SPHERE MINERALS LIMITED

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ASX ANNOUNCEMENT

27 June 2014

SPHERE ANNOUNCES THE COMPLETION OF THE EL AOUJ EAST PRE-FEASIBILITY STUDY AND AN UPDATE TO THE ORE RESERVES AT THE EL AOUJ IRON ORE PROJECT

Sphere Minerals Limited (Sphere) (ASX Code SPH) is pleased to announce that El Aouj Mining Company SA (owned 50% by Sphere Minerals Limited and 50% by SNIM, the Mauritanian state mining company) has completed a Pre-Feasibility Study (PFS) for the development of the El Aouj Iron Ore Project based on the El Aouj East deposit. The project is based on the production of a sinter feed product derived from fresh magnetite ore beneficiated to produce a 66%Fe concentrate.

Over the last two years Sphere has undertaken an extensive exploration programme within the El Aouj tenement on behalf of El Aouj Mining Company and has progressively declared Mineral Resources compliant with the JORC code that now total 4.4 billion tonnes (refer to previous ASX announcements referenced in the footnote[1]).

As a result of the work completed in the Pre-Feasibility Study an updated Ore Reserve is declared for the El Aouj East Deposit (see attachment). The updated Ore Reserve totals approximately 760 million tonnes at an average grade of 35%Fe. This work is a continuation of Sphere commitments to the Joint Venture entity to progress the project opportunities in Mauritania.

The project is proposed to be developed in stages.

The Pre-Feasibility Study showed that:

- The project is feasible and can be constructed, and expanded, in stages based on 'modules' with an approximate capacity of 9.5 million saleable tonnes per annum for each module. The PFS proved the feasibility for 2 modules, and subsequent work identified the layout for three modules at El Aouj East.
- The resource life of El Aouj is significant. Additional work complementary to the PFS demonstrated that construction of further modules within the tenement to service the other guelbs could take the annual tonnage to 35-45Mtpa. At the proposed initial development scale of 9.5Mtpa, the nominal life based on exploiting all of the currently defined resource would be over 200 years, and even at 45Mtpa the resource life would be over 40 years.
- The magnetite product is similar in specification to material already produced and sold by SNIM on the international seaborne market.
- The process flow sheet used to beneficiate the ore is based on dry magnetic separation (similar to that used at Askaf, which is now in construction)
- The capital and operating costs developed in the Pre-Feasibility Study are competitive and warrant the advancement of the project into the feasibility phase for the initial module. The resource scale allows for multiple project options as part of a staged development to match market conditions.
- El Aouj Mining Company SA is currently evaluating proposals for a Feasibility Study.

Competent Persons' Statement

The geological interpretation, wireframe model and the drill hole dataset used in the resource estimation of the El Aouj Centre magnetite deposit is based on, and fairly represents information and supporting documentation prepared by Dr Schalk van der Merwe, Consultant Geologist to Sphere Minerals Limited. Dr van der Merwe is a member of a Recognised Overseas Professional Organisation (ROPO), the South African Council for Natural Scientific Professionals (SACNASP). Dr van der Merwe has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 Edition). Dr van der Merwe consents to the inclusion in this report of the geological interpretation and the drill hole dataset and the supporting information in the form and context in which it appears.

The Mineral Resource estimation and classification of the El Aouj Centre magnetite deposit is based on, and fairly represents, information and documentation prepared by Mr Alan Miller. Mr Miller is a full-time employee of Golder Associates Pty Ltd and a Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Miller has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 Edition). Mr Miller consents to the inclusion in this report of the Mineral Resource estimation and classification and the supporting information in the form and context in which it appears.

The Ore Reserve statement was prepared by Vicki Woodward of Golder Associates, MAusIMM(CP) as the competent person for the purposes of complying with the JORC Code. Ms Woodward has sufficient experience that is relevant to the style of mineralisation and mine planning being undertaken to qualify as a Competent Person as defined in the Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 Edition).

[1] ASX Announcement, 13 December 2013, "Mineral Resource Update for Guelb el Aouj Magnetite Iron Ore Deposit, Mauritania" The Competent Person for the geological information was Dr Schalk van der Merwe and the Competent Person for the resource estimate was Mr Alan Miller. The cut-off grade used was 20% DT80 wt% for the fresh mineralisation and 20% head Fe for the weathered mineralisation.

[1] ASX Announcement, 4 October 2013, "Maiden Inferred Mineral Resource Estimate for Tintekrate Magnetite Deposit, Mauritania. The Competent Person for the geological information was Dr Schalk van der Merwe and the Competent Person for the resource estimate was Mr Alan Miller. The cut-off grade used was 20% DT80 wt% for the fresh mineralisation and 20% head Fe for the weathered mineralisation.

[1] ASX Release, 27 July 2012. Quarterly Activities Report for the Quarter Ending June 2012. The Competent Person for the geological information was Dr Schalk van der Merwe and the Competent Person for the resource estimate was Mr Alan Miller. The cut-off grade used was 20% DT80 wt% for the fresh mineralisation and 20% head Fe for the weathered mineralisation.

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Jon Romcke
El Aouj Mining Company
Ilot NOT N°197
Tevragh Zeina
BP 6868 Nouakchott
Mauritania

ORE RESERVES STATEMENT – EL AOUJ EAST

Dear Jon

1.0 INTRODUCTION

Golder Associates (Golder) has completed an Ore Reserves estimate update for El Aouj Mining Company (EMC)'s El Aouj East Magnetite Project as part of a Pre-feasibility Study (*El Aouj Pre-Feasibility Study PFS Report February 2014, EMC and Worley Parsons)*. The Ore Reserves estimates are based on the June 2013 interim geology model (Resource).

The Mineral Resource estimates were prepared and classified in accordance with the Australasian Code for the Reporting of Identified Mineral Resources and Ore Reserves (JORC Code, 2012).

2.0 PROJECT DESCRIPTION

2.1 Geological Block Model

The June 2013 geological model (*gea_ok042013.bmf*) was developed by Golder (Miller 2013) using geological interpretations provided by Sphere.

Table 1 gives the resources in the geological model by class and weathering for the head grades and mass recoveries.

Table 1: Resources of *In Situ* by Class in Geological Model where DT80 > 20%

Class	Mass (Mt)	DT80 (%)	Fe (%)	DTLib (%)	DTLib2 (%)	SiO_2 (%)	Al_2O_3 (%)	LOI (%)
Measured	432.2	43.2	35.9	49.9	47.5	43.9	1.2	-0.4
Indicated	565.9	43.9	36.0	50.6	48.4	43.6	1.0	-0.4
Inferred	113.4	42.3	35.7	50.2	47.0	44.1	1.2	-0.4
Total	**1111.8**	**43.5**	**35.9**	**50.3**	**47.8**	**43.8**	**1.1**	**-0.4**

2.1.1 Model Regularisation Comparison

Golder carried out a regularisation study and selected the 25 m × 25 m × 12 m model for mine planning purposes. Compared to the geological resource model the mining model gives a 3% lower ROM tonnage at a 4% relative lower DT80 grade. This appears a reasonable dilution and ore loss and should provide a suitable long-term model. The 25×25×12 m selective mining unit (SMU) block represents about one shift of production.

