19 DECEMBER 2023

SANDY MITCHELL STAGE 2 DRILL PROGRAM SUCCESSFULLY COMPLETED

Rare Earth Elements and Heavy Minerals mineralisation visible in every hole

HIGHLIGHTS

- **2,426m Stage 2 program completed with mineralisation encountered in sand from surface to the metamorphic bedrock averages 12.9 m in depth with the deepest hole to date being 25.5 m of sand above bedrock.**
- **There is no overburden; logging and assays returned to date show mineralisation from bedrock to surface.**
- **The area of resource grid drilling, including stage 2 and stage 1 (completed in June 2023), covers an area of 3.6 km^2 being only 3.6% of the total high range radiometric area on the tenement.**
- **Representative metre samples assayed to date show:**
    - **Total Rare Earth Oxides plus Yttrium and Scandium average grade of 435.7 ppm, with highest grade of 1642.9 ppm; [1]**
    - **Light Rare Earth plus Scandium average grade 392.0 ppm with the highest grade of 1603.1 ppm, and comprised 89.9% of TREO+Y+Sc. [1]**
    - **Heavy Rare Earth plus Yttrium average grade of 43.7 ppm with the highest grade of 319.3 ppm, and comprised 10.0% of TREO+Y+Sc. [1]**
    - **Magnetic Rare earth Oxides average grade of 93.2 ppm with the highest grades of 317.8 ppm, and comprised 21.4% of TREO+Y+Sc. [1]**
- **The Rare Earths at Sandy Mitchell are all hosted in sand, the preferred style of Rare Earth deposit as they do not need to be extracted from clay with chemicals or rock by comminution and processing.**
- **Beneficiation test work has shown the greatest upgrade is by simple gravity separation, confirming the material is amenable to straightforward beneficiation by gravity processing. [2]**
- **Concentrate assays reported to date have returned 51.9% TREO, and contained mostly La, Ce, Pr and Nd, plus Heavy Rare Earths Dy and Tb, which collectively represents a very high value saleable product.[2]**
- **Direct cerium oxide (CeO_2) recovery from gravity feed to REM concentrate is estimated to be 71.7%, with indications that recoveries greater than 83% may be achievable.[2]**
- **More assay results from drilling are pending and together with ongoing test work and ongoing test work will form the basis of a Maiden Mineral Resource Estimate (MRE).**

[1] Refer to Appendix A and Appendix B

[2] Refer to AHK ASX Announcement 24th of November 2023

Ark Mines Limited (ASX:AHK) is pleased to announce that Stage 2 drill program at the Company's 100% owned Sandy Mitchell Rare Earth and Heavy Mineral Project in North Queensland (see **Figure 1**) has been successfully completed.

The first two batches of results (from 1m intervals) for Ark's 144-hole Stage 1 drill program have confirmed that rare earths mineralisation is evident in every interval of every hole assayed to date (see Appendix B). Along with the recently announced beneficiation test work (*AHK ASX Announcement 24th November 2023*), this has demonstrated that the Sandy Mitchell sands make a high-grade rare earth concentrate with robust recoveries.

Drilling at Sandy Mitchell has been divided into reconnaissance, and an initial resource grid. Stage 1 (1488.3 m on 144 air core holes by Saxon) and Stage 2 (2425.8 m on 187 air core holes by AED) focussed on the resource grid which is now complete for a total 3914 m on 331 air core holes, covering an area of 3.6 km^2 on a staggered 120 m x 120 m pattern with a 0.7 km^2 higher resolution portion infilled at 60m x 120m, to support statistical investigations (see **Figure 2**).

All holes in Stage 1 were drilled until air core refusal at rock. All holes in Stage 2. were drilled using air core, with a reverse circulation finish to obtain bedrock sample in addition to the overlying mineralised sand column. The extensive Chelmsford Gneiss bedrock is believed to be the source of the rare earths, and the RC finish affords Ark the opportunity to sample this directly, as well as ensuring that the air core drill hasn't refused on float while still in the sand column. This has resulted in a 2.7 m increase in the average depth to bedrock of stage 2 (mean 12.9 m, max 25.5 m) compared to stage 1 (mean 10.3 m, max 18 m) which, given the area of mineralisation, represents a significant volume of material. The overall average depth to bedrock across the whole grid drilling area is 11.8 m (see **Figure 3**).

All holes were sampled by the metre and split to yield a representative sample, with 1 in 40 also split to yield a representative duplicate. All representative samples and duplicates have been dispatched to North Australian Laboratories for sodium peroxide fusion with an inductively coupled plasma mass spectrometer finish on a full multi-element REE, HM and accessory mineral suite, plus gravimetric bulk density and moisture. Only 21% of Stage 1 assay has been returned to date, 8% of the total programme, (see Appendix B), but results are very encouraging. No significant intercepts have been calculated, since domaining and cutoff grade determination will not be carried out until the full assay set has been returned and analysed. This is expected to result in selected domain grades above the drill hole assay averages quoted here.

All bulk sample has been stored in Ark's secure bag farm for further metallurgical study. All drill collars have been surveyed by Twine using real time kinetic instruments for 20mm accuracy. The assay returns together with these data and geological logging will inform Ark's maiden JORC 2012 resource model and estimation in the resource grid area. This work is set to commence as soon as the assays are returned and the data set is validated.

Additionally, 454 m of air core reconnaissance drilling, on 34 holes, was completed from existing station tracks in a spread across the tenement, targeting high to medium range radiometric anomaly areas (see **Figure 4**). Sampling, assay, QAQC and survey on these is identical to the resource grid samples. The purpose of this is to support the auger reconnaissance grid (Refer to AHK ASX Announcement 31st of October 2023) with depth to bedrock data, to inform an eventual JORC 2012 exploration target. Auger reconnaissance will continue in the new year, after the wet season hiatus.

Executive Director Ben Emery said, *"We are pleased to have completed our objective of having the resource grid complete before the wet season so we can move towards declaring Sandy Mitchell's maiden MRE early in the New Year. Step out drilling we have undertaken also provides us with the opportunity to define an Exploration Target for the project should mineralisation be evident in these holes. We had a feeling that the stage 1 air core wasn't always making bedrock and getting the extra depth of mineralised sand and proving a technique for future works is another great outcome from Sandy Mitchell. With more assays pending and further test work results to report, we*

expect a steady stream of updates and we have every confidence that Sandy Mitchell's value is only just being realised."

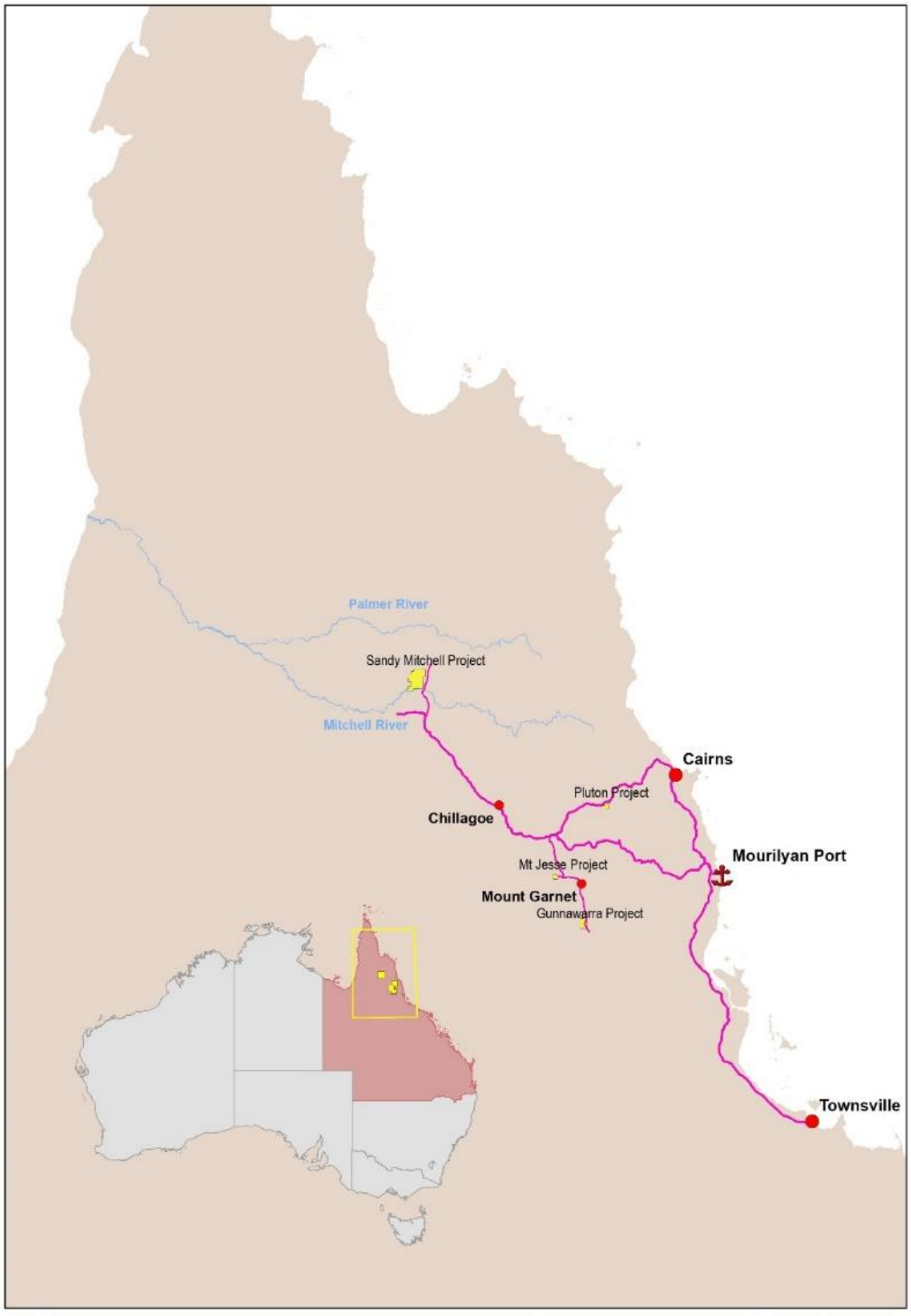

Figure 1: Sandy Mitchell Rare Earth and Heavy Mineral Project location.

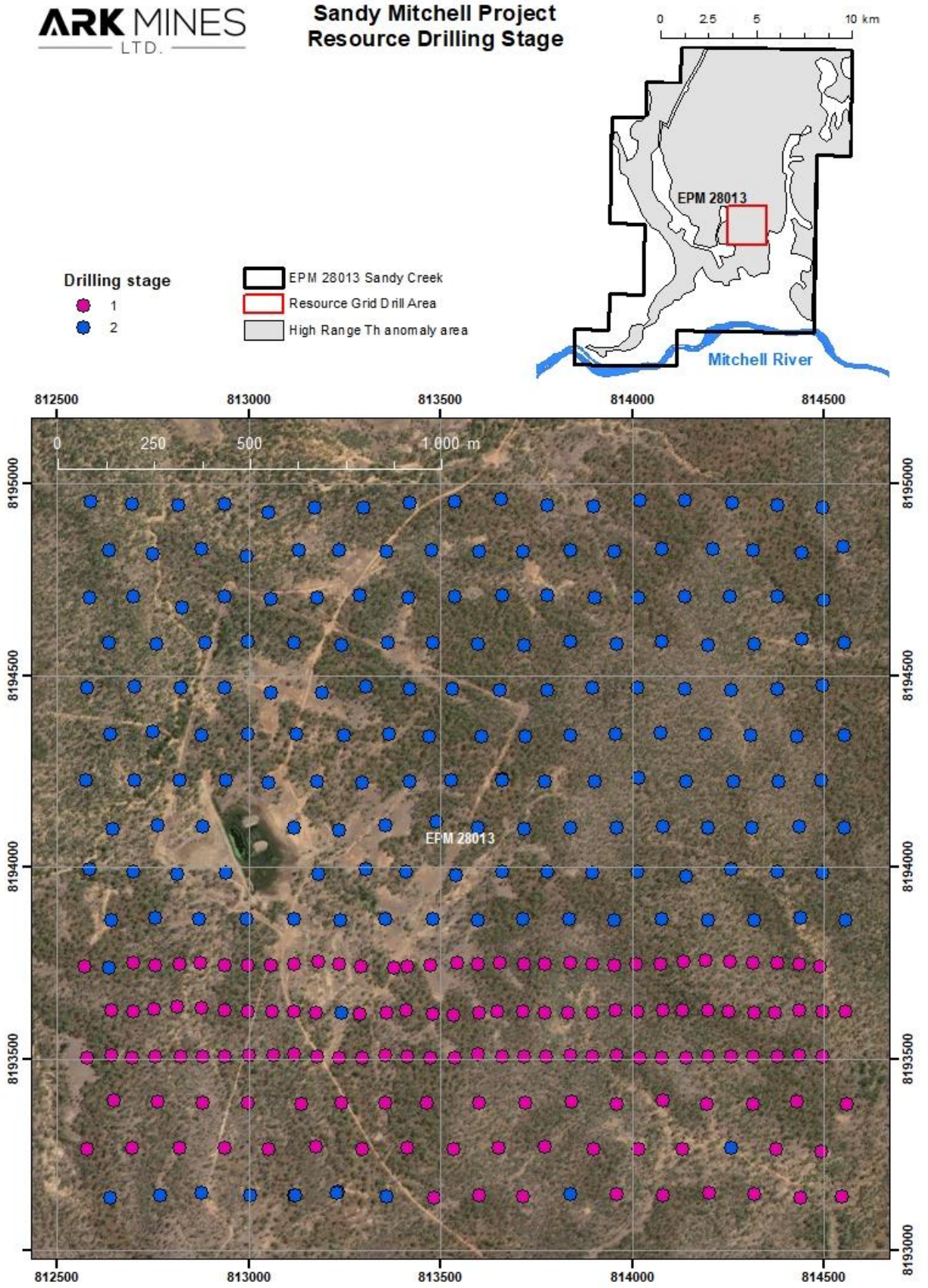

Figure 2: Sandy Mitchell initial resource area showing hole collar location, colour coded by drilling stage. Stage 2 has just completed; stage 1 completed in June 23.

