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EU environment regulation and their impact on competitiveness of European lead and zinc industry in the EU 10

Key words

Mining zinc and lead, EU enlargement, mining law

Abstract

With the enlargement process, mining companies in the new member countries will have to reach EU environmental standards by implementing European legislation, and have a greater awareness of pollution prevention and control as well as waste management. The most important EU legal regulations, which influence zinc and lead producers in the new EU countries are:

1) the European Directive on Pollution Prevention 96/61/EC of 24th September 1996 (IPPC): "Integrated Pollution Prevention and Control (IPPC)",
2) a draft proposal for a new Batteries Directive (91/157/eec) — adopted the European Commission in November 2003, i.e it is a revision of the Council Directive of 18 march 1991 on Batteries and Accumulators,
3) a Proposal of EU Directive on the Management of the Waste from Extractive Industries, which was officially published on June 2, 2003,
4) a EU communication (COM (2003) 572) entitled "Towards a thematic Strategy on the Sustainable Use of Natural Resources" — officially published in October 2003.

The applicant countries were expected to transpose all existing Community environmental law into their national legislation, and this is taking considerable effort. The influence of new laws influence to the behavior of companies, but its impact on their competitiveness, particularly in the mining sector in EU new members.

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Introduction

The EU stated in 2001 that the environment in the (CEEC) was in a very poor state, and the enlargement of the European Union to include these new countries posed an environmental challenge on a far greater scale than on previous accessions. The applicant countries were expected to transpose all existing Community environmental law into their national legislation, and this is taking considerable effort. The new laws influence the operation and behavior of companies, but also impact on their competitiveness, particularly in the mining sector.

In the new EU member states, mineral resources include hard and brown coal, non-ore and construction materials, as well as non-ferrous metals and precious metals (Cu, Zn, Pb — mainly in Poland). With the reform of the economic system introduced in new EU states during the early 1990s many mining companies have been closed or privatized. Those companies that still operate have to implement new ecological policies and invest millions of Euros for pro-ecological solutions. With the enlargement process, mining companies in the new member countries will have to reach EU environmental standards by implementing European legislation, and have a greater awareness of pollution prevention and control as well as waste management. The most important EU legal regulations, which influence zinc and lead producers in the new EU countries are:

The European Directive on Pollution Prevention 96/61/EC of 24th September 1996 (IPPC): "Integrated Pollution Prevention and Control (IPPC)" is the title of a framework directive adopted in September 1996. The IPPC Directive is about minimising pollution from various point sources throughout the European Union. All existing zinc and lead installations in new EU members are required to obtain a permit from the authorities and without this permit, they are not allowed to operate. The permits must be based on the concept of Best Available Techniques (BAT). In many cases BAT requires radical environmental improvements and in some instances will be very costly for companies to adapt their plants to comply with this. The IPPC Directive can be seen as the basis for the dissemination of environmental technology and best practice in industry in the EU.

According to the reference document on BAT for the non-ferrous metals industries (December 2001) environmental problems concerning zinc production from primary sources in the EU old member states included:

— Air pollution caused by the emission of sulphur dioxide from the roasting and smelting of sulphide concentrates. Achieving a high fixation of sulphur by producing sulphuric acid and liquid sulphur dioxide has effectively solved this problem. This was also noted as a problem in lead processing.

— The removal of iron during processing results in the production of significant quantities of solid waste that contains a variety of metals. The disposal of this waste requires a very high standard of containment and monitoring.

— Fugitive emissions from roasting and calcining are also very important and need to be considered for all of the process stages. The fugitive emissions of acid mists from the electrowinning of zinc is a particular example of this.

Whereas for lead production the main issues were:

— Off-gases from the various furnaces in use for the production of secondary lead. The gases are cleaned in fabric filters which reduces the emissions of dust and metal compounds. The formation of dioxins is possible due to the presence of small amounts of chlorine in the secondary raw materials and the destruction of these is an ongoing issue.

— Many lead compounds are classified as toxic. The general policy is to restrict emissions to the lowest practicable levels given the state of technology, and recycling is normally conducted whenever appropriate and economic. Environmental legislation (e.g. EU directive 82/605/EEC of July 28, 1992 on the protection of workers from risks related to exposure to metallic lead and its ionic compounds at work, or directive 82/844/EEC of December 3, 1982, which sets a limit for levels of lead in air throughout the EU) will require investment to reduce lead emissions to the air. In recent years several new technologies have been developed and implemented which offer more efficient methods of smelting lead concentrates.