2.2 Open Pit Whittle Optimisation

Whittle Optimisations and sensitivities were carried out on the regularised model. Two cases are summarised in Table 2. All costs and revenues are in USD.

Table 2: Optimisation Cases

Case	Oretype	Resource Class	Slopes	Comment
1	No oxide	Measured, Indicated, plus Inferred	Overall	Dtlib(65)
2	No oxide	Measured plus Indicated only	Overall	Dtlib(65)

Table 3 summarises the optimum shell (based on maximum undiscounted cashflow before capital) for the two cases.

Table 3: Summary of Results

Case	Pit	Rock Mt	Waste Mt	SR t/t	ROM Mt	Prod Mt	DTLib(65) %	Const $M	Davg $M
1	24	2 855	1 904	2.0	951	396	49.5	33 046	11 282
2	24	2 492	1 627	1.9	864	362	49.7	30 480	11 128

Case 2 shows the effect of removing the Inferred material (included in Case 1). It has made only a small change with ROM tonnage and undiscounted cashflow drops by about 9% and the discounted average (Davg) value only dropping by 1%.

It should be noted that the Revenue Factor 1 shells (for Case 1) realises almost all the fresh Mineral Resources (958 Mt). The extra tonnages are only being obtained at high strip ratios and at the edges of the deposit.

The Case 1, 0.4 Revenue Factor pit shell was selected as the base for the final pit design to introduce some conservatism and reduce the overall strip ratio of the final pit design.

2.3 Mine Design

The outcrop expression of the Guelb el Aouj East deposit is identified by two prominent ridges of 'meta-BIF' on the western and eastern limbs of the deposit and a closure of the southern synform. The erosion resistant magnetite-quartzite material rises up to 250 m above the surrounding plain.

2.3.1 Pit Design Parameters

The recommended overall wall angles for practical mining at the completion of the final pit design are given in Table 4.

Table 4: Slope Parameters

Material	Wall Angles
Weathered	40°
Fresh	48°

Table 5 summarises the mine design parameters used for the pit designs.

Table 5: Mine Design Parameters

Parameter	Weathered	Fresh
Batter Angle	57°	80°
Bench Height	36 m (3 × 12 m)	36 m (3 × 12 m)
Berm Width	20 m	20 m
Inter-ramp Angle	40°	54°
Ramp Width	35 m for double lane 20 m for single lane	35 m for double lane 20 m for single lane
Ramp Gradient	10%	10%
Minimum mining and cutback width	300 m preferred, down to ~200 m or less in some areas	

The pit will be mined in 12 m benches with triple benching between berms. The ramp width is suitable for trucks of up to 230 t capacity.

2.3.2 Pit Design

This final pit design used for the PFS represents the Ore Reserve Pit and contains 97% Measured and Indicated ore. El Aouj East is a large multi-stage pit and a good road system is essential for ensuring that production rates can be met. This concept combined with sufficient minimum mining widths for efficient loading equipment manoeuvrability has been at the forefront of the design strategy.

Figure 1 shows the design for the final pit.

The final pit is some 2.6 km in length and 1.8 km wide. The highest point mined will be the ridge of the guelb at 560 m RL with the final depth of the pit at -196 m RL. The lowest intersection of the pit with the surface is about 344 m RL.

Each stage requires multiple ramps to access both ore and waste exits. Access between the stages generally is not possible so each stage has an independent set of ramps. The benefits include more flexible operation of the haulage routes as the mine progresses particularly considering the high tonnages being hauled.

Table 6 summarises the physicals for each stage. ROM is only the fresh material meeting cut-off requirements after ore loss and dilution. The waste includes the oxide material.

Table 6: Physicals by Stage

Stage	Rock	Waste	ROM				Strip Ratio	
	Mt	Mt	Mt	DTLib (%)	Libsiz (μm)	Product (Mt)	ROM (t/t)	Product (t/t)
1	190.4	173.0	17.4	51.7	369	9.0	9.9	19.2
2	512.3	234.9	277.4	50.0	322	138.8	0.9	1.7
3	498.9	311.9	187.0	49.8	365	93.1	1.7	3.4
4	550.6	388.0	162.6	47.7	330	77.6	2.4	5.0
5	361.1	224.8	136.3	49.5	335	67.5	1.7	3.3
Total	**2113.3**	**1332.5**	**780.8**	**49.4**	**338**	**386.1**	**1.7**	**3.5**

