

Summary Information Memorandum. April 2011



Ukrainian Titanium Sector

Investment Opportunities

Confidentiality notice

The Recipient acknowledges that information in this document is of a confidential nature. The Recipient shall not reproduce this document, in whole or in part, and shall not distribute all or any portion of this document to any person. If the Recipient does not wish to pursue this matter, it has to delete electronic files containing this document and return any hard copies of this document to the address given hereunder.

TOV Exim-Consulting
11-B Vorovskogo st., office 602, 04053 Kiev, Ukraine
Ph. +38 044 2308117, +38 067 6491402
Fax. +38 044 2386469
stelmakh@exim-active.com

Why to invest in Ukrainian titanium sector?

Ukraine is one of the largest producers of titanium feedstock in the world

Ukraine accounts for about 10 % of discovered world titanium mineral reserves. As of January 1st, 2010 state geologic register included 26 explored deposits of various titanium-containing minerals, mainly ilmenite. Official information on reserves is kept confidential by governmental agencies. However data for individual deposits is available and suggests that Ukrainian titanium mineral reserves exceed 100 million tons, more than in any other European country.

For over 40 years now, an integrated industrial complex has been in operation combining extraction of titanium ore with production of metal and titanium dioxide. Ukraine has not only developed titanium minerals mining industry, but also significant chemical and metallurgical processing facilities.

Traditionally there were two regions in Ukraine where titanium minerals have been mined: Irshansky and Volnogorsky groups of deposits. This situation has been changed during the current decade as soon as old deposits became more and more depleted. Quality of ilmenite has been worsened so that Ukrainian TiO₂ producers first in their history had to apply for imports of ilmenite from Australia and India. At the same time global demand for the titanium and titanium dioxide has increased. Under such circumstances several "reserved" deposits were re-activated.

Currently ilmenite and rutile concentrates are produced in Ukraine by 3 enterprises: Krymskiy Titan (at leased Irshansky and Volnogorsky Mining and Processing Plant), Valki-Ilmenite (Irshansk area), and Ukraine Minerals (tails at Volnogorsky Mining and Processing Plant). Country's average annual production during past five years was about 500 thsd. tons.

About 50% of total mined titanium concentrates have been exported. Major destinations are Czech Republic, Russia, USA, Canada, Netherlands, Kazakhstan. Ukraine accounts for over 80% of titanium concentrates consumption in Russia.

Global market growth

Titanium dioxide feedstock industry will experience demand growth over the next five years which will be above average historic industry trend growth rates. This view is shared by that of independent industry analysts including TZMI.¹ Demand for pigment (the principal end use market for titanium feedstock) has averaged a compound annual growth rate of approximately 3% over the past 30 years and has moved closely in line with the growth in the global economy over this period. The compound annual growth rate of Chinese pigment consumption has averaged approximately 15 % over the last 20 years, reflecting the growing importance of China in pigment demand. While demand was adversely affected by the global recession in late 2008 and 2009, industry experts have predicted a strong rebound in pigment demand of 8 % to 10 % for 2011.² This demand growth is expected to be driven principally by increased demand from China and other developing countries accompanied by strong economic growth and a shift towards urbanisation in those countries as there is typically a strong correlation between GDP growth per capita in developing countries and the relatively low consumption of pigment per capita in such developing countries underpins the favourable global outlook for the titanium dioxide feedstock industry.

The ongoing recovery in the pigment market is expected to be result in significant re-stocking by pigment producers of TiO₂ during 2010 and 2011. A small surplus of feedstock until 2012 is forecasted

¹ TZ Minerals International Pty Limited, independent consultant in the mineral sands and TiO₂ pigment industries.

² The world largest TiO₂ producer DuPont for example has stated that its expectations are above trend line in growth for the period 2009 to 2015 in range of 5 % to 10 % as demand catches up with the long term growth rate.

by TZMI following by a significant growing deficit in supply to 2015 of over approximately 1 million t TiO₂ or up to 20 % of total projected market size.

Increases in supply necessary to address this anticipated deficit are subject to a number of constraints: certain existing operations worldwide and especially Ukraine’s largest Irshansky Mining and Processing Plant and Volnogorsky Mining and Processing Plant are reaching full capacity and have limited expansion potential. Reasons for reducing (or not increasing future production) include suspension or cancellation of development projects; resource depletion of some major titanium mines; considerable capital expenditure required in order to facilitate meaningful expansion often unjustified by the size of the resource.

