Integrated Waste Management: Valorsul Case Study

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EXECUTIVE SUMMARY

Valorsul was created in November 1994 for municipal waste treatment of North Lisbon Metropolitan Area, integrating the municipalities of Amadora, Lisbon, Loures and Vila Franca de Xira. Consequently Valorsul became the company responsible for the conception, construction and management of all the necessary installations to recover or disposal municipal waste produced in those municipalities.

Valorsul is nowadays responsible for the treatment of approximately 750,000 Mg of municipal waste, per year. This amount of waste is treated by Valorsul by means of a municipal waste integrated management system. It includes the following facilities:

i. an incineration installation with energy recovery;
ii. a materials recovery facility and drop-off centre;
iii. a bio-waste processing installation;
iv. a bottom ash processing and recovery installation;
v. a landfill.

With the purpose of provide Valorsul with management tools that help to achieve and demonstrate excellence on environmental and occupational health and safety performance, the company has implemented an Integrated Management System (IMS). This is being done according to the requirements specified in the following international standard:

- Environmental management systems – ISO 14001:2004;

In the first phase, the system was implemented in the incineration installation and in the administrative areas of the head-office. Later, it was extended to the other facilities. It is aim of this paper to present these phases, concerning the environmental and occupational health and safety management systems.

The implementation of the Valorsul IMS to continual improvement is based on methodology PDCA (Plan-Do-Check-Act), which is described in the three reference standards for the environment, occupational health and safety and quality.

Since November 2006 the interface of the IMS with the Valorsul staff is done through an intranet platform called SGI-BEL. This platform is based in a methodology that identifies and characterizes the existing processes and activities in Valorsul and its interactions, in three levels of detail.
It is also aim of this paper to present future developments of the IMS, namely the implementation of the International Standard ISO 9001:2008, concerning Valorsul quality management system.

The future challenge for the IMS, will also include a new reference: the SA8000 on social responsibility, which aims to ensure the adoption by the organization, of policies and procedures that protect basic human rights of workers.

Since 2004 Valorsul publishes, annually, its sustainability report, reflecting the transparency that the company wishes to meet with its stakeholders. All these reports have been based in the Global Reporting Initiative's guidelines. The 5th sustainability report, concerning 2008 Valorsul data, will be the first to be verified by an external entity, referring to those guidelines.

Finally, the activity of Valorsul is fully incorporated into national and European guidelines for the sector. The Municipal Solid Waste Strategic Plan II (PERSU II) is an important reference for those which are involved in the sector between 2007-2016. In PERSU II, Valorsul is referred as one of the systems with higher capitation separate collection at the national level, as part of a group of six systems that have implemented curbside collection. The PERSU II refers to the future implementation of the new incineration line for RDF (Refuse Derived Fuels), and the future capacity expansion of the bio-waste processing installation.

**INTRODUCTION**

Valorsul is the company responsible for the treatment of solid waste in the North Lisbon Metropolitan Area, where approximately 750,000 Mg of municipal waste is produced, per year. This amount of waste is treated by Valorsul by means of a municipal waste integrated management system.

With the purpose to provide Valorsul with management tools that help to achieve and demonstrate excellence on environmental and occupational health and safety performance, the company has implemented an environmental, occupational health and safety management systems. This is being done according to the models specified in the following international standard:
- Environmental management systems – ISO 14001:2004;

In the first phase, the system was implemented in the incineration installation and in the administrative areas of the head-office. Later, it was extended to the other facilities. It is aim of this paper to present these phases, concerning the environmental and occupational health and safety management system, which is certified since 16 November 2005.

It is also aim of this paper to present future developments of IMS, namely the implementation of the international standard ISO 9001:2008, concerning the Valorsul quality management system. It is foreseen that the first phase of the concession audit occurs in the end of September 2009.

**VALORSUL HISTORIAL**

In November 1994 it was created the company for municipal waste treatment of North Lisbon Metropolitan Area, integrating the municipalities of Amadora, Lisbon, Loures and Vila Franca de Xira (Decree-Law 297/94, of 21 November), afterwards named Valorsul.