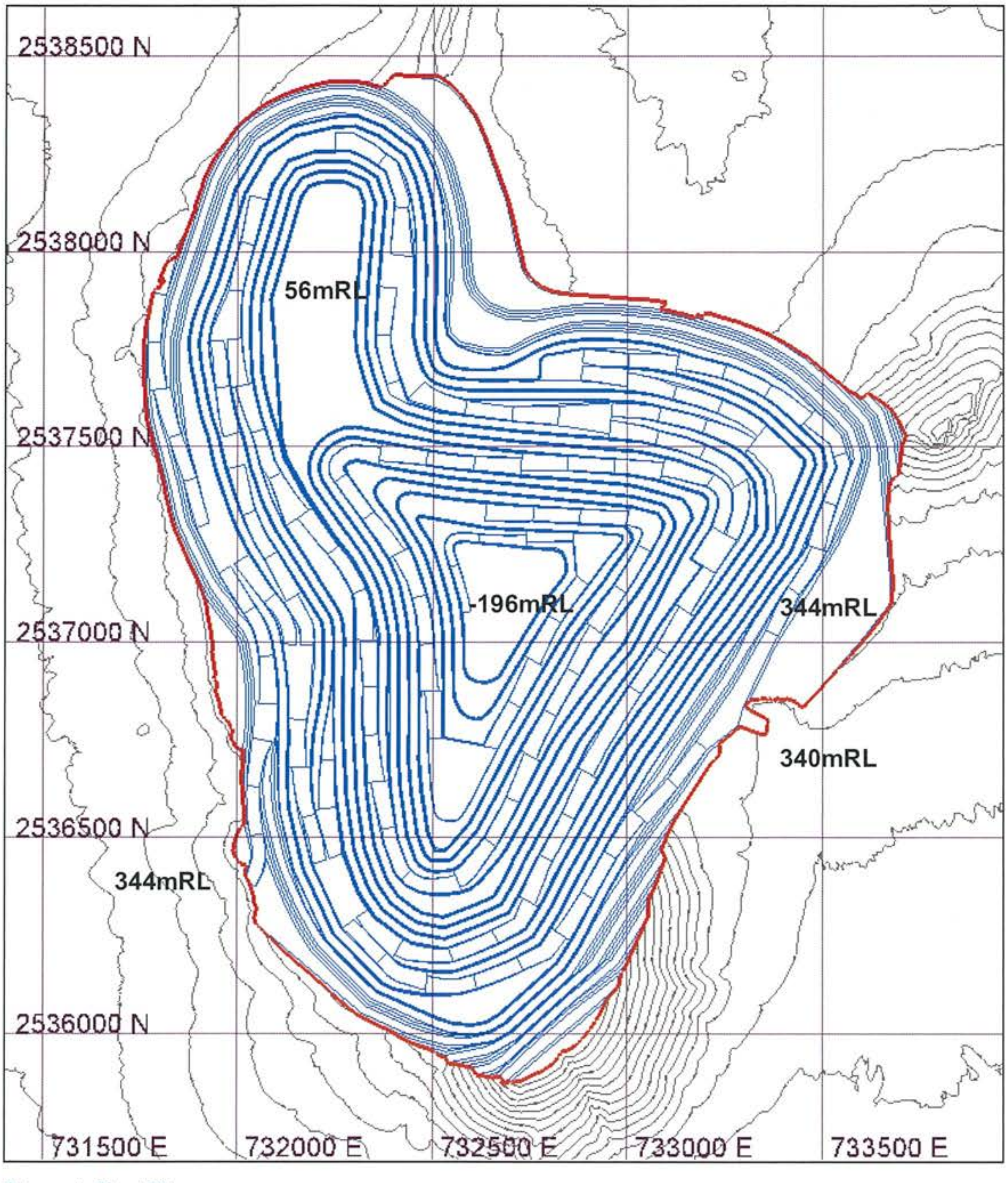

Figure 1: Final Pit

2.4 Site Layout

2.4.1 ROM Pad Location

Figure 2 is a photograph of the El Aouj East Project looking from south to north. It shows the V shape of the ridges that are the outer limbs of the deposit and define its limits and create the ridges. These limbs are shown by the typical cross-section in Figure 3.