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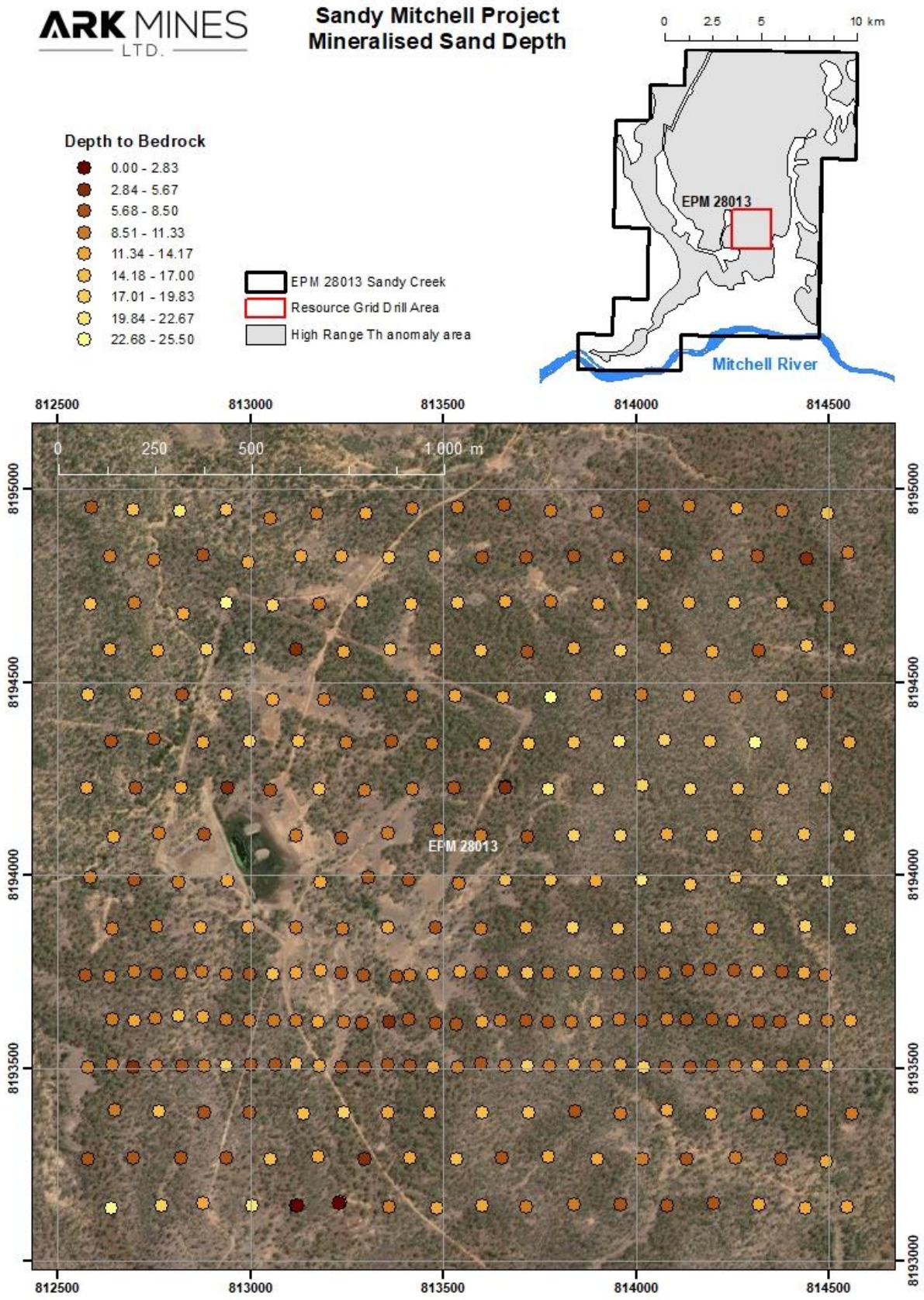

Figure 3: Sandy Mitchell initial resource area showing completed hole collar locations, colour coded by depth to bedrock. This equates to depth of mineralised sand column, since logging and assay returns show no overburden and mineralisation in the whole sand column.

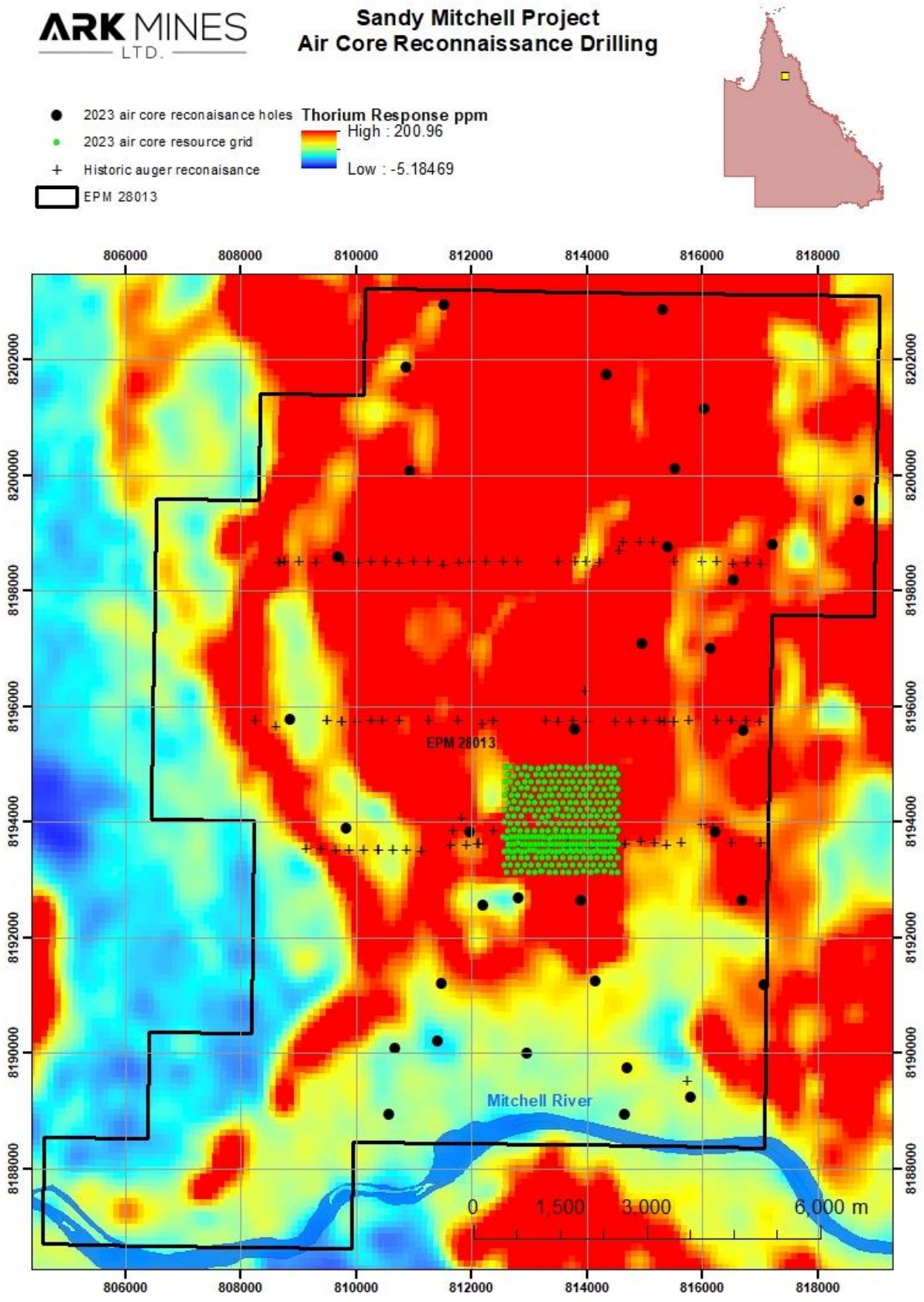

Figure 4: Sandy Mitchell 2023 air core reconnaissance drilling against the thorium radiometric response data. Historic auger reconnaissance and the 2023 air core grid drilling is also shown.

This announcement has been approved by the board of Ark Mines Limited

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About Ark Mines Limited

Ark Mines is an ASX listed Australian mineral exploration company focused on developing its 100% owned projects located in the prolific Mt Garnet and Greenvale mineral fields of Northern Queensland and includes:

The Sandy Mitchell Rare Earth and Heavy Mineral Project

- Ark is rapidly advancing the 147km^2 EPM 28013 'Sandy Mitchell' tenement – an advanced Rare Earths Project in North Queensland with additional 138km2 of sub blocks under application
- Very high historical TREO grades including high grade pan concentrates of all critical Light Rare Earths including dysprosium (Dy), terbium (Tb), holmium (Ho), erbium (Er), thulium (Tm) ytterbium (Yb), yttrium (Y) and excluding only Lutetium
- Up to 25% of the TREO is Nd and Pr (magnet metals)
- Rare Earths at 'Sandy Mitchell' are amenable to panning a concentrate
- Planned low-cost, fast start up, straightforward beneficiation by gravity processing

Ark's exploration portfolio also consists of three high quality projects covering 200km^2 of tenure that are prospective for copper, iron ore, nickel-cobalt and porphyry gold:

Gunnawarra Nickel-Cobalt Project

- Comprised of 11 sub-blocks covering 36km^2
- Borders Australian Mines Limited Sconi Project - most advanced Co-Ni-Sc project in Australia
- Potential synergies with local processing facilities with export DSO Nickel/Cobalt partnership options

Mt Jesse Copper-Iron Project

- Project covers a tenure area of 12.4km^2 located ~25km west of Mt Garnet
- Centred on a copper rich magnetite skarn associated with porphyry style mineralization
- Three exposed historic iron formations
- Potential for near term production via toll treat and potential to direct ship

Pluton Porphyry Gold Project

- Located ~90km SW of Cairns near Mareeba, QLD covering 18km^2
- Prospective for gold and associated base metals (Ag, Cu, Mo)
- Porphyry outcrop discovered during initial field inspection coincides with regional scale geophysical interpretation.

Reliance on historic data

All sample data reported in this release, as disclosed in the body of the release, in the tables in the Appendix and in the JORC table is based on data compiled by the Competent Person from other sources and quoted in their original context. These sources have been referenced in the text and the original Competent Persons statements may be found with the relevant documents. Some of this information is publicly available but has not been reported in accordance with the provisions of the JORC Code and a completed Table 1 of the JORC Code and Competent Persons statement is attached to this Release. Whilst every effort has been made to validate and check the data, these results should be considered in the context in which they appear and are subject to field verification by the Company.

Competent Persons Statement

The Information in this report that relates to exploration results, mineral resources or ore reserves is based on information compiled by Mr Roger Jackson, who is a Fellow of the Australian Institute of Mining and Metallurgy and a Fellow of the Australasian Institute of Geoscientists. Mr Jackson is a shareholder and director of the Company. Mr Jackson has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity that he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the `Australian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves '(the JORC Code). Mr Jackson consents to the inclusion of this information in the form and context in which it appears in this report. Mr Jackson confirms information in this market announcement is an accurate representation of the available data for the exploration areas being acquired.

Forward Looking Statements and Important Notice

This report contains forecasts, projections and forward-looking information. Although the Company believes that its expectations, estimates and forecast outcomes are based on reasonable assumptions it can give no assurance that these will be achieved. Expectations and estimates and projections and information provided by the Company are not a guarantee of future performance and involve unknown risks and uncertainties, many of which are out of Ark Mines control.

Actual results and developments will almost certainly differ materially from those expressed or implied. Ark Mines has not audited or investigated the accuracy or completeness of the information, statements and opinions contained in this announcement. To the maximum extent permitted by applicable laws, Ark Mines makes no representation and can give no assurance, guarantee or warranty, express or implied, as to, and takes no responsibility and assumes no liability for the authenticity, validity, accuracy, suitability or completeness of, or any errors in or omission from, any information, statement or opinion contained in this report and without prejudice, to the generality of the foregoing, the achievement or accuracy of any forecasts, projections or other forward looking information contained or referred to in this report.

Investors should make and rely upon their own enquiries before deciding to acquire or deal in the Company's securities.

Appendix A: JORC Code, 2012 Edition – Table 1

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	Ark Mines May to June 2023 Sandy Mitchell programme sampling techniques: • Samples are rock chips and accompanying bulk fines collected on 1m intervals by air core drill using 100mm bit. • Sample was passed through an 82.5: 12.5 riffle splitter to yield a representative aliquot of approx. 1.5 kg collected in prenumbered calico bag, and a remainder retained in a numbered plastic bag, with recoveries volumetrically estimated with periodic checks by mass using digital scale, compared against laboratory loose bulk density measurements. • Historic works by SGS (SGS Oretest Job No: S0580, 2010 for JOGMEC) shows mineralisation to have grainsize < = 125µm (very fine sand) and thus the sample mass is adequate for representivity. • Sample for total digest assay was sent to North Australian Laboratories for Assay. • Sample for pan concentration was sub-sampled by spade channel through the remainder sample to a mass of approx. 1kg per metre as determined by digital scales. These were then panned to a concentrate and the subsequent concentrates composited per hole. • Pan Con composite samples were sent to IHC Mining where samples were screened to -1mm, heavy minerals were further separated by heavy liquid separation with yields weighed at each stage. • The final heavy mineral concentrate was subject to Portable XRF analysis for a limited indicative assay. • Samples for preliminary metallurgical testing were sent to Downer Mineral Technologies and comprised the entire bulk metre remainder after riffle splitting the representative aliquot and removal of the 1kg pan concentrate aliquot. Ark Mines November to December 2023 Sandy Mitchell programme sampling techniques: • All sampling methodologies were as per the June programme, but the air core bit was exchanged for a reverse circulation face hammer to complete the end of hole. • The bedrock horizon was determined by geological chip logging supported by driller's run sheet records.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is*	Ark Mines May to June 2023 Sandy Mitchell programme: • Drill was by Comacchio track mounted air core rig using 100mm air core bit. • All holes were vertical and drilled to refusal or 17.5m, whichever came first. Ark Mines November to December 2023 Sandy Mitchell programme: • Drill was by AusRoc 4000 multi-purpose rig using 100mm

Criteria	JORC Code explanation	Commentary
	oriented and if so, by what method, etc).	and changing to slim line 100mm RC face hammer at depth. • All holes were vertical and drilled to complete the final metre in bedrock.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Recoveries were assessed by volumetric estimation by the metre based on total sample weights using a digital scale with comparison made via laboratory loose bulk density measurements. • Sample was passed through a cyclone with a gated chute to allow fines to fall out of the air stream. The chute was kept closed until the end of each metre had been drilled, then opened to collect sample, and closed prior to recommencement of drilling. • No relationship between recovery and grade has yet been identified.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Sample was logged by the metre for all drilling, by the site geology team for both qualitative and quantitative criteria. • Drill logs for 100% of drilling are available with overall length of 3914.2m. • Logging is sufficient to support resource estimation, mining and metallurgical studies.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are*	Ark Mines May to June 2023 Sandy Mitchell programme: • All sample passed through the drill cyclone dry. • Sub-sampling for laboratory assay was by 87.5:12.5 riffle splitter: the bulk sample was passed evenly through the riffles with the assay aliquot collected in a pre-numbered calico bag, and the reject collected in a numbered plastic bag. • Field duplicates were taken at 1:40 by 50:50 riffle splitter. • Historic works by SGS (SGS Oretest Job No: S0580, 2010 for JOGMEC) shows mineralisation to have grainsize < 125µm (very fine sand) and thus the sample mass is representative. • Sample for pan concentration was sub-sampled by spade channel through the reject to a mass of approx. 1kg per metre as determined by digital scales. • Sample for preliminary metallurgical testing was selected from the 11m twinned hole SMDH 00014b and comprised the entire 87.5% bulk metre sample after riffle splitting to yield the representative sample and removal of the 1kg pan concentrate aliquot. Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme:

Criteria	JORC Code explanation	Commentary
	appropriate to the grain size of the material being sampled.	• All sampling was conducted as per the June 2023 programme, but duplicates at 1 in 40 were taken by passing the total reject sample through an 87.5:12.5 riffle splitter in the same manner as the primary sample.

Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*
	• *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*
		Ark Mines May to June 2023 Sandy Mitchell programme:
		• Metre samples were sent to North Australian Laboratories (NAL) for total digest assay:
		• Samples were weighed then kiln dried and re-weighed.
		• 1 in 5 samples was tested for moisture content.
		• 1 in 3 samples was tested for dry loose bulk density.
		• Sample was then pulverization in an LM-5 to 90% passing 75 µm with assay aliquot selected by laboratory splitter.
		• Al, Ca, Cr, Fe, Mg, P, S, and Ti were assayed by 4 acid digest with ICP-OES finish.
		• Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th, U, Zr, Hf, Nb, Ta, Si, Sr, Pb were assayed by sodium peroxide fusion in nickel crucibles with ICP-MS finish.
		• Field duplicates were taken at 1:40 by 50:50 riffle split of the assay aliquot.
		• For total digest samples:
		  • Laboratory repeats were requested at no less than 1 in 40 but carried out by the laboratory at 1 in 10.
		  • Standard insertion was carried out by the laboratory at 1 in 12.
		  • Assay of blank quartz flushes was requested at 1 in 40.
		• For pan concentrate samples
		  • Laboratory repeats were requested at no less than 1 in 40.
		  • Standard insertion was requested of the laboratory at no less than 1 in 40.
		  • Assay of blank quartz flushes was requested at 1 in 40.
		• Total radiometric count was measured on all assay samples using a SAIC Exploranium GR-110G hand held scintillometer, hired from Terra Search Townsville, pre-calibrated.
		• Reading times were 10 second accumulations, which was the machine maximum, with 100x10 second background accumulations taken per day, per measuring station.
		• IHC Mining Laboratory procedures for pan concentrate composite samples was:
		  • Creation of duplicates by split at a rate of 1 in 24
		  • Screen to -1mm and weigh
		  • Heavy liquid separation and weigh
		  • Pulverization of the heavy mineral fines by extended grind
		  • Portable XRF analysis of the pulp
		• QAQC implemented is believed sufficient to establish accuracy and precision.
		• Mineral Technologies preliminary met' samples were processed at bench scale by:
		  • 55.2kg of individual samples were combined by rotary homogenisation then split to yield a representative aliquot of 38.3 kg for process testing.

