

## Original Article

# Waste Management of Used Batteries and Accumulators. Case Study - S.C. REBAT S.A. Copșa Mică

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## Abstract

In Romania, the waste management activity is based on OUG 78/2000, which implements a series of directives of the Council of Europe. The Ministry of the Environment and the National Environmental Protection Agency (NAPP) are responsible for coordinating this activity. Modern production processes and increased needs of industrial companies have undoubtedly led to a considerable demand for the environment. Waste management also aims at saving natural resources by re-using recoverable parts. Waste management includes all waste collection, transportation, treatment, recovery and disposal activities. Responsibility for waste management activities lies with their generators in accordance with the "polluter pays" principle or, as the case may be, with producers in accordance with the "producer responsibility". The management of spent batteries and accumulators is governed by H.G. No.1132 / 2008 (regarding the regime of batteries and accumulators and waste batteries and accumulators) and applies to all types of batteries and accumulators, regardless of form, volume, weight, component materials or their use.

**Keywords:** *waste, waste management, waste batteries.*

## 1. Introduction

In the 21<sup>st</sup> century there is a growing focus on the issue of waste management in relation to the quality of life due to the annual increase in the amount of waste and the concern it is producing for the world community [4].

In Romania, waste management is based on OUG 78/2000, which implements a number of Council of Europe directives. The Ministry of the Environment and the National Environmental Protection Agency (NAPP) are responsible for coordinating this activity. An integrated waste management concept contains several small concepts that relate to different areas.

The general objectives can be presented as follows:

- exhaustion of all possibilities of avoiding training and reducing the amount of waste, in cooperation with the population and the economic sector;
- sorting, collection and recovery of household waste, must be done in accordance with ecological and economic points of view;
- reducing the pressure on the storage ramps by using the classic method of capitalization, composting, as well as by pretreatment of the deposit residues;
- optimal use of energy, technically correct disposal of hazardous materials and effective control of such materials;
- examination of all types of remnants such as household rubbish, industrial waste,

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- construction and demolition waste for recovery;
- establishment of the concept of waste management at the communal level, with the purpose of systematization and territorial organization, as well as with the purpose of meeting the regional and supra-regional interests;
- the maximum safety of sanitation by creating a regional and supraregional association of ecologically and economically representative associations for waste recycling, composting and energy recovery, for the controlled, ecological disposal of the remaining waste, which cannot be redeemed.

Different industrial activities are sources of pollution, which are important to consider, from raw material processing and processing to disposal of residual materials [3].

Modern production processes and increased needs of industrial companies have undoubtedly led to a considerable demand for the environment.

Waste management also aims at saving natural resources by re-using recoverable parts. Managed waste can be both solid and liquid or gaseous, as well as with various properties (eg radioactive), requiring treatment methods specific to each one [2].

Urban and industrial development at increasing pace and with them increasing population, increasing the level of civilization and ensuring the growing consumption needs lead to the decrease and exhaustion of natural sources and reserves of raw materials, materials and fuels, energy, with the consequences of the global market penetration [1].

### **Waste and Used Waste Management - integrated management strategies.**

The management of spent batteries and accumulators is governed by H.G. No.1132/2008 (regarding the regime of batteries and accumulators and waste batteries and accumulators) and applies to all types of batteries and accumulators, regardless of form, volume, weight, component materials or their use, without prejudice to national legislation which transposes Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles and Directive 2002/96 /EC of the European Parliament and of the Council of 27 January 2003 on waste from electrical equipment and electronic (WEEE).

According to the above-mentioned Government Decision, battery and accumulator manufacturers are required to organize the collection of battery and accumulator waste in one of the following ways:

- individual

- by transferring responsibilities, on a contractual basis, to a legally established economic operator, collectively referred to as a collective organization.

## **2. Material and Method**

**Site description.** SC ROMBAT S.A. REBAT work point, place. Copșa - Mică, Uzinei str., No. 2, Sibiu County is located within the former commercial company CARBOSIN Copșa - Mică, on a land with a total area of 36,950 sqm. Location is structured:

- the built area - 7646 sqm
- the surface of the transport routes (concrete platforms) - 14845 sq. m
- the surface of the sewerage network - 130 sqm
- the area occupied by green space (free construction area) - 14329 sq. m
- Geographical location coordinates: 46° 08' 25" N 24° 019' 36" E

According to the Situation Plan and the Area Planning Plan, the buildings are in the height of P and P + 1 in the office area and P + 2 in the area of the battery chamber. The resistance structure consists of reinforced concrete foundations, metal posts, metal roof beams.