In September 1995 Valorsul signs, with the Ministry for Environment, Spatial Planning and Regional Development, a concession contract for 25 years. At that time Valorsul becomes the
company responsible for the conception, construction and management of all necessary installations to recover or disposal municipal waste produced in the above mentioned municipalities.

In June 1998 the first landfill of municipal waste was done. In May 2000 Valorsul starts the incineration of municipal waste, with energy recovery. In February 2002 Valorsul materials recovery facility starts in operation, receiving packaging waste, sorting it and storing for subsequent recycling.

In July 2002 Valorsul approves the environmental policy and occupational health and safety policy.

In August 2003 it was published a ministerial law for the acceptance of municipal waste, in Valorsul incineration installation, produced in Cascais, Mafra, Oeiras and Sintra (Ministerial Law nº 16104/2003, of 29 July).

In December 2004 it was published the first Valorsul sustainability reporting, done subsequently on an annual frequency.

In February 2005 begins the acceptance of bio-waste at Valorsul bio-waste processing installation.

In November 2005 the certificates of registration for Valorsul, concerning ISO 14001:2004 and OHSAS 18001:1999, were emitted for the incineration installation and the head-office. In January 2007 it was added to the certificates of registration the activities of landfill and bottom ash recovery. Later that year, in December, Valorsul approves the new environmental, safety and quality policy.

Also in December 2007, the Ministry for Environment, Spatial Planning and Regional Development releases a permit granting authorization to operate incineration with energy recovery installation, which guarantees that the installation complies with the requirements to achieve integrated prevention and control of pollution (Council Directive 96/61/EC, of 24 September 1996).

In March 2008 the Ministry for Environment, Spatial Planning and Regional Development releases another permit, this time granting authorization to operate the landfill of waste, which also guarantees that the installation complies with the requirements to achieve integrated prevention and control of pollution. At the same time, it is added to the certificates of registration, concerning ISO 14001:2004 and OHSAS 18001:1999, the activities of packaging waste sorting and bio-waste recycling.

In Figure 1 is shown the quantity of waste treated at Valorsul, in the past decade.

**VALORSUL AT THE PRESENT TIME**

At the present time, Valorsul is the company responsible for the recovery and disposal of approximately 750,000 Mg/year of municipal waste. This amount of waste is treated by Valorsul by means of a municipal waste integrated management system, which includes the following facilities:

i. an incineration installation with energy recovery;
ii. a materials recovery facility and drop-off centre;
iii. a bio-waste processing installation;
iv. a bottom ash recovery installation;
v. a landfill.
In Figure 2 it is presented Valorsul integrated waste management stakeholders, where are included all waste treatment installations.

Concerning municipal waste acceptance criteria and procedures, at Valorsul installation, firstly, it is determined if the waste can be recycled. For that it is requested detailed information on the waste. This detailed information includes the appropriate waste code from the European Waste List (first published by Commission Decision 2000/532/EC, of 3 May).

If the waste is separately collected packaging waste (or paper and board waste exclusively), it is accepted at the materials recovery installation. If it is waste electrical and electronic equipment it is accepted at the drop-off centre, for separate collection. If it is bio-waste, it is accepted at the bio-waste processing installation.

On the other hand, if it is classified as mixed municipal waste, it is accepted at the incineration installation, with energy recovery. Mixed municipal waste is landfill only when it is not adequate for incineration or when the incineration installation is in maintenance.

The procedures presented follow the European guidelines, namely, on the targets for packaging waste recycled, recovered or incinerated, at waste incineration installation, with energy recovery, and on the reduction of bio-waste going to landfill. All those guidelines are presented in the Municipal Solid Waste Strategic Plan II (PERSU II), published by Portuguese Order in Council 187/2007, of 12 February. This plan presents the Portuguese guidelines from 2007 to 2016.

