.8 | 1.9 | 9.2 | 2.0 | 8.7 | 2.2 | 8.0 | 0.7 | 4.3 | 1.4 |
| Fine Refuse | 0.4 | 0.5 | 0.9 | 1.7 | 0.5 | 0.9 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| Plant Feed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/8" | 48.50% | 68.70% | 110.30 | 48.50% | 112.77% | 182.84 | 200.00% | 31.01% | 221.45 |
| 3/8" x 1/8" | 26.19% | 39.72% | 286.99 | 74.69% | 28.62% | 295.90 | 151.50% | 18.94% | 350.48 |
| 1/8" x 1 mm | 11.12% | 34.45% | 280.44 | 85.81% | 12.79% | 304.34 | 125.31% | 14.60% | 386.58 |
| 1mm x 100M | 7.70% | 33.39% | 310.48 | 93.51% | 7.64% | 317.16 | 114.19% | 12.67% | 414.67 |
| Minus 100M | 6.49% | 49.69% | 288.36 | 100.00% | 4.57% | 320.92 | 106.49% | 11.17% | 437.20 |



| Plant Feed | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/8" | 11.62 | 6.18 | 11.56 | 32.18 | 13.61 | 16.15 | 4.39 | 0.56 | 3.05 | 0.94 | 2.76 | 0.87 | 3.99 | 0.32 | 1.56 | 0.54 |
| 3/8" x 1/8" | 20.56 | 26.98 | 43.98 | 88.92 | 21.45 | 43.36 | 10.87 | 1.72 | 8.16 | 1.34 | 6.76 | 1.87 | 5.99 | 0.67 | 3.48 | 0.87 |
| 1/8" x 1 mm | 19.56 | 27.82 | 41.15 | 91.20 | 19.68 | 40.59 | 10.32 | 1.65 | 7.69 | 1.30 | 6.67 | 1.85 | 5.95 | 0.63 | 3.52 | 0.86 |
| 1mm x 100M | 21.62 | 31.09 | 49.89 | 93.84 | 23.11 | 46.04 | 11.68 | 1.89 | 8.85 | 1.49 | 7.33 | 1.94 | 6.21 | 0.73 | 3.81 | 0.97 |
| Minus 100M | 25.53 | 26.63 | 42.05 | 79.84 | 32.84 | 40.13 | 9.66 | 1.57 | 10.10 | 1.32 | 6.48 | 1.87 | 5.71 | 0.42 | 3.29 | 0.92 |



| Clean Coal - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/8" | 16.33% | 8.24% | 398.90 | 16.33% | 8.24% | 398.90 | 100.00% | 8.67% | 492.55 |
| 3/8" x 1/8" | 24.66% | 9.23% | 556.84 | 40.99% | 8.84% | 498.13 | 83.67% | 8.75% | 509.77 |
| 1/8" x 1 mm | 25.45% | 9.19% | 433.60 | 66.44% | 8.97% | 472.81 | 59.01% | 8.56% | 488.55 |
| 1mm x 100M | 23.24% | 6.20% | 626.50 | 89.68% | 8.25% | 502.73 | 33.56% | 8.07% | 536.00 |
| Minus 100M | 10.32% | 12.29% | 433.16 | 100.00% | 8.67% | 492.55 | 10.32% | 12.29% | 433.16 |
| Float/Sink Analysis - Plus 3/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.54% | 10.28% | 410.70 | 197.18% | 10.09% | 485.38 | 200.00% | 10.67% | 467.18 |
| 1.6 x 1.9 | 4.92% | 42.92% | 362.11 | 102.64% | 9.91% | 556.77 | 105.46% | 11.03% | 514.38 |
| Sink 1.9 | 0.54% | 53.45% | 270.83 | 97.72% | 8.24% | 607.79 | 100.54% | 9.47% | 548.17 |
| Float/Sink Analysis - 3/8" x 1/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.18% | 7.99% | 620.31 | 97.18% | 7.99% | 620.31 | 100.00% | 9.23% | 556.84 |
| 1.6 x 1.9 | 2.04% | 43.57% | 359.77 | 99.22% | 8.73% | 593.51 | 2.82% | 51.77% | 219.37 |
| Sink 1.9 | 0.78% | 73.35% | 0.00 | 100.00% | 9.23% | 556.84 | 0.78% | 73.35% | 0.00 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 94.98% | 6.17% | 632.47 | 94.98% | 6.17% | 632.47 | 100.00% | 9.19% | 433.60 |
| 1.6 x 1.9 | 1.78% | 39.45% | 394.17 | 96.76% | 6.79% | 606.99 | 5.02% | 66.24% | 83.17 |
| Sink 1.9 | 3.24% | 80.94% | 0.00 | 100.00% | 9.19% | 433.60 | 3.24% | 80.94% | 0.00 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 97.29% | 4.76% | 731.67 | 97.29% | 4.76% | 731.67 | 100.00% | 6.20% | 626.50 |
| 1.6 x 1.9 | 1.63% | 42.84% | 354.08 | 98.92% | 5.39% | 682.20 | 2.71% | 57.93% | 316.24 |
| Sink 1.9 | 1.08% | 80.70% | 285.92 | 100.00% | 6.20% | 626.50 | 1.08% | 80.70% | 285.92 |