Other important legislation for the zinc and lead industry is a revision of the Council Directive of 18 march 1991 on Batteries and Accumulators Containing Certain Dangerous Substances (91/157/eec). In November 2003 the European Commission adopted a draft proposal for a new Batteries Directive, which will require the collection and recycling of all batteries placed on the EU market. The aim of this is to limit current and future uncontrolled disposal of spent batteries in the EU, and to establish a closed-loop system for all batteries to avoid their incineration or disposal in landfill when they reach the end of their lives. On 6 April 2004, the European Parliament's Environment, Public Health and Consumer Policy Committee adopted a set of 82 amendments to the Commission's Batteries Directive proposal. According to the lead and battery industries, if they had been incorporated into the Commission's proposal these amendments could have had far reaching consequences for lead.

But the most important legislation for the zinc and lead mining producers in Europe is the EU Directive on the Management of the Waste from Extractive Industries, which was officially published on June 2, 2003, and reached political Agreement in Council on 14 October 2004. The Directive merely creates 'a level playing field' in the areas of extractive waste, by specifying requirements on the design, operation, closure and most importantly post closure inspection of waste management facilities. This will be achieved, by specifying and requiring improvements on all aspects of these facilities. This is particularly important in view of the prospective EU enlargement, given the number of extractive industrial locations in several new EU members, and prospective EU members, and the need to raise standards. As a result mining companies across the whole of Europe will have to develop or revise their strategies to prevent and reduce the effects of waste facilities through their life cycle.

Another significant environmental initiative within the EU was published in October 2003 — a EU communication (COM (2003) 572) entitled "Towards a thematic Strategy on the Sustainable Use of Natural Resources". This is the first step in the development of a European Resource Strategy, for which the main objective is to achieve a decoupling of any resource-related environmental impact from economic growth over the longer-term (25 years). The Resources Strategy will complement existing environmental policies that address the status of environmental media, but will begin a life-cycle assessment (LCA) of resources, i.e. taking into account the entire life-cycle of a product as well of its substitutes.

Based on existing data and software (Sima Pro) the 2000 LCA comparison for zinc (World average data, delivery to Rotterdam), lead (mining to production of metal using a scrap use percentage of 50%) and copper (open pit mining (2/3) and sulphide ores (0.6%Cu) assumed, delivered to Rotterdam, 13% scrap) using Ecoindicator 99 points shows that in three impacts category the 1 kg of produced metal (LCA) influenced mostly on resources, than on human health and in last point on ecosystem quality.

Zinc mining in new EU

The Old European Union accounted for about 7% of the total world mined production in 2003, the bulk of which is produced in Ireland and Sweden. Within the new European Union, which produced around 8.5% of world zinc mine output in 2003, an additional two, but large, underground zinc-lead mines were added to the population, both in Poland: Trzebionka and Olkusz-Pomorzany.

Trzebionka mine extracts 2.3 Mt of ore per annum grading 3.4% Zn and 1.5% Pb with the ore processed in a mill close to the mine. The quality of the concentrates sold is very good: the company offers clean zinc and lead concentrates with grades over 60% Zn and 70% Pb respectively, with only small amounts of impurities (the maximum content of MgO is 0.2%; CaO — 0.8%). The Trzebionka mine and processing plant is part of the structure of ZG Trzebionka S.A., a joint stock company in operation since 1992.

The Olkusz-Pomorzany mine extracts around 2.5 Mt of ore per annum grading 4.2% Zn and 1.4% Pb, which is processed at a plant at Olkusz. The Olkusz-Pomorzany mine and processing plant, as well as the smelting plant with the capacity of 70kt Zn, are part of ZGH Boleslaw Mining and Smelting Plants S.A. Additionally, ZGH Bolesław S.A. produce a zinc oxide (50—52% Zn, 11—15% Pb) from zinc-bearing waste at a Recycling Plant.

The volume of Polish primary zinc production can be maintained over the next two years but production beyond 2006—2008 will depend on the development of new reserves. Trzebionka, in particular, has a limited life as reserves are located a long distance from the main shaft.

TABLE 1

Zinc — mine production in Europe in 2000—2003 (kt Zn in zinc and bulk concentrate)

TABELA 1

Produkcja górnicza cynku w Europie w latach 2000—2003 [tys. t]

Year	2000	2001	2002	2003
Bulgaria	10	10	10	10
Finland	16	20	35	39
Greece	17	32	34	3
Ireland	263	299	255	419
Macedonia	20	20	20	10
Poland	150	150	141	147
Romania	23	23	23	23
Russian Federation	165	172	179	177
Serbia & Montenegro	4	8	0	0
Spain	201	171	70	15
Sweden	177	156	149	187
Europe	**1 046**	**1 061**	**916**	**1 030**
World total	**8 998**	**9 145**	**9 110**	**9 498**
New EU (%)	***9.2***	***9.1***	***7.5***	***8.5***
Old EU (%)	***7.5***	***7.4***	***6.0***	***7.0***
Europe (%)	***11.6***	***11.6***	***10.1***	***10.8***