In the following three independent projects Volchanske, Nosachivske and Birzulivske deposits are presented in detail.



Volchanske deposit. TOV Demurinsky Mining and Processing Plant

Background information

TOV Demurinsky Mining and Processing Plant is an independent privately owned company registered in Dnepropetrovsk, Ukraine. Demurinsky is the sole owner of "The special permit for industrial development of Volchanske ilmenite deposit", which was obtained in January 2002 for 10 years. The license will be prolonged for additional 20 years.

Volchanske is a placer deposit located near Novoandreevka village in Dnepropetrovsk oblast, Ukraine. The deposit combines five stripes of 20 km by length and 1 km by width with high concentration of heavy minerals: ilmenite, rutile, dysten-sillimanite, staurolite and zircon. The site enjoys developed infrastructure, including access roads, power and water supply. Total licensed area is 2,500 hectares. Average overburden depth is 40 m. Average thickness of productive stratum is 7.5 m. The deposit site enjoys developed infrastructure, including power supply, water supply as well as access to roads.

Reserves

Reserves (B, C1) at 3.0% cut off are: 5 million t of ilmenite, 0.7 million t of rutile, 1.2 million t of dysten-sillimanite, 0.7 million t of staurolite and 0.2 million t of zircon. Content of heavy minerals in sands: 9.2 %. Average overburden depth: 39 m. Average thickness of productive stratum: 7.4 m. Average content in sands: ilmenite 82 kg/m³, rutile 26 kg/m³, zircon 6 kg/m³, dysten-sillimanite 41 kg/m³, staurolite 26 kg/m³. Average TiO₂ content in ilmenite: 64 %, in rutile: 96%.

Current status and economics

An amount of ca. USD 20 million was invested until now into development of the deposit including pit construction, one on-site primary processing module and processing factory. Demurinsky has completed construction of mine and first movable processing module (sands processing capacity: 0.5 million tpa) and in 2009 first ilmenite concentrate was produced. However, in order to reach target processing capacity an additional investment of ca. USD 15 million is required to finance construction of two processing modules with total processing capacity 1.0 million tpa of sands.

Target production volumes of mineral concentrates shall be 60 thsd. tons of ilmenite, 20 thsd. tons of rutile, 4 thsd. tons of zircon. Revenue potential is over USD 450 million until 2027. Expected net income after completion until 2027 is over USD 200 million. Average EBITDA margin exceeds 75%.

Birzulivske deposit. TOV VKF Velta

Background information

TOV VKF Velta is an independent privately owned company established in 2000 and registered in Dnepropetrovsk, Ukraine. Velta is the owner of “The special permit for industrial development of Birzulivske ilmenite deposit”, which was obtained in January 2007 for 20 years.

Velta’s sole business is industrial development of Birzulivske ilmenite deposit.

Birzulivske is a placer deposit with total licensed area 1,200 hectares. Average overburden depth is 22.5 m. Average thickness of productive stratum is 6.4 m. The deposit site enjoys developed infrastructure, including power supply, water supply as well as access to roads.

History of development

The Birzulivske deposit was initially discovered in late 70s of the past century.

During two decades in 80-90s development of Birzulivske was frozen and deposit was put to national mineral resources reserve of Ukraine. The deposit was re-activated in 2002 as new established mining company Velta has obtained 5-years license for Birzulivske.

During next several years Velta has conducted significant exploration work. In 2006 a detailed deposit study has been prepared. In 2008 in assignment of Velta state engineering enterprise Krivbassproject has completed design for the first stage of the mine construction.

In 2007-2009 the evaluation of alternative mining techniques was performed by the Chair of Mineral Processing, National Mining University in Dnepropetrovsk. The following two alternative main mining methods were taken for closer analysis:

- (i) dredging;
- (ii) soft surface mining by using no-transportation scheme with sands washing and separation by hydraulic screen filters.

The second scheme was approved.

Ilmenite Reserves

Birzulivske ilmenite reserves are 5 million tons at 3.5% cut off. The reserves figure is calculated in categories B, C1, C2 of the Ukrainian classification. The average ilmenite content in sands is 160 kg/m³ with TiO₂ content in ilmenite 54-57%.

Prospective resources of by-products include kaolin (19 million tons), fire- and bentonitic clays (11 million tons), construction sands (25 million tons), molding sands (14 million tons).

