SUMMARY TECHNICAL PRESENTATION

OF BALKHASHMED

1. INTRODUCTION

Paribas has been mandated by the Government of Kazakhstan as advisor for the privatisation of Balkhashmed, set for completion in 1995.

Balkashmed is a large copper complex that, in 1994, produced 135 000 t of refined copper, as well as 7.2 t of gold and 112 t of silver in the form of electrolytic slimes. Although today, a significant amount of copper concentrates come from outside Kazakhstan and are treated on custom basis, the complex is situated in a region with a large potential of copper resources with significant by-product gold & silver. Most of these resources are proved and are categorized according to Russian methodology.

Besides being a major state asset sale in the Kazakh non ferrous metals sector, the privatisation of Balkashmed should be regarded as an opportunity to acquire an integrated copper and precious metals business in a resource rich part of the CIS, with a very significant potential for future development.

It is the firm intention of the Kazakh Government to privatise the existing complex, together with assured reserves of copper & precious metals. However, a decision has yet to be taken with respect to the exact structure of the sales package, in particular the orebodies and the amount of reserves to be included in it.

In addition to investigating the interest of selected potential investors, the purpose of this summary presentation is to exchange views on the preferred sales package.

Responses should be sent to Paribas, for the attention of N. Pelletier, by 10.05.95

2. GENERAL ASPECTS

With a reported smelting and electrolytic refining capacity, of respectively 200 000 tpa and 300 000 tpa, Balkashmed is the second largest producer of copper cathodes in Kazakhstan. Jezkhazgan is the first, with a reported smelting and electrolytic refining capacity, of respectively 220 000 tpa and 300 000 tpa. In both cases, the excess refining capacity has been used to treat blister copper produced by Kazakh and regional, (CIS), small producers.

The Balkhashmed copper complex was created in the late 1930s and is located some 600 km north of Almaty in the middle of the northern shore of lake Balkhash.

Since 1994, Balkashmed operates under the form of a joint-stock company, totally owned by the State.

3. CURRENT SITUATION

Taking into account the current smelting installations, the acid production facilities effectively in operation (100 000 tpa), and the average Cu grade of concentrates processed (20% Cu), the annual production of blister copper is presently capped at about 115 000 t. Considering the purchase of blister produced in other metallurgical complexes in Kazakhstan (20 000 t in 1994 from Irtych polymetallics Combinate), the maximum production of refined copper, as of 1994, is of the order of 135 000-140 000 tpa.

3.1. REFINED COPPER OUTPUT AND CAPACITY

Since 1989, the production of copper cathodes has decreased significantly and reached a low of 120 000 t in 1991. Output increased to 138 045 t in 1993 and 135 247 t in 1994 (of which 78 183 t were from own and purchased raw materials i.e. 55%). The 1993 and 1994 figures compare with an historical peak of 308 165 t in 1973, and 240 780 t in 1989.

This reduction of output results from three main causes: the current state of the smelting equipment (one of the four smelting furnaces is out of service), a decrease of the average copper grade in concentrates treated and environmental problems related with SO2 emissions.

3.1.1. PROCESSS EQUIPMENT

The process of smelting to blister stage comprises of four smelters, five converters and three refining furnaces (anodes). There are two Vanjukov smelters with 40 000 tpa capacity each, and two reverbatory smelters with 35 000 tpa capacity each. The Vanjukov smelters are designed to treat a homogeneized low copper grade charge of concentrates and fluxes with relatively high moisture content. They produce copper matte at approximately 44% Cu and sulphuric gases of 15-25% SO2 which are sent to the acid plant. The reverbatory furnaces need to be fed with a higher copper grade in the charge and they produce copper matte at approximately 28% Cu (the average grade of the matte is 36%); the gases are too low in SO2 content (5.5%) to be treated for acid production and they are therefore released to the atmosphere. At present one of the Vanjukov furnaces is out of service due to the difficulty of procuring an important spare-part sub-component (top gas recovery system). This furnace also needs to be relined. Apart from that, smelting and refining plant and equipment are in good shape, even if they require some revamping.