Source: Brook Hunt 2004

Lead mining in new EU

The majority of lead is produced as a by-product in mines, which have been developed for other metals, most notably zinc and silver. The old EU contributes over 4% of world lead mine production — Sweden and Ireland are the most significant suppliers of lead. There are only few active mines globally where lead is the primary metal and the last one in Europe, Boliden's Laisvall mine in Sweden, closed in 2001. In total, Europe supplies about 7.9% of lead mine production, and new EU about 5.8% (table 2).

TABLE 2

Lead — mine production in Europe in 2000—2003 (kt Pb in lead and bulk concentrate)

TABELA 2

Produkcja górnicza ołowiu w Europie w latach 2000—2003 [tys. t]

Year	2000	2001	2002	2003
Bulgaria	15	15	15	15
Greece	16	27	28	2
Ireland	57	45	31	55
Italy	7	7	0	0
Macedonia	26	20	15	8
Poland	52	54	56	55
Romania	16	16	16	16
Russian Federation	14	14	19	20
Serbia & Montenegro	1	2	0	0
Spain	51	36	6	2
Sweden	108	86	43	50
Europe	**363**	**322**	**229**	**223**
World total	**3 038**	**3 052**	**2 790**	**2 815**
new EU (%)	***9.6***	***8.4***	***5.9***	***5.8***
old EU (%)	***7.9***	***6.6***	***3.9***	***3.9***
Europe (%)	***11.9***	***10.6***	***8.2***	***7.9***

Source: Brook Hunt 2004

Zinc and lead metal production in new EU

In 2003, the old EU produced over 21% of the zinc metal produced globally, whereas its share in refined lead production amounted to 19%. (tables 3 and 4). Among the new members, refined zinc is produced only in Poland (155 k t), whereas refined lead is produced in Poland (61 kt), Czech Republic (30 kt) and parts of the Former Republic of Yugoslavia (e.g. Slovenia 14 kt).

New projects in new EU

Within Europe there are several zinc-lead mine projects under consideration, e.g. Olympias in Greece, Aljustrel in Portugal (EuroZinc), the restart of operations at Sotiel, held

by the former mining contractor at Aguas Tenidas, and Blaiken by Scan Mining AB in Sweden, as well as at Neves Corvo, operated by Somincor (owned by EuroZinc) in Portugal. Also expansions are planned at Galmoy and Zinkgruvan. While there are additional resources outlined in new EU member states, there are, as yet, no zinc-lead projects being advanced towards production.

The only active smelter project under consideration in Europe is the expansion of San Juan de Nieva in Spain by 50kt Zn/a to around 520kt Zn/a.

TABLE 3

Refined zinc — metal production in Europe in 2000—2003 (kt Zn)

TABELA 3

Produkcja cynku rafinowanego w Europie 200—2003 [tys. t Zn]

Year	2000	2001	2002	2003
Belgium	264	260	262	269
Bulgaria	87	86	83	93
Finland	224	249	236	266
France	327	329	33	259
Germany	332	335	358	362
Italy	171	179	174	120
Macedonia	61	58	54	20
Netherlands	214	198	197	223
Norway	138	145	145	141
Poland	176	178	158	155
Romania	52	47	37	45
Russian Federation	234	240	247	244
Serbia & Montenegro	5	14	2	0
Spain	389	435	501	523
United Kingdom	75	91	90	13
Europe	**2 749**	**2 844**	**2 577**	**2 733**
World total	**8 948**	**9 309**	**9 683**	**9 827**
new EU (%)	***24.3***	***24.2***	***20.7***	***22.3***
Old EU (%)	***22.3***	***22.3***	***19.1***	***20.7***
Europe (%)	***30.7***	***30.6***	***26.6***	***27.8***

Source: Brook Hunt 2004

TABLE 4

Refined lead — metal production in Europe in 2000—2003 (kt Pb)

TABELA 4

Produkcja ołowiu rafinowanego w Europie w latach 2000—2003 [tys. t Pb]