| Clean Coal - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/8" | 26.57 | 41.98 | 66.23 | 127.30 | 21.36 | 61.76 | 13.11 | 2.41 | 10.29 | 1.49 | 8.99 | 3.03 | 8.09 | 1.08 | 4.61 | 0.61 |
| 3/8" x 1/8" | 37.07 | 95.95 | 78.28 | 147.41 | 29.16 | 79.73 | 19.51 | 3.33 | 17.60 | 2.85 | 16.64 | 4.63 | 12.16 | 2.63 | 8.38 | 1.52 |
| 1/8" x 1 mm | 29.13 | 77.51 | 59.64 | 111.97 | 24.50 | 60.50 | 15.33 | 2.65 | 13.95 | 2.36 | 13.17 | 3.52 | 9.35 | 1.98 | 6.66 | 1.38 |
| 1mm x 100M | 39.90 | 103.84 | 80.89 | 163.41 | 43.92 | 90.42 | 23.40 | 4.09 | 21.45 | 3.75 | 19.74 | 4.67 | 12.97 | 2.43 | 9.29 | 2.30 |
| Minus 100M | 32.98 | 63.47 | 57.49 | 109.66 | 38.78 | 60.44 | 15.22 | 2.94 | 14.83 | 2.65 | 12.77 | 3.22 | 9.51 | 1.46 | 6.15 | 1.60 |
| Float/Sink Analysis - Plus 3/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 27.52 | 44.71 | 67.87 | 131.42 | 20.15 | 63.99 | 13.03 | 2.49 | 10.61 | 1.46 | 9.35 | 3.27 | 8.45 | 1.17 | 4.75 | 0.46 |
| 1.6 x 1.9 | 23.82 | 32.64 | 62.42 | 115.21 | 23.54 | 55.85 | 12.96 | 2.18 | 9.33 | 1.50 | 7.58 | 2.35 | 6.97 | 0.76 | 4.12 | 0.88 |
| Sink 1.9 | 14.88 | 18.30 | 38.81 | 77.27 | 46.12 | 29.84 | 16.64 | 1.29 | 6.43 | 2.56 | 7.26 | 0.08 | 3.85 | 0.38 | 3.50 | 3.62 |
| Float/Sink Analysis - 3/8" x 1/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.35 | 109.87 | 86.15 | 162.47 | 31.83 | 88.20 | 21.73 | 3.71 | 19.83 | 3.21 | 18.84 | 5.22 | 13.67 | 3.03 | 9.49 | 1.71 |
| 1.6 x 1.9 | 23.45 | 35.95 | 59.77 | 110.46 | 24.51 | 56.86 | 12.58 | 2.18 | 9.40 | 1.52 | 8.10 | 2.40 | 6.84 | 0.80 | 4.12 | 0.83 |
| Sink 1.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 42.63 | 116.52 | 85.88 | 161.50 | 34.72 | 87.57 | 22.33 | 3.86 | 20.57 | 3.48 | 19.54 | 5.20 | 13.76 | 3.01 | 9.88 | 2.02 |
| 1.6 x 1.9 | 25.24 | 41.57 | 63.48 | 117.12 | 30.71 | 60.71 | 14.14 | 2.47 | 10.85 | 1.89 | 9.19 | 2.58 | 7.52 | 0.84 | 4.66 | 1.19 |
| Sink 1.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 46.51 | 129.29 | 90.59 | 186.12 | 49.43 | 104.58 | 27.33 | 4.93 | 26.02 | 4.55 | 24.09 | 5.69 | 15.52 | 3.02 | 11.28 | 2.71 |
| 1.6 x 1.9 | 21.49 | 36.79 | 58.62 | 107.30 | 27.04 | 55.03 | 12.65 | 2.10 | 9.43 | 1.53 | 7.95 | 2.12 | 6.27 | 0.79 | 3.95 | 1.02 |
| Sink 1.9 | 19.49 | 22.32 | 47.22 | 87.71 | 28.16 | 43.56 | 11.14 | 1.24 | 6.80 | 1.29 | 6.12 | 1.31 | 4.82 | 0.56 | 3.02 | 1.17 |