Criteria	JORC Code explanation	Commentary

- The composite sample was screened to 2000 µm, 500 µm and wet screened at 20 µm with the 500 to 20 µm fraction then passed through 2 stages of gravity separation using Wilfley table (rougher stage).
- The Wilfley concentrate was passed through a bromoform heavy liquid separation flask (cleaner stage).
- The HLS sinks were attrition cleaned for 5 minutes at a 65% wet weight density and deslimed, then passed through a Geoteknica FM3 froth floatation cell using starch depressant and sodium silicate surfactant.
- Both sinks and floats were separately processed through a dry induced Reading magnetic separator.
- This yielded 4 final streams of mag and non-mag floats (containing the bulk of REE) and mag and non-mag sinks, containing the bulk of zircon, as well as various tails from each previous stage.
- Percentages of material passing or rejecting at each stage were determined by mass.
- The float magnetic fraction was further refined by semi-lift magnetic separator to determine feasibility of individual mineral species separation, but the yields of this process were not assayed due to volumetric limits from this round of processing.

- Mineral Technologies sent samples of the tails and product concentrates, excluding SLM stage products, to Bureau Veritas Brisbane for assay:
  - Samples were dried and pulverised using tungsten carbide bowls in a vibrating pulveriser to 90% passing 75 µm with a BQF before each sample.
  - Sample was fused to a glass bead to determine Fe, Si, Al, Cr, Mg, Mn, P, U, Th, V, Nb, S, Ca, K, Ce, Sn, Ti, and Zr oxides by XRF.
  - LOI was determined by mass after heating to 105°C (drying temp) and 1000°C (fusing temp).
  - Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Tm, Y and Yb were determined by laser ablation of fused bead with ICP-MS finish.
  - Standards were assayed at 1 in 3 to cover all elements in the suite for both assay methods.
  - Laboratory repeats were carried out at 1 in 4.

Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme:

- Metre samples were sent to North Australian Laboratories (NAL) for total digest assay:
- Samples were weighed then kiln dried and re-weighed.
- 1 in 5 samples was tested for moisture content.
- 1 in 3 samples was tested for dry loose bulk density.
- Sample was then pulverization in an LM-5 to 90% passing 75 µm with assay aliquot selected by laboratory splitter.
- Al, Na, Ca, Cr, Fe, Mg, P, S, and Ti were assayed by 4 acid digest with ICP-OES finish.
- Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th, U, Zr, Hf, Nb, Ta, Si, Sr, Pb, K, Sn, W and As

Criteria	JORC Code explanation	Commentary

		were assayed by sodium peroxide fusion in nickel crucibles with ICP-MS finish.
		• This represents a minor expansion on the June 2023 suite, with the inclusion of Na, K, As, W, Sn and As.
		• Field duplicates were taken at 1:40 by 50:50 riffle split of the assay aliquot.
		• For total digest samples:
		  • Laboratory repeats were requested at no less than 1 in 40 but carried out by the laboratory at 1 in 10.
		  • Standard insertion was carried out by the laboratory at 1 in 12.
		  • Assay of blank quartz flushes was requested at 1 in 40.

Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*
	• *The use of twinned holes.*
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*
	• *Discuss any adjustment to assay data.*
		Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme:
		• Significant intersections have not yet been determined.
		• 11 twin holes have been drilled for a total of 104.85 twin metres Two of these twins are using power auger to twin air core, to support both resource and reconnaissance works.
		• Data was entered into MS excel then verified against hard copy data, followed by import into Datamine Studio RM for validation.
		• Primary data is stored as hard copy, electronic tables in CSV format and Datamine format.
		• Assay data yielding elemental concentrations for rare earths (REE) within the sample are converted to their stoichiometric oxides (REO) in a calculation performed using the conversion factors in the table below.
		• Rare Earth oxide is the industry accepted form for reporting rare earths. The following calculations have been used for reporting:
		  • **TREO** = La2O3 + CeO2 + Pr6O11 + Nd2O3 + Sm2O3 + Eu2O3 + Gd2O3 + Tb4O7 + Dy2O3 + Ho2O3 + Er2O3 + Tm2O3 + Yb2O3 + Lu2O3+ Y2O3
		  • **CREO** = Nd2O3 + Eu2O3 + Tb4O7 + Dy2O3 + Yb2O3
		  • **LREO** = La2O3 + CeO2 + Pr6O11
		  • **HREO** = Sm2O3 + Eu2O3 + Gd2O3 + Tb4O7 + Dy2O3 + Ho2O3 + Er2O3 + Tm2O3 + Yb2O3 + Lu2O3+ Y2O3
		  • ND/Pr = Nd2O3 + Pr6O11
		  • TREO – Ce = TREO – CeO2
		  • %NdPr + NdPr/TREO

Element Name	Element Oxide	Oxide Factor
Ce	CeO2	1.2284
Dy	Dy2O3	1.1477
Er	Er2O3	1.1435
Eu	Eu2O3	1.1579
Gd	Gd2O3	1.1526
Ho	Ho2O3	1.1455
La	La2O3	1.1728
Lu	Lu2O3	1.1371
Nd	Nd2O3	1.1664

Criteria	JORC Code explanation	Commentary

Pr	Pr6O11	1.2081
Sc	Sc2O3	1.5338
Sm	Sm2O3	1.1596
Tb	Tb4O7	1.1762
Th	ThO2	1.1379
Tm	Tm2O3	1.1421
U	U3O8	1.1793
Y	Y2O3	1.2699
Yb	Yb2O3	1.1387

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Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • An initial collar survey by hand held GPS was conducted as a failsafe, with expected accuracy of ±5000mm in x and y, and ±50000mm in z. • Full survey by Twine Surveys was subsequently carried out using RTKdGPS with accuracy of ±20mm in x and y, and ±200mm in z • Twine's professional RTK survey was implemented between drill collars and used to generate a digital terrain model for high quality topographic control. • All survey data is recorded in MGA 2020 zone 54 and AHD.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Data spacing for 3 lines of drilling is 60m x 120m. • Data spacing for the remaining 13 lines is 120m x 120m • No compositing has been applied to 1m samples for total digest assay. • Pan concentrates were composited per drill hole. • Preliminary metallurgical sample was composited as discussed under *Laboratory Tests.* • Representative metre samples for total digest assay were not composited, residual sub-metre hole ends were similarly assayed separately to preserve geometric representation.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Deposit type is fluvial channel placer with channels believed oriented north to north-east and meso scale structure oriented sub-horizontal arcuate. The applied vertical sampling is the optimal orientation for the deposit type. • No bias by orientation or spatial relationships has been identified.
Sample security	• *The measures taken to ensure sample security.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Samples were collected after logging and transported at the end of each day to the company locked storage in

Criteria	JORC Code explanation	Commentary
		Chillagoe. • Samples were boxed in closed pumpkin crates, wrapped in plastic for shipping by courier to the laboratory in Pine Creek, NT. • Samples for IHC Mining and Downer Mineral Technologies were similarly boxed, wrapped and couriered to the laboratories, but prior to shipping were stored on site at the Ark fenced bulk bag farm. • Bagged reject was stored on site in Ark's fenced secure bag farm and covered in UV resistant tarping for future use.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Ark Mines May to June 2023 and November to December 2023 Sandy Mitchell programme: • Full audit of sampling techniques and data available to date was carried out by geological consultants, Empirical Earth Science. • EES notes that the composited concentrate samples results in assay representing diluted material with no internal separation possible. • EES noted that the hand panning process of such fine material is prone to heavy mineral loss, with the possibility that concentrates underrepresent the total heavy mineral fraction. • ESS noted that the pXRF technique used in initial concentrate assays is not suited to yield full REE data, but that the results can inform approximate proxy calculations for the full REE suite. • EES noted that none of these factors apply to the representative metre samples and total digest assays, which meet best practice. • EES noted that the preliminary metallurgy was of insufficient volume and source dispersion to represent the entire eventual resource, but was well suited to its stated purpose of proof of concept, testing recovery technique, and process to inform the next stage of bulk metallurgy. • EES also noted that the preliminary metallurgy was selected from pan con composite results, representing a median grade material within that data set, and is thus a reasonable preliminary representation of grade and recovery performance.

Appendix B: Sandy Mitchell Stage 1 partial assay return

NB: Scandium and Neodymium in this table are not fully reported by the laboratory (blank assays), and will be updated in future releases as further assay is returned.