3.1.2. CONCENTRATE FEED TO THE SMELTERS

In 1994, the average Cu metal content in the concentrates smelted was approximately 20%, whereas it was more than 25% in the 1970s, because richer copper ores were exploited. The decrease in average concentrate grade followed the start-up of Jezkhazgan copper complex in the 1970s, which called for a different allocation of copper resources between the two complexes. Prior to this, the Jhezkazgan mines near Jhezkazgan complex was providing Balkhashmed with high grade copper concentrates (approx. 35% Cu).

3.1.3. ENVIRONMENTAL ASPECTS

The Government of Kazakhstan, responding to pressure from the international community, has enacted stricter regulations on harmful emissions with the result that Balkhasmed is now paying high penalties for SO2 and other harmful gases released to the atmosphere.

3.2. PRECIOUS METALS

In addition to the production of copper cathodes, Balkashmed produces gold, silver and other precious metals in the slimes of the electrolytic unit. As of today, gold and precious metals in the slimes are concentrated in a plant on the site of the complex and the product is sent outside for refining (to Chimkent which produces up to doré stage and to Ust Kamenogorsk which produces both doré and fine gold). However, a gold and precious metals refining unit is presently under construction; it will be operational at the end of 1995 or at the beginning of 1996.

Gold & silver and other precious metals contribute importantly to the economics of Balkhashmed (see table below, in which all the metals produced are valuated as if they were derived from 100% own and purchased sources). Most of the gold and silver produced, come from sources in Kazakhstan. Gold and silver in the slimes mainly come from auriferous quartzites that are used as silica flux for slag/metal separation in the smelting process.

The following table shows the production of copper, gold and silver, in 1994 and over the five year period 1989-1994:

Productions	**1994**	**1989-1994**
Refined copper (t)	135 247	924 098
Blister copper (t)	120 000	706 150
Gold in slimes (kg)	7 220	59 893
Silver in slimes (kg)	112 113	1 070 464
Valuations		
M US$ Cu	298.1	2 036.7
M US$ Au	87.1	722.6
M US$ Ag	12.7	120.9
M US$ total	397.8	2 880.2
Refined copper equivalent of Au & Ag (t)	45 265	382 686
Total Cu equivalent t	180 512	1 306 784
add-on value for Au,Ag in % over Cu	33.5%	41.4%

NB: Calculated with the following selling prices: Cu 1US$/lb, Au 374 $/oz after deducting 6 $/oz refining charge; Ag 3.4$/oz after deducting 0.6 $/oz refining charge.

3.3. CURRENT SUPPLY OF RAW MATERIALS

The current structure of supply of copper raw materials illustrates a high reliance on custom smelting (55% of Cu fed to the smelters), the material of which comes either from mines and concentrators directly, or through traders. Presently, the utilisation of own and Kazakh resources is relatively low. Typically:

Less than 25% of the concentrates treated are produced by Balkashmed own mines. These are the open pit mines of Kounrad and Sayak, respectively situated 15 km and 200 km from the complex and with average grades of 0.35% Cu and <1% Cu respectively); the concentrates produced are respectively 12-15% and 17-19% Cu. Copper reserves left in these two mines are respectively 0.7 Mt Cu and 0.12 Mt Cu. Kounrad is very similar to Bingham in the US. Remaining reserve of gold is respectively 2 t and 4 t.

The balance of copper supply is largely procured and processed on custom basis and is sourced principally from Mongolia (36% from Erdenet mine), and Chile (7%), and from other Kazakhstan mines and concentrators (28%). It is only since 1989 that the reliance on Cu imported from outside, has occurred. Before disintegration of the USSR, copper supplies came exclusively from domestic and regional sources.

A comparable situation applies to the sources of gold, silver and other precious metals.

Blister copper is purchased from outside Balkhasmed but in Kazakhstan (Irtych polymetallics complex). This blister contains significant amounts of Au and Ag.

3.4. PRODUCTS AND MARKETS

3.4.1. CATHODES

The main product of the complex is high grade Cu cathodes designated under Kazakh standards as MOK (99.97% Cu). MOK is not registered at LME due to its level of impurities which affect wire drawing characteristics and this is due mainly to the level of impurities contained in the ores and concentrates and to the absence of adequate electrolyte bleeding and purifying in the cells (extraction of metal impurities dissolved in the electrolytic process).