Finally, it should be mentioned, the acceptation of animal by-products not intended for human consumption, that is currently made at the incineration installation, with energy recovery.
INTEGRATED MANAGEMENT SYSTEM (IMS) IMPLEMENTATION PHASES

During the implementation of municipal waste integrated management system, it was identified the need to endow the organisation with management tools that may help to achieve and demonstrate a solid performance, either in what concerns the environment or occupational health and safety at work. These tools could help Valorsul to identify and to control its environmental aspects, impacts and hazards and risks for the employees, as well as establishing targets for continual improvement.

The creation of an environment and safety commission, in September 2001, launched the bases for the establishment and implementation of an Environmental Management System, in accordance with ISO 14001:1996, and also for an occupational health and safety management system, in accordance with the OHSAS 18001:1999.

In July 2002, as mentioned before, the environmental and the occupational health and safety policies of Valorsul have been approved. They were strongly related with the scope of the company and oriented towards performance of excellence with stakeholder’s involvement.
The first step of Environmental Management System and occupational health and safety management system consisted on the development of the environment and safety manual, in which were included:

- General procedures: documents of general purpose, applied to all the company, which establish rules or actuation forms having in account the requirements concerning support standards to the existing management systems;
- Specific procedures: documents that give specific indications of how to do the activity(ies) / process(es) that affect or could affect the environmental and occupational health and safety performance (they establish “what”, “when” and “who”); and
- Work instructions: documents that contain simple and exact information that describes how to adequately perform tasks (it establishes “how”).

In May 2004 it was created the environmental, safety and quality management system direction. At this moment it was decided to integrate the two existing systems in only one: the Integrated Management System (IMS). With this integration it was intended to create the conditions for the future inclusion of ISO 9001:2000, through a process approach in the development, implementation and improvement of the effectiveness of IMS. The processes identified for Valorsul are represented in Figure 2, with indication of the respective code (from P01 till P15).

Since November 2006 the interface of IMS with the Valorsul staff is done through an intranet platform called SGI-BEL. This platform is based in a methodology that identifies and characterizes the existing processes and activities in Valorsul and its interactions, in three levels of detail (Figure 3).

The documentation previously developed, since 2001, was reconverted for this new methodology that is based in the mapping of the developed activities, accordingly adapted for environment, occupational health and safety and quality requirements. The main value of this platform is the
visual representation component of information and the representation of the interactions between processes and activities.

This platform, which is intended to be dynamic, in order to follow the organization and system evolution, has the main purpose to simplify and to promote the fast access to support documentation to the IMS and the availability of referring information to the company and the IMS in particular.

The inclusion of the quality component in the IMS became evident with the review, in end of 2007, of the environmental and occupational health and safety policies, which lead to the establishment of one integrated policy. Thus, in 5 December 2007, it was approved the environment, safety and quality policy of Valorsul, as mentioned before.

It is through the implementation of these principles that is possible to achieve the objective of continual performance improvement of Valorsul, in terms of environmental, occupational health and safety and quality. This improvement performance of the given services and the available products intends not only to reflect itself in the image that Valorsul promotes, but also to make a difference in the way that Valorsul relates to the different stakeholders.

During 2008 the review of IMS happened mainly on the occupational health and safety component, due the necessary adaptations of IMS for fulfilment of the new requirements of OHSAS 18001:2007. An example of one of these adaptations consisted on the review and implementation of the methodology for hazard identification, risk assessment and determining controls.

The first semester of 2009 was noticeable the emission of certificates of registration of IMS implemented in Valorsul for reference standards ISO 14001:2004 (environment) and OHSAS 18001:2007 (occupational health and safety). This recognition confirms Valorsul concerns with the questions relating to continual improvement performance in these two areas, and strengthens the commitment to the principles laid down in the environment, safety and quality policy.

The implementation of Valorsul IMS to continual improvement is based on methodology, known as PDCA (Plan-Do-Check-Act), which is described in the three reference standards for the environment, occupational health and safety and quality. In the case of the ISO 14001 and OHSAS 18001 requirements related to these four steps of PDCA are presented in Figure 4.