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00013	3	4	70	421.1	478.9	440.9	451.3	413.3	27.6	7.8	100	100.2	38	19.8	96.1	199.1	21.9	72.6	13.5	1.9	8.2	1.1	4.6	0.7	1.4				39.5	5.8	54.1	241.8
SMDH 00013	9	10	70	743.9	826.3	780.3	774	728	52.3	15.9	179	179.4	46	36.4	164.8	354.3	38.7	130.2	23.5	1.9	14.6	1.9	8.6	1.1	2.3		2		63.7	8.3	50.4	535.6
SMDH 00012b	0	1	40	567.5	625.1	608.1	568	551	57.1	16.5	150.1	137.6	17	40.6	122.8	266.9	29.8	99.4	19	1.7	11.4	1.4	7	1.3	3.1		3.1	0.6	53.1	9.2	28.6	546.1
SMDH 00012b	1	2	50	691.9	761.5	738.5	694.7	671.7	66.8	20.2	186	172.6	23	46.6	149.1	322	35.3	127	22.6	2.1	13.6	1.8	8.5	1.5	3.7	0.6	3.5	0.6	62.1	9.7	31	690
SMDH 00012b	4	5	70	412.2	463.7	437.7	428.9	402.9	34.8	9.3	107.4	101.2	26	25.5	90.7	190.6	21.6	73.8	14.8	2.3	9.1	1.1	4.7	0.8	1.8		0.9		37	7.1	42.6	412.5
SMDH 00012b	5	6	70	402.7	460.4	432.4	418.2	390.2	42.2	12.5	111.3	101.5	28	29.7	84.8	185.9	21.6	73.2	14.1	1.7	8.9	1.2	5.5	1	2.4		2.4		37.2	5.9	33.3	331.6
SMDH 00012b	6	7	80	338.1	381.8	361.8	348.2	328.2	33.6	9.9	90.4	83.4	20	23.7	72	157	18.1	60.3	11.9	1.4	7.5	0.9	4.1	0.8	1.9		2.2		33.3	3.9	27.2	392.5
SMDH 00012b	8	9	80	496.5	558.2	527.2	515	484	43.2	12.5	129.6	123.9	31	30.7	105	229.5	27.1	89.2	19	2.1	12.1	1.4	6.2	1	2.4		1.5		44.7	4.8	40.9	408.3
SMDH 00012b	9	10	90	325.5	382.1	362.1	336.2	316.2	45.9	9.3	102.3	81.3	20	36.6	66.1	152.4	17.2	59	11.9	1.6	8	0.9	4.2	0.8	1.7		1.7		27	2.7	24.7	270.8
SMDH 00012b	10	11	80	356.4	405.1	384.1	369.2	348.2	35.9	8.2	99.8	89.7	21	27.7	74.4	165.5	19.3	65.7	13.1	1.7	8.5	0.9	3.8	0.7	1.3		1.5		31.5	2.7	24.7	250.8
SMDH 00012b	11	12	75	348.9	410	382	368.4	340.4	41.6	8.5	101.5	85.4	28	33.1	72.8	165.1	18.4	61.9	12.5	1.4	8.3	0.9	4.2	0.7	1.6		1.1		31.6	3.9	25.6	471.7
SMDH 00012b	13	14	80	422.7	480.4	457.4	436.1	413.1	44.3	9.6	117.9	103.9	23	34.7	90.1	198.6	22.4	75.9	14.8	1.7	9.6	1.1	4.5	0.8	1.7		1.5		35.7	3.1	24	174.1
SMDH 00012	0	1	45	616.7	688.8	673.8	617.1	602.1	71.7	14.6	177.8	152.2	15	57.1	131.6	292	32.9	110.9	19.9	1.4	13.4	1.5	6.9	1.3	2.7		2.2		54.2	5.2	22.3	742.3
SMDH 00012	1	2	60	403.4	466.5	440.5	420.4	394.4	46.1	9	112.3	94.7	26	37.1	85.1	198.1	21	68.9	12.3	1.5	7.5	0.8	4	0.8	1.7		1.7		36	2.9	19.5	646.8
SMDH 00012	2	3	65	207.6	242.5	224.5	221.8	203.8	20.7	3.8	60.9	54.1	18	16.9	46.3	93.4	11.1	40.7	7	1	4.3		2.3		0.7		0.8		15.6	1.5	19.7	533
SMDH 00012	3	4	70	351	408.2	388.2	362.3	342.3	45.9	8.7	106.9	86.5	20	37.2	75.1	166.2	18	63.1	11.6	1.2	7.1	0.9	4.5	0.8	1.7		0.8		29.2	3.4	23.5	349
SMDH 00012	4	5	75	464	515.5	487.5	483	455	32.5	9	111	109.7	28	23.5	101.3	225.5	23.7	81.6	13.7	1.5	7.7	0.8	3.6	0.7	1.7		2.2		40.4	3.5	19.2	445.2
SMDH 00011b	2	3	85	437.8	488.1	462.1	453.1	427.1	35	10.7	112.1	110.4	26	24.3	93.5	205.6	23.8	81.9	13.7	1.2	7.4	0.8	3.9	0.8	1.9		3.3		41.9	3.8	18.7	372
SMDH 00011b	4	5	90	155.1	186.2	163.2	177	154	9.2	1.1	46.6	47.6	23	8.1	31.9	67.6	10.6	35.9	4.1	1.5	2.4		1.1						11.3	3.2	10	290
SMDH 00011b	7	8	60	287.2	313.5	305.5	286.9	278.9	26.6	8.3	74.3	69.6	8	18.3	61.7	134.6	14.9	50.7	9.6	1.3	6.1	0.7	3.3	0.6	1.1		2.6		24.1	1.8	22.3	322.3
SMDH 00011	1	2	60	434.5	490.9	467.9	445.7	422.7	45.2	11.8	115.2	102.2	23	33.4	96.3	207.4	22.1	74.2	13.2	1.7	7.8	1.1	4.8	0.9	2.2		2.8		36.9	4.5	16.5	274.5
SMDH 00010b	1	2	50	476.5	618.9	567.9	489.6	438.6	129.3	37.9	188.1	118.1	51	91.4	95.1	210.5	23.3	83.2	14.6	1.9	10	1.5	10.1	2.5	6.7	1.1	15	1	37	5.7	26.2	333.8
SMDH 00010b	4	5	85	407.5	458.9	432.9	422.2	396.2	36.7	11.3	104.4	98.4	26	25.4	88.4	192.6	21	72.6	12.4	1.6	7.6	0.8	4	0.8	1.7		4		34.7	3.4	17.6	315.4
SMDH 00010	0	1	50	1013.2	1102	1081	1004.7	983.7	97.3	29.5	263.6	247	21	67.8	207.5	485.2	52.8	181	35	1.6	20.6	2.4	10.8	1.9	4.3	0.7	8.8	0.6	107.5	6.3	21.6	354
SMDH 00010	1	2	55	287.6	333	308	304.1	279.1	28.9	8.5	79.8	74	25	20.4	61	130.6	15.6	54.1	10.6	1	6.2	0.7	3.6	0.7	1.8		1.7		30.8	1.5	22.7	401.6
SMDH 00010	2	3	60	434.1	476.3	462.3	436.1	422.1	40.2	12	118.4	112.4	14	28.2	92.1	197.4	23.7	82.3	15.9	1.5	9.2	1.1	5.3	0.9	2.3		2.4		47.9	2.1	28.8	478.9
SMDH 00009b	0	1	55	1077.4	1175.4	1143.4	1080.7	1048.7	94.7	28.7	279.1	269.7	32	66	235.1	502.3	58.6	195.4	34.7	2	20.6	2.6	13.1	2.2	5	0.8	4.3	0.7	99.6	6.4	21.2	726.6
SMDH 00009b	1	2	60	812.6	874.9	845.9	827.5	798.5	47.4	14.1	195	203.3	29	33.3	185.4	378.8	43.7	150.2	24.4	2.1	13.9	1.6	7.8	1.3	2.4		1		70.4	3.2	21.3	360.5
SMDH 00009b	7	8	75	623	685.3	660.3	632.7	607.7	52.6	15.3	161.9	154.7	25	37.3	140.1	287.1	32.5	113.7	19.9	2.4	12	1.4	7.1	1.3	3		2.5		58.4	3.3	23.9	381.2
SMDH 00009	0	1	45	475.2	538.4	518.4	477.1	457.1	61.3	18.1	139.3	119.6	20	43.2	101.3	218.7	24.9	86.3	15	1.4	9.5	1.3	7.1	1.4	3.7	0.6	3.4	0.6	42.2	3.3	18.9	480.2
SMDH 00008b	0	1	50	417.4	474.2	451.2	425.5	402.5	48.7	14.9	119.9	107.3	23	33.8	90.1	189.4	22.5	77.3	13.5	1.3	8.4	1.1	6.4	1.1	2.7	0.6	3		37.9	2.4	17.2	478.5
SMDH 00008	1	2	65	390.1	472.6	431.6	413.7	372.7	58.9	17.4	118.1	95.8	41	41.5	86.1	177	20.5	68	12.1	1.3	7.7	0.9	6.4	1.3	3.4	0.6	4.1	0.7	41.9	2.2	21.9	248.4
SMDH 00007b	0	1	45	673.1	771.9	745.9	679.2	653.2	92.7	19.9	203.6	164.6	26	72.8	142.6	318.8	35.5	119.2	21.6	1.7	13.8	1.6	8.3	1.5	3.5	0.6	3.8	0.6	58.8	4.2	22.5	873
SMDH 00007b	1	2	5	354.8	448.5	416.5	371.2	339.2	77.3	15.6	135.2	89.4	32	61.7	72.7	163.3	17.9	64.4	11.4	2	7.5	1.1	6	1.3	3	0.6	3	0.6	29.9	3.7	26.6	489.5
SMDH 00007	1	2	50	310.3	376	348	329.6	301.6	46.4	8.7	100.3	77.2	28	37.7	67.2	143.2	16.6	56.1	10.2	2	6.3	0.8	3.7	0.8	1.6		1.8		25	2.2	14.4	499.7
SMDH 00007	2	3	70	382.2	445.6	422.6	394.6	371.6	51	10.6	119.8	98	23	40.4	81.2	176.3	20.5	72.1	12.2	1.9	7.4	0.8	4.6	0.8	2.1		2.3		31.1	2.1	30.6	448.9
SMDH 00006b	1	2	55	662.1	779.4	753.4	664	638	115.4	24.1	225.6	166.7	26	91.3	141.8	303.8	36.1	118.7	20.8	3.7	13.1	1.9	10	2.1	4.3	0.7	4.4	0.7	45.5	3.7	24.2	549.5
SMDH 00006b	4	5	75	432.8	504.9	481.9	444.5	421.5	60.4	11.3	135.4	107.6	23	49.1	91.6	206.2	22.7	78.6	12.6	1.4	8.4	0.9	5.4	1	2.2		1.8		34.7	2	14.9	486.8
SMDH 00006b	8	9	70	720.4	832.3	804.3	727.1	699.1	105.2	21.3	234.9	185.7	28	83.9	151.5	334.7	37.7	137.1	21.5	3	13.6	1.5	9.4	1.8	3.8	0.6	3.6	0.6	57.2	3.5	22.3	508.6
SMDH 00006b	11	11.5	45	763.2	902.6	847.6	795.8	740.8	106.8	22.4	238	191.4	55	84.4	161.1	359.8	40.6	139.6	23.2	2.8	13.7	1.6	9.6	1.8	4.1	0.7	4	0.6	58.9	3.4	22.7	636.4
SMDH 00005b	0	1	20	622.3	668.6	657.6	616.6	605.6	52	16.7	139.9	133.2	11	35.3	111.4	338.3	29.8	95.4	17.7	1.2	11.8	1.3	6.7	1.5	3	0.6	3	0.6	56.1	3.3	18.6	786.6
SMDH 00005b	1	2	25	518.3	575.8	543.8	538.6	506.6	37.2	11.7	124.6	125	32	25.5	106.5	253.4	27.5	91.3	16	1.6	10.3	1.2	5	0.9	2.1		2.5		44.4	2.7	17.6	507.5
SMDH 00005	1	2	40	382.1	437.6	400.6	412.8	375.8	24.8	6.3	90.6	90.7	37	18.5	84.6	184.1	20.1	66.5	11.5	1.5	7.5	0.7	3.4	0.7	1.5				32.3	3.1	19.2	770.9
SMDH 00002b	7	7.5	50	145.3	167.3	152.3	158.7	143.7	8.6	1.6	36.7	36.3	15	7	33.1	66.8	8.1	27.2	4.5	1.5	2.5		1		0.6				12.2	2	12.7	285.8
SMDH 00001	0	1	40	379.9	444.1	407.1	406.3	369.3	37.8	10.6	103.4	94.7	37	27.2	85.3	171.9	19.7	69.5	13.5	1.2	8.2	0.9	4.6	1	2.4		1.7		37.6	4.5	17.9	745.4
SMDH 00205	0	1	45	482.5	534.2	513.2	487.9	466.9	46.3	15.6	126.5	119.9	21	30.7	99.3	226.3	25.6	87.1	17	1.5	10.1	1.2	6	1.1	2.9		4.4		41.5	3.5	19.9	545
SMDH 00205	4	5	40	24.1	38.8	26.8	36.1	24.1	2.7		7.2	5.5	12	2.7	6.9	9.8	1	4.5	1.2		0.7								1.1	0.6	8.9	200.5
SMDH 00206	0	1	40	368.6	425.2	397.2	385.2	357.2	40	11.4	105.8	96.2	28	28.6	76.8	167.9	20.2	70.2	13.2	1.2	7.7	0.9	4.9	1	2.2		2.4		34.7	2.8	19	504.8
SMDH 00207	10	10.5	40	175	197.9	182.9	187.3	172.3	10.6	2.7	42.9	42.1	15	7.9	37.5	83.4	9.1	31.6	5.6	2	3.1		1.4		0.6		0.7		14.6	1.1	18	313.7
SMDH 00211	0	1	20	609.2	687	659	617.8	589.8	69.2	19.4	168	148	28	49.8	128.2	291.9	31.2	107.3	18.4	1.4	11.4	1.5	8	1.6	3.5	0.6	3.6	0.6	56.2	4	21.5	531.5
SMDH 00213b	0	1	50	562.3	651.7	613.7	578.3	540.3	73.4	22	164.5	139.8	38	51.4	113.2	267.4	28.3	101.2	17.2	1.6	11.4	1.5	8.8	1.9	3.9	0.8	4.4	0.7	51.8	4.7	28.3	572.6

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00213b	10	11	20	455.9	521.7	496.7	464.8	439.8	56.9	16.1	137	118	25	40.8	93.4	211.3	23.7	86.4	14.5	1.9	8.6	1.2	6.7	1.6	2.9		3.1	0.6	38.3	3.1	24	540
SMDH 00216	4	5	40	292.3	349	312	320.9	283.9	28.1	8.4	78.2	72.6	37	19.7	62.6	136.6	15.1	52.6	9.5	1	6.5	0.8	4.1	0.7	1.5		1.3		23.6	2.9	23	400.1
SMDH 00216b	0	1	30	328	372.8	347.8	344.5	319.5	28.3	8.5	85.9	81	25	19.8	69.1	155.3	16.3	60.1	11	1.4	6.3	0.8	3.8	0.7	1.5		1.7		27.2	2.9	16.9	295.8
SMDH 00216b	11	12	85	250.9	278.5	278.5	239.7	239.7	38.8	11.2	80.9	65.2		27.6	54.1	109.9	13.5	45.5	8.3	1.6	6.8	0.9	5.3	0.9	2.2		1.9		18.5	1.5	21.5	792.8
SMDH 00216b	12	13	95	293.7	334.8	334.8	275.2	275.2	59.6	18.5	103.1	74.9		41.1	62.7	125.7	14.6	51.3	10.2	1.7	9	1.2	7.8	1.4	3.3	0.6	3.5	0.7	20.8	2.2	25.7	637
SMDH 00216b	13	14	85	292.6	322.3	322.3	281	281	41.3	11.6	86.9	71		29.7	64.6	132.7	15.2	50.2	10.3	1.4	6.6	0.9	4.7	1	2.4		2.6		24	2.7	20	715.7
SMDH 00216b	14	14.5	80	321.5	337.4	337.4	313.7	313.7	23.7	7.8	78.2	78.5		15.9	72.5	147.2	17.6	56	11.6	1.4	7.4	0.9	4	0.6	1.3		1		27.2	2.5	22.9	399
SMDH 00217	0	1	25	292.2	331.4	310.4	305.3	284.3	26.1	7.9	78.2	73	21	18.2	62.6	136.5	14.7	54	9.3	1.7	5.5	0.7	3.6	0.7	1.5		1.4		20.5	2.4	22.6	415.1
SMDH 00217	1	2	30	775.5	792	792	767.9	767.9	24.1	7.6	140.5	160.1		16.5	205	378.1	38.9	116.6	16.6	2.8	9.9	0.9	3.7	0.6	1.4		1		31.3	2.2	48.6	490.3
SMDH 00217	2	3	20	381.6	444.1	413.1	400.4	369.4	43.7	12.2	104.3	90.8	31	31.5	81.4	182	19.6	64.5	12.5	1.6	7.8	1.1	5.6	1.1	2.1		2.3		32.1	4.4	28.8	398.8
SMDH 00217	3	4	50	297.2	331.6	331.6	285.5	285.5	46.1	11.7	91.6	71.1		34.4	67.6	135.7	15.1	50.2	9.5	1.2	6.2	0.8	5	1	2.6		2.3		24	2.9	18.6	449.4
SMDH 00217	4	5	30	331.1	349.6	349.6	322.9	322.9	26.7	8.2	80.7	78.1		18.5	75.3	155.4	17.3	56	10.4	1.4	7.1	0.8	4	0.7	1.4		1.3		27.7	2.8	21.5	459.5
SMDH 00217	5	6	65	378.8	394.2	394.2	371.7	371.7	22.5	7.1	86.7	91		15.4	85.5	179.1	21.1	65.3	11.8	1.4	7.5	0.9	3.7	0.6	1.1		0.8		33.2	3.1	21.5	322.2
SMDH 00217	6	7	70	265.9	279.5	279.5	259.8	259.8	19.7	6.1	66.9	65.6		13.6	61.1	121.6	13.8	47.8	9.2	1.5	4.8	0.6	3.4		1.1		1		19.3	1.9	24.3	427.5
SMDH 00217	7	8	50	249.2	271.4	271.4	239.8	239.8	31.6	9.4	72.1	61.9		22.2	57.1	112.5	13.3	43.2	7.3	1.3	5.1	0.7	4.7	0.7	1.6		1.7		20	2	20	392.5
SMDH 00217	8	8.5	80	203.2	220.3	220.3	196.4	196.4	23.9	6.8	56.4	49		17.1	45.3	94.3	11	33.8	6.6	1.3	4.1	0.6	3.6		1.3		1.3		16.6	2	17.2	391.3
SMDH 00217b	0	1	40	440.1	462.1	462.1	430	430	32.1	10.1	107.1	106.8		22	98.7	207.1	23.9	77	13.1	2.2	8	0.9	5	0.8	1.7		1.7		37.1	2.9	11.4	413.6
SMDH 00217b	1	2	50	298.8	310.4	310.4	293.5	293.5	16.9	5.3	70.4	73.5		11.6	66.6	140.8	16.2	53.7	9.7	1.5	5	0.6	3		0.8		0.9		25.3	1.4	8.6	261.4
SMDH 00217b	2	3	75	269	285.3	285.3	261.7	261.7	23.6	7.3	69.5	65.6		16.3	59.5	123.8	14.4	46.7	9.5	2	5.8	0.7	3.8	0.6	1.1		1.1		21.3	1.1	7.2	134.5
SMDH 00217b	3	4	25	191.7	219.3	204.3	203	188	16.3	3.7	51.7	47.5	15	12.6	40.3	91.3	10	34.5	6.4	1.6	3.9	0.6	2.4		0.7				23.3	3.3	9.4	160.6
SMDH 00217b	4	5	35	156.7	171.4	171.4	151.7	151.7	19.7	5	45.5	37		14.7	35.9	70	8.5	25.7	6	2.3	3.3		2.8		1.1		1.1		37.8	1.4	10	170.1
SMDH 00217b	5	6	50	392.8	407.4	407.4	386.1	386.1	21.3	6.7	91.1	95.5		14.6	88.9	183.6	21.5	68.8	13.1	2.5	7.7	0.8	4.4		0.9		0.6		32.9	1.5	7.2	138.3
SMDH 00217b	6	7	70	539.8	567.9	567.9	527.5	527.5	40.4	12.3	138	136.5		28.1	114.1	250.8	29	99.1	19.5	2.4	12.6	1.4	7	1	1.8		1.1		53.5	5.8	22.9	100.2
SMDH 00217b	7	7.5	65	294.3	323	323	282.4	282.4	40.6	11.9	87.7	72.1		28.7	62.4	133.5	15.1	50.2	11.4	2	7.8	1.1	5.7	1	1.9		2.2		22.9	1.5	28.6	83.9
SMDH 00218	0	1	30	482.6	520.8	520.8	465.5	465.5	55.3	17.1	131.8	116.9		38.2	107.3	223.6	24.8	84	14.4	1.5	9.9	1.3	6.8	1.3	3.1	0.6	3.4	0.6	43.7	3.8	15.7	422.4
SMDH 00218	1	2	25	481.6	608.5	608.5	429.9	429.9	178.6	51.7	235.1	129.1		126.9	92.5	192.6	23.1	84	19.1	2.2	16.4	2.7	19.3	4.1	10.5	1.8	11.7	1.6	30.7	3.9	21.5	379.2
SMDH 00218	2	3	60	413.4	511.9	511.9	372.5	372.5	139.4	40.9	187.6	107.9		98.5	82.6	169.9	20.1	71.2	15.2	1.3	12.2	2	14.6	3.2	8.1	1.4	10.1	1.5	29	4.7	24.3	358.2
SMDH 00218	3	4	50	866	934.2	934.2	836.7	836.7	97.5	29.3	215.7	186.2		68.2	222	404.5	41.2	131.8	21.3	2.5	13.4	1.8	11.4	2.2	5.1	1	6.8	1	46	6.8	52.9	351.5
SMDH 00218	4	5	50	414	460.6	460.6	394.9	394.9	65.7	19.1	126.7	99.5		46.6	92.8	186.8	20.7	70	13.3	1.3	10	1.2	7.6	1.5	3.7	0.6	3.9	0.6	33.1	3.8	18.6	279.2
SMDH 00218	5	6	90	303.6	335.5	335.5	290.4	290.4	45.1	13.2	94.6	77.5		31.9	66.7	133.9	15.8	54.8	10.8	1	7.4	0.9	6	1	2.7		2.6		24.9	2.1	15.7	215.5
SMDH 00218	6	7	90	446.9	513.9	488.9	453.4	428.4	60.5	18.5	127.6	106.7	25	42	96.8	208.6	22.5	75.9	13.7	1.4	9.5	1.3	7	1.5	3.2	0.6	4.3	0.6	39.3	5.1	23.7	378
SMDH 00218	7	8	50	558.2	575.7	575.7	549.3	549.3	26.4	8.9	123.2	132.2		17.5	130.2	261.9	28.9	96.8	18.4	2.4	10.7	1.3	5.2	0.6	1.1		0.7		55.6	2.7	11.4	147.5
SMDH 00218	8	9	60	509	528.3	528.3	500.1	500.1	28.2	8.9	120.8	127.2		19.3	118.3	231.4	27.8	93.3	16.6	2.1	10.6	1.2	4.9	0.8	1.3		0.7		48.2	2.7	17.2	216
SMDH 00218	9	10	90	484.7	526.5	526.5	466.8	466.8	59.7	17.9	138.7	120.8		41.8	108.1	217.8	25.3	86.3	16.6	1.4	11.3	1.4	7.8	1.4	3.3	0.6	3.4		44.5	3.7	21.5	354.2
SMDH 00218	10	11	80	162.7	263.1	196.1	216	149	47.1	13.7	72	45.1	67	33.4	31.2	66.8	7.9	30.3	6.4	1.4	5	0.9	6	1.1	2.9		2.8		9.7	1.9	12.9	183.8
SMDH 00218	11	12	80	445.5	488.2	488.2	425.7	425.7	62.5	19.8	129.9	109.4		42.7	99.8	199.7	23.4	77	14.7	1.2	9.9	1.3	7.7	1.4	3.7	0.7	4.4	0.6	37.7	3.5	17.2	394.3
SMDH 00218	12	13	90	299.8	330	330	287.3	287.3	42.7	12.5	92.9	77		30.2	65.7	133.6	15.8	54.8	9.3	1.5	6.6	0.9	5.5	1	2.7		2.4		25.5	2	14.3	250.4
SMDH 00218	13	14	90	518.3	577	577	493.9	493.9	83.1	24.4	151	115.6		58.7	123.8	241	24.9	79.3	14.1	1.6	9.2	1.4	10	1.9	4.2	0.8	5.4	0.7	34.6	3.5	42.9	420.5
SMDH 00218	14	15	90	238.7	277.3	277.3	224	224	53.3	14.7	87.6	59.6		38.6	51.4	104	11.8	40.8	8.2	1.2	6.6	0.9	6.1	1.3	2.6	0.6	3.2		18	2.6	25.7	281.2
SMDH 00218	15	16	90	517.5	567.5	567.5	496.3	496.3	71.2	21.2	150.7	125.7		50	116.6	235.5	26.6	88.6	15.9	1.6	11.5	1.5	9	1.7	3.8	0.8	4.4		44.8	3.4	24.3	422.4
SMDH 00218	16	17	90	490.8	567.6	567.6	458.7	458.7	108.9	32.1	173.3	120.5		76.8	105.4	218.2	25.4	81.6	15.3	1.4	11.4	1.8	11.7	2.7	5.9	1.3	7.6	1.1	41.6	3.2	24.3	429.3
SMDH 00218	17	17.5	60	395.2	452.1	452.1	371.6	371.6	80.5	23.6	133.4	95.7		56.9	87.3	176.4	20.2	65.3	13.1	1	8.3	1.4	8.8	1.9	4.3	0.9	5.6	0.7	33.9	4.4	27.2	418.1
SMDH 00218b	0	1	30	157.5	187.3	170.3	170.6	153.6	16.7	3.9	44.4	38.5	17	12.8	34.6	71.9	8.5	27.8	5.7	1.6	3.5		2.2		0.9		0.8		14.2	4.8	11.9	246.3
SMDH 00218b	1	2	45	74	80.1	80.1	72	72	8.1	2	22.8	19.3		6.1	17.9	31.1	4	14	2.1	1.4	1.5		1.3				0.7		5.6	0.8	11.4	262.6
SMDH 00218b	2	3	70	43.3	49.3	49.3	41.8	41.8	7.5	1.5	15.2	9.8		6	11.1	18.1	1.9	7	1.5	1.3	0.9		0.9				0.6		2.6	0.6	8.6	186.1
SMDH 00218b	3	4	50	77.7	86.2	86.2	74.9	74.9	11.3	2.8	23.3	17.1		8.5	19.6	33.7	4	11.7	2.6	1.7	1.6		1.4		0.6		0.8		3.9	0.7	14.3	147.2
SMDH 00218b	4	5	65	89.5	97.1	97.1	86.7	86.7	10.4	2.8	27.2	22.6		7.6	21.5	37.2	4.7	16.3	3.1	1.7	2.2		1.6		0.6		0.6		3.9	0.8	25.7	211.7
SMDH 00218b	5	6	65	67.3	71.9	71.9	66.2	66.2	5.7	1.1	18.8	16.2		4.6	15.6	30.2	3.4	11.7	2.2	1.4	1.7		1.1						5.3		7.2	212.2
SMDH 00218b	6	7	85	67.9	76.3	76.3	64.7	64.7	11.6	3.2	23.1	16.8		8.4	16.7	28.1	3.4	11.7	2	1.3	1.5		1.7		0.6		0.9		3.5	0.6	14.3	284.2
SMDH 00218b	7	8	90	89.4	99.4	99.4	86	86	13.4	3.4	28.2	21		10	21.1	39.7	4.2	15.2	2.4	1.4	2		1.6		0.8		1		6.7	1.1	22.9	705.7
SMDH 00218b	8	9	85	99.3	105.9	105.9	96.3	96.3	9.6	3	28.4	25.7		6.6	21.2	44.7	5.3	18.7	2.7	1.4	2.3		1.7		0.6		0.7		7.9	1.1	14.3	456.6
SMDH 00219	0	1	40	301.1	331.9	317.9	309.7	295.7	22.2	5.4	75.2	70.9	14	16.8	65.4	145	14.6	52.6	10.1	2.1	5.9	0.7	3	0.7	1				28.2	4.6	13.6	341.8
SMDH 00219	1	2	40	385.7	397	397	380.7	380.7	16.3	5	81.9	86.6		11.3	97.6	182.2	18.8	64.2	8.8	2.8	6.3	0.6	3		0.8		0.6		20	0.9	18.6	184.9
SMDH 00219	2	3	60	229.3	237.9	237.9	226.2	226.2	11.7	3.1	52.7	54.3		8.6	53.9	107.2	12.1	39.7	6.7	1.9	4.7		2.5		0.6				19.7	0.8	12.9	125.5
SMDH 00219	3	4	50	769.9	782.3	782.3	764.1	764.1	18.2	5.8	134.8	156.2		12.4	211.3	373.4	37	114.3	15.2	3.2	9.7	0.9	4		0.9				25.7	1.1	47.2	147.6
SMDH 00219	4	5	50	270.6	280	280	267.1	267.1	12.9	3.5	63.5	66.4		9.4	65.4	124.4	13.9	50.2	7.5	1.6	4.1		2.3		0.6		0.6		21.2	0.9	18.6	141.3
SMDH 00219	5	6	60	732.6	748.3	748.3	725.2	725.2	23.1	7.4	141.4	158.6		15.7	186.9	354.9	35.8	117.8	18.4	2.9	8.5	0.9	4.1	0.6	1		0.8		38.8	1.4	40.1	126.7