| Coarse Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 3/8" | 80.17% | 89.01% | 200.65 | 80.17% | 89.01% | 200.65 | 100.00% | 88.55% | 202.72 |
| 3/8" x 1/8" | 11.46% | 87.26% | 219.45 | 91.63% | 88.79% | 202.96 | 19.83% | 86.67% | 211.31 |
| 1/8" x 1 mm | 3.91% | 87.23% | 159.05 | 95.54% | 88.73% | 201.19 | 8.37% | 85.85% | 199.98 |
| 1mm x 100M | 3.63% | 85.71% | 229.20 | 99.17% | 88.62% | 202.19 | 4.46% | 84.65% | 236.96 |
| Minus 100M | 0.83% | 79.99% | 273.30 | 100.00% | 88.55% | 202.72 | 0.83% | 79.99% | 273.30 |
| Float/Sink Analysis - Plus 3/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.32% | 14.52% | 520.13 | 0.32% | 14.52% | 520.13 | 100.00% | 89.01% | 200.65 |
| 1.6 x 1.9 | 0.50% | 51.50% | 342.16 | 0.82% | 37.07% | 369.37 | 99.68% | 89.25% | 200.48 |
| Sink 1.9 | 99.18% | 89.44% | 200.07 | 100.00% | 89.01% | 200.65 | 99.18% | 89.44% | 200.07 |
| Float/Sink Analysis - 3/8" x 1/8" | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 0.79% | 12.43% | 554.20 | 0.79% | 12.43% | 554.20 | 100.00% | 87.26% | 219.45 |
| 1.6 x 1.9 | 2.42% | 51.18% | 189.58 | 3.22% | 41.62% | 216.47 | 99.21% | 87.86% | 219.07 |
| Sink 1.9 | 96.78% | 88.78% | 219.49 | 100.00% | 87.26% | 219.45 | 96.78% | 88.78% | 219.49 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 1.84% | 9.28% | 597.17 | 1.84% | 9.28% | 597.17 | 100.00% | 87.23% | 159.05 |
| 1.6 x 1.9 | 2.29% | 45.07% | 312.75 | 4.13% | 29.14% | 353.06 | 98.16% | 88.69% | 158.19 |
| Sink 1.9 | 95.87% | 89.73% | 156.34 | 100.00% | 87.23% | 159.05 | 95.87% | 89.73% | 156.34 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 2.73% | 11.79% | 449.58 | 2.73% | 11.79% | 449.58 | 100.00% | 85.71% | 229.20 |
| 1.6 x 1.9 | 2.46% | 44.10% | 377.53 | 5.19% | 27.10% | 394.01 | 97.27% | 87.79% | 228.37 |
| Sink 1.9 | 94.81% | 88.92% | 226.45 | 100.00% | 85.71% | 229.20 | 94.81% | 88.92% | 226.45 |