![Figure 4. PDCA (Plan-Do-Check-Act)](image-url)
Getting through this cycle of planning, implementing, monitoring and review of all the tools and practices, it is possible to fulfil the objective of creating conditions to minimize the risks and environmental impacts, improve performance and continually improve the results.

Activities taken under the implemented IMS certification process - audits, emission of certificate of registration and the respective scope and standards - are summarized in Figure 5.

Currently there are conditions for the next step: the adaptation of existing IMS to the requirements of the quality standard, ISO 9001:2008, using the process approach implemented in 2004.

In Table 1 are presented the benefits and difficulties of the implementation of IMS at Valorsul.

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<th>Benefits</th>
<th>Difficulties</th>
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<td>- Systematization of the identification of the legislation, the assessment of the applicability and verification of compliance</td>
<td>- Unfamiliarity of the principles and contents of IMS</td>
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<td>- Reducing risks of accidents and occupational diseases</td>
<td>- Mistrust on the capital gains associated with the implementation of IMS</td>
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<td>- Improving the satisfaction and motivation of employees by promoting and ensuring an environment of safe and healthful work</td>
<td>- Resistance to change</td>
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<td>- Minimization of environmental impacts such as waste, degradation of air quality and water, noise, ...</td>
<td>- Indifference to the importance of promoting the continuous improvement cycle of IMS</td>
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<td>- More effective and pro-activity at the operational planning</td>
<td>- Non-responsibility due to unfulfilment of the requirements set</td>
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<td>- Improving the image of the organization and its acceptance by society</td>
<td>- Subjectivity in the identification of clients (under the angles of the NP EN ISO 9001:2008), given the characteristics of the company</td>
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<td>- Systematize the know-how of Valorsul through SGI-BEL</td>
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Table 1. Benefits and difficulties of the implementation of the IMS at Valorsul

This objective was reinforced with the publication on 23 February 2009, of Dispatch nº 6008/2009. This law approves a recommendation to the board of Águas de Portugal, SGPS, S. A. (AdP), which is Valorsul main shareholder. AdP must comply with the guidelines established, that includes a target for the triennium 2008-2010: the completion of the certification of quality of the AdP group companies.
CONCLUDING REMARKS AND FUTURE DEVELOPMENTS

After more than a decade since the first waste acceptance, in June 1998, the system Valorsul designed in 1994, is fully operational and with a recognized performance, namely in the areas of environmental and occupational health and safety. This recognition is due to the benefits of the Integrated Management System, that includes minimization of environmental impacts, reducing risks of accidents and occupational diseases and also improving the satisfaction and motivating the employees.

The activity of Valorsul is fully incorporated into national and European guidelines for the sector. The PERSU II is an important reference, for those which are involved in the sector, between 2007-2016. This document includes references from many of the European Union and national legal frameworks in waste sector. Among others, here are defined national targets and actions to implement the reduction of bio-waste going to landfill and recycling and recovery of packaging and packaging waste.

In PERSU II, Valorsul is referred as one of the systems with higher capitation concerning separate collection, at the national level, as part of a group of six systems that have implemented curbside collection. The PERSU II refers to the future implementation of the new incineration line for RDF (Refuse Derived Fuels) and the future capacity expansion of the bio-waste processing installation.

Since 2004 Valorsul publishes, annually, its sustainability report, reflecting the transparency that the company wishes to meet with its stakeholders. All these reports have been based in the Global Reporting Initiative's guidelines. The 5th sustainability report, concerning 2008 Valorsul data, will be the first to be verified by an external entity, referring to those guidelines. The maturity attained with the experience of reporting, raised the need for a third party review to validate the methodology used in preparing the report, its contents and identify opportunities for improvement.

It is expected that the efforts that have been developed to ensure the needs and expectations of customers, internal and external, while gradually increasing their confidence in the products and services from Valorsul, are reflected in the certification of IMS’s quality component. This is the expectation to the end of the 2nd half of 2009.

The future challenge for the IMS, will include a new reference on social responsibility, which aims to ensure the adoption by the organization, of policies and procedures that protect basic human rights of employees.

REFERENCES