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00219	6	7	70	216.8	228.7	228.7	212.8	212.8	15.9	4	54.1	52.3		11.9	49.5	101.2	11.5	38.5	6.1	1.4	4.6		2.3		0.8		0.9		18.4	2.1	12.9	106
SMDH 00219	7	7.5	80	227.2	245.5	245.5	218.7	218.7	26.8	8.5	64.3	56.2		18.3	51.6	102.4	11.8	39.7	6.8	1.6	4.8	0.7	4	0.7	1.4		1.7		19.5	1.2	8.6	124.4
SMDH 00219b	0	1	45	257.9	276.7	276.7	251.1	251.1	25.6	6.8	70.8	64.1		18.8	58.1	118.8	13	47.8	7.9	0.9	4.6		3.3	0.7	1.4		1.4		23.2	2.1	11.4	332.3
SMDH 00219b	1	2	45	327	344.4	344.4	319.7	319.7	24.7	7.3	81.2	78.8		17.4	76.1	152.1	16.2	58.3	10.4	1.2	5.4	0.7	3.6	0.6	1.1		1.3		26.9	1.9	12.9	348.1
SMDH 00219b	2	3	50	327.2	337	337	323	323	14	4.2	70.2	76.1		9.8	77.5	156.1	17.2	56	8.8	1.5	5.9	0.6	2.3		0.6		0.7		30.7	1.9	28.6	481.2
SMDH 00219b	3	4	55	176.2	184.8	184.8	173.4	173.4	11.4	2.8	15.7	10.4		8.6	17.4	144	3.3	5.8	1.6		1.3		1.3		0.7		0.8		1.4	4.1	2.9	
SMDH 00219b	4	5	90	1072.7	1094.4	1094.4	1062.1	1062.1	32.3	10.6	199.5	228.2		21.7	285.5	513.5	53.6	168	25	3.2	13.3	1.1	5.5	0.7	1.8		1.5		59.9	2.2	65.8	569.2
SMDH 00219b	5	6	90	737.9	769.6	769.6	723.1	723.1	46.5	14.8	165.8	169.2		31.7	186.9	341.7	38.2	123.6	18.8	3.1	10.8	1.3	6.1	1.1	2.6		3	0.7	42.3	3.4	52.9	946.4
SMDH 00219b	6	7	90	572.7	666.7	666.7	528.6	528.6	138.1	44.1	201.1	132		94	131.8	249.6	27.3	92.1	15.1	2.4	10.3	1.5	11.1	3.2	9.7	1.9	14.1	2.6	34.7	3.2	45.8	1015.8
SMDH 00219b	7	8	85	585.8	871.7	800.7	552.4	481.4	319.3	104.4	330.7	138.6	71	214.9	114.8	222.3	25.1	87.5	15.2	2.3	14.2	2.6	23.4	7	24.6	4.7	35.5	6.6	26.5	3.4	44.3	1243.8
SMDH 00219b	8	9	85	664.9	752.7	752.7	618.3	618.3	134.4	46.6	210.1	150.8		87.8	156.6	294.7	31.4	106.1	16	2.9	10.6	1.5	11.8	2.9	10.1	1.9	15.4	3	34.4	1.1	44.3	986.4
SMDH 00220	0	1	70	341.2	389.6	389.6	318.1	318.1	71.5	23.1	117.3	84.3		48.4	74.1	146.3	17.4	58.3	11.2	2	8.8	1.3	7.3	1.8	4.8	0.9	5.9	1.1	22.1	1.5	25.7	493.4
SMDH 00220	1	2	45	108.3	217.9	145.9	165.8	93.8	52.1	14.5	68.6	33.3	72	37.6	15	38.8	5.1	21.1	5.8	2.8	5.2	0.9	6.2	1.4	3		3		2.8	2.5	13.6	331.5
SMDH 00220	2	3	90	96.9	242.9	133.9	192.1	83.1	50.8	13.8	64.3	30.1	109	37	13.5	33.8	4.5	18.9	5.6	1.7	5.1	0.8	5.9	1.4	2.9		2.8		2.5	2.7	11.7	402.3
SMDH 00220b	0	1	50	521.4	561.5	561.5	502.6	502.6	58.9	18.8	137.1	122.1		40.1	121.5	241.6	26.6	87.5	14.6	1.5	9.3	1.3	6.7	1.5	3.7	0.6	4.4	0.6	46.2	2.7	18.6	689.9
SMDH 00220b	1	2	55	345.4	368.6	368.6	335.1	335.1	33.5	10.3	88.8	82.4		23.2	81.3	158.7	18	59.5	10.1	1.2	6.3	0.7	4.2	0.9	1.9		2.6		30.6	2.1	21.5	506.4
SMDH 00220b	2	3	70	435.7	472.3	472.3	420.3	420.3	52	15.4	125.1	110		36.6	98.5	195.2	23	79.3	14.3	1.5	8.5	1.2	6.5	1.1	3.3		3.3		39.1	3.7	25.7	517.4
SMDH 00220b	3	4	85	439.9	466.3	466.3	428.8	428.8	37.5	11.1	108	103		26.4	100.6	207.7	23	73.5	13.5	1.6	8.9	1.2	5.3	0.9	1.9		1.8		39.4	3.4	24.3	520.7
SMDH 00220b	4	5	85	427.4	479.7	479.7	404.6	404.6	75.1	22.8	135.3	102.8		52.3	93	192.6	21.4	72.3	13.9	1.6	9.8	1.3	7.8	1.8	4.8	0.8	5.7	0.6	36.2	3.4	24.3	472.4
SMDH 00220b	5	6	70	496.5	544.4	544.4	474.5	474.5	69.9	22	146.4	122.2		47.9	109.4	224.7	25.7	86.3	16.1	2	10.3	1.6	8.6	1.8	4.1	0.6	4.7	0.6	45.7	4.1	30	686.3
SMDH 00220b	6	7	75	350.8	384.5	384.5	335	335	49.5	15.8	102.4	85.3		33.7	78	158.6	18	61.8	11.1	1.4	6.1	0.8	4.7	1.3	3.4	0.6	4.4	0.6	31.2	2.1	24.3	522.6
SMDH 00220b	7	8	75	441.6	477.3	477.3	425.8	425.8	51.5	15.8	119.4	104.5		35.7	99.9	203.8	22.5	74.6	14.3	1.7	9	1.1	6.3	1	3.2	0.6	3.6		39	2.2	21.5	490.2
SMDH 00220b	8	9	70	448.3	484.5	484.5	431.7	431.7	52.8	16.6	121	105.2		36.2	104	207.5	22.5	74.6	12.6	2.1	8.4	1.2	6.9	1.3	2.6	0.6	3.4	0.6	37.1	2.2	67.2	437
SMDH 00221	0	1	35	577	607.6	607.6	563.2	563.2	44.4	13.8	145.2	143.1		30.6	132.1	267.3	30.1	105	16	1.6	11.1	1.2	6.8	1.1	2.2		2.5		57.4	3.1	15.7	809.4
SMDH 00221	1	2	50	638	675.7	675.7	621	621	54.7	17	171.4	165.2		37.7	140.6	289.2	33.6	122.5	20.4	2.1	12.6	1.5	7.6	1.3	3	0.6	3		61.3	3.7	22.9	998.2
SMDH 00221	2	3	90	222.1	246.1	246.1	211.8	211.8	34.3	10.3	70.8	55.3		24	49.7	97.3	10.8	38.5	7.3	2.3	5.9	0.8	5.2	0.8	1.5		2		10.2	1.1	54.4	1097.5
SMDH 00221	3	4	90	319	401.3	337.3	375.5	311.5	25.8	7.5	77.1	70.9	64	18.3	79.9	149.3	15	51.3	7.8	2.9	5.3	0.7	3.9	0.6	1		1.3		14.1	0.7	61.5	732
SMDH 00221	4	5	90	207	228.3	228.3	198.2	198.2	30.1	8.8	63.1	49.3		21.3	52.5	89.1	10	33.8	5.5	2.5	4.8	0.8	4.7	0.7	1.3		1.3		6.4	0.6	60.1	950.8
SMDH 00221	5	6	85	200.1	292.5	231.5	249.1	188.1	43.4	12	74.5	50	61	31.4	44.7	84	9.7	32.7	7.5	2.8	6.7	1.2	6.4	1	1.8		1.6		2.3	0.7	70.1	941.4
SMDH 00221	6	7	95	222	272.8	272.8	200.9	200.9	71.9	21.1	102.2	58.9		50.8	43.9	89.4	10	39.7	8.7	2.5	6.7	1.2	8	1.6	4.1	0.8	4.7	0.7	6.7	1.3	57.2	902.7
SMDH 00221	7	8	35	491.8	528.6	528.6	477.1	477.1	51.5	14.7	130.9	117.7		36.8	113.9	224.4	26	82.8	16.4	2.4	11.2	1.4	7.5	1.3	2.6		1.9		31.1	1.5	37.2	731.2
SMDH 00221	8	9	90	430.1	462.2	462.2	415.9	415.9	46.3	14.2	120.7	109.1		32.1	94.8	193.7	22.6	78.1	15	2.1	9.6	1.3	7.1	1.3	2.3		2.2		28.1	1.9	30	564.1
SMDH 00017	0	1	40	345.9	366.7	366.7	338	338	28.7	7.9	85.3	79.7		20.8	82.6	159.9	18.2	57.2	10.6	3	6.5	0.7	3.6	0.6	1.5		1.5		21.4	1.1	15.7	141.3
SMDH 00017	1	2	48	125.5	132.2	132.2	124.2	124.2	8	1.3	31.1	28.8		6.7	31	57.9	6.5	21	3.6	2.1	2.1		1.3						8.9		14.3	143.9
SMDH 00017	2	3	40	222.4	228.7	228.7	220.1	220.1	8.6	2.3	48.9	51.3		6.3	53.5	104	11.2	38.5	7.1	2.5	3.3		1.6		0.7				20.3	0.6	11.4	92.7
SMDH 00017	3	4	70	272.3	280.9	280.9	268.9	268.9	12	3.4	60.7	64.9		8.6	64.2	126.8	15	47.8	8.2	2.2	4.7		2.1		0.7		0.6		24.8	0.9	11.4	164.8
SMDH 00017	4	5	65	428.6	452.6	452.6	417.9	417.9	34.7	10.7	108	103.8		24	99.3	197.3	22.5	75.8	12.8	2.7	7.5	0.8	4.7	0.8	1.9		2.5		36.6	1.7	17.2	387.7
SMDH 00017	5	6	90	316.4	327.7	327.7	311	311	16.7	5.4	70.3	73.3		11.3	64.6	161	15.9	53.7	8.2	1.6	6	0.6	3.1		1		0.7		24.6	1.1	17.2	376.9
SMDH 00017	6	7	75	377.5	415.1	415.1	359	359	56.1	18.5	112.2	90.7		37.6	72.4	183.6	18.1	64.2	10.6	2	8.1	1.1	7.3	1.5	3.9	0.6	3.5	0.6	27.5	1.7	22.9	346.6
SMDH 00017	7	8	95	337.3	372.7	372.7	321	321	51.7	16.3	102.5	81.5		35.4	63.9	162.4	16.4	57.2	10.9	2	8.2	1.1	6.8	1.3	3.2	0.6	3.3		23.9	1.5	42.9	429.4
SMDH 00017	8	9	80	310.3	335.8	335.8	297.7	297.7	38.1	12.6	89	77.5		25.5	59.2	149	15.6	54.8	9.7	1.6	7.8	0.9	6.2	1	2.1		2.4		21.8	1.5	22.9	374.7
SMDH 00017	9	10	60	535.8	572.8	572.8	517.8	517.8	55	18	133.6	119.6		37	111.7	268.5	25.5	85.1	13.8	2.5	10.7	1.5	7.5	1.4	3.7	0.6	3.3		24	1.5	38.6	385.7
SMDH 00016b	0	1	35	348.9	380.4	380.4	334.8	334.8	45.6	14.1	99	82.5		31.5	63.9	174.4	16.6	58.3	11	1.6	9	1.2	6.4	1.1	2.9		2.5		24.5	1.5	17.2	336.1
SMDH 00016b	1	2	40	265.5	282.1	282.1	257.9	257.9	24.2	7.6	69.9	65.1		16.6	54.3	126.6	13.7	46.7	8.6	1.9	6.1	0.8	3.9	0.6	1.3		1		17.9	0.8	14.3	307.8
SMDH 00016b	2	3	75	407	415.1	415.1	403.2	403.2	11.9	3.8	81.8	92		8.1	83.9	210.9	20.2	68.8	10.6	1.9	6.9	0.6	2.4		0.8				32.8	0.9	14.3	243.5
SMDH 00016b	3	4	85	430.4	439.2	439.2	427	427	12.2	3.4	89.5	101.1		8.8	101.8	205.1	22.6	75.8	12.2	2.2	7.3	0.6	2.1		0.7				40.1	1.4	15.7	282.2
SMDH 00016b	4	5	65	289.3	297.7	297.7	287	287	10.7	2.3	63.8	68.8		8.4	69.7	135.1	15.8	51.3	8.2	2.4	4.5		1.7				0.6		25.7	0.7	12.9	103.5
SMDH 00016b	5	6	60	382.4	407.4	407.4	372.3	372.3	35.1	10.1	99	91.9		25	86.9	177.3	19.9	66.5	11.9	2	7.8	1.1	4.4	0.8	2.1		1.7		32.4	1.9	24.3	362.6
SMDH 00016b	6	7	90	520	545.3	545.3	508.8	508.8	36.5	11.2	127.8	129		25.3	117.4	240.6	28.2	94.5	16.1	1.7	10.3	1.1	5.2	0.8	2.1		2		48.9	2.6	20	421.6
SMDH 00016b	7	8	90	562.5	589.9	589.9	550.1	550.1	39.8	12.4	137.3	138.1		27.4	127.4	259.9	30.1	101.5	17.9	1.9	11.4	1.1	5.4	0.9	2.3		2.7		52.9	2.9	22.9	525.7
SMDH 00016b	8	9	98	479	502.1	502.1	468.6	468.6	33.5	10.4	117.8	118.4		23.1	109	221.7	25.1	87.5	14.8	1.4	9.1	0.9	4.9	0.8	1.9		1.9		45.5	2.6	21.5	462
SMDH 00016b	9	10	75	213.8	250	250	200	200	50	13.8	80.9	54.5		36.2	44.6	93.4	11.2	36.2	7	1.4	6.2	0.9	6.2	1.1	2.9		2.7		12.5	1.2	27.2	358.4
SMDH 00016b	10	11	90	207.7	243.1	243.1	193.5	193.5	49.6	14.2	44.7	21.1		35.4	55.7	107	13.5		8.5	1.7	7.1	1.1	6.5	1.3	2.6		2.7		18.5	1.1	37.2	444.4
SMDH 00016b	11	12	85	229	253.6	253.6	219	219	34.6	10	31.9	21.1		24.6	62.2	123.3	15.5		10.3	1.7	6	0.8	4.8	0.9	1.8		1.7		25.1	1.3	22.9	369.2
SMDH 00016b	12	13	85	238.9	260.6	260.6	229.8	229.8	30.8	9.1	28.2	20.7		21.7	67.1	130.3	15.6		9.5	1.4	5.9	0.7	4.4	0.7	1.6		1.7		28.8	1.4	27.2	445.8
SMDH 00016	0	1	5	393.9	408.9	408.9	387.4	387.4	21.5	6.5	20.2	26.3		15	118.1	227.4	22.4		11.4	1.3	6.8	0.7	3.2	0.6	0.9		1.1		32.3	2	42.9	302.7
SMDH 00016	1	2	50	324.8	352.7	352.7	314.5	314.5	38.2	10.3	34.7	20.4		27.9	152.6	132.9	15.1		7.3	1.5	5.1	1.2	4.1	0.9	2.1		2		23.8	2.9	32.9	427.5