| Coarse Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 3/8" | 15.91 | 15.95 | 26.40 | 62.77 | 19.48 | 29.86 | 8.08 | 1.11 | 5.32 | 1.17 | 5.04 | 1.26 | 4.60 | 0.37 | 2.46 | 0.88 |
| 3/8" x 1/8" | 16.75 | 18.41 | 29.52 | 71.54 | 17.91 | 33.23 | 8.23 | 1.24 | 5.75 | 1.12 | 5.34 | 1.50 | 5.09 | 0.51 | 2.69 | 0.63 |
| 1/8" x 1 mm | 14.50 | 12.65 | 18.14 | 49.18 | 15.13 | 23.85 | 6.18 | 0.92 | 4.37 | 1.01 | 4.31 | 1.22 | 4.45 | 0.41 | 2.18 | 0.54 |
| 1mm x 100M | 17.09 | 18.63 | 31.78 | 76.71 | 19.44 | 33.41 | 8.40 | 1.25 | 5.82 | 1.02 | 5.36 | 1.53 | 4.83 | 0.54 | 2.66 | 0.74 |
| Minus 100M | 19.35 | 24.43 | 41.97 | 80.60 | 25.97 | 41.89 | 10.36 | 1.55 | 7.73 | 1.28 | 6.41 | 1.71 | 5.38 | 0.52 | 3.14 | 1.00 |
| Float/Sink Analysis - Plus 3/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 34.64 | 80.05 | 78.25 | 143.71 | 27.37 | 76.80 | 17.71 | 3.45 | 15.58 | 2.47 | 14.59 | 4.20 | 10.90 | 1.98 | 7.24 | 1.18 |
| 1.6 x 1.9 | 22.54 | 32.92 | 55.00 | 108.11 | 23.00 | 53.75 | 12.42 | 2.10 | 8.69 | 1.50 | 7.67 | 2.19 | 6.62 | 0.68 | 4.02 | 0.95 |
| Sink 1.9 | 15.88 | 15.87 | 26.29 | 62.60 | 19.47 | 29.77 | 8.06 | 1.11 | 5.30 | 1.17 | 5.02 | 1.25 | 4.59 | 0.37 | 2.45 | 0.88 |
| Float/Sink Analysis - 3/8" x 1/8" | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 39.18 | 91.92 | 77.24 | 144.72 | 33.03 | 77.78 | 20.22 | 3.64 | 17.23 | 3.35 | 16.72 | 4.28 | 11.90 | 2.38 | 8.70 | 1.92 |
| 1.6 x 1.9 | 17.72 | 15.32 | 20.31 | 62.33 | 16.45 | 27.88 | 6.97 | 1.25 | 4.90 | 1.27 | 4.76 | 1.49 | 5.11 | 0.49 | 2.68 | 0.64 |
| Sink 1.9 | 16.71 | 18.37 | 29.59 | 71.58 | 17.91 | 33.26 | 8.23 | 1.23 | 5.75 | 1.12 | 5.33 | 1.50 | 5.08 | 0.50 | 2.69 | 0.63 |
| Float/Sink Analysis - 1/8" x 1 mm | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 41.78 | 96.54 | 80.43 | 157.49 | 38.60 | 84.77 | 21.85 | 3.90 | 19.27 | 3.72 | 18.43 | 4.42 | 12.69 | 2.27 | 9.06 | 1.94 |
| 1.6 x 1.9 | 22.88 | 29.12 | 44.99 | 97.73 | 23.37 | 48.62 | 12.10 | 2.04 | 8.70 | 1.73 | 6.66 | 2.13 | 6.86 | 0.73 | 4.10 | 0.98 |
| Sink 1.9 | 14.35 | 12.29 | 17.69 | 48.39 | 14.99 | 23.43 | 6.08 | 0.90 | 4.28 | 1.00 | 4.25 | 1.20 | 4.41 | 0.41 | 2.14 | 0.53 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 33.36 | 73.22 | 57.17 | 114.36 | 26.64 | 64.03 | 15.62 | 4.10 | 14.62 | 3.88 | 14.81 | 4.14 | 12.50 | 1.89 | 8.04 | 1.22 |
| 1.6 x 1.9 | 22.93 | 38.65 | 61.95 | 115.18 | 26.98 | 59.69 | 13.77 | 2.32 | 9.82 | 1.72 | 8.60 | 2.39 | 7.21 | 0.83 | 4.41 | 1.07 |
| Sink 1.9 | 16.95 | 18.16 | 31.30 | 76.07 | 19.31 | 32.95 | 8.30 | 1.22 | 5.74 | 1.00 | 5.29 | 1.51 | 4.77 | 0.53 | 2.62 | 0.74 |