However MOK sells competitevely in export markets because copper content is generally 99.99% Cu. Thus, up to 70% of the production is exported outside the CIS, the European Union being the main export market. Approximately 25% is sold in the CIS (essentially in Kazakhstan).

The higher copper grade is MOOK which is tradable at LME conditions, under grade A quality. It is possible to produce some MOOK copper cathodes by operating in campaigns using the better quality concentrates and to produce anodes with lower level of impurities. In the present structure of copper supply, about 10-15% of MOOK quality of copper cathodes could be produced. Balkhashmed also produces some M1K quality cathodes.

The total production of 135 247t of cathodes in 1994 divides as follows:

to be returned to suppliers for custom smelting	57 064 t
own and purchased copper for sale on export markets	69 162 t
reserved for the transformation plant	9 021 t
total	135 247 t

3.4.2. TRANSFORMED PRODUCTS: ROLLED PLATE, STRIPS AND WIRE BARS

Part of the production of copper cathodes is transformed on site in a metal transformation plant into rolled products (plates and strips) and wire bars of copper and various copper alloys (Ni, Zn, etc.). There is also a small magnet wire unit of 500 tpa capacity. The transformation plant is integrated in Balkhashmed Combinate, but it is managed as an independent enterprise. Present nominal capacity is 84 000 tpa of transformed products (32 000 t rolled and 52 000 t of wire-bars).

An expansion and modernisation program is presently underway which will increase rolling capacity to 75 000 tpa, modernise wire-bar production with a capacity

of 40 000 tpa, increase and modernise magnet wire capacity of production to 7 000-8 000 tpa.

Expansion of rolling capacity is undertaken by Ebner of Austria (furnaces), and Skoda of Czech Republic (rolling mills). Modernisation of the wire bar section is undertaken by Mannesmann-Demag of Germany; it involves two rod rolling mills; the first was commissioned in 1994, the second will be commissioned in 1995. Modernisation of the magnet wire producing unit (to produce range of diameters 0.15-1.5 mm), is being done by MAG of Austria in association with German manufacturers of equipment; production will be 7 000-8 000 tpa, depending on wire diameter.

The supply of copper cathodes to enable the transformation plant to operate at its new capacity of 100 000 t of rolled products and wire-bars, after modernisation, is a strategy issue for Balkhashmed. This plant was one of eight similar ones in USSR and it supplied transformed products to Russia and other republics in the USSR. This activity has drastically decreased since the disintegration of the USSR, the recession that has followed, and the disappearance of orders by the industrial and military combinates. Since 1991, Balkhashmed has adapted by selling much more cathodes on far export markets. Management will therefore have to arbitrate between shipment of its own/purchased copper to export markets and/or to the transformation plant.

The production of the transformation plant was as follows in 1989 and 1994:

Years	1989	1994	1989-1994
rolled products (t)	35 205	6 472	139 628
Wirebars (t)	52 031	1 070	183 640
Wirebars on toil basis		6 696	19 016
Total transformation plant (t)	87 236	14 238	342 284

NB: copper for toil transformation is sent by Russian companies. This is a recent development which the transformation plant uses to maintain activity and copper supply.

3.4.3. GOLD, SILVER AND OTHER PRECIOUS METALS

By product gold, silver and other precious metals (selenium, tellurium, platinum, palladium, etc.), are produced in the form of electroytic slimes as mentioned before. Precious metals in the electrolytic cell slimes are concentrated in a hydro-metallurgical plant on the site of the complex and dry concentrated residues are produced. A gold and precious metals refining plant is under construction by Boliden Contech. It will be

fully paid and operational at the end of 1995. Fine gold, silver and other precious metals produced will be remitted to the Central Bank through the monopoly state organisation Altin Almas which will pay for costs and profit margin, under prevailing state prices.

When by-product precious metals are added to copper production and converted into equivalent copper quantity and grade, the production of copper is significantly higher (+40-50%) as well as the average grade of the copper supply.