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00016	2	3	40	156.7	181.5	181.5	148.6	148.6	32.9	8.1	30.7	14.8		24.8	47.9	77.1	10.3		7.2	1.4	4.7	0.7	3.8	0.7	1.5		1.4		14.9	2.7	37.2	493.7
SMDH 00016	3	4	70	156.9	174.9	174.9	150	150	24.9	6.9	22.8	13.7		18	43.9	84.4	9.8		6.7	0.9	4.3	0.7	3.2	0.6	1.1		1.3		15.7	4	40.1	431.4
SMDH 00016	4	5	55	302.1	389.9	389.9	265.4	265.4	124.5	36.7	103	31		87.8	75.8	152.8	17.3		10.2	1.5	7.8	1.5	12.2	3	8.2	1.5	9.3	1	25.1	3.9	35.8	632.7
SMDH 00016	5	6	90	649.7	733.5	733.5	610.4	610.4	123.1	39.3	102.5	53.3		83.8	182.8	354.3	38.1		19.4	3.5	12.3	1.8	13.4	2.9	8.5	1.5	9.9	1.3	43.7	1.5	47.2	946.6
SMDH 00016	6	7	80	424.2	523.1	523.1	378.9	378.9	144.2	45.3	118.2	40.8		98.9	110.6	218.7	24.2		12.8	2.7	9.9	1.8	14.8	3.4	10.5	1.8	11.5	1.5	26.4	1.4	40.1	859.2
SMDH 00016	7	8	55	469.1	534.4	534.4	442	442	92.4	27.1	79.4	38.3		65.3	133.5	254.4	27.3		13.9	3.1	9.8	1.5	9.5	2.2	6.1	1	5.9	0.9	24.5	1.3	67.2	1000.5
SMDH 00016	8	9	65	323.4	424.2	424.2	281.8	281.8	142.4	41.6	119.1	32.6		100.8	82.4	163.5	16.6		8.8	2.3	8.2	1.5	14.5	3.3	9.4	1.5	10	1.4	17.4	1.5	34.3	887.7
SMDH 00015b	0	1	40	532.5	576.8	576.8	513.2	513.2	63.6	19.3	56.3	40.3		44.3	159.4	293.2	31.3		16.4	3	9.9	1.3	7.7	1.5	4.1	0.7	4		33.1	2.1	47.2	442.7
SMDH 00015b	1	2	30	342.2	363.3	363.3	332.5	332.5	30.8	9.7	27.8	26.6		21.1	86.3	204.2	21.3		11.8	1.4	7.5	0.9	4.4	0.7	1.7		2		47.1	2	21.5	238.6
SMDH 00015b	2	3	70	296.8	326.8	326.8	284.9	284.9	41.9	11.9	37.8	24		30	80.3	166	18.2		11.7	2	6.7	0.8	5	1	2.5		2.6		31.3	1.9	27.2	337.3
SMDH 00015b	3	4	65	238	247.7	247.7	234.6	234.6	13.1	3.4	58.3	60.6		9.7	52.5	109.6	13.4	45.5	7	1.4	5.2		1.7		0.8		0.9		21.2	0.9	22.9	374.4
SMDH 00015b	4	5	45	287.7	297.7	297.7	283.8	283.8	13.9	3.9	70.8	75.5		10	60.8	132.9	16.4	56	8.9	1.7	7.1	0.7	2.4		0.8				25.6	1.3	17.2	305.6
SMDH 00015b	5	6	85	271.4	299.2	299.2	260.2	260.2	39	11.2	88.2	73.8		27.8	54.8	119.2	14.7	53.7	9.4	1.3	7.1	0.8	4.6	0.9	2.5		2.4		24.2	1.9	21.5	299.3
SMDH 00015b	6	7	75	376.6	420.3	420.3	356.9	356.9	63.4	19.7	126.5	101.2		43.7	75.5	163.3	19.7	72.3	14.1	1.3	10.7	1.5	7.7	1.4	4.1	0.6	3.8	0.6	34	3.1	34.3	448.7
SMDH 00015b	7	8	70	353.4	410.8	410.8	329.5	329.5	81.3	23.9	132.9	92		57.4	70.7	152.8	17.9	64.2	12.8	1.4	9.7	1.4	8.5	1.8	5.6	0.9	5	0.7	32.2	2.7	28.6	418.2
SMDH 00015b	8	9	70	309.9	352.2	352.2	290.6	290.6	61.6	19.3	109.9	82.9		42.3	61.9	133.8	16.3	58.3	10.7	1	8.6	1.2	7.1	1.5	4.3	0.7	3.9	0.6	27.5	1.7	22.9	397.8
SMDH 00015b	9	10	90	346	384.6	384.6	327.8	327.8	56.8	18.2	117.3	95.9		38.6	68.5	148.9	18.5	68.8	12.5	1.3	9.3	1.3	7.3	1.4	4	0.7	3.5		32.7	1.9	22.9	369.4
SMDH 00015b	10	11	80	282.3	311.9	311.9	268.7	268.7	43.2	13.6	88.4	72.5		29.6	60.3	125.3	14.9	51.3	9	1.2	6.7	0.9	5.4	1	3		3.3		21.2	1.7	21.5	333.9
SMDH 00015b	11	12	95	403	434.5	434.5	389.2	389.2	45.3	13.8	116.8	104.9		31.5	85.4	180.9	21.3	77	13.7	1.7	9.2	1.2	5.4	1.1	3		3.1		30.7	1.5	24.3	274.2
SMDH 00015b	12	13	60	314.8	327.5	327.5	309.6	309.6	17.9	5.2	79.3	82.6		12.7	68.1	144.5	17.5	61.8	9.6	1.5	6.6	0.7	2.6		1.1		0.8		28.4	1.4	22.9	473.6
SMDH 00015b	13	14	50	251.7	257.3	257.3	249.5	249.5	7.8	2.2	58.8	65.6		5.6	56.4	116.5	13.8	50.2	6.4	1.4	4.8		1.6		0.6				20.3	0.7	21.5	512
SMDH 00015b	14	15	55	148.6	153	153	147.6	147.6	5.4	1	34.6	37.7		4.4	33.8	68.7	8.7	28	4.1	1.2	3.1		1						12.7	0.6	15.7	514.8
SMDH 00015	0	1	25	357.8	404.1	384.1	367.8	347.8	36.3	10	96.5	88	20	26.3	75.6	169.2	19.1	63.7	11.4	1.3	7.5	0.8	4.4	0.9	1.9		2		32.1	4	10.7	594.6
SMDH 00015	1	2	65	709	748.2	748.2	689	689	59.2	20	168.6	163.2		39.2	175.5	327.2	36.5	117.8	17.3	2.7	12	1.4	7.5	1.5	4	0.7	4.2	0.7	30.3	2.5	50.1	276.9
SMDH 00015	2	3	75	427.1	462.8	462.8	409	409	53.8	18.1	118.5	102.3		35.7	99.1	191.8	21.6	73.5	11.8	2.1	9.1	1.3	5.9	1.4	4	0.7	4.1	0.7	24.4	2	28.6	316.8
SMDH 00015	3	4	50	258.4	277.3	277.3	249.8	249.8	27.5	8.6	76	68.2		18.9	54.5	113.6	13.4	50.2	9.2	2.3	6.6	0.8	3.8	0.6	1.7		1.7		21.8	1.4	14.3	246.8
SMDH 00015	4	5	65	324.3	378.1	378.1	302.2	302.2	75.9	22.1	121.5	83.4		53.8	65.7	141.5	16.6	56	11.1	0.9	10.4	1.5	9.3	1.8	4.3	0.7	3.9	0.6	25.1	3.2	27.2	339.6
SMDH 00015	5	6	90	226.7	251.2	251.2	216.2	216.2	35	10.5	72.5	59.3		24.5	47.6	99.7	12.1	42	7.5	0.8	6.5	0.8	4.4	0.9	2.5		1.9		19.3	2.2	22.9	232.7
SMDH 00015	6	7	45	328	361.9	361.9	313	313	48.9	15	104	86.6		33.9	68.3	145.8	17.4	61.8	10.4	0.9	8.4	1.2	6.2	1.3	3.2		3.1		28.7	2.6	22.9	337.6
SMDH 00015	7	8	75	131.6	147.3	147.3	125.8	125.8	21.5	5.8	43	34.3		15.7	27.4	58	7	24.5	5		3.9		2.8	0.6	1.4		1		11	0.9	10	188.4
SMDH 00015	8	9	45	101.8	116.3	116.3	96.6	96.6	19.7	5.2	36.7	27.4		14.5	21.3	43.6	5.2	19.8	3.8		2.9		2.4		1.7		1.1		7.2	0.8	10	194.4
SMDH 00015	9	10	50	222.3	259.8	259.8	208.9	208.9	50.9	13.4	83.2	56		37.5	49	96.4	11.2	38.5	7.1	0.9	5.8	0.9	5.4	1.3	3.3		2.5		15.9	1.9	20	292.6
SMDH 00015	10	11	60	236.8	271.3	271.3	224.5	224.5	46.8	12.3	84.4	60.7		34.5	51.1	103.3	12.2	42	7.9	1.4	6.6	0.9	5.6	1.1	2.7		2		19.6	2.9	22.9	307
SMDH 00015	11	12	90	242.6	271.6	271.6	231.1	231.1	40.5	11.5	79	61.3		29	52.8	107.7	12.3	43.2	7.9	1	6.2	0.9	4.9	1	2.5		2.2		20.5	2.6	21.5	344
SMDH 00015	12	13	60	282.5	330.9	330.9	261.5	261.5	69.4	21	107.3	71.8		48.4	57.7	121.9	13.9	49	10	1	8	1.2	7.7	1.5	4.6	0.7	4.6	0.7	24.2	2.8	18.6	279.1
SMDH 00014b	0	1	50	284.4	303.4	303.4	275.8	275.8	27.6	8.6	81.8	77.1		19	60.6	125.3	15.2	57.2	9.3	0.9	7.3	0.8	3.9	0.6	1.8		1.5		31.5	2.1	11.4	333.6
SMDH 00014b	1	2	50	317.8	334.4	334.4	310.2	310.2	24.2	7.6	80.4	78.4		16.6	73.4	143.1	16.6	57.2	11	2	6.9	0.8	3.8	0.6	1.3		1.1		24.6	2.1	31.5	291
SMDH 00014b	2	3	65	286.7	298.1	298.1	281.9	281.9	16.2	4.8	71.4	73.1		11.4	63.8	130.7	15	54.8	9.7	1.9	6	0.7	2.6		0.9		0.6		25.6	1.7	10	159.4
SMDH 00014b	3	4	80	159.7	166.6	166.6	157.4	157.4	9.2	2.3	40.1	40.8		6.9	36.1	73.1	8.8	30.3	4.3	1.2	3.6		1.7		0.6				13.1	0.8	5.7	79
SMDH 00014b	4	5	60	311.6	321.8	321.8	308	308	13.8	3.6	76.2	82.6		10.2	69.4	140.3	17.9	61.8	9.7	1.3	7.6	0.6	2.3		0.7				28.2	1.4	7.2	121.8
SMDH 00014b	5	6	95	414.4	426.8	426.8	408.6	408.6	18.2	5.8	99.7	108.8		12.4	89.7	188.4	23	81.6	14.8	1.5	9.6	0.9	3.3	0.6	1				41.9	2.1	8.6	225.6
SMDH 00014b	6	7	80	813.2	834.4	834.4	800.9	800.9	33.5	12.3	193.6	216		21.2	175.7	370.5	46	161	26.1	2.4	19.2	2	7	0.9	1.7		0.7		81.7	3.2	15.7	248.7
SMDH 00014b	7	8	70	710	733.7	733.7	698.6	698.6	35.1	11.4	173	186.4		23.7	152.1	323.9	39.4	138.8	24.7	2.3	17.4	1.9	6.3	0.8	1.5		0.9		71.2	3.3	11.4	372.6
SMDH 00014b	8	9	75	439.5	455	455	431.7	431.7	23.3	7.8	107.3	113.9		15.5	94.9	202.2	23.8	85.1	13.7	1.7	10.3	1.1	3.9	0.6	1.4		0.8		39.9	1.7	10	169.9
SMDH 00014b	9	10	60	379.3	391.2	391.2	373.7	373.7	17.5	5.6	89.4	96.2		11.9	84.1	174.8	20.9	71.2	11.7	2.2	8.8	0.8	3.3		0.9		0.6		32.5	1.8	8.6	165.1
SMDH 00014b	10	11	60	396.2	409.2	409.2	390.2	390.2	19	6	96.1	102.7		13	86.7	181.9	21.5	77	12.3	1.9	8.9	0.9	3.3		1.1		0.7		35.6	2.2	8.6	147.6
SMDH 00014bt	0	1	60	344.7	360.6	360.6	337.3	337.3	23.3	7.4	86.8	88.3		15.9	72.1	160.8	18.6	65.3	11.6	1.2	7.7	0.8	3.6	0.6	1.4		1		31.5	2	10	326.9
SMDH 00014bt	1	2	50	374.9	388.5	388.5	369.3	369.3	19.2	5.6	91.9	96.8		13.6	83.4	171.1	20.5	72.3	11.5	2	8.5	0.8	3.2		1		0.6		31.5	1.4	8.6	155.7
SMDH 00014bt	2	3	50	367.6	377.6	377.6	363.4	363.4	14.2	4.2	82.1	89.7		10	87	171.6	19.8	66.5	9.4	2.2	6.9	0.8	2.6		0.8				27.4	1.5	27.2	121.4
SMDH 00014bt	3	4	70	475.9	488.6	488.6	468	468	20.6	7.9	101.6	106.3		12.7	102.6	236.3	20.5	80.5	14.6	3.1	10.4	1.2	4.1	0.6	1.4		0.6		43.7	2.1	11.4	174.7
SMDH 00014bt	4	5	40	546.1	562.1	562.1	538.7	538.7	23.4	7.4	125.5	132.5		16	122.1	257	25.7	101.5	18.3	2.7	11.4	1.3	4	0.6	0.9		0.6		44.4	2.6	11.4	219.6
SMDH 00014bt	5	6	80	509.6	525.1	525.1	502.9	502.9	22.2	6.7	109.2	115.5		15.5	117.2	245.9	24.2	86.3	16.2	2.4	10.7	1.1	3.9	0.6	1.1				38.3	2.4	12.9	174.1
SMDH 00014bt	6	7	65	553	569.4	569.4	545	545	24.4	8	121.7	128.1		16.4	126.2	263.4	25.6	96.8	17.9	2.8	12.3	1.2	4.5	0.6	1.1		0.6		43.6	2	10	117.8
SMDH 00014bt	7	8	80	562.7	580.5	580.5	554.4	554.4	26.1	8.3	130.1	136.4		17.8	127.1	264.2	26.8	103.8	18.3	2.7	11.5	1.3	4.5	0.6	1.3		0.6		43	3.3	12.9	173.8
SMDH 00014bt	8	9	80	536.2	553.6	553.6	527.8	527.8	25.8	8.4	120	125.2		17.4	120.2	257.2	24.9	94.5	17.4	2.3	11.3	1.2	4.6	0.6	1.1		0.9		47.2	5	111.6	194.4
SMDH 00014bt	9	10	70	374.6	391.9	391.9	367.6	367.6	24.3	7	94.6	85.2		17.3	86.4	182.5	10.4	71.2	6.3	2.5	8.3		3.6	0.6	1.5		1.3		28.9	3.4	47.2	197.9
SMDH 00014bt	10	11	85	189.6	198.5	198.5	186.5	186.5	12	3.1	45.8	44.8		8.9	44.3	86.2	10.4	32.7	6.3	2.5	4.1		1.7		0.7		0.7		16.6	1.7	64.4	154.4