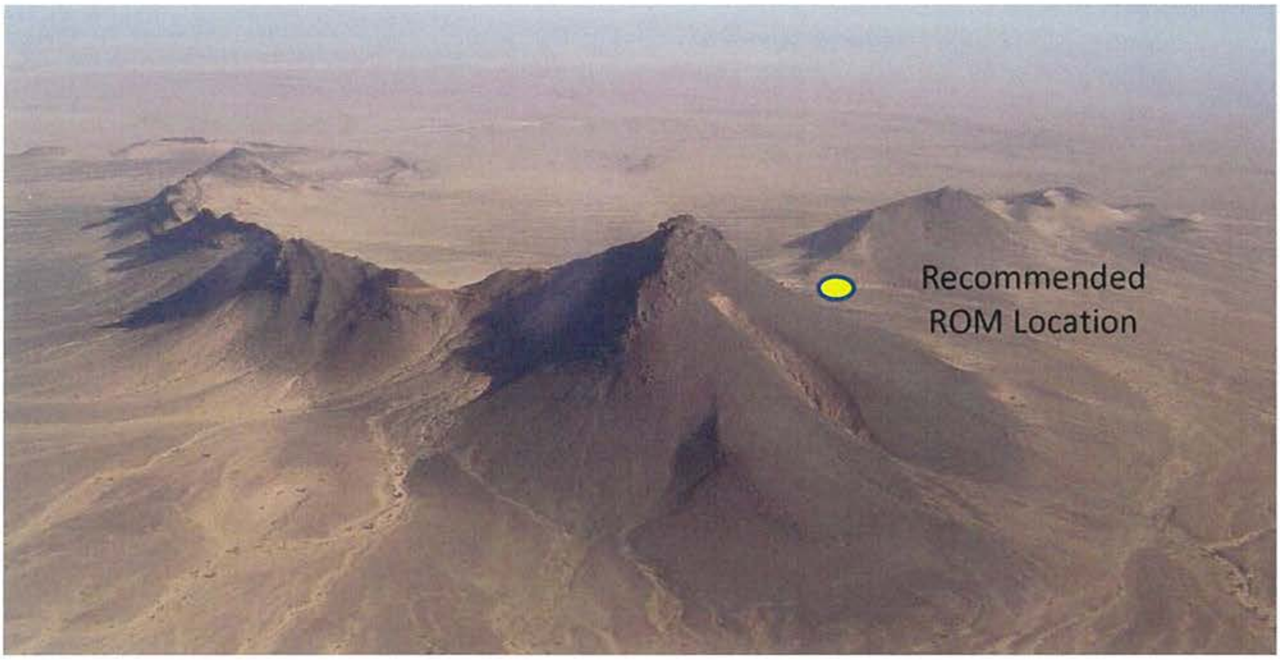

Figure 2: View of El Aouj looking from the South

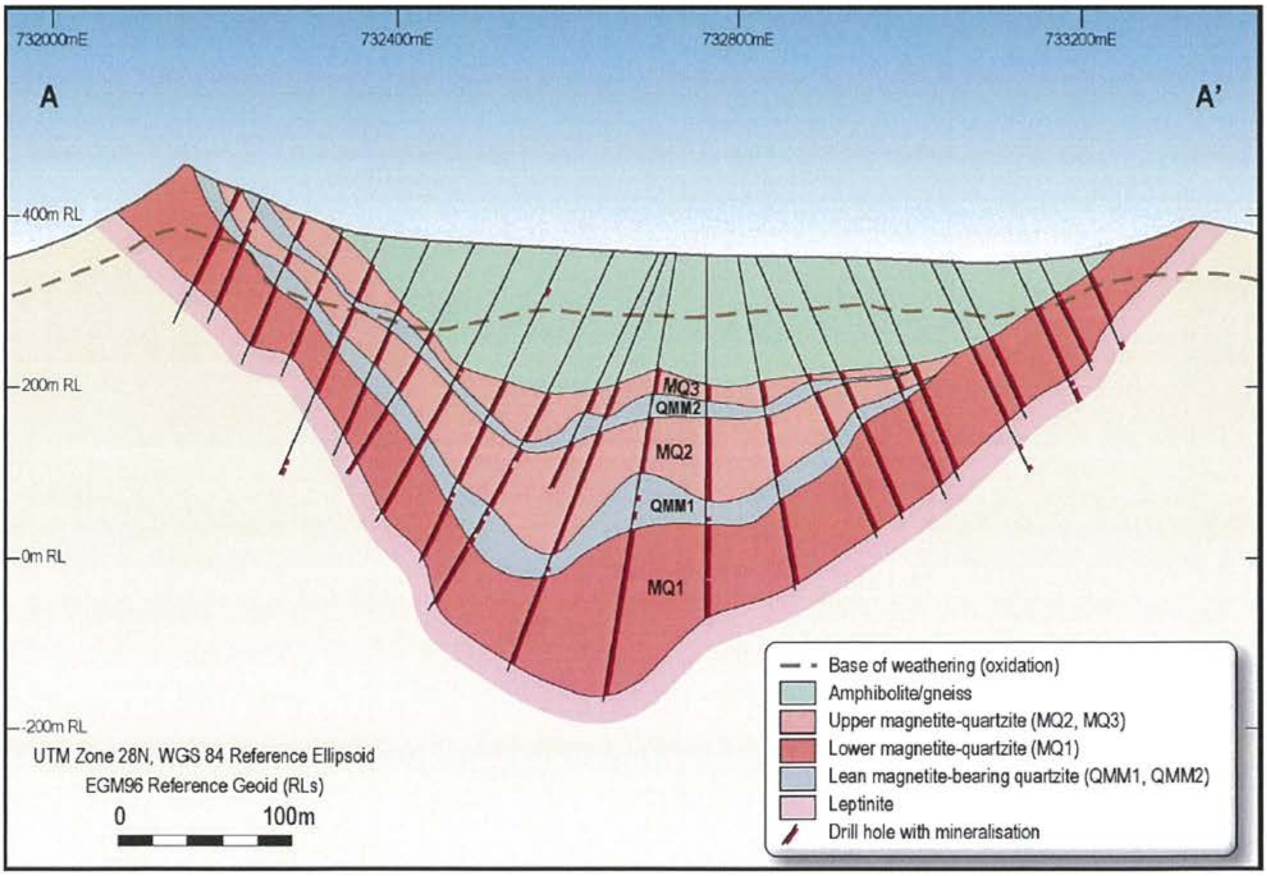

Figure 3: Typical Geological Cross-Section

As Figure 1 Final Pit and the photograph in Figure 2 shows, there is a natural funnel through the eastern ridge line which is also the lowest point where the final pit intercepts with the surface topography. This is a natural location for a pit exit and for the siting of the ROM/Primary Crusher as this gives the shortest hauls for ore to the ROM pad. Other locations would be higher in elevation and the ore would have to be hauled further uphill with corresponding loss of productivity and increase in haul costs.

A static ROM location on the western side of the deposit is not considered suitable as the pit develops further along the west limb than the east. There is an increased haul distance from the western side back to the plant.

2.4.2 Waste Dump Location

The proposed waste dump development uses the ridge line to provide access to the dumps at the higher levels, rather than haul down to the valley floor and then up to the top of the dump. This reduces the haul distance and improves waste haulage productivity.

The pit development moves from the south to north with the eastern side proposed to be the initial starting point.

2.4.3 Waste Dump Design

Figure 4 shows the location of the dump with respect to the pit. The dump reaches a maximum elevation of about 400 m RL or 105 m above the valley floor (295 m RL). The overall angle is designed at a maximum of 18° with 35 m wide berms for every 20 m vertical lift.. The toe of the dump closest to the pit is designed to be about 100 m from the pit wall. This is to alleviate the possibility of wall failure due to the dump adding load to the wall. The gap also provides a drainage channel between the dump and pit. This standoff requires geotechnical review for the Feasibility Study.

There are two primary pit exits on the west wall around the 340 m RL. They will give access to the western part of the dump. Material from above the pit crest intersection will be hauled down to the dump using temporary ramps. The dump on the south east side will be accessed by contour ramps.

Figure 4 is a section on 2 537 000 mN showing the final pit and dump.

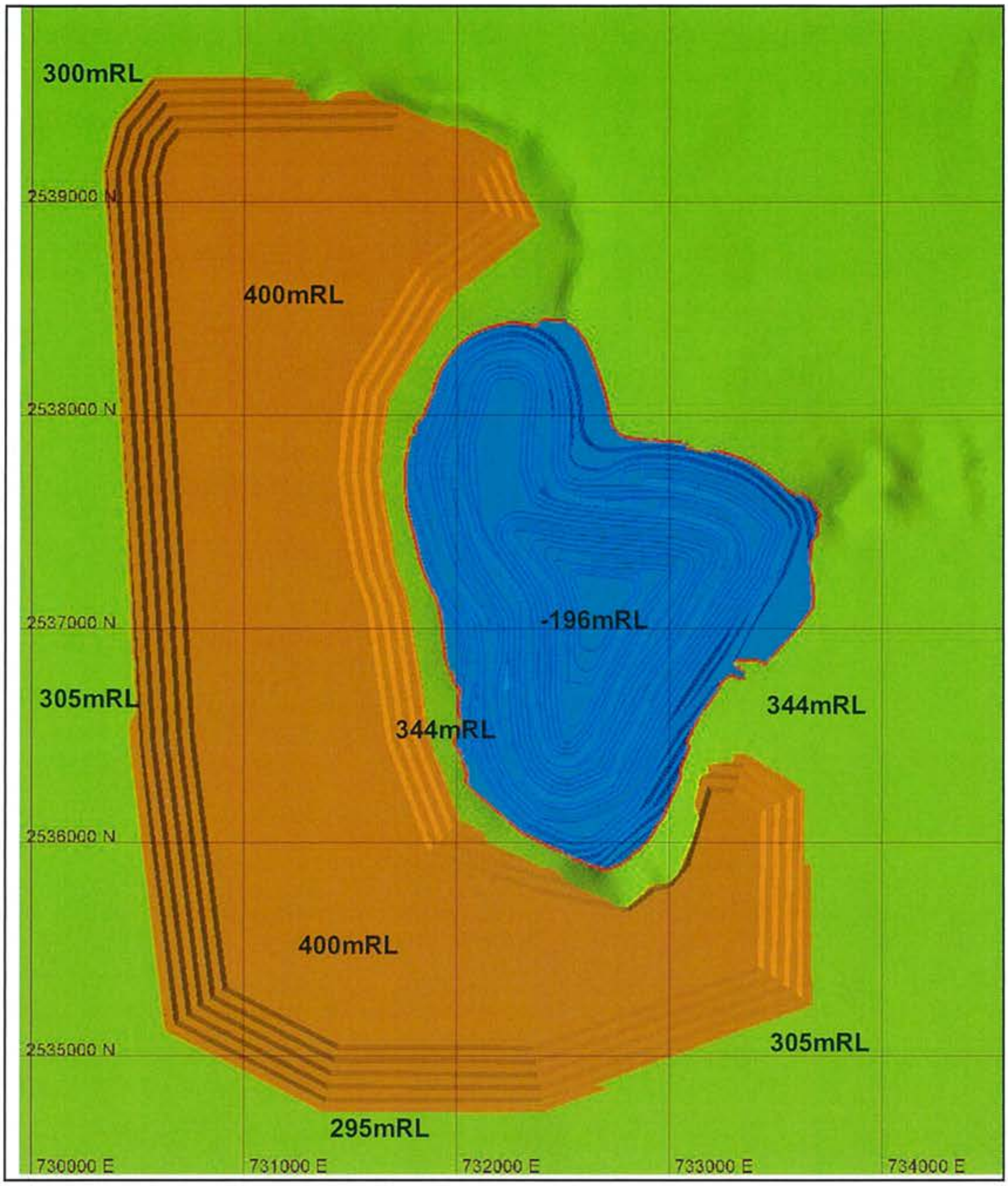

Figure 4: Dump and Pit Location Schematic

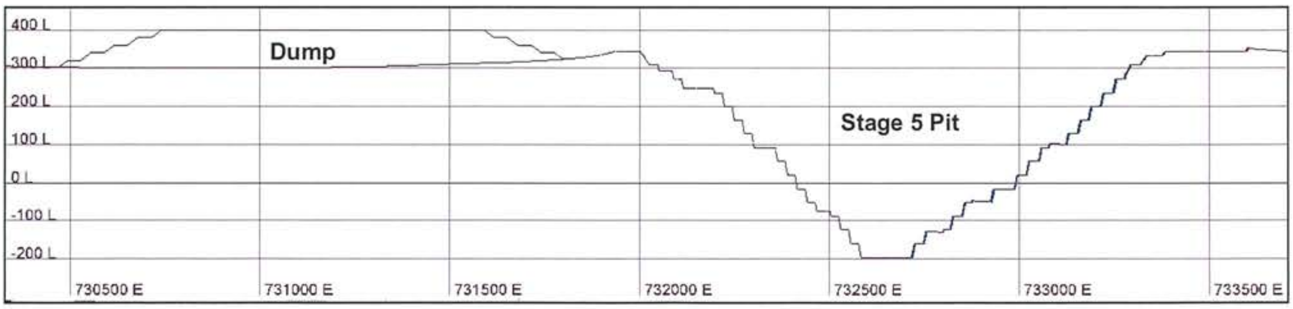

Figure 5: Section on 2 537 000 mN

2.5 Production Scheduling

MineMax Scheduler software was used to schedule the El Aouj East deposit on a period basis.