3.4.4. OTHER BY-PRODUCTS

Other by-products of the smelting and refining process are sulphuric acid and copper sulfate, but with limited marketing and sales revenues, and sales of services (water, heat, maintenance, spare parts, etc.) to small enterprises and to the population of Balkhash.

3.5. HUMAN RESOURCES

Manpower of the whole complex was approx. 14 000 (including the Kounrad and Sayak mines) in 1994. The distribution of personnel is shown below, with indication of main units, industrial and non industrial, workers and staff.

Balkhashmed: distribution of personnel as of 1/1/1995

	workers	staff	total
direction & administration	48	423	471
mines & concentrating plant	2 644	324	2 968
smelting & refining	2 223	193	2 416
copper alloys transformation plant	1 021	178	1 199
spare parts fabrication plant	632	85	717
total industrial personnel	6 568	1 527	10 739
total non industrial personnel	4 920	1 097	6 017
of which social proper (*)	851	572	1 423
total complex including (*) social proper	11 488	2 624	14 112
total complex excluding (*) social proper	10 637	2 052	12 689
production t Cu cathodes			135 247
production t Cu equivalent (incl. add-on Au & Ag)			180 512
productivity based on total personnel of the complex t Cu equiv/man year excl. social			14.2
productivity metallurgy alone t Cu equivalent/man year excl. social			74.7

__ compares to an international reference of 60. The previous figure has no international reference because it include mines and __
__ concentrator.

3.6. FINANCIAL PERFORMANCE

Based on the information provided by Balkhashmed, the cost of production in 1994 (for 135 247 t Cu cathodes of which 78 183 t from own and purchased Cu materials, and 57 064 t from custom smelting), amounted to approximately 5 210 M Te, or 152.5 M US$ (at the average rate of exchange of 1994 of 34.16 Te/US$), i.e. 0.51 US$/lb Cu cathode (0.69 US$ for own and purchased copper, 0.14 US$ for smelting and refining charges on custom smelted copper).

Included in the 0.51 US$/lb Cu, general and administration costs are 0.09 US$/lb and 0.06 US$/lb Cu are for the company's contribution to the costs of social infrastructures which correspond to services rendered to its personnel (medical welfare, kindergartens, recreational and cultural centers, agricultural enterprises, shops, etc.). The 0.69 US$/lb of own and purchased copper include purchase of Cu, Au and Ag raw materials.

Based on the information provided by Balkhashmed, the total sales value of own copper and precious metals production and of the smelting and refining services for custom smelting, amounted to 6 610 M Te, or 194 M US$ i.e. 0.65 US$/lb Cu cathode (1.00 US$/lb for own production, 0.17 US$/lb for smelting and refining charges).

From this, there results an operating profit of 605 M Te, or 17.7 M US$ i.e. 0.06 US$/lb Cu cathode of total production (10.08% over costs).

The following table shows these results in detail (for the smelter/refinery).

Sales & Costs 1994 figures	**Cu t**	**sales**	**costs**	**profit**
in Te (000s)				
Cu from own & purchased raw material	78 183	5 872 780	4 048 760	1 824 020
Cu from custom smelted raw materials	57 064	736 950	595 914	141 036
sub total	135 247	6 609 730	4 644 674	1 965 056
general & administration			795 185	-795 185
social			564 835	-564 835
total	135 247	6 609 730	6 004 694	605 036
% profit				10.08%
in US$ (000s)				
Cu from own & purchased raw material	78 183	171 920	118 523	53 396
Cu from custom smelted raw materials	57 064	21 573	17 445	4 129
sub total	135 247	193 493	135 968	57 525
general & administration			23 278	-23 278
contributions to social infrastructures			16 535	-16 535
total	135 247	193 493	175 781	17 712
% profit				10.08%
in US$ /lb Cu				
Cu from own & purchased raw material	78 183	1.00	0.69	0.31
Cu from custom smelted raw materials	57 064	0.17	0.14	0.03
sub total	135 247	0.65	0.46	0.19
general & administration			0.08	-0.08
contributions to social infrastructures			0.06	-0.06
total		0.65	0.59	0.06

It can be seen that custom smelting is less profitable than smelting and refining of own and purchased materials because the smelting and refining charges are just sold at their cost. This points out to the necessity of increasing the supply of own copper supply, by developing new copper orebodies (see section 4.2 below).