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00014	0	1	35	413.8	440.7	440.7	401.1	401.1	39.6	12.7	108.1	101.2		26.9	94.1	187.6	21.9	73.5	14.3	1.9	7.8	0.8	5	0.9	2.6		2.8	0.6	31.6	2.8	40.1	443.6
SMDH 00014	1	2	80	295.2	325.4	307.4	308	290	17.4	5.2	70	72.5	18	12.2	67.2	136.6	16.1	53.1	9.5	1.4	6.1	0.7	2.6		1.1		0.8		25.5	2.6	25.2	360.8
SMDH 00014	2	3	80	1616.4	1642.9	1642.9	1603.1	1603.1	39.8	13.3	271.9	317.8		26.5	461.3	774.9	79.1	230.9	33.9	6.7	16.3	1.4	6.4	1	2.3		2.2		29.5	1.5	42.9	308.4
SMDH 00014	3	4	85	237.1	246.6	246.6	232.9	232.9	13.7	4.2	57.2	59.7		9.5	53.5	108.7	13	44.3	7.3	1	5.1		2.4		0.8		1		19.1	2	24.3	534.4
SMDH 00014	4	5	80	312.2	324.5	324.5	306.5	306.5	18	5.7	72.6	74.4		12.3	72.4	145.6	15.7	54.8	10.1	1.6	6.3	0.7	3.2		1		0.8		25	2	32.9	459.1
SMDH 00014	5	6	95	408.2	427.6	427.6	399.3	399.3	28.3	8.9	98.9	99.9		19.4	91.2	188.4	22.1	72.3	15	1.7	8.6	0.9	4.6	0.7	1.6		1.1		34.8	2.7	28.6	489.1
SMDH 00014	6	7	90	327.1	352.1	352.1	316.4	316.4	35.7	10.7	90.3	81.1		25	72.5	148.4	17.4	58.3	11.2	1.6	7	0.9	4.5	0.8	2.3		2.2		27	2	24.3	464
SMDH 00014	7	8	95	346.4	381.2	381.2	330.8	330.8	50.4	15.6	100.4	81.3		34.8	77.6	158.7	17.6	57.2	10.2	1.9	7.6	0.9	5.6	1.1	3.2	0.6	3.6	0.6	23.4	1.8	75.8	434.8
SMDH 00014	8	9	95	376.9	420.7	420.7	357	357	63.7	19.9	116.8	90.5		43.8	84.4	167.3	19.6	63	11.4	2.1	9.2	1.1	6.8	1.4	4.2	0.7	5	0.7	27.1	2.6	42.9	521.5
SMDH 00013b	0	1	50	456.7	484	484	444.7	444.7	39.3	12	117.6	112.6		27.3	99.7	213	24	81.6	14.6	1.7	10.1	1.1	5.9	0.9	2.1		2		39.5	3.1	25.7	491.2
SMDH 00013b	1	2	65	433.3	453.2	453.2	424.4	424.4	28.8	8.9	106.1	107.5		19.9	97.7	199.7	23	79.3	14.6	1.7	8.4	1.1	4.1	0.7	1.5		1.5		35.6	3.7	12.9	582.1
SMDH 00013b	2	3	70	234.3	253	253	226.3	226.3	26.7	8	66	58.5		18.7	54.7	104.7	12.1	42	7.4	0.9	4.5	0.6	3.8	0.6	1.5		1.5		19.2	1.9	15.7	334.2
SMDH 00013b	3	4	90	177.6	191.8	191.8	172.6	172.6	19.2	5	46.9	41.1		14.2	40.3	83.3	9.4	29.2	5.6	1	3.8		2.5		1.1		1.4		13.9	1.4	18.6	415.4
SMDH 00013b	4	5	85	415.1	428.4	428.4	410.6	410.6	17.8	4.5	80	84.1		13.3	112.8	200.5	19.9	61.8	8.1	2.5	5		2.4		1.1		1		13.7	1.4	57.2	773.5
SMDH 00013b	5	6	95	131.4	148.5	148.5	124.7	124.7	23.8	6.7	45	32.5		17.1	28.4	57.4	6.2	23.3	4.8	1.6	3		3	0.7	1.5		1.5		8.2	1.1	32.9	548
SMDH 00013b	6	7	70	233.3	261.5	261.5	221.7	221.7	39.8	11.6	77.1	58.7		28.2	49	104.9	11.5	40.8	7.9	1.7	5.9	0.8	5.6	1	2.4		1.8		18.9	1.5	74.4	387.7
SMDH 00013b	7	8	98	100.9	115.1	115.1	96.2	96.2	18.9	4.7	34.5	23.7		14.2	22.5	43.6	5.3	16.3	3.7	1.9	2.9		2.1		1.3		1.3		6.1	1.1	32.9	641
SMDH 00013b	8	9	85	219.5	269.9	269.9	196.2	196.2	73.7	23.3	96.1	53.9		50.4	45	89.3	10.3	35	8	2.1	6.5	1.1	7.5	1.7	4.9	1	6.3	0.8	11.7	1.7	50.1	472.2
SMDH 00013b	9	10	85	207.4	258.6	258.6	184.7	184.7	73.9	22.7	94.2	50.9		51.2	42.2	85.9	9.5	32.7	7.2	1.6	5.6	1.1	7.6	1.7	4.8	1	5.7	0.8	11.2	1.8	38.6	221.4
SMDH 00013b	10	11	95	302.3	354.4	354.4	279.1	279.1	75.3	23.2	118	77.7		52.1	64.3	125.9	13.9	53.7	10.3	2.1	8.9	1.3	8.8	1.7	4.7	0.9	5.1	0.7	18.2	1.9	35.8	232.7
SMDH 00034	0	1	45	540.9	555.6	555.6	533.7	533.7	21.9	7.2	117.7	128.2		14.7	128.3	255.3	27.9	95.6	14.8	2.7	9.1	0.8	3.9	0.6	1		0.9		46.1	1.5	28.6	187.8
SMDH 00034	1	2	40	1144.7	1162	1162	1134.7	1134.7	27.3	10	191.8	221.1		17.3	266.1	615.1	51	163.3	22	4.4	12.8	1.3	5.5	0.7	1.7		0.8		48.9	1.1	55.8	127.7
SMDH 00034	2	3	90	481.4	497.5	497.5	474.2	474.2	23.3	7.2	98.7	104.1		16.1	102.4	251.9	23.1	77	10.8	1.6	7.4	0.7	3.3	0.6	1.5		1.1		36.3	1.1	15.7	355.4
SMDH 00034	3	4	90	422.8	434	434	418.3	418.3	15.7	4.5	85.6	93.6		11.2	88.7	221	20.5	70	9.9	1.3	6.9	0.6	2.5		0.8		0.6		32.5	1.3	17.2	549.9
SMDH 00034	4	5	90	399.7	433.4	433.4	383.4	383.4	50	16.3	107.9	92.1		33.7	78.1	198.6	19.2	66.5	11.4	1.3	8.3	1.1	5.3	1.3	3.9	0.7	4		27.9	1.4	21.5	524.8
SMDH 00034	5	6	95	555.8	569.4	569.4	549.9	549.9	19.5	5.9	108.8	119.4		13.6	120.3	291	25.9	89.8	12.8	1.7	8.4	0.8	2.9		1.3		0.9		40.9	1.2	21.5	341.1
SMDH 00034	6	7	90	402	410.9	410.9	398.4	398.4	12.5	3.6	77.8	85.9		8.9	84.7	211.7	18.7	64.2	10.6	1.7	6.8	0.6	2.4		0.6				32.8	0.9	12.9	261.1
SMDH 00034	7	8	85	459.3	467.8	467.8	455.4	455.4	12.4	3.9	90.6	102.7		8.5	95	241	22.6	77	10.9	2	6.9	0.7	2.4		0.8				37	0.8	12.9	264.5
SMDH 00033b	0	1	50	597	629.8	629.8	582.3	582.3	47.5	14.7	139.2	133.5		32.8	116.6	308.6	28.5	96.8	16.9	1.4	13.5	1.4	6.8	1	2.9		2.6		51	2.9	28.6	609.2
SMDH 00033b	1	2	30	220.1	245	230	231.3	216.3	13.7	3.8	51.8	51.8	15	9.9	50.9	103.7	11.5	38.5	6.4	1.6	3.7		1.8		0.9		1.1		19.5	1.8	12.3	543.6
SMDH 00033b	2	3	85	163.4	169.5	169.5	162	162	7.5	1.4	36.6	36.3		6.1	40.3	78.1	8.1	26.8	3.9	2.3	2.5		1.4						14.5	0.6	17.2	363.4
SMDH 00033b	3	4	80	124.7	129.5	129.5	123.7	123.7	5.8	1	28.4	29		4.8	30.1	58.3	7	21	3.6	1.6	2.1		1						10.6	0.6	11.4	370.7
SMDH 00033b	4	5	90	156.3	161.3	161.3	155.3	155.3	6	1	34.9	35.7		5	38.2	73.7	7.9	26.8	4.2	2.1	2.4		1						13.1	0.6	17.2	312.4
SMDH 00033b	5	6	95	134.4	138.5	138.5	133.4	133.4	5.1	1	31.1	32.5		4.1	33.8	61.1	7	24.5	3.1	1.5	2.4		1						10	0.6	24.3	299.1
SMDH 00033b	6	7	65	399.6	427.7	427.7	387.3	387.3	40.4	12.3	106.7	97.4		28.1	88.7	184.8	21	70	12.2	2.2	8.4	1.1	5.3	1	2.6		2.3		36.3	2.8	27.2	344.5
SMDH 00033b	7	8	98	418.9	453.6	453.6	403.9	403.9	49.7	15	119.3	103.7		34.7	93.7	189.9	21	75.8	13.6	1.9	8	0.9	6	1.1	3.3	0.6	3.1		38.1	3.1	25.7	435.5
SMDH 00033b	8	9	98	383.5	429.2	429.2	363.5	363.5	65.7	20	123.2	95.4		45.7	82.6	170.1	19.6	66.5	14.4	1.7	8.6	1.3	8	1.5	4.2	0.6	4.4		34.3	3.2	27.2	432.4
SMDH 00033b	9	10	85	407.7	442.7	442.7	393	393	49.7	14.7	116.5	101.2		35	90.2	185.4	21.3	72.3	13.1	1.6	9.1	1.2	6.4	1.3	3.1		2.7		37.9	3.4	28.6	466.3
SMDH 00033b	10	11	98	345.5	374.3	374.3	334.1	334.1	40.2	11.4	97.9	85.3		28.8	74.5	160.1	17.5	61.8	10.7	1.3	8.2	1.1	4.9	0.9	2.6		1.9		32	2.9	25.7	415.8
SMDH 00033b	11	12	95	313.1	340.4	340.4	301.2	301.2	39.2	11.9	91.6	78.8		27.3	68.6	141.9	15.8	57.2	9	1.3	7.4	0.9	4.9	0.9	2.7		2.5		28.7	2.2	24.3	336.9
SMDH 00033b	12	13	98	465.8	512.8	512.8	445	445	67.8	20.8	134.8	108.7		47	104.8	215.6	22.8	77	12.2	1.9	10.7	1.3	7.6	1.6	4.5	0.7	4.4	0.7	36.2	3.4	34.3	549.6
SMDH 00033	0	1	45	542.8	571	571	530.2	530.2	40.8	12.6	139.3	138.1		28.2	120.6	247.6	28.3	102.6	17.2	1.3	12.6	1.3	5.9	0.8	2.4		2.2		49.6	2.1	14.3	460.5
SMDH 00033	1	2	45	957.9	1002	1002	937.4	937.4	64.6	20.5	203	201		44.1	250.2	458.1	45.9	144.6	20.3	3.8	14.5	1.9	8.6	1.6	4.2	0.7	3.5		31.9	2.1	78.7	405
SMDH 00033	2	3	80	701.6	742.1	742.1	683.4	683.4	58.7	18.2	155	144.2		40.5	184	336.3	32.5	102.6	14	2.8	11.2	1.4	7.7	1.4	3.8	0.6	3.3		19.7	1.8	71.5	307.7
SMDH 00033	3	4	55	293.6	340.7	340.7	272.6	272.6	68.1	21	107.8	72.9		47.1	61.1	127.3	13.7	49	10.3	1.5	9.7	1.5	8.7	1.5	4.5	0.6	4.2		15.1	1.8	37.2	301.9
SMDH 00033	4	5	85	325.2	375.9	375.9	303.7	303.7	72.2	21.5	120.2	84.8		50.7	67.7	139.8	16.8	57.2	11.1	1.5	9.6	1.5	9.3	1.6	3.9	0.6	4	0.6	23.1	2.5	27.2	438.7
SMDH 00033	5	6	50	421.1	449.8	449.8	408.8	408.8	41	12.3	109.9	100.5		28.7	100	192.7	21.7	72.3	12.1	2.4	7.6	1.1	5.4	1	2.1		2.7		27.9	1.4	24.3	290.8
SMDH 00033	6	7	45	393.1	406.1	406.1	388.1	388.1	18	5	90.1	95.7		13	91.6	183.9	21.3	71.2	11.1	2.7	6.3	0.6	2.6		1		0.8		37.1	0.7	8.6	106.8
SMDH 00033	7	8	40	310.1	328.9	328.9	302.4	302.4	26.5	7.7	77.6	73.5		18.8	74.1	141.5	16.8	52.5	9.3	2.1	6.1	0.6	3.6	0.7	1.4		1.4		26.3	0.9	20	243.5
SMDH 00033	8	9	45	267	288.7	288.7	258.3	258.3	30.4	8.7	75.1	65.4		21.7	60	120.6	14	46.7	9.2	2	5.8	0.7	4	0.8	1.6		1.6		21.4	0.9	20	310.3
SMDH 00033	9	9.5	60	275.4	288	288	270.8	270.8	17.2	4.6	66.6	66.4		12.6	63.2	128	14.4	49	9.2	2	5	0.6	2.4		0.8		0.8		26.3	0.6	11.4	133.7
SMDH 00032b	0	1	50	429	451	451	419.3	419.3	31.7	9.7	106.4	106.6		22	95.8	198.5	22.8	78.1	14.6	0.6	8.9	1.1	4.6	0.7	1.7		1.6		42.6	3.2	8.6	666.2
SMDH 00032b	1	2	45	489	510.3	510.3	478.9	478.9	31.4	10.1	114.1	117.5		21.3	106.4	234.6	25.5	86.3	14.4	0.8	10.9	1.3	4.4	0.8	2.1		1.5		47	2.9	17.2	373.2
SMDH 00032b	2	3	45	253.7	300.6	300.6	235.9	235.9	64.7	17.8	101.3	65.6		46.9	55.1	105.9	12.7	44.3	8.7	1.5	7.7	1.3	7.3	1.4	3.9	0.6	3.3		18.3	1.7	34.3	302.8
SMDH 00032	4	5	95	276.3	296.7	287.7	281.3	272.3	15.4	4	65.4	66.3	9	11.4	64.7	128.6	14.6	48.6	8.3	2.3	5.2	0.6	2.5		0.9				24.8	2.1	11.3	210.3
SMDH 00029b	2	3	50	299.6	335.9	318.9	308.6	291.6	27.3	8	79	74.8	17	19.3	65.7	137.5	16.1	53.9	10.8	1	6.6	0.8	4	0.7	1.6		0.9		29.8	3.5	11.2	376.2
SMDH 00029b	3	4	40	502	548.1	530.1	507.6	489.6	40.5	12.4	129	126.9	18	28.1	108.8	230.7	27.3	92.6	18.2	1.3	10.7	1.3	5.7	0.9	2.3		2.2		48.2	4.7	14.4	347.7