Description of the main activities and processes. The main activities and processes are presented next - Waste Flow Breakdown, Flow Diagram, Waste Flow Crushing, Flow Waste Batteries, Melt Flow Diagram in Rotary Ovens and Flow Diagram Refining and Realignment Raw Lead and Casting in Ingots.

Under the technology, the following basic operations will be performed:

- dismantling spent batteries by cutting caps;
- grinding spent lead acid batteries and wet separation of resulting fractions,
- desulphurization of the slurry and production of sodium sulphate from the sulfur fractions (paste and acid electrolyte)
- the melting of lead-containing wastes in rotary kilns;
- refining and realization of molten crude lead;
- casting lead in ingots;
- treating electrolyte, acidic and wash water.

### 3. Results and Discussions

Waste management must be carried out without endangering human health and without harm to the environment (Table 1), in particular:

- a) without risk to air, water, soil, fauna or flora;
- b) without creating discomfort due to noise or odors;
- c) without adversely affecting the landscape or areas of special interest.

Table 1. Waste management generated in the unit [5]

Nr crt	Waste name/ Annual quantity	Waste code according H.G. no. 856/2002	Dangerousness according to Anexa 4 L. nr. 211/2011	Waste management		
				Recovery	Temporary storage in the unit	Removal
1.	Melting slag 16800 t/y Pb content in max 10 %	10 04 01*	H 14	Acquired by an authorized firm	Temporarily stored in covered warehouse	Disposal in authorized installations in waste disposal operations where recovery is not possible
2.	Dust from combustion gases other than those specified in 10 10 09 4100 t/y	10 04 04*	H 14	Utilization in their own furnaces without affecting the quality of the emissions	Temporarily stored in closed bags	
3.	Cast 1233 t/y	19 02 06	H 14	Acquired by an authorized firm	Temporarily stored	Disposal in authorized installations in waste disposal operations where recovery is not possible
4.	Polypropylene 3976 t/y	19 12 04	Harmless	Exploitation within S.C. ROMBAT S.A. Bistrita, Bistrita Nasaud county	Temporarily stored in closed bags	
5.	Ebonite and separators and other plastics 3055 t/y	16 01 21*	H 14		Temporarily stored in closed bags	Removed by Company authorized
6.	Padding and refractory materials from metallurgical processes	16 11 04	Harmless	Aggregate repairs thermal (as the case)	Metal containers in production halls	Removed by Company authorized
7.	Wastes of hydraulic oils	13 01*	H5	Acquired by an authorized firm	Metal barrels in arranged space. The collection is done in tightly sealed containers, resistant to mechanical and thermal shock	

Table 1. Waste management generated in the unit [5] – continued

Nr crt	Waste name/ Annual quantity	Waste code according H.G. no. 856/2002	Dangerousness according to Anexa 4 L. nr. 211/2011	Waste management		
				Recovery	Temporary storage in the unit	Removal
8.	Municipal waste	20 03 99	Harmless		Containers on concrete surface	Eliminated by an authorized company at the ecological disposal facility
9	Paper - Fractions collected separately	20 01 01	Harmless	Acquired by an authorized firm	Containers on concrete surface	
10.	Plastic - Fractions collected separately	20 01 39	Harmless	Acquired by an authorized firm	Containers on concrete surface	
11.	Metal - Fractions collected separately	20 01 40	Harmless	Acquired by an authorized firm	Containers on concrete surface	
12.	Glass - Fractions collected separately	20 01 02	Harmless	Acquired by an authorized firm	Containers on concrete surface	
13.	Bags from filtration plants	15 02 02*	H 14	Reintroduction into melting furnaces where no emission impact is demonstrated in the installation		Disposal by Authorized Units
14.	Sludges from rainwater clearing on the site	19 09 99	Harmless			Eliminated by an Authorized After-Characteristics Company

#### 4. Conclusions

Modern production processes and increased needs of industrial companies have undoubtedly led to a considerable demand for the environment. Waste management also aims at saving natural resources by re-using recoverable parts

Waste batteries and accumulators must be handled in accordance with the requirements of the national legislation harmonized with the European one, thus fulfilling the following objectives:

- restricting the placing on the market of batteries and accumulators containing certain dangerous substances
- separate collection for spent batteries and accumulators

- safe disposal for the health of the population and the environment of hazardous components from waste batteries and accumulators.

Regarding the recovery of the resulting waste, this is done by the transfer of responsibility or within the SC. ROMBAT S.A.

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