The added value of the copper transformation plant is higher; so is its operating profit; the profit margin over annual operating costs (1994, including contributions to the social infrastructures), is about 40%.

During the past four years, Balkhashmed has undertaken major productivity investments as mentioned before: precious metals refinery, acid plant, transformation plant modernisation (rolling capacity expansion, wirebars modernisation and magnet wire unit). These important investments enhance Balkhashmed's value added and profit margin; they were made possible by a 100 M US$ credit, arranged by Glencore AG ex Mark Rich of Switzerland, and are guaranteed by quick repayments in copper cathodes. As of end 1995, all this credit will have been repaid in copper (except a loan of 8.6 M US$ by the Austrian Government to finance the magnet wire unit supplied by MAG).

Today, Balkhashmed wants to increase its own resources of copper by developing new mining and concentration capacity (see next sections).

4. POTENTIAL

4.1. OUTPUT OF COPPER AND PRECIOUS METALS

4.1.1. OPTIMAL LEVEL OF PRODUCTION

A decision will have to be taken on the optimum level of production of the complex, taking into account the respective proportions of own resources versus custom smelting. Other factors to be taken into account include the environmental issues, the productivity of main process equipment, as determined by the average Cu grade of the concentrates available to the complex, and the amount of fixed charges i.e. the scale factor of the complex.

The optimal level of production will therefore have to be selected between a minimum (the two Vanjukovs providing the matte required to the converters, with minimal negative environmental effects, i.e. 80 000-100 000 tpa blister) and a maximum (with one or the two reverbatory furnaces operating in addition, with maximum negative environmental effects, i.e. 120 000-150 000 tpa blister). An alternative in the search of maximum production, could be to replace one, or the two, reverbatory furnace(s), by more modern furnaces.

4.1.2. POTENTIAL PRODUCTION

Setting aside the issue of the optimum level of output, if the objective is to increase production, we believe that the annual output of blister could rise from the current 115 000 tpa to 150 000 tpa within two to three years, as a result of the rehabilitation of the Vanjukov smelter which is out of service, and of the construction of a new acid production unit which will allow to produce up to 390 000 tpa of acid, which is planned by management. The cost of this investment program is estimated at USD 40 m.

In addition to this, any increase in the average grade of concentrates processed will allow a further increase of the production of blister by improving the productivity of the smelters and converters, and thus that of refined copper. For example, a 10% relative increase in the average grade of concentrates (from say 20% to 22% Cu), will result in an incremental output of blister of 15 000 tpa. This is a reasonable assumption considering the large copper resources available in the region. Such resources were extensively proven and explored in the past years and are ready for development.

The total production of Balkashmed own blister could then be of 165 000 tpa.

In this case however, it cannot be ruled out that the production of acid may exceed the capacity of absorption by the market. In such case, acid disposal and/or neutralization processes may therefore have to be developed (limestone/lime gypsum to be stockpiled as a final waste product), the cost of which (capital and operating) will have to be considered in making a decision as to the optimum level of production. Alternatively, a decrease of the level of production near the minimum level mentioned above (two Vanjukovs and 80 000-100 000 tpa blister), would obviously ease the environmental problems and those of acid disposal.

Taking into account the possibility to purchase external blister from other metallurgical complexes in Kazakhstan, currently Irtych 15 000-20 000 tpa, and, as prior to disintegration of the USSR, also 15 000-20 000 tpa from East Ural in Russia, the potential maximum output of refined copper is of the order of 200 000 t. Given the high level of the present breakeven point, such an increase in output would, on its own, improve the financial performance of the complex.

Further improvements of the financial performance could be achieved through a reduction of fixed costs such as personnel, maintenance, consumption of inputs, organisational and management information systems etc.