Year	2000	2001	2002	2003
Austria	24	22	22	22
Belgium	122	102	92	72
Bulgaria	87	83	68	76
Czech Republic	29	30	30	30
France	262	234	195	100
Germany	387	374	380	368
Greece	6	5	5	5
Ireland	9	10	7	10
Italy	230	216	188	199
Macedonia	23	19	16	7
Netherlands	21	20	18	21
Poland	62	62	61	61
Romania	26	31	30	4
Russian Federation	64	66	65	95
Spain	120	122	116	120
Sweden	78	75	64	73
Switzerland	7	7	7	7
Ukraine	7	7	7	7
United Kingdom	334	376	366	294
Yugoslavia FR	23	17	17	17
Europe	**1 898**	**1 861**	**1 737**	**1 571**
World total	**6 674**	**6 575**	**6 618**	**6 567**
New EU (%)	***25.2***	***25.1***	***23.3***	***20.9***
Old EU (%)	***23.6***	***23.4***	***21.7***	***19.2***
Europe (%)	***28.4***	***28.3***	***26.2***	***23.9***

Source: Brook Hunt 2004

In the Eastern European countries the metallurgical sector consists of a large number of medium or small sized plants, many of them old and obsolete. These have structural weaknesses, the main one being the lack of an economic supply of local ore or concentrate.

Geographically, they are generally not well placed to import these materials and may not have access to cheap electric power. Therefore, so far, restructuring, privatisation and foreign investments have not been very successful in these countries in the smelting industry. By way of an example, the foreign capital flow reached an accumulated value of more then US$70 billion in Poland and US$38 billion in the Czech Republic between 1993—2003. However, the share of this received by the mining sector amounted to less than 0.5% of the total inflow, e.g. in Poland it amounted to 0.3%.

In the Czech Republic exploitation of copper, zinc and lead deposits had been possible only due to governmental subsidies, which were terminated on January 1, 1994. Major copper mining activity in the Czech Republic was focused on volcano-sedimentary sulphide deposits in the Zlate Hory mining district. Other mining operations producing copper, zinc and lead were at Tisova (Cu, closed in 1973). Horni Benesov (Zn-Pb, closed in 1992). In Slovakia, all copper, mercury, lead/zinc, antimony and polymetallic ferrous mines were closed at the beginning of 1990s.

However, in the Czech Republic, even though there are no active metal mines, there are nine copper deposits, twelve zinc deposits, and twenty six gold deposits identified but with no active development. In Poland, the situation is much better with an additional twenty one identified zinc-lead deposits with resources of 183 Mt (containing 3.3Mt of zinc and 7.3Mt of lead) with 34 Mt (containing 0.6Mt zinc and 1.5Mt lead) which may become reserves with additional work.

European zinc mine and zinc smelter production costs

The European zinc mining industry faces strong global competition due to quality of deposits, high energy price as well as environmental requirements. According to Brook Hunt data, in 2002 the cost to produce 1 tonne concentrate positioned European zinc mines on the 83rd percentile of global production in $/t terms. When put into c/lb terms, through to finished metal, the position worsens, with the average for European zinc mines deteriorating to the 90^{th} percentile (fig. 1). However, in this figure there is a range of individual country costs in Europe from $640/t to $980/t. This poor position is a consequence of exploiting a relatively poor resource base. However, there are benefits to the European zinc mines — the relatively close proximity to smelters and the supply of relatively clean concentrates with low penalties.

Within the new Europe the average cost of zinc production in both Polish mines is one of the highest. This is due to very high mining cost, connected with high water pumping rates (increasing the energy costs), the high use of backfill and relatively high labour costs in addition to the low head grades produced from the mine. The cost to concentrate in Polish mines is over 30% higher than the EU average. The structure of mining cost in Trzebionka S.A. is as follows:

— labour cost — 28%,

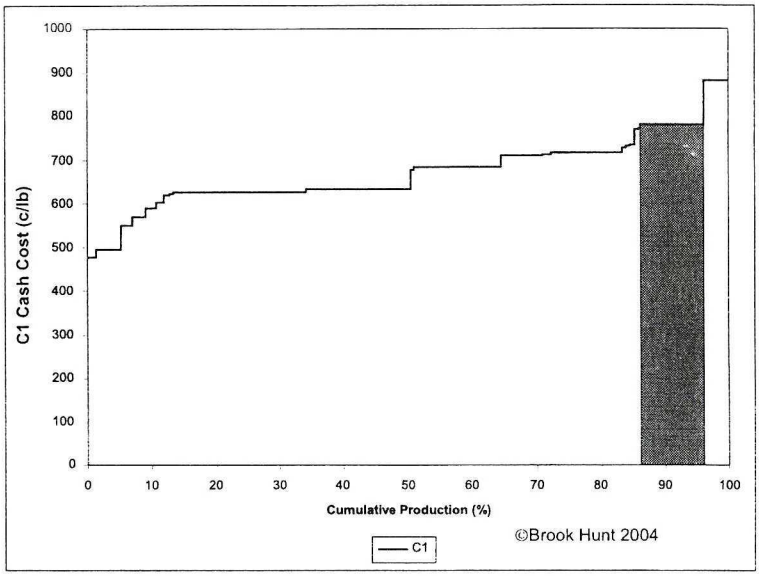

Fig. 1. 2002 Zinc production cost curve (composite costing) by region, highlighting the position of Western European production (including Poland)