## PLANT 19

| Fine Refuse - Screen Analysis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Individual | | | Cumulative Retain | | | Cumulative Pass | | |
| Size | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Plus 100M | 11.90% | 76.62% | 284.80 | 11.90% | 76.62% | 284.80 | 100.00% | 72.95% | 287.47 |
| Minus 100M | 88.10% | 72.45% | 287.86 | 100.00% | 72.95% | 287.47 | 88.10% | 72.45% | 287.86 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | |
| | Individual | | | Cumulative Float | | | Cumulative Sink | | |
| SG | Weight | Ash | REE | Weight | Ash | REE | Weight | Ash | REE |
| Float 1.6 | 13.50% | 9.72% | 516.47 | 13.50% | 9.72% | 516.47 | 100.00% | 76.62% | 284.80 |
| 1.6 x 1.9 | 3.43% | 42.36% | 364.03 | 16.93% | 16.33% | 436.37 | 86.50% | 87.06% | 280.76 |
| Sink 1.9 | 83.07% | 88.91% | 279.13 | 100.00% | 76.62% | 284.80 | 83.07% | 88.91% | 279.13 |

## PLANT 19

| Fine Refuse - Screen Analysis | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| Size | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Plus 100M | 19.74 | 25.54 | 46.11 | 86.27 | 24.31 | 43.59 | 10.70 | 1.60 | 7.69 | 1.20 | 6.39 | 1.73 | 5.27 | 0.59 | 3.17 | 0.92 |
| Minus 100M | 22.39 | 24.39 | 44.331 | 88.475 | 27 | 42.712 | 9.7712 | 1.5339 | 8.2712 | 1.1356 | 6.2373 | 1.7966 | 5.5 | 0.5593 | 2.9915 | 0.7627 |
| Float/Sink Analysis - 1mm x 100M | | | | | | | | | | | | | | | | |
| | REE Concentration (ppm, ash basis) | | | | | | | | | | | | | | | |
| SG | Sc | Y | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Float 1.6 | 36.43 | 84.15 | 66.34 | 141.26 | 28.50 | 72.58 | 18.69 | 3.90 | 17.88 | 3.11 | 15.24 | 4.50 | 12.35 | 2.20 | 8.11 | 1.23 |
| 1.6 x 1.9 | 22.57 | 36.94 | 60.97 | 114.52 | 23.11 | 57.48 | 12.77 | 2.16 | 9.36 | 1.34 | 7.83 | 2.45 | 6.88 | 0.82 | 4.12 | 0.72 |
| Sink 1.9 | 19.39 | 24.27 | 45.46 | 84.73 | 24.26 | 42.80 | 10.51 | 1.55 | 7.47 | 1.17 | 6.20 | 1.66 | 5.11 | 0.56 | 3.06 | 0.92 |