For scheduling the main considerations were:

- All oxide was stockpiled and not used as ROM feed. Oxide is included as waste in the schedules.
- The processing mass recovery was calculated as per Table 7. This converts the DTLib(65) in the model to plant recovery allowing for the plant efficiency (difference between lab tests and actual likely plant recovery).
- The schedule was based on achieving a concentrate product of a nominal 15 Mt/a at full capacity, however the annual capacity varied depending on the mass recovery and Dt liberations sizing as carried in the block model.
- The crusher feed was set to a maximum of 38.4 Mt/a (6000 tph for 6400 hours per year).
- The HPGR was set to a maximum of 109.9 Mt/a (14 650 tph for 7500 hours per year).
- No (long term) stockpiles are used for fresh material with the exception of the first (start-up) period.
- The strategy was a global optimisation to maximise the NPV.

Schedule V20 was used as the base case for the equipment schedules and cost model.

Table 7: Product Recovery Algorithms

Ore Type	Plant Mass Recovery %
MQU	(DTLib * 1.1239 – 10.586)*0.97
MQL	(DTLib * 1.0957 – 6.8351)*0.97

2.5.1 Schedule V20

This case has a maximum pre-production material movement of 100 Mt , which will be taken over two 'pre-production' years. Table 8 gives the annual production schedule. It shows a maximum annual material movement of about 125 Mt in Year 1 and Year 2, dropping to 80 Mt in Year 3 and then up to 110 Mt per year in Year 7 to Year 14 with Stages 4 and then 5.

Table 8: Mining Production Schedule V20

Period	Rock	Waste	SR	Upper			Lower			Total	
				ROM	DTLib(65)	Libsiz	ROM	DTLib(65)	Libsiz	ROM	Prod
	Mt	Mt	t/t	Mt	%	(μm)	Mt	%	(μm)	Mt	Mt
Pre-Prod	100.0	94.0	15.8	0.0	-	-	6.0	52.7	369	6.0	2.9
Year1	125.0	107.9	6.3	3.8	43.2	219	13.3	52.8	399	17.1	8.0
Year2	125.0	90.5	2.6	13.0	44.0	239	21.5	52.0	369	34.5	15.4
Year3	80.0	41.8	1.1	20.2	44.3	241	18.1	53.2	367	38.2	16.7
Year4	80.0	41.9	1.1	21.5	44.8	237	16.6	54.7	405	38.1	16.8
Year5	80.0	41.9	1.1	21.0	44.6	234	17.1	54.1	401	38.1	16.8
Year6	99.4	61.0	1.6	18.0	44.2	228	20.4	53.8	416	38.4	17.1
Year7	110.0	71.6	1.9	12.4	43.4	207	26.0	53.5	425	38.4	17.7
Year8	110.0	71.6	1.9	7.0	42.2	197	31.4	54.5	406	38.4	18.6
Year9	110.0	71.6	1.9	7.2	41.3	193	31.2	53.9	416	38.4	18.3
Year10	110.0	71.6	1.9	13.9	41.8	193	24.5	53.9	477	38.4	17.3
Year11	110.0	71.6	1.9	18.5	42.0	209	19.9	52.9	444	38.4	16.4
Year12	110.0	71.6	1.9	16.4	42.9	222	22.0	53.0	395	38.4	16.9
Year13	110.0	71.6	1.9	19.3	42.3	208	19.1	52.7	431	38.4	16.4
Year14	110.0	74.5	2.1	13.6	42.1	192	21.9	52.4	419	35.5	15.6
Year15	80.0	41.6	1.1	17.7	43.6	211	20.7	53.7	458	38.4	17.0
Year16	101.9	63.5	1.7	5.9	42.9	205	32.5	54.4	397	38.4	18.8
Year17	110.0	71.9	1.9	21.8	42.7	222	16.3	53.0	478	38.1	16.0
Year18	110.0	71.7	1.9	20.5	43.2	224	17.7	55.0	439	38.3	16.7
Year19	48.0	9.6	0.2	15.4	42.5	242	23.0	53.8	405	38.4	17.2
Year20	45.2	7.2	0.2	10.6	42.3	239	27.4	52.5	377	38.0	17.3
Year21	48.9	12.4	0.3	4.0	41.8	226	32.5	51.9	365	36.5	17.2
Total	**2113.3**	**1332.5**	**1.7**	**301.9**	**43.2**	**221**	**479.0**	**53.4**	**411**	**780.8**	**351.1**

Figure 6 shows the yearly material movements.

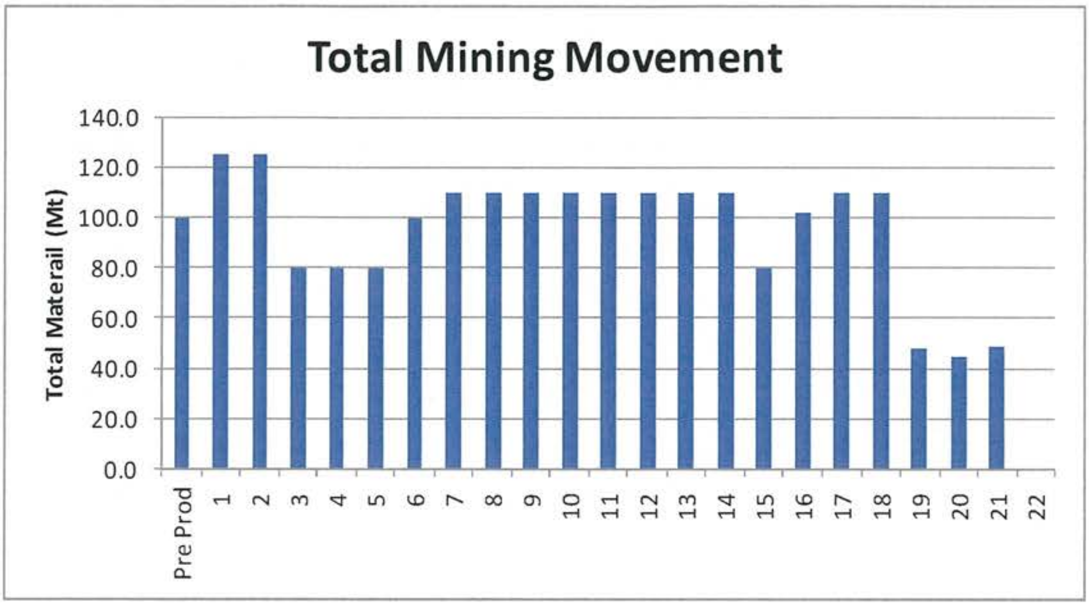

Figure 6: Schedule V20 Total Mining Movements

Figure 7 shows the amount of product produced.

