# Hanno RESOURCES

EXPLORATION IN THE TIRIS IRON ORE PROVINCE MAURITANIDES 2014 SESSION 5



Outcrop of iron ore, Touaizerfaten, Tiris Iron Ore Province, Western Sahara

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Note: All dollar amounts are US dollar unless otherwise stated



#### COMPANY OVERVIEW

- Founders of Hanno have been involved in Western Sahara natural resources for over 15 years
- Exclusive 4 year Technical Cooperation Agreement to assess the mineral prospectivity of Western Sahara signed with the Government in March 2007
- Agreement covered an evaluation of the whole country and reconnaissance of the Liberated Territories
- Hanno has geologically mapped the Liberated Territories of Western Sahara at 1:200,000; best known historic mapping at 1:1,000,000
- Extensive satellite imagery based remote sensing work
- TCA completed and presented in July 2011 earning right to licence up to 20,000km<sup>2</sup> of ground in 10 licences of 2,000km<sup>2</sup>



### WESTERN SAHARA MINING LAW

- Government committed to responsible stewardship of natural resources and providing attractive and stable fiscal and legislative framework for mining investment
- Recently established the Saharawi Arab Democratic Republic Petroleum and Mining Authority (SADRPMA)
- New Mining Law was adopted by Parliament in May 2014
- Exploration Permit allows exclusive prospecting for all minerals
- Valid for 3 years, renewable twice each for further 3 years
- Permit area up to 2,000km<sup>2</sup>
- Mining Permit valid of 30 years, renewable twice each for further 10 years
- Royalty 3% on all minerals, corporate tax rate 25%
- Available at Stand 22B for further information



#### PERMIT AREAS

 Hanno has 7 permit areas totalling 13,989km<sup>2</sup>



# TIRIS IRON ORE PROVINCE

- The Zouerate Iron Ore Complex lies within the Tiris Iron Ore Province
- Exploration by Sphere Minerals has identified a magnetite resource of >3,800Mt at 36% Fe within the Guelb el Aouj licence area and a 595Mt at 36% Fe magnetite resource within the Askaf licence area
- Evidence from satellite interpretation work by Hanno shows this Archean BIF terrane extends over the border into Western Sahara
- Hanno's Permit Areas 4, 5, 6 and 7 cover a major part of the Tiris Iron Ore Province



#### **GEOLOGICAL MAPPING**

- Liberated Territories of Western Sahara are geologically unexplored with modern techniques
- Hanno has mapped the Liberated Territories at 1:200,000 scale, best known historic mapping at 1:1,000,000
- Mapping based on Landsat interpretation combined with extensive ground-truthing
- Map sheets available for sale from SADR Petroleum and Mining Authority



## LANDSAT REMOTE SENSING

- Extensive Landsat satellite imagery based remote sensing
- Ratio of spectral bands highlights potential iron targets
- Example on left shows Guelb El Aouj, Mauritania above and similar image of Gleibat Haoulia, Western Sahara below
- Results have generated in excess of 90 significant sized iron ore targets
- Ground-truthing and sampling has confirmed many of these targets

Some targets are quite easy to find in the field...



# TIRIS IRON ORE PROVINCE

- Evidence from satellite interpretation and field work shows this Archean BIF terrane extends over the border into Western Sahara
- Hanno has sampled and mapped over 60 iron ore guelbs/hills with rock chip results of up to 69.6% Fe
- Detailed field mapping of just the outcropping mineralisation has generated a conservative prospective exploration target of over 4,000Mt of iron ore within Hanno's permit areas



Hand specimen sample C00225, 69.0% Fe, Saasaaiat

Location	Fe (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	P (%)	S (%)
Guelb Tikit	68.06	2.54	0.20	0.030	0.006
Gleibat Haoulia	55.27	17.57	0.51	0.095	0.131
Touaizerfaten	68.07	2.57	0.25	0.176	0.004
Touaizerfaten	59.48	6.33	0.82	1.359	0.019
Saasaaiat	54.88	20.51	0.25	0.018	0.018
Saasaaiat	66.34	3.90	0.79	0.071	0.012
Saasaaiat	69.00	1.52	0.49	0.030	0.009
Riche	69.60	0.52	0.16	0.014	0.006
Riche	55.53	19.33	0.19	0.046	0.007
Farfariat	59.31	2.79	0.62	0.081	0.022
Farfariat	52.51	14.16	0.62	0.060	0.027