Rys. 1. Krzywa kosztów produkcji cynku w na świecie z uwzględnieniem kosztów producentów europejskich

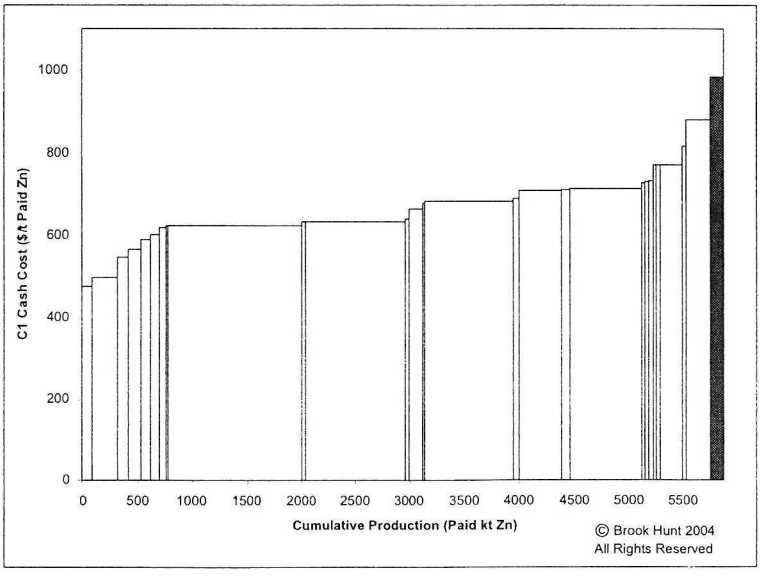

Fig. 2. Zinc production cost curve (composite costing) by country, highlighting the position of Polish production (2002)

Rys. 2. Krzywa kosztów produkcji cynku w na świecie z uwzględnieniem kosztów producentów polskich

— energy consumption — 13%,
— consumables — 20%,
— amortisation — 6%,
— transport — 11%,
— other — 22%.

The high cost of metal production in Poland is also connected with existing high environmental charges. As a result, the two Polish mines are at the high cost end of the fourth quartile of the cost curve (figs. 2 and 3), and are most likely to remain there, given the lack of scope for expansion in capacity, improvement in grade or for reduction in labour or power costs.

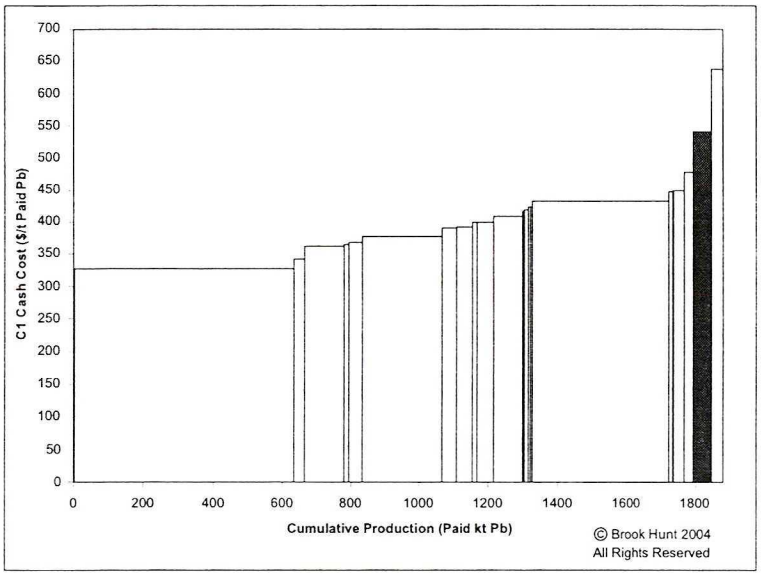

Fig. 3. Lead production cost curve (composite costing) by country, highlighting the position of Polish production (2002)

Rys. 3. Krzywa kosztów produkcji ołowiu w na świecie z uwzględnieniem kosztów producentów polskich

During the last period of low metal prices, Polish zinc producers maintained their volume of production but operated at a cash loss (tables 4 and 5).

During the period of low prices experienced in the first years of the century there was a significant affect on both the smelting and mining industries. Worldwide, about 21% of refined output from zinc smelters was produced at a cash operating loss during 2002 and over 40% in 2003. Over this period significant production cuts were made at twenty-six smelters around the world, including the permanent closure of four smelters, three of which were ISF plants.