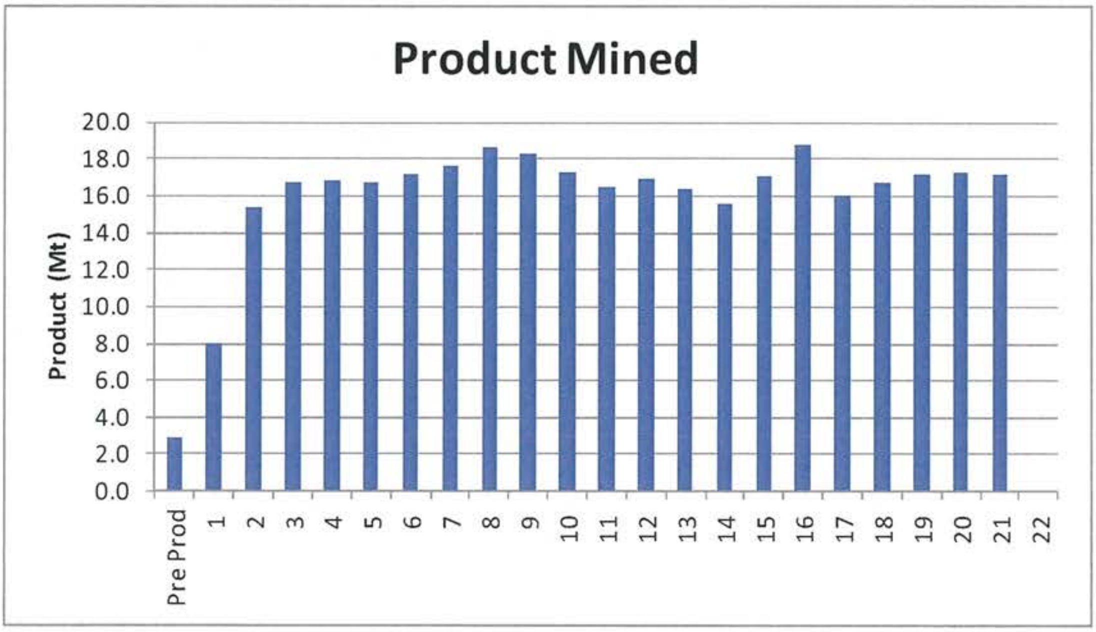

Figure 7: Schedule V20 Product

2.6 Ore and Waste Mining

The ore and waste will be mined using 12 m benches. This gives good productivity and reasonable selectivity for El Aouj. El Aouj has a maximum annual material movement of 125 Mt and an average movement of about 93 Mt/year or 254 000 t/day. These are very large tonnages and require commensurately large mining equipment. For El Aouj the equipment size ranges currently being investigated are excavators with bucket capacities in the range 18-35 m^3 and trucks in the range 170-230 t payload. These are chosen as they are large, are well tested and with good supply of parts. SNIM is running similar sized machines at its operations and where possible using the same machines could aid in inventory control and provide experienced maintenance personnel. There are obviously larger machines, such as +300 t trucks, however they are not as common or well tested and there would likely be no parts or experience available locally. They would also require wider roads and larger excavators. Too few excavators could create a blending and scheduling problem by not having enough machines to be mining a blend of upper and lower ore plus be operating in different stages at the same time.

For the purpose of this study it has been assumed that a Cat 6050 or similar machine (18 m^3) will be used for excavating the material. These units will mine both ore and waste and will be interchangeable. Each machine has the capacity to mine about 12.5 Mt per year and the mobility to allow it to move from face to face and stage to stage if required.

Haulage units are assumed to be nominal 177 t rear dumps such as the Cat 789 and be the same for ore and waste. A Cat 994 FEL or similar sized machine will act as backup to the hydraulic excavators. They could also be used for tramming ore from the ROM stockpiles on the pad.

Table 9 lists the major production equipment with the capacity, number required and typical at Year 5 and Year 15.

Table 9: Major Equipment at Year 5 and Year 15

Item	Quantity Required Year 5	Quantity Required Year 15	Capacity	Examples
Excavators	8	10	18 m^3	Cat 6050
Front End Loaders	2	2	16 m^3	Cat 994
Haul Trucks	28	51	180 t	Cat 789
Water Trucks	5	5	90 kl	Cat 777
Drills	10	14	150-250 mm	D75KS
Graders	4	4	229-279 kW	Cat 16M
Track Dozers	12	12	433 kW	Cat D10T
RT Dozers	3	3	597 kW	Cat 854

It is considered that explosive and potentially a down the hole explosive service will be provided by a contractor. Part of these services will also be technical support to ensure efficient cost effective blasting.

2.7 Manpower

The roster is a continuous four-panel crew roster operating 12 hour shifts. A total of 595 personnel are required for the mining operations at Year 5.

2.8 Operating and Capital Costs

The costs below are estimated to pre-feasibility study level. The capital and operating costs have been obtained from a number of sources including:

- EMC
- Glencore/Xstrata
- Golder
- Original equipment manufacturers (OEM).

An owner operated cost model has been developed. This scenario assumes that the owner will carry out the majority of mining, maintenance and supervisory functions. Some aspects such as provision of down the hole explosives are assumed to be carried out by contractors.

2.8.1 Capital Costs

The major components of this cost include a large fleet of haul trucks (180 t capacity) and large hydraulic excavators (18 m^3), together with large FEL (16 m^3) plus drills, dozers and ancillary equipment.

The LOM capital costs are summarised in Table 10 for the Schedule V20 case.

The initial capital is based on the equipment required to get production to a rate of 15 Mt per year (end of Year 2).

Table 10: Summary of Project Mining Capital ($M)

Capital Item	Base
Mobile Equipment	
Initial Mobile Equipment (to end Year 2)	315.2
Replacement and Additional Mobile Equipment	428.4
Other	
Miscellaneous/Technical etc.	9.5
Inventory	37.8
Contingency (10%)	75.3
Total	**866.1**

2.8.2 Summary of Operating Costs over Life

Table 11 gives the mining operating cost summary for the project over life for the V20 scenario.

Table 11: Average Life of Mine Operating Costs ($/t Material Movement)

Item	Unit	Base
Labour	$/t	0.15
Fleet	$/t	1.35
Blasting	$/t	0.28
Miscellaneous	$/t	0.05
Grade Control	$/t	0.00
Sub-Total	**$/t**	**1.83**
Contingency (10%)	$/t	0.18
Unit cost/t rock	**$/t**	2.02
Unit cost/tonne of Product	**$/t**	12.18
Unit costs/tonne of Ore	**$/t**	5.48

The average mining cost was about $1.80/t rock for the first 10 production years.

