

WASTE LIFE-CYCLE TRACEABILITY FOR NATURAL RESOURCES PROTECTION: IN ITALY A NEW MANAGEMENT SYSTEM (SISTRI)

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Abstract

The treatment of special and hazardous waste has fed, over the years, the lucrative business defined by *Legambiente* as “ecomafia”. In order to arrest the waste traffic that causes environmental devastation and, therefore, consequences on human health, it has been developed in Italy a new electronic monitoring system that should allow to follow all the waste collection and disposal steps. The new system for the waste traceability control (SISTRI), introduced by Ministerial Decree December 17, 2009, will replace the current paper-based management with a completely telematic system; it should allow to know real-time data on the special waste life-cycle, ensuring a greater efficiency in order to prevent illegality.

Riassunto

Il trattamento dei rifiuti speciali e pericolosi ha alimentato negli anni il lucroso business di quella che è stata definita da *Legambiente* “ecomafia”. Per mettere fine a traffici che devastano l’ambiente, con conseguenze sulla salute umana e creando in alcuni casi autentiche emergenze sociali, in Italia è stato studiato un sistema di monitoraggio informatico che dovrebbe permettere di seguire ogni passaggio della raccolta e smaltimento dei rifiuti. Il nuovo sistema di controllo della tracciabilità dei rifiuti (SISTRI), introdotto con Decreto Ministeriale 17 dicembre 2009, andrà a sostituire l’attuale sistema cartaceo di

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gestione rifiuti con un sistema completamente informatizzato grazie all'ausilio di dispositivi elettro-nici; permetterà di conoscere in tempo reale i dati relativi all'intera filiera dei rifiuti speciali e dovrebbe garantire una maggiore efficacia all'azione di contrasto dei fenomeni d'illegalità.

Keywords: Waste, special waste, SISTRI, MUD.

Introduction

The protection of environment and public health is a basic principle of a policy on waste management. The VI European Programme of Action for the Environment has paid great attention to sustainable waste management by listing a series of measures and activities in order to achieve the fixed environmental targets (1). The integrated waste management system represents a necessary strategy for a sustainable control of a process with complex technical, administrative and environmental aspects.

In Italy, the waste management is regulated by Legislative Decree no. 152 of April 3, 2006 (known as "Testo Unico Ambientale"), Ministerial Decree of February 5, 1998 (on non-hazardous waste recovery), Ministerial Decree no. 161 of June 12, 2002 (on hazardous waste recovery) and their subsequent amendments, additions and updates (2-4). In 1997, the framework law represented by "Decreto Ronchi" (D.Lgs. no. 22 of February 5, 1997) introduced in Italy a waste management system based on some fundamental principles already and widely considered in the European legislation reference (5). This decree foresees, for the first time, a waste management system that integrates environmental and human health protection with market rules, considering waste as a resource to be replaced, pre-treated or not, in the economic and productive cycle.

Numerous regulations, enacted in order to discipline a complex and disjointed field, have deeply affected the current Italian integrated waste management system. The excessive number of European, national and local rules, often uncoordinated and contradictory, causes problems in interpretation and, therefore, applicability. After the entry into force of the "Decreto Ronchi", the integrated waste management has met, over the years, many obstacles, especially in the Italian southern regions. The backwardness of the waste management system is mainly due to inadequate treatment, recovery, recycling and disposal facilities, but also to illegal disposal activities, source of profit for criminal organizations.

The lack of information and data on hazardous waste production and disposal and on dangerous substances contained therein represents a further difficulty in the Italian waste management system.

In Italy, the illegal disposal of toxic waste affects particularly the Campania region. The “Rapporto Ecomafia 2009” by *Legambiente* shows how, during 2008, despite attention and repression, about 1,035 illegal dumps have been identified (6). In particular, the inefficiency of waste traceability has contributed, over the years, to encourage the illegal traffic of hazardous and special waste.

The last three years estimates have highlighted that more than 13 million tons of hazardous waste have been illegally dumped in Campania. The consequences for environment and thus human health of illegal disposal are considerable. In 2004 the scientific journal “The Lancet Oncology” (Elsevier) published a study entitled: *Italian “Triangle of Death” linked to waste crisis*, that defines the triangle of death the vast area of the Naples Province between Acerra, Nola and Marigliano (7).

This area (about 550,000 people) has a mortality rate for liver cancer (defined as the number of deaths per year per 100 thousand people) close to 38.4 for men and 20.8 for women, when the national average is 14. The increased mortality was attributed to pollution caused by the illegal spillage of toxic substances of different origin.

Both qualitative and quantitative monitoring of total waste production represent undoubtedly a key indicator to provide important information about environmental stress. In order to achieve a proper waste management planning, it is essential to handle environmental information and data allowing the real knowledge of the *specific waste flows*.

The actual management system foresees a completely paper-based system consisting in three documents: *Registro di carico e scarico* (loading and unloading log); FIR, *Formulario di identificazione* (identification form); MUD, *Modello Unico di Dichiarazione ambientale* (environmental statement form), a system that meet some insuperable difficulties.

In fact, the waste amount reported in the MUD is not always consistent with those reported in other documents; the waste route from production to final disposal is often different from: producer → transporter → disposer, but it may involve more than one temporary storage and subsequent treatment; the data collected by the paper-based system are, sometimes, not known until some years from the waste management operations, causing serious difficulties in making an appropriate environmental policy and, therefore, in ensuring legality.

Besides the problems on data reliability and transmission, the waste production quantification with MUD database leads to an underestimation of total waste amount. In fact, the statement should not be submitted by all producers (eg farmers who don't reach a certain turnover), not all waste types must be declared (eg building and demolition products) and the MUD is often evaded. Regarding the conditions to reach a realistic quantification of waste production, the flows control and, therefore, the control of the whole waste management system is of primary importance.