TABLE 4

The structure and volume of production in Trzebionka mine

TABELA 4

Struktura i wielkość produkcji w kopalni Trzebionka

Year	2001	2002	2003
Production data			
Ore Mined (kt)	2 212.3	2 259.2	2 130.8
Zn/Pb grade in ore (%)	3.3/1.4	2.98/1 67	3.2/1.77
Concentrate production (kt)	59.5	54.5	54.3
Zn/Pb concentrate grade (%)	61.7/73.9	62.4/74.2	62.5/74.2
Financial data — '000 PLN			
Turnover	157 253	143 372	155 832
Net income	–32 057	– 14 785	+3 248

Source: ZG Trzebionka S.A.

TABLE 5

The structure and volume of production in Olkusz-Pomorzany mine

TABELA 5

Struktura i wielkość produkcji w kopalni Olkusz-Pomorzany

Year	2001	2002	2003
Production data			
Ore Mined (kt)	2 376.2	2 467.7	2 547.0
Zn/Pb grade in ore (%)	4.2/1.5	4.21/1.45	4.19/1.43
Concentrate production (kt)	83.4	86	88
Zn/Pb concentrate grade (%)			
— in primary concentrate	54.8/1.63	54.52/1.66	54.42/ 1.69
— in bulk	47.50/10.25	49.08/10.33	47.84/10.16
Zn smelter production (kt Zn)	68.7	72	74
Financial data — '000 PLN			
Turnover	324 625	316 386	328 514
Net income	+1 152	–14 113	–15 716

Source: ZGH Boleslaw S.A.

In the case of mine production, in 2001 eight mines were closed or placed on care and maintenance because of low metal prices. A further two closed in 2002 and another six in 2003, altogether removing 0.54 Mt Zn of mine output over three years.

The rise in the zinc price to around 1000 USD/t has removed much of this price pressure. Based on last year's TC benchmark contract of 148 USD/t basis 1000 USD/t and a zinc price of 1000 USD/t, we calculate that the proportion of profitable output is now around 95% for mines and approaching 90% for smelters, both at the cash operating level.

In general, the financial performance of the zinc industry was poor in the 1990s. Although the prospects for this decade are much brighter, the cost of environmental compliance in a world where there is not uniform legislation and a level playing field does pose a challenge to European producers.

EU waste management regulation and its influenced on zinc and lead producers

Waste from the extractive industry represents a major waste stream in the EU, reaching approximately 29% of the annual average waste production. The number of tailings management facilities within the EU and the enlargement countries is significant, and extends over a wide range of environments and climatic conditions. Following the accidents at several mines in recent years (Aznalcollar 1998; Baja Mare 2000) and in order to prevent and reduce problems caused by mine waste facilities throughout their life-cycle, two years ago the European Commission decided to develop a BAT document for the management of waste rock and tailings. The Proposal for a EU Directive on the Management of the Waste from Extractive Industries, was officially published by the Commission on 2 June 2003. The aim is to create 'a level playing field' for the mining industry, by specifying requirements on the design, operation, closure and, most importantly, post closure monitoring. This is particularly important in view of the prospective EU enlargement, given the number of extractive industrial locations in several new EU members and the need to raise standards. As a result mining companies across the whole of the new Europe will have to develop or revise their strategies to prevent and reduce effects of waste facilities through their life cycle.

According to the Commission Explanatory Memorandum to the Proposal, the new obligations (and additional costs) that mineral extraction operators are expected to face can be grouped under three headings:

— one-off costs arising directly from the need to adapt a waste facility to the regulatory and operating regime created by the proposed Directive;
— annual costs applicable during the operational phase of the facility;
— annual costs applicable during the after-care phase of the facility.

Articles 5—13 in the Proposal are likely to create some one-off costs for many operators, though some operators will not be directly affected. The largest costs are likely to be those associated with Articles 11 (construction and management of waste facilities) and 13 (prevention of water and soil pollution). Articles 5, 6 and 12—13 are likely to create some

additional annual operational phase costs for many operators. Articles 12 (closure and after-care) and, to a lesser extent, Article 13 are likely to create additional after-care phase costs for most operators.

Article 14 seeks to address the risk that an operator might declare bankruptcy during or at the end of the operational phase, leaving no resources to cover the closure and after-care phases. This is considered in more detail below, taking as an example the Polish zinc-lead mines.