DIRECT SHIP ORE (DSO) POTENTIAL

- Approximately 40% of current SNIM production is high grade direct ship products; potential for similar DSO products exists in Western Sahara
- Rock chip samples from 11 outcrop locations gave assay results of 54.88% to 69.60% Fe
- Mineralogical and petrological work show this to be massive very coarse essentially pure magnetite
- High contrast in magnetic susceptibility between massive coarse magnetite, BIF and surrounding country rock should highlight zones of the coarse magnetite within the area of an airborne geophysical survey
- Aim to delineate multiple pods or lenses of potential DSO material to form the basis of a quick start up operation with early cashflow

Table showing high-grade iron rock chip results from locations in Western Sahara



# **GLEIBAT HAOULIA**

- The Gleibat Haoulia target area is made up of 3 hills, Gleibat Haoulia North, West and East
- Located just south of Mijek and approximately 75km north of the F'Derik railhead
- 20 iron ore rock chip samples collected for assay
- Mineralisation was identified in the field as coarse grained magnetite BIF
- Assay results range from 21.34% to 55.27% Fe with low impurities of AI, P and S
- Average sample composition 37.51% Fe, 44.58%  $\rm SiO_2, \ 0.27\% \ Al_2O_3, \ 0.040\% \ P$  and 0.028% S
- Exploration target size of 500 to 600Mt estimated for the area based on mapping





#### **GLEIBAT HAOULIA NORTH**

- Ridge striking northwest-southeast approximately 1,500m long and up to 160m high
- Unit of iron ore mapped with a true thickness of 50m at the northwest end increasing to a thickness of 180m in the central section, dipping approximately 60° to the northeast
- 5kg sample collected for initial DTR testwork and further 25kg sample collected for dry magnetic separation testwork
- Estimated exploration target size of approximately 200Mt assuming depth of 200m down-dip of the iron ore unit
- Currently a primary target for initial drilling campaign





### **GLEIBAT HAOULIA WEST**

- Ridge striking east-west approximately 2,500m long and up to 180m high
- Unit of iron ore mapped with a relatively uniform true thickness of 70m to 100m, dipping approximately 60° to the north
- 5kg sample collected for initial DTR testwork and further 25kg sample collected for dry magnetic separation testwork
- Estimated exploration target size of 200 to 250Mt assuming depth of 200m down-dip of the iron ore unit
- Currently a primary target for initial drilling campaign





### **GLEIBAT HAOULIA EAST**

- Ridge striking east-west approximately 1,500m long and up to 140m high
- Multiple stacked and folded units of iron ore have been mapped with cumulative true thicknesses of 40m to 100m, dipping approximately 60° to the north
- 5kg sample collected for initial DTR testwork and further 25kg sample collected for dry magnetic separation testwork
- Estimated exploration target size of 100 to 150Mt assuming depth of 200m down-dip of the iron ore units
- Potential for increase in unit thickness at depth due to folded structure



## FARFARIAT

- The Farfariat target area is made up of 20 hills, located to northwest of Mijek, approximately 100km northnorthwest of the F'Derik railhead
- 32 iron ore rock chip samples collected for assay
- Assay results range from 35.98% to 59.31% Fe with low impurities of AI, P and S
- Average sample composition 42.30% Fe, 36.93% SiO<sub>2</sub>, 0.21% Al<sub>2</sub>O<sub>3</sub>, 0.056% P and 0.031% S
- 5kg sample collected for initial DTR testwork and further 25kg sample collected for dry magnetic separation testwork
- Exploration target size of >750Mt estimated for the area based on mapping



Touaizerfaten Central, seen from the west

## TOUAIZERFATEN

- The Touaizerfaten target area is an approximately 45km long chain of hills located 100km to the northwest of the F'Derik railhead
- 25 iron ore rock chip samples collected for assay
- Assay results range from 32.23% to 68.07% Fe
- Average sample composition 40.41% Fe, 40.15% SiO<sub>2</sub>, 0.31% Al<sub>2</sub>O<sub>3</sub>, 0.180% P and 0.025% S
- 5kg sample collected for initial DTR testwork
- Estimated exploration target size of >1,200Mt based on mapping

#### Existing iron ore infrastructure (from Sphere Minerals)



#### FUTURE GROWTH

- Hanno aims to prove a resource base capable of supporting 20-30Mt/yr production
- Full potential of the Tiris Iron Ore Province is limited by current rail infrastructure
- Production expansion by regional players to in excess of 100Mt/yr would require a second rail track
- Hanno's preferred rail solution is a direct rail line to the port of Dakhla, Western Sahara, over 300km shorter distance than the current rail line to Nouadhibou
- Current rail infrastructure passes through corner of Western Sahara
- Alternative dual track solution could cut directly across the corner of Western Sahara significantly reducing distance and cost

# **Hanno RESOURCES**

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