SISTRI: characteristics and objectives

In the Italian legislative system, the implementation of Ministerial Decree December 17, 2009 with subsequent modifications and additions in Ministerial Decree February 15, 2010 plays a major role in changing the current waste management system (8-9). The Ministry for the Environment, Land and Sea has established the SISTRI, a new waste traceability control system, which allows to follow electronically the entire life-cycle of special waste (hazardous and not) and urban waste for the Campania Region only. The decree entered into force on January 14, 2010.

SISTRI has been launched in the context of a national strategy aiming at increasing the public administration efficiency by speeding-up the procedures, reducing at the same time costs and burdens and providing legality and transparency in the waste management system.

The system should represent a radical change in the way of managing the waste information. The current paper-based system will be replaced with an innovative procedure based on electronic identification devices (software, USB key and black box) which should simplify procedures reducing business costs and manage in real-time a complex and multifaceted process of the entire waste life-cycle. Moreover, SISTRI should ensure a more careful control of special waste with particular attention to transport and final disposal steps.

SISTRI will be connected via electronic network with the Albo Nazionale dei gestori ambientali (National Registry of environmental operators) to provide real-time data on waste transport, and the Superior Institute for Environmental Research and Protection (ISPRA) to provide, through the new Catasto Telematico (Electronic Cadastre), waste production and management data to the Regional Agency for Environmental Protection (ARPA) and to the local Authorities.

In order to ensure the traceability of waste transported by sea or rail, SISTRI will be also directly connected with the Coast Guard computer systems and with Railway. Furthermore, its proper work will be itself constantly monitored by a Committee of supervision and control.

All companies involved in the waste life-cycle should join the new waste digital traceability system (about 600,000 organizations according to ministerial estimates).

The entry into force of the new system will be in three steps starting from March 31 (D.M. February 15, 2010 extend for 30 days the deadlines already set by D.M. December 17, 2009) up to August 13, 2010 when it will be operative. The MUD will be no longer necessary since the new system will acquire real-time data every day.

Electronic devices: USB and black box

The control system on the waste traceability is possible by means of a USB drive containing the software for the system operation. This device allows a safe access to the system, data storing, transmission, and the electronic sign submission. Each drive can contain up to three electronic certificates associated with operators identified during the application process as delegates for the waste management procedures. These certificates allow delegate univocal identification and their electronic signatures. USB device contains: ID (username), password, unlock password (PIN) and personal unlocking code (PUK).

In the case of waste transport vehicles, a satellite device (black box) must be installed to ensure the load traceability. The devices, owned by SISTRI and get on loan, are delivered and installed at authorized stores.

MUD to SISTRI transition

The environmental statement form (MUD) was introduced by Decree of the President of the Council of Ministers of December 24, 2002 (corrected with Dpcm December 22, 2004) (10-11). This decree foresees the annually submission (deadline April 30) of the MUD in paper form by all companies involved in the waste life-cycle. Two years ago, the Dpcm December 2, 2008 introduced a new more complex MUD, with more sections and boards, enabling the data transmission about disposal waste routes to the Chambers of Commerce and extending the submission oblige

to others operators. With Dpcm 2008, art. 5 (comma 2-*quiquies*), the use of the “old” MUD form was extended by one year for the submission of 2009 statement (2008 waste production), therefore, under the current legislation and unless further deadline extension, the “old” MUD form can no longer be used for the statement that must be delivered by April 30, 2010. The extension of the “old” MUD form has been decided as the new form, much more difficult, would cause heavy commitments for the waste companies, in terms of time consuming, employees training and costs for the new software adaptation.

For the 2010 statement, the waste companies will finally submit the new MUD form (2009 waste production), despite this represents the last time before the introduction of the new control system of waste traceability (SISTRI). Therefore, the deadline of April 30, 2010 will see about 600.000 waste companies faced not only with problems and payment of SISTRI, but also, unless further extension of the “old” MUD, engaged in the new statement form filling, a measure now practically useless.

Conclusion

The excessive growth of waste production, due to increased consumption, urbanization and economic progress, requires more attention by government and society to waste management. With the introduction of SISTRI, Italy is the first EU country activating a so advanced supervision and control system on waste life-cycle.

The aim of SISTRI is: a more effective action against illegality; get real-time data of the total waste life-cycle; simplification of the current bureaucratic procedures by means of electronic writing processes resulting in lower operating and management costs.

The most important innovations introduced by SISTRI are: the replacing of FIR, loading and unloading log and MUD with electronic devices; electronic management of all documents; simplification of the administrative and bureaucratic tasks; real-time data input verification, with errors reduction; real-time knowledge of waste handling (Italian, imported or exported waste).

Despite the undeniable benefits introduced by SISTRI, in terms of environmental damage reducing, control and management of the waste life-cycle, it will not be so easy to prevent the problem of illegal disposal, since many people could not join the new system. Moreover, the waste

company, especially small, medium and transporters, will meet high costs for the adaptation to the new system.

In conclusion, the SISTRI purposes about the waste life-cycle management are shared by all, but the business world risks to pay for organization and application difficulties of the new system. SISTRI, in fact, is simple in theory, but the reality of Italian waste management is complex and the rigidity of the electronic traceability system faces with the segmented legislation of the Italian territory. However, unless further extension, by August 13, 2010 all companies have to apply the new waste management system.

The aim of this work was to describe the transition from the current Italian waste paper-based management to an innovative electronic traceability system for special waste (SISTRI) identifying possible advantages and criticalities. This work should continue with the analysis of the technical aspects related to the future new system integration in the Italian organization.

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