During the early exploration period (1969-76), mineral resources of the Birzulivske deposit were calculated by state geological authorities using method of geological blocks. From May 2006 to June 2007 an additional geological survey work was carried out by the Ukrainian state geological enterprise KP Pivdenukrgeologiya.

The completed field work included 427 drilled wells with cumulated depth 26,089 m and 9,850 logged and documented samples. The reserves calculation was approved by Ukrainian State Commission on Mineral Resources. Birzulivske reserves were also independently audited by Micromine Russia in 2007 and were classified to suit the code JORC as “measured resources” and “indicated resources”. In

2008 the processing of ilmenite concentrate from sands of Birzulivske deposit was tested at the Chair of Mineral Processing, National Mining University, Dnepropetrovsk, Ukraine.

Chemical tests

Chemical composition of the ilmenite ore material from Birzulivske was tested by a number of competent entities.

In 2006 State Enterprise Pivdenukrgeologiya has qualified ilmenite from Birzulivske as appropriate for industrial production of titanium dioxide using sulphate method.

In 2007 three samples of ilmenite concentrate were certified by Societe Generale de Surveillance Group, who concluded that chemical composition of the samples is adequate for industrial TiO₂ production using sulphate technology. In 2008-2009 samples of ilmenite concentrate were tested by potential off-takers from Czech Republic, Slovenia and Ukraine.

Construction works

Velta has completed full scope of technical and organisational preparation in order to start deposit industrial development. All permissions for construction and mining works are obtained and land of the deposit is leased or purchased.

Mining works on the Project site have began in November 2010 and will include construction of the open pit mine, the processing factory and related infrastructure. The Project completion is envisaged in December 2011, whereby first finished concentrate delivery is expected in 3rd quarter 2011. The average target production volume shall be 15,400 tonnes of ilmenite concentrate per month.

Production and sales

All stages of ilmenite production will be deployed within the Project site. The finished ilmenite concentrate will be loaded to the trucks in bulk or into big-bags with capacity of 1-2 tons and transported to the own rail terminal in Novomirgorod, 19 km from Birzulivske.

The reaching of basic average level of monthly production 15 thsd. tons (185 thsd. tpa) is expected 12 months after start of the Project works.

Velta intends to sell nearby 100% of produced ilmenite concentrate under long term (up to five years) off-take contracts. Velta has signed the protocols about intensions with leading TiO₂ producers from Czech Republic, Slovenia and Ukraine at fixed prices approximately 10% below spot market prices. In case that small part of the production will not be contracted, it shall be sold at prevailing market prices, which currently are about 140 USD per ton.

Project economics and financing

Total deposit development cost will comprise approximately 70 million USD. Revenue potential during the actual license period (until 2027) is over 500 million USD. Expected net income for the same period is over 250 million USD. Average EBITDA margin is about 70%.

The Project is financed by shareholders own funds and by a USD 40.5 million loan provided by Ukrgazbank. At the same time Velta intends to refinance the existing loan in order to get more favourable conditions. Velta is intending to undertake an IPO on the AIM market in the UK in 2012.

Nosachivske deposit. TOV TioFab, Ltd.

Background information

Nosachivske is situated 45 km to Nord-East from Birzulivske. It is a multi-mineral hard rock deposit located in Cherkassy oblast, Ukraine. Besides of ilmenite Nosachivske has significant reserves of apatite and feldspar. The deposit area is 105 hectares. The deposit consists of two elongated ore layers of a tabular form. Overburden depth is 100 to 200 m. The deposit site has developed infrastructure, including power and water supply as well as an access road. The railway line runs about 1 km away from the deposit's western border.

The 20-years production license for Nosachivske was granted in 2007 to TOV TioFab, Ltd., an independent privately owned company registered in Cherkassy, Ukraine.

Reserves

With TiO₂ reserves of over 25 million t at 3.5% cut off, Nosachivske belongs to the largest ilmenite deposits in the world. The reserves figure is calculated in categories B, C1, C2 according to Ukrainian classification and it approximately corresponds to the "indicated" and "inferred" resources according to JORC. In addition Nosachivske has significant by-products resources: 4.5 million tones of apatite and 195 million tones of feldspar. Reserves of Nosachivske were calculated by the state enterprise Centrurkgeologiya in 2006. The field work for the calculation of reserves included drilling of 67 wells with a total depth of 18,307 m. In total 11,109 samples were taken for chemical, spectral and mineralogical analysis. Reserves calculation has been made using method of geological blocks. Reserves calculation was approved by Ukrainian State Commission on Mineral Resources.