A study in 2001 on the "Costs of improving the management of mining waste" used a small sample of European mines to estimate the overall cost of waste management at metal mines. The cost was judged to be just less than 15 EUR/t of metal mined for zinc mines, and about twice that amount for copper mines. The conclusion from the Symond's Report was that the cost of managing mining waste for both zinc and copper mines — there are so many determinants that the costs of waste management for every mine in every country can vary significantly — equals about 1.5—2.0% of the total cash operating costs. The overall annual cost (capital plus operating) of waste management at zinc and copper mines in Europe varied from 8.4 to 76.5 EUR/t of metal, with a weighted average for seven mines 26.2 EUR/t of metal, which was equal to 2.0 EUR/t of ore (table 6).

TABLE 6

Overall annual costs of waste management at seven zinc mines

TABELA 6

Koszty gospodarki odpadami w kopalniach cynku w wybranych kopalniach w Europie

Metal(s)	Mine	EUR/t of ore	EUR/t metal
Zinc, mostly with lead	1	—	18.3
	2	—	8.4
	3	—	5.7
	4	—	76.5
	5	—	44.3
Zinc, copper, some gold	6	—	14.0
	7	—	41.2
Weighted average* (1—7)		2.0	26.2
Weighted average (excl. mine 4)		1.1	14.8

* Weighted by respective tonnages

In some European countries there are now additional obligations concerning mining waste management and after-care, e.g. in Lisheen mine, 51% of the tailings have to be cemented and back-filled (the unit cost per tonne of tailing — is higher for backfilling than

for placing in the tailings pond) in mined-out areas of the mine and the remaining half (49%) have to be pumped to a lined impoundment near the mine entrance. Similarly, at the long-established Zinkgruvan mine in Sweden over half of tailings volume is backfilled within the mine void space. While this may seem onerous, many mines require the backfilling of stopes to stabilize the ground and prevent both the loss of recoverable ore and post-mining ground subsidence. The use of tailings means that other materials do not have to be purchased (or mined locally) for backfill, as is the case with the Polish mines.

Polish zinc producers do not use tailings for the backfilling yet due to the high water inflows in the mines and the use of some of the pumped mine water as a local potable supply, a situation that might be upset if tailings were placed back in the mine. According to Polish environmental legislation every tonne of tailings that is placed in the tailings pond is levied with the charge, e.g. for 1 t of tailings — according to the latest Ordinance of the Cabinet from October 15, 2003 — the charge amounts to 9.51 PLN/t (approximately 2 EUR). For both Trzebionka and ZGH Bolesław S.A. these charges cause considerable additional cost. For example, at ZG Trzebionka S.A., the cost of waste management is equal to more than 3.5% of the total cost (table 7).

TABLE 7

Cost of waste management in Trzebionka

TABELA 7

Koszty gospodarki odpadami w kopalni Trzebionka

Type of cost	Cost (in '000 EUR per year)	% of total cost
Pumping tailing to the pond	159	11.7
Tailings storage	675	49.5
— of which fee for storage	*591*	*43.4*
Recycle 1	41	3.0
Piezometer	11	8.0
Tailings dumps construction	302	22.1
Recycle 2	113	8.3
Reclamation	20	1.5
Labour	40	2.9
Total	**1,361**	**100.0**
— of which amortisation	213	*16.0*
Cost of waste management [EUR/t metal]	***15.67***	
Share of waste management as % of cost to concentrate plus mine site DD&A	***3.8%***	

Source: ZG Trzebionka S.A.

The share of waste management costs is high despite the fact that Trzebionka pays only for 20—30% of the tailings produced as the remaining 70—80% is used in the construction of the tailing ponds walls). The second largest cost element is "depreciation and amortisation", which amounts to about 16% of waste management cost. This is related to the ever-increasing number of pro-ecological capital investments, which have to be subsequently recognised in the accounts. As a result, the capital cost of waste management has been rising and reached nearly 4% of the total costs of produced metal at Trzebionka, whereas the average in Europe is 1.5—2%.

For ZGH Bolesław S.A. the operating cost of waste management amounts to about EUR 0.6 M/a (2/3 of which comprises the cost of labour, taxes and consumables with the other 1/3 the cost of pumping and energy), whereas the cost of the environmental fee paid over last two years (2002—2003) amounted to only EUR 0.09 M/a, which was 0.2% of the mine site cost. In 2004 a special charge for solid waste storage is planned (amounting to about EUR 0.15 M) with the result that the total cost of waste management, including charges, will increase to EUR 0.85 M, which will be about 2,0% of the cost to concentrate. Moreover, including an additional royalty of about EUR 0.5 M/a, the cost of waste management plus charges will increase to 3.5% of the mine site cost.

