THE TECHNOLOGIES AND THE POTENTIAL OF RECYCLING IN ROMANIA

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This paper presents a general overview of the past and actual position of the lead industry in relation with the environmental legislation and its impact. The lead industry has watched environmental lead levels being steadily reduced down to levels that, ten years ago, would have been considered unachievable. Nevertheless, the industry has managed to survive the effect of the ever-increasing demands of producers and users have had to assess their future positions, as the cost implications of environmental laws have had a significant impact on their bottom lines. The need to be aware of the existence of new and proposed legislation is of paramount importance, as the threat from the vast array of EEC Legislation is ever apparent.

For those occupationally exposed to lead, it is generally accepted that good hygiene practices should be adopted, along with the overall aim to limit the amount of available lead-in-air in the breathing zone.

Although limit values for lead-in-air have been present for over the last 20 years, only in more recent years these standards been tightened. Occupational limit values are typically in the range 50-150 µ/dl. (Fig.1). Much speculation has developed over the importance of lead-in-air and any correlation in may have blood lead. As a result, air lead is perceived to be no more than an indicator of plant control.

As analytical methodologies have improved and legislation has forced down the acceptable levels of lead in-blood, today’s levels have decreased to the range 10-70 µg/dl (Fig.2). Moreover many operating companies have been working with lower target levels than those currently require by law. The control of emission from industrial sources is also of vital importance. This includes air, water and waste streams. Although, over the years, concentration limits have been as high as 100 mg/mc, the industry is currently having to comply with standards as low as 1 mg/mc.

Other air parameters are also to be considered, i.e., boundary or ambient air levels. Typical values used globally are in the range 1,5-2,0µg.m.
reflect best Available Technology for the process under scrutiny. Typical levels here would be proof applied in the range from as low as 0,1 to 3 mg/l. Lower levels be applied to some sensitive receiving matters, while the higher values related to sewers or main estuaries.

The disposals such wastes is carefully controlled under strict land conditions. The degree of hazard of this material be determined by lead content and the general stability of the waste, i.e. the leachability of any heavy meet that it may contain.

Standard leachate tests simulation land fill conditions may be applied prior to its acceptance particularly when a non-hazardous classification sought by the producer of this waste.

**BATTERY COLLECTION**

The European battery Directive has called for more formal methods of battery collection to be introduced in member states.

Although there have been collection screws introduces in Italy and Sweden, each country is being asked to design its own system. This may force a shift away from the more traditional routes of collection and place more emphasis on the battery manufacture to take in, and be responsible for, battery scrap [1], table 1. When lead metal prices are low, the smelter can only pay an appropriate amount for spent batteries based upon their metal content. Low scrap prices, and always will be, less attractive to those collection batteries, particularly when legislative requirements place a higher financial burden on collection and storage facilities. Having collected the lead/acid batteries, the merchant must transport batters in a responsible way.

Added to this, the merchant should also ensure the following [2]
- drivers are adequately trained to carry special wastes
- vehicles carry appropriate plating
- vehicles and containers are sound and leak proof
- documentation is complete and returned
- documentation is retained for up to 2 years.

Over the last seven years, for example, the actual recovery rates in the UK have been over 84% [3]. It is believed however, that in more recent years this level has increased to well over 90%, estimated to have been 95% in 2000, [4]. The recovery rates in the UK are amongst some of the best in the world.

**CRITICAL ANALYSES OF THE RECYCLING PROCESS OF THE BATTERY SCRAP**

The main deficiencies regarding the collecting and transport of the battery scrap are determined by:
- the lost of sulfuric acid, aprox. 5 kg/battery
- the pollution of the soil and of the freatic waters on the entire territory [5]
- the lack of arranged spaces for storing collectors and beneficiaries, increases the pollution with sulfuric acid and lead compound
- the neutralization of the sulfuric acid in the unorganized system is practically unconceivable.

The dissemblage operation

Until now the following compounds resulted from dissemblage of the battery are not taken into account:
- poly propylene
- hard rubber
- pvc scrap

The technologies and the potential of recycling in Romania

The potential production capacities of the lead production commercial societies are shown in the Table2.

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Tabl. Battery recovery in various OECD countries
Tab.2. Lead Production Societies in Romania

<table>
<thead>
<tr>
<th>No.</th>
<th>Commercial Society</th>
<th>Town</th>
<th>Technology</th>
<th>Capacity (tones/year)</th>
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<tr>
<td>1.</td>
<td>RomPlumb S.A.</td>
<td>Baia Mare</td>
<td>WJ+RT 2</td>
<td>25 000</td>
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<td>2.</td>
<td>Sometra S.A.</td>
<td>Copşa Mică</td>
<td>I.S.P.</td>
<td>40 000</td>
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<td>3.</td>
<td>Neferal S.A.</td>
<td>București</td>
<td>RT 2</td>
<td>34 000</td>
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</table>

From the presented data, we can see that, at this time, the entire base of material and, also, battery scrap can be processed in the existing production capacities, with the specification from the basic material related to the pollution problem, the transport of the material and the retailing of the product.

This analysis shows that this development can be accomplished at Sometra S.A. because:
- an unpolluted technology can be realized by the technological flux of processing interfering lead concentrates and zinc of the I.S.P. installation
- this platform involves the smallest effort of investment, having available locations and capacities, the supply with utilities, qualified work and a central geographical position.

It must be underlined that whatever the placement in the main preoccupations in accomplishing a new capacity are the pollution problems and the obligation to respect the limited internal standards and of the EU the evacuation of polluting factors in the environment.

Conclusions

The lead industry must decide its own fate in either accepting these change in environmental law or risk its future. Similarly, individual companies must consider their own policies and ask themselves it they intend to stay in business by investing in their plants and their employees.
ІЗОБОНОМЕРИСТІСТЬ СИНАТЕЗУ УГЛЕВОДІВ З ГАЗІВ-ПІРОЛІЗУ МЕТАНУ НА МОДИФІКАЦІЯХ КО-КАТАЛІЗАТОРІВ

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В роботі [1] було вивчено перетворення газів-піролізу метану в утворення безвідхідних (екологічно чи продуктивно) технологічних продуктів (етилену, пропілену); однак даний процес не здатний виробляти вузькі фракції вуглеводнів.

При термокаталітичному піролізі метану при 1500°С утворені гази-піролізу містять (% об.): CO-25,0–30,0; H₂ -50,0–55,5; O₂ -0,2–0,5; CO₂ -3,2–4,0; С₂H₂ -7,8–8,6; С₂H₄ -0,3–1,0; CH₄ -3,0–6,0; N₂ -1,0–2,0; метилацетилен 0,001–0,017; пропаніден – 0,017–0,03; вінілацетилен – 0,014–0,03; дивінілацетилен – 0,08–0,19; бензол – 0,042–0,065; бутадіен – до 0,005, основними компонентами яких є СО і H₂, тому їх перетворення зводиться фактично до каталітичного гідрравання СО за Фішером-Тропшом. Необхідно зазначити, що на сьогоденньй день гази-піролізу не знаходять кваліфікованого використання, а, в основному, спалюються на факелах, що призводить до забруднення навколишньої середовища.

Інтерес до процесу Фішера-Тропша почав відновлюватися в зв’язку з безперервним рос-