The average content of TiO₂ in the ilmenite is 49-50%. The average content of titanium dioxide in the ore is 8.3%, with a recovery rate over 80%.

In 2005-2008 comprehensive tests for the processing of the Nosachivske ores were conducted by Metso Minerals AB, Sweden. Recovery rate of TiO₂ based on the results of tests is 82.3%.

In March 2011 Nosachivske reserves were audited and re-estimated according to JORC-code by Micromine Consulting and Micromine Ukraine Co Ltd. The audited results confirm or even overperform above mentioned parameters.

Chemical tests

Ilmenite concentrate from Nosachivske was tested in 2007 by Kemira Pigments Oy, Finland. Result: quality corresponds to the standard requested by Kemira Pigments Oy. The chemical composition of the Nosachivske ilmenite is adequate for industrial TiO₂ production using sulphate technology. The unique feature of the apatite-ilmenite ore of the Nosachivske deposit is an almost complete absence of titanomagnetite and other titanium oxide concentrates, except for ilmenite. Nosachivske ilmenite has a smaller content of P₂O₅ and other impurities than many operating deposits worldwide.

In 2009, the state enterprise Ukrainian Research Institute of Glass carried out a comprehensive research of samples of feldspar concentrate in order to explore the possibility of using it as aluminum containing raw material for glass production. Result: feldspar can be used for production of all types of flat glass.

Pre-feasibility study

In the period 2001 – 2009, TioFab has conducted a detailed study of the Nosachivske deposit including assessment of reserves, geological, mineralogical and chemical tests. The pre-feasibility study was completed in 2004 by Ukrainian state enterprise Ukrniiproekt. The concept of the deposit's industrial development and technological scheme of ore processing were elaborated.

The general concept of Nosachivske deposit industrial development envisages underground mining method. Overburden shall be removed using vertical shafts, transportation and ventilation cross-sections as well as technological slopes.

Productive layers of ilmenite ore assumed to be extracted in depth from minus 100 to 500 m. In order to secure annual extraction capacity of 4 million tonnes ore at least 12 cells shall be constructed at the stage of ore extraction and 4 cells – at the preparation stage, i. e. 16 cells being permanently operational.

Sales concept

The bulk of produced ilmenite concentrate can be sold under long term off-take agreements. Major TiO₂ producers Krimean Titan, Sumykhimprom (both Ukraine) and Kemira Pigments Oy (Finland), as well as several Ukrainian glass plants have already expressed their interest to purchase ilmenite, apatite and feldspar concentrates from the Nosachivske mine. The rest of production can be absorbed on the spot market by Ukrainian, Russian and global off-takers.

Current status

The major part of the land necessary to start mining is acquired. It is expected that during 1H2011 the full package of permissions for construction and mining works will be obtained and acquisitions of land will be completed.

The mining works on Nosachivske can be launched upon availability of necessary financing with the first ilmenite concentrate delivery expected 24 months later. Basic average monthly output at full capacity is 45 thsd. tonnes of ilmenite, 10 thsd. tonnes of apatite and 174 thsd. tonnes of feldspar.

Financing concept

The estimated deposit development cost will comprise approximately USD 600 million. Revenue potential is over USD 5 billion until 2028.

The funding of the Nosachivske deposit will require involvement of international financial institutions for debt and a strategic investor for equity financing.

Preliminary consultations were held with a number of major banks. These consultations showed that one of the critical conditions for crediting mining projects put forward by international banks is their requirement of substantial involvement of an international mining company with experience in implementing similar projects. Presently not a single Ukrainian mining company will be able to comply with this requirement. Thus, in the nearest future, TioFab will be looking for an international mining company able to undertake a strategic investment into the Nosachivske project.

Conclusion

Demurinskiy Mining and Processing Plant, Velta and TioFab have completed full scope of technical and organizational preparation to start operations. Each company possess long term production licence for its deposit. Companies have obtained all permits necessary to start mining works.

In the future taking into account the feedstock reserves of such magnitude and quality as presented deposits possess, it would be economically feasible to deploy enterprises producing metallurgical and chemical products close to titanium ore resources. Important prerequisites necessary for the vertical integration are there: strong raw material base, developed infrastructure, proximity to Ukrainian, European and Russian off-takers, skilled local workforce.