BHID	FROM	TO	Rec	TREO	TREO+Y+Sc	TREO+Y	LREO+Sc	LREO	HREO+Y	HREO	CREO	MagREO	Sc_2O_3	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	ThO_2	U_3O_8	Nb_2O_5	ZrO_2
units:			*%*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
SMDH 00028b	0	1	30	475	526.8	509.8	477	460	49.8	15	127.3	116.3	17	34.8	104.7	218.8	25.3	83.2	16.1	1.5	10.4	1.3	6.5	1.1	2.9		3.2		43	6	18.5	454.8
SMDH 00028b	8	8.5	20	83.6	121.7	106.7	90.1	75.1	31.6	8.5	44.1	23.4	15	23.1	15.1	32.7	4.1	14.8	3.8	1.7	2.9	0.6	3.9	0.7	1.8		1.5		3.4	1.3	8.6	108.5
SMDH 00027b	1	2	20	304	347.7	330.7	310.8	293.8	36.9	10.2	88.5	76.2	17	26.7	65.9	139.1	16.7	54.1	9.5	2.3	6.2	0.8	4.6	0.8	2.3		1.7		23.4	2.1	19.3	223.8
SMDH 00029	0	1	20	547.9	636.8	622.8	543.2	529.2	93.6	18.7	188.3	140.9	14	74.9	116.5	249.9	29.2	102.1	18.4	1.7	11.4	1.5	8.1	1.6	3.5	0.6	3.4		49.8	4.6	27.3	670.3
SMDH 00026b	11	11.5	50	414.2	476.1	456.1	423	403	53.1	11.2	123.2	102.2	20	41.9	90.9	191.6	22.1	74.2	14	1.2	9	1.1	4.8	0.9	1.9		2.5		37.8	3.7	15.2	729.6
SMDH 00023b	1	2	35	405.1	454.6	436.6	414.8	396.8	39.8	8.3	113.4	103.1	18	31.5	88.9	187.7	22.4	76	12.8	1.2	7.8	0.9	3.8	0.7	1.5		1.4		41.9	3.8	20.5	461.7
SMDH 00023b	6	7	80	527.7	577	557	540.4	520.4	36.6	7.3	139.8	137.7	20	29.3	120	239.9	28.8	103.6	16.8	1.6	9.7	1.1	4.2	0.7	1.3				46.4	3.8	25.2	483
SMDH 00022b	0	1	20	737.7	812.6	795.6	739.5	722.5	73.1	15.2	204.5	185.8	17	57.9	154.1	353.9	40.1	137.5	23.1	0.9	12.9	1.5	6.7	1.3	2.7		3		75.4	5	16	583
SMDH 00022	0	1	15	648.4	758.3	727.3	658.7	627.7	99.6	20.7	209.4	162.9	31	78.9	134.3	306.9	33.8	119.3	19.9	1.4	12.1	1.5	8.3	1.6	3.7	0.7	4.1	0.8	65.8	4.8	21.5	593.9
SMDH 00022	1	2	25	589.6	709.6	669.6	608.6	568.6	101	21	194.4	143.3	40	80	121.9	282.2	30.2	104	18.2	1.3	10.8	1.4	7.7	1.7	4	0.7	4.6	0.9	53.9	4	24.6	417.5
SMDH 00021	0	1	20	478.7	551.8	526.8	490.8	465.8	61	12.9	139.1	114	25	48.1	96.9	236.8	24.2	83.2	14.6	1.2	8.9	1.2	5.4	1.1	2.5		2.7		50.2	2.9	18.2	698.2
SMDH 00020	3	4	20	78.5	88.6	83.6	82.8	77.8	5.8	0.7	21.1	17.7	5	5.1	19.2	35.7	3.9	13.1	2.3	2.2	1.4		0.7						4.3	1.4	11.3	113.7
SMDH 00019b	0	1	5	510.1	543	534	509.1	500.1	33.9	10	109.7	108.6	9	23.9	90.3	282.5	23.7	79.5	14.6	0.9	8.6	0.9	4.5	0.9	2.2		1.5		46.5	4.8	12.4	335.8
SMDH 00019b	10	11	98	191.1	245.1	207.1	223.5	185.5	21.6	5.6	52.8	45.9	38	16	42.1	88.7	10.3	33.1	6.1	1.2	4		2.5		1.4		1.7		17.3	3.9	27.9	404.3
SMDH 00019	0	1	30	461.2	499.9	488.9	460.4	449.4	39.5	11.8	109.4	102.5	11	27.7	80.6	247.6	22.1	73.9	14.7	1.3	9.2	1.3	5.2	0.9	2.7		1.7		46.2	5	17.7	452.5
SMDH 00227	0	1	10	689.1	731.5	725.5	679.7	673.7	51.8	15.4	174.2	173.1	6	36.4	147.5	325.5	37	127.4	21.6	1.7	13	1.5	7.2	1.1	3		2.6		65.7	5.7	32.8	268
SMDH 00228	0	1	18	958.5	1031.6	1011.6	953.8	933.8	77.8	24.7	247.4	239.3	20	53.1	232.4	428.1	47.5	180.8	27.3	2.5	15.2	1.8	9.2	1.8	4.6	0.8	5.8	0.7	66.6	6	45.8	402.3
SMDH 00235	8	8.5	50	200	279.7	241.7	216.5	178.5	63.2	21.5	79.9	46.7	38	41.7	41.2	84.8	9.7	31.5	6.1	1.2	4	0.7	4.8	1.3	4.8	0.9	8	1	13.2	4.4	16.2	179
SMDH 00252	5	6	20	144.5	167.1	161.1	145.4	139.4	21.7	5.1	47.4	36	6	16.6	33.2	62.3	7.4	25.1	5.5	2.2	3.7	0.6	2.9	0.6	1				10.7	4.1	9.2	121.8
SMDH 00250	0	1	20	340.8	389.8	378.8	335.9	324.9	53.9	15.9	105.9	83.9	11	38	74.4	152.1	17.5	59.4	12.2	1.5	7.8	1.1	5.9	1.3	3.3	0.7	3.6		27.8	3.1	27.6	501.6
SMDH 00248	2	3	25	558.1	642.1	619.1	555.7	532.7	86.4	25.4	168.4	134.3	23	61	119.6	257.6	28.9	94.7	18.1	2	11.8	1.5	9.2	1.9	5.1	0.9	6	0.8	46.7	3.9	33.2	287.9
SMDH 00244	1	2	25	623.5	720.7	685.7	632.3	597.3	88.4	26.2	182.8	152.1	35	62.2	128.7	290.9	33.7	106.4	21.3	2.2	14.1	1.9	10.1	2.1	5.1	0.9	5.4	0.7	58.9	5.8	31.9	438.2
SMDH 00243	4	5	15	831.1	943.6	895.6	851.1	803.1	92.5	28	232.1	210.5	48	64.5	172.6	389.4	44.8	153.8	25.6	1.9	15	1.8	10.1	2.2	5.7	1	6.4	0.8	77.4	2.8	25.7	477.4
SMDH 00241	0	1	25	867.9	937.1	920.1	862	845	75.1	22.9	217.2	210.6	17	52.2	183.1	415.3	47.2	151.4	28.8	1.6	17.6	2.1	9.9	1.6	4	0.7	4.6		82.5	5.2	17.9	727.7
SMDH 00256	3	4	20	504.6	570.1	538.1	521.5	489.5	48.6	15.1	137.2	129.2	32	33.5	102.4	231.7	26.8	94.7	20.2	1.3	12.4	1.3	6.4	1.1	3		3.3		57.7	3.1	20.3	599.3
SMDH 00257	0	1	15	631.6	691.6	673.6	631.4	613.4	60.2	18.2	167.5	158.2	18	42	134.8	294.6	34.2	114.8	20.8	1.5	12.7	1.5	7.7	1.4	3.1	0.6	3.3	0.6	57.6	4.1	17.3	698.2
SMDH 00257	1	2	20	909.9	1000.3	969.3	914.2	883.2	86.1	26.7	239.5	228.7	31	59.4	193.9	421.2	50.7	165	31.9	2.1	18.4	2.2	10.8	1.9	4.9	0.9	5.2	0.8	83.2	5.1	21.5	520.9
SMDH 00257	3	4	20	67.4	79.6	71.6	74.8	66.8	4.8	0.6	18.8	16.2	8	4.2	16.5	29.5	3.5	12.1	2.1	1.9	1.2		0.6						5.2	1.8	11.3	169.3
SMDH 00260	0	1	15	500	552.5	532.5	508	488	44.5	12	135.4	126.8	20	32.5	108.5	233.2	25.5	94.2	15.5	1.6	9.5	1.2	5.9	1	2.5		1.4		46.7	4	19.2	232.9
SMDH 00264	11	11.5	50	320	352.5	341.5	323.4	312.4	29.1	7.6	84.5	78.7	11	21.5	70.5	148	17.4	56.7	11.4	1.7	6.7	0.8	3.8	0.7	1.5		0.8		31.4	3.9	20	115
SMDH 00265	1	2	15	320.9	386.4	352.4	344.1	310.1	42.3	10.8	98.6	83.3	34	31.5	69.5	144.8	17.6	60.1	10.1	1.4	6.6	0.9	4.7	1	2.6		1.6		27.1	4.4	18.5	58.2