3.0 ORE RESERVE STATEMENT

This section details the Ore Reserves as determined by the Pre-feasibility Study for the El Aouj East Iron Ore Project located north of F'Derik in Mauritania. These Reserves are based on a Pre-feasibility Study that has recently been completed. The Ore Reserves are based on the fresh magnetite material in the final pit meeting a 20% DTR cut-off (Table 12).

Table 12: Ore Reserves within Designed Pit

	ROM Mt	Fe %	DTR %	DTLib(65) %
Proved	373	35.0	43.6	49.9
Probable	385	34.6	43.0	49.1
Total	**758**	**34.8**	**43.3**	**49.5**

An additional 23 Mt of fresh Inferred Resources is included within the designed pit. There is also 97 Mt of Measured and Indicated oxide Resources within the pit. This material is planned to be stockpiled and may be processed at some future date.

This Reserve was prepared by Vicki Woodward of Golder Associates, MAusIMM(CP) as the competent person.

4.0 COMPLIANCE WITH THE JORC CODE ASSESSMENT CRITERIA

The JORC Code (2012) describes a number of criteria, which must be addressed in the documentation of Ore Reserves estimates, prior to public release of the information. These criteria provide a means of assessing whether or not parts of or the entire data inventory used in the estimate are adequate for that purpose. The Ore Reserves estimate stated in this document was based on the criteria set out in Table 1 of that Code.

JORC Code, 2012 Edition – Table 1, Section 4 Estimation and Reporting of Ore Reserves	
Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve. *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	The Mineral Resource models for the Guelb El Aouj East were developed by Golder Associates Pty Ltd as part of work commissioned for a pre-feasibility study. Mineral Resources are reported inclusive of Ore Reserves (June 2013).
Site Visits	
Comment on any site visits undertaken by the Competent Person and the outcome of those visits. *If no site visits have been undertaken indicate why this is the case.*	A site visit by the competent person Vicki Woodward, was undertaken in December 2013. The El Aouj East site was inspected as well as SNIM's operating magnetite mine El Rhein. Drill core and the laboratory were also inspected and discussions held with the professional staff based in the Zouerate and Nouachott office.
Study Status	
The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves. *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	The current study is a Pre-Feasibility Study and is examining a mining and processing operation to produce a sinter feed blend (SFB) concentrate product. This deposit had a definitive feasibility study (DFS) completed in 2008 for a pellet plant operation.

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Cut-Off Parameters	
The basis of the cut-off grade(s) or quality parameters applied.	A cut-off grade of 20% DTR has been used for developing the geological model and mine planning. No oxidised material has been included in the Ore Reserves. The economic cut-off is well below the geological cut-off used. The base product price could drop to about $60/t before the cut-off reached 10% DTR.
Mining Factors or Assumptions	
The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design). *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* *The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.* *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* *The mining dilution factors used.* *The mining recovery factors used.* *Any minimum mining widths used.* *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* *The infrastructure requirements of the selected mining methods.*	The Resource model was regularised to an SMU of 25 m × 25 m × 12 m. This caused an ore loss of 3% and a drop in Fe and DTR of 4%. No further ore losses or ore dilution was considered as part of the mine planning because the regularisation process generated appropriate loss and dilution factors. The Ore Reserves are reported within a pit design, which is based on an open pit optimisation. The optimisation was carried out including Measured, Indicated and Inferred Mineral Resource categories. The optimisation used a product price of USD$125 per dry metric tonne of magnetite concentrate. Sensitivities were run to an iron ore price of $60/t. The pit selected to base the pit design on used the equivalent of a $50/t iron ore price The overall pit slopes used for the design are based on feasibility level geotechnical studies (SRK 2013). The stage cutbacks were around 200 m with the minimum mining width of 80 m. The Inferred material is less than 3% of the fresh ore within the final pit design. This is a standard truck and shovel iron ore operation and although located in a remote part of the world, there are existing nearby operations including rail, port, and town facilities.
Metallurgical Factors or Assumptions	
The metallurgical process proposed and the appropriateness of that process to the style of mineralisation. *Whether the metallurgical process is well-tested technology or novel in nature.* *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*	The metallurgical recovery through the proposed processing plant is based on Davis Tube Liberation Grind Size Testing ("DTLib"). This test determines the mass recovery at the target concentrate grade of 65% Fe by carrying out a series of grinds with increasing grind times until a Davis Tube concentrate grade of 65% Fe is achieved.

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Any assumptions or allowances made for deleterious elements. *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	This level of analysis was carried out on 3 m drill hole intervals which provided a high level of resource understanding relating to the grain size and grind size required of the ore to produce the target grades. Further bulk testing was carried at the SGA Laboratories in Germany to test the dry magnetic processing route at batch and pilot scales. The bulk testing samples were carefully selected by an experienced geologist (with the required background in the ore body), from available bore core to provide an ore body average sample. The testwork results, combined with the DTLib(65) mass recovery carried in the mining block model provides the confidence in relying on the metallurgical factors developed and thus represented in the mining block model. A further assumption has been made that the bulk sample pilot test mass recovery results are discounted by a 0.97 scaling factor between the testwork algorithm and a "real world" industrial plant. The dry magnetic separation process has been used at the SNIM El Rhein mine for the last 30 years. The ore characteristics at El Rhein are very similar to those at El Aouj. The specification of the product ore concentrate is similar to that already marketed by SNIM to European and Asian steel mills. Market acceptance is expected due to the relatively high target grade of 66.5%Fe and low levels of deleterious elements.
Environmental	
The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	The sustainable development, environmental and socio-economic aspects of El Aouj are being examined within the Environmental and Socio-Economic Impact Assessment (ESIA) process that is currently being undertaken. The ESIA itself will be finalised during the feasibility phase of the Project. This will build on existing work and will involve technical impact assessments and identification of mitigation and monitoring requirements as necessary, and the development of frameworks environmental and socio-economic management and closure plans. Closure planning for the final landforms in relation to the open pit, the waste rock dumps and the tailings storage facilities will be determined during the Feasibility Study. It is anticipated that the pit will be left open, and will require a bund and fence to protect people and animals from accidently falling into it. The waste rock dumps are likely to be left in place with some additional contouring so some of the features are like the lower slopes on the guelbs. The tailings facility is likely to be capped to some degree with waste rock material to reduce wind erosion effects, progressively if possible.