4.2. POTENTIAL FUTURE SUPPLY OF RAW MATERIALS

Thanks to the favourable geological environment of Kazakhstan, there are sufficient national resources to enable Balkashmed to rely increasingly and durably on own reserves for copper, rich in gold and silver. These are currently state-owned properties, fully explored, but yet to be developed.

The main characteristics of some of these ore bodies are set out below :

Balkhashmed's priority is Boshikul orebody; this is located in Ekibastuz district of Pavlodar region, 100 km from the town of Ekibastuz, 18 km north of Boshikul railway station [1000 km north of Balkash]. This orebody is fully explored and ready for exploitation (openpit). It is a copper porphyry type in the form of a massive orebody. There are 1.20 Mt Cu in ore at 0.72% Cu, in proven categories A+B+C1 (as per Russian methodology), plus an additional reserve of 0.94 Mt Cu in categories C_2 and P. Gold reserve is 46 t (all categories) in approx. 300 Mt of ore which corresponds to a grade of 0.15 g/t.

It is estimated that the investments needed to exploit the Boshikul deposit amount to 235 M US$, based on engineering studies and a proposal. Mining and concentration facilities are to mine and process 6.5-7.0 Mtpa of ore and produce 39 000 tpa of copper contained in 180 000-200 000 tpa of concentrates at 25-30% Cu. Subject to making

start up investments, the potential therefore exists to develop a secure and durable source of concentrates for Balkhashmed.

Actogay orebody is in Semipalatinsk region 20 km east of Actogay railway station, 420 km east of Balkhash. This is also a copper molybdenum porphyry orebody in the form of disseminated mineralisations. The orebody is fully explored. Copper reserve is approx. 5.9 Mt Cu in 1 475 Mt ore at 0.40% Cu. Gold reserve is 44 t which corresponds to a grade of 0.03 g/t.

A*idarlay* orebody, situated near Actogay, has similar characteristics as Actogay. The orebody is also fully explored. Copper reserve is approx. 5.8 Mt Cu in 1 450 Mt ore at 0.40% Cu. Gold reserve is 14 t which corresponds to a grade of 0.01 g/t.

These two orebodies are the largest of all; in addition to Cu, Au and silver (Au/Ag ratio is >10), they contain a substantial cover of oxidized materials in addition to the above cited tonnage, which is amenable to acid leaching and SX/EW processing, for which Balkhashmed have a project.

Karatas orebody 100 km north of Balkhash, is also a fully explored orebody. It contains copper and molybdenum disseminated ores in vertical to subvertical veins of irregular form. There are four areas which contain a total of 0.25 Mt Cu in 77 Mt of ore at 0.33% Cu, and 28 000 t Mo at 0.04% Mo.

Kusmurun and Akbastau orebodies, located 160 km north of Balkhash, contain 0.8 Mt Cu in ore at 2.9% Cu. Concentrate grade according to Balkhashmed would be 18-20% Cu.

Koktau: Koktau orebody (and Chilisay concentrator), is situated north west of Balkhash. It contains 0.7 Mt Cu in ore at 1.83% Cu. Concentrate grade according to Balkhashmed would be 22% Cu.

Koksai: this is a porphyry copper orebody which is situated in Taldy-Korgan region, 150 km NE from Almaty, 70 km S from Taldykorgan. Cu reserves are 0.8 Mt Cu in ore A+B+C1 1 639.6 kt; by-products are: Au 37 159 kg, Ag 396 t, Se 1 121 t, Re 177 t, Te 355t, Mo 15.7 kt.

In addition to these potential copper resources with by-product Au and Ag, there are auriferous ores from gold orebodies proper, and mines and concentrators (the gold and silver being contained in quartzites which used as a Si02 flux in the smelting process). These ores come from the following mines (Ag estimated on the basis of an assumed Ag/Au ratio of 12:1):

	Au	**Ag**
Zharkulak	7 t	84 t
Muzbel	20 t	240 t
Kenzhem	43 t	416 t
total	70 t	840 t.

All the resources mentioned in this section are currently under state ownership. As mentioned in the introduction, the Government of Kazakhstan is prepared to consider the inclusion of certain of these resources in the sales package.