Conclusions

Mining in EU conditions

The structural and economic changes that took place in the early 1990s in most of the new EU member countries forced mining entities to embrace the market economy. The transformation of the economies in the new EU members, has contributed to significant ownership changes in the entities and their way of management. Although ore mining in the new EU member countries has long-lasting tradition, most of the base-metal ore mines have already been closed.

Consequently there is a considerable mining legacy left in the new EU member states, including heaps, waste dumps and sumps . The accession of new members into the European Union will require them to comply with environmental protection standards. It is expected that numerous existing old mining sites will have to be rehabilitated, and many more sites requiring reclamation will be created when industries shut down due to economic problems. Therefore all mining companies across the whole of the new Europe will have to develop or revise their strategies according to the EU Directive for the Management of Waste from Extractive Industries, which was officially published on June 2, 2003. The Directive merely creates 'a level playing field' in the areas of extractive waste, by specifying requirements on design operation, closure and, most importantly, the post closure inspection of waste management facilities.

The additional requirements for dealing with waste products from mining operations will increase minesite costs across the EU. These additional costs are not required from their

global competitors and will place even more pressure on European producers. In the case of mines in the new EU member states additional capital investments may have to be made to bring existing facilities into line with best practice, placing additional financial stress on these operations.

Ten countries acceded to the European Union on May 1st this year changing the landscape of Europe Union mining industry. The analysis of mining output shows that the role of the new EU members in the EU is important, particularly that of Poland. Currently, there are not many new deposits being advanced in the new EU member countries, but with the introduction of new technology, they may become more active and a valuable mining base for the whole EU. This may become important for the old EU, which is already a significant importer of raw materials. The old EU is already an important producers of refined metals, with operations in the new EU generally higher cost and requiring investment. Therefore, an opportunity for the new EU members could be the development of semi-fabricating and component manufacturing sectors, based on the advantages provided by low labour costs, well-trained labour forces, more favourable investment condition (corporate taxes) and a location advantage to serve their own region as well export to Eastern Europe.

New EU members are trying to attract investment by offering an attractive fiscal tax regime. In the Czech Republic the standard rate of corporate tax is 28% in 2004, which will reduce to 26% in 2005 and 24% from 2006, while in Poland, since January 1 2004, the Corporate Income Tax rate amounts to 19%. On January 1 2004 a new comprehensive reform of the Slovak tax system came into force, with the corporate rate tax reduced from 25% to 19%. Hungary also reduced its corporate tax rate from 18% to 16%, whereas Estonia was the first European country to set a flat tax on corporate profits and has zero tax on reinvested earnings, yielding an effective corporate tax rate.

To attract new investors to mining investment the important aspects are also the level of royalty, environmental requirements and charges, and of course cost of production.

Comparison and calculation of the costs of mining waste management in Europe, globally, requires clear accountability and an accepted measurement methodology. While costs for each mining producer are easily quantified, the methods of the calculation of waste management costs — with so many variables — for every mine in every country can vary significantly. Even though accounting standards for most European (EU and candidate countries) mining companies are in compliance with International Accounting Standards, there may be differences in the way costs are presented and calculated. This is especially evident in waste management costs. To identify all costs and to develop a transparent methodology for waste management, the cost calculation needs to take full account of Life Cycle Assessment analysis for an individual company.

The cost of environmental compliance in a world where there is not uniform legislation and a level playing field poses a challenge to European producers.

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WPŁYW WPROWADZANYCH PROPOZYCJI ROZWIĄZAŃ PRAWNYCH W ZAKRESIE OCHRONY ŚRODOWISKA W NOWYCH KRAJACH EU NA KONKURENCYJNOŚĆ PRZEMYSŁU CYNKU I OŁOWIU

Słowa kluczowe

Przemysł cynku i ołowiu, rozszerzenie Unii Europejskiej, przepisy prawne

Streszczenie

W referacie omówiono założenia propozycji nowych dyrektyw i komunikatów tworzonych w Unii Europejskiej, które — jeżeli zostaną wdrożone — będą miały znaczący wpływ na działalność krajowych podmiotów górniczych. Analizę prowadzono na przykładzie przemysłu cynku i ołowiu w krajach UE, w tym w Polsce. Wykazano zarówno znaczenie polskiego wydobycia na tle krajów UE i świata, jak i przeanalizowano istniejące koszty produkcji i koszty zarządzania odpadami oraz przedstawiono dodatkowe zobowiązania wprowadzonych w wybranych kopalniach cynku i ołowiu rozwiązań w zakresie gospodarki odpadami (np. zarząd kopalni Lisheen w Irlandii, przed uzyskaniem pozwolenia na rozpoczęcie wydobycia, musiał zapewnić, że 51% odpadów będzie mieszanych z cementem i lokowanych pod ziemią).