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	Characterisation of the waste materials will be required as part of future studies to support the closure plans. Based on environmental studies conducted at Guelb el Aouj East by Scott Wilson (now part of URS) during a DFS (completed in 2008) for the production of DR pellets, it is assumed that there are no environmental issues with respect to mining waste or process residue (tailings) that would affect the prospect for eventual economic extraction of the deposit.
Infrastructure	
The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.	SNIM are the owners of the existing iron ore handling port at Nouadhibou and the existing 700 km of rail infrastructure connecting the Zouerate area with Nouadhibou. Part of the EMC JV consortium agreement between SNIM and Sphere was a commitment by SNIM to provide the port and rail logistics. Negotiations have commenced with SNIM with respect to updating commercial arrangements regarding port and rail access. A rail and port term sheet with agreed positions on key commercial terms is expected to be finalised near the completion of the PFS.
Costs	
The derivation of, or assumptions made, regarding projected capital costs in the study. *The methodology used to estimate operating costs.* *Allowances made for the content of deleterious elements.* *The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.* *The source of exchange rates used in the study.* *Derivation of transportation charges.* *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* *The allowances made for royalties payable, both Government and private.*	Projected capital and operating costs for mining have been developed based on production schedules over more than 20 years to achieve a production rate of at least 15 Mt/a of product. Estimation of the production rates and operating costs have been developed from first principles and benchmarked against existing operations in Australia, South Africa and Mauritania. Costs include allowances for mining, administration, railing to the port and shipping. All costs and revenues are in USD. A price of USD$100/dtm (equivalent to a USD$1.61/dtmu at 62%Fe) from the long term IODEX62 price has been used in the financial model, with a USD$1.89/dmt (calculated from a USD$1.50/dmt penalty per 1%Si in concentrate over 5%Si, with the concentrate Si% expected to be 6.3%). The Mining Convention for El Aouj specifies a royalty of 1.5% payable to the Mauritanian government applied to the selling price less sea freight and marketing, commencing in the first year saleable product is produced. This figure is derived from the applicable Mauritanian law. Transport costs from mine to port have been based on advice from SNIM using DORC equivalent methodology to derive an all up cost for the rail transport and port loading charges. The estimation of future sea freight rates has been based on the experience of both SNIM and Glencore in the bulk material seaborne freight market.
Revenue Factors	
The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.	Revenue is based on a magnetite concentrate of 66.5%Fe. This product is expected to have limited deleterious elements based on the bulk sample test work – the main diluent in the concentrate product is Silica at 6.3%.

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The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Pricing derivations have been based on feedback from the marketing teams at both SNIM and Glencore, and represents a view that is also very close the consensus view from a group of investment banks. SNIM and Glencore both actively trade iron ore on the international seaborne market today. The pricing is considered reasonably conservative compared to the current iron ore futures market for iron ore that is currently trading for 2015 deliveries at a premium to the pricing for the El Aouj PFS financial model.
Market Assessment	
The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future. *A customer and competitor analysis along with the identification of likely market windows for the product.* *Price and volume forecasts and the basis for these forecasts.* *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	China is the key to understanding the iron ore market. Crude steel consumption, and hence production, in China is pushed by the varied needs of population, government and industry to create wealth. Long product demand for construction and industry is driven by development of major infrastructure projects, and residential construction (by far the largest sector) – expected to peak post 2020. This increase is forecast to rise from 350 Mtpa to 400 Mtpa. Flat product demand is driven primarily by consumer goods and manufacturing, where machinery production and auto and appliances are being driven by the move to increased consumer demand. This demand increase is forecast to rise from 200 Mtpa to 320 Mtpa. This forecast steel demand increase is forecast to drive the Chinese demand for iron ore from 1 Bt/yr in 2012 to 1.2 Bt/yr in 2020. The products targeted by El Aouj are expected to fit neatly into the demand for high quality sinter feed products that will be part of the blend of feed required. High Fe, with low alumina levels, will help steel mills create sinter feed blends that can cope with the lower Fe and higher alumina products forecast to come from Western Australia as production from this region increases.
Economic	
The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	The financial modelling indicates that the El Aouj East Project is likely to produce a positive NPV at the required discount rate for a range of long-term iron ore prices. Sensitivity analysis has also shown that the projects economics remain secure within a normal sensitivity range.
Social	
The status of agreements with key stakeholders and matters leading to social licence to operate.	This operation is a joint venture between SNIM and Sphere Minerals, a subsidiary of GlencoreXstrata. SNIM is the local mining arm of the Mauritanian government. Mining is a well accepted industry within the county. The government of Mauritania is actively attracting foreign investment in an effort to accelerate the expansion of the Mauritanian economy. The legislated mining fiscal regime is one of the most attractive in West Africa. The mining licence is in place for the project.

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Other	
To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves: ■ *Any identified material naturally occurring risks.* ■ *The status of material legal agreements and marketing arrangements.* ■ *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	There is a risk that the mining area is close (30 km) to the Western Sahara border where previous military clashes occurred regularly in the 1970s between separatist groups striving for an independent Western Sahara country clashed with the Mauritanians. The UN brokered a cease fire more than 20 years ago that has been honoured, and Mauritania as a State has renounced any claim on the Western Sahara territory. There are currently risks associated with the instability in north Mali, but these are mitigated by a strong military presence in the region to protect the existing iron ore industry (which generates approximately 40% of the country's GDP) as well as the new projects currently being encouraged in the region. The distance of 700-1000 km between Mali and Zouerate of open desert is monitored and patrolled. The major government agreements and approvals are already in place and there are no foreseen impediments to gaining the future approvals required. The Environmental Permit required should be achieved before a final investment decision is contemplated as this is supported by defined timeframes in the legislation. The El Aouj Project is owned 100% by a local Mauritanian company El Aouj Mining Company SA (known as EMC or El Aouj Mining) via rights granted by the Government of Mauritania in the Exploitation Permit EL 609 on 27 April 2008, based on a decree of the Council of Ministers (#2008-087). This 'right to mine' was re-affirmed by the Government on 22 July 2013 in an Arrete issued by the Minister of Mines that, in effect, re-set the required start date for development activities to January 2017. As part of the ESIA process URS will prepare the ESIA Terms of Reference (ToR) to submit to the Ministry of Mines which is then sent on to the Ministry of the Environment, as designated competent ministry, for review and approval. The timing for this application is aligned with the commencement of the Feasibility Study. The approval of the ToR marks the regulatory initiation of the ESIA process and the first public consultation meetings required during the process, most likely with community and government representatives at Zouerate, Touajil and F'Derik.
Classification	
The basis for the classification of the Ore Reserves into varying confidence categories. *Whether the result appropriately reflects the Competent Person's view of the deposit.* *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	There is Measured, Indicated and Inferred Resources within the model. The Measured and Indicated Resources within the designed pits have been converted to Proved and Probable Ore Reserves (Measured to Proved, Indicated to Probable). The competent person does not believe there is any reason to downgrade any of the material.

Golder Associates

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Audits or Reviews	
The results of any audits or reviews of Ore Reserve estimates.	No independent reviews of the Ore Reserves have been undertaken.
Discussion of Relative Accuracy/Confidence	
Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate. *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	The Ore Reserve has been completed to a minimum of a PFS standard; hence confidence in the resulting figures is good. Benchmarking of many mining parameters and costs has been done with the nearby SNIM operated magnetite mine (el Rhein) and other existing operations in Australia and South Africa. Drill hole spacing studies based on the DTR variogram was completed by Golder for Guelb el Aouj East in 2005. The approach considers the theoretical estimation error incurred in estimating grades for various drilling grids. An estimation error of less than 10% for Measured Resource, 10 to 15% for Indicated Resource and greater than 15% for Inferred Resource on a six month production period at an assumed ROM annual production rate of 18 Mt/a. The relative accuracy is reflected in the resource classification discussed above that is in line with industry acceptable standards.

GOLDER ASSOCIATES PTY LTD

Vicki Woodward
Senior Mining Engineer

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