



## STRATEGIC BUSINESS PLAN

### ISO/TC 275

#### *"Sludge recovery, recycling, treatment and disposal"*

#### EXECUTIVE SUMMARY

How do you recover, re-use or valorize the waste material contained in sludge, particularly when it originates from the wastewater treatment or the production of drinking water? How do you dispose of sludge when recovery is not possible? At what cost? How do you assess the associated risks? And how do you communicate about this topic? What does sludge contain, especially when it is a by-product of urban wastewater treatment or water purification? These are just some of the questions that need to be addressed by the technical committee ISO/TC 275.

Sludge is produced by many human activities. Each individual contributes, directly or not, to the production of sludge; the way sludge are managed, used or disposed is therefore of interest for everyone. For example, most food processes produce sludge that must be managed – treated, used or disposed of – which has an impact on the food prices and on the competitiveness of the industry.

International expertise in sludge management (recovery, recycling, treatment and disposal) is world-leading, which leads to global business opportunities for consultancy, design, construction, supply and operation. Companies in this sector show a high rate of innovation maintain their competitive advantage. The production, recovery, treatment and use or disposal of sludge is supported by a large ancillary industry consulting on, designing, developing and manufacturing, supplying and maintaining equipment.

Sewage sludge represents less than 5% of the total quantity of all the sludge (nightsoil, slurry, manure, dredged sludge, biogas production residues...) that could have similar types of environmental, hygienic or other effects. Therefore the general purpose of ISO/TC 275 is to develop and provide generic standards appropriate for all sludge within its scope and all routes for recovery, recycling, treatment, use and disposal of sludge.

Production, treatment, recycling, use and disposal of sludge are now a global issue. ISO TC 275 uses the experience acquired in the European Union where industry currently has a leading international position in these technologies. Indeed, CEN/TC 308 has developed measurement methods for regulatory parameters, standards on physical behavior of sludge, guidance on sludge treatment and management which provide with a consistent basis, each time it is relevant, for the international questioning. The development of ISO Standards in the scope of ISO TC/275 can be regarded either in the framework of the Vienna Agreement, either through implementation of the international work results or through joint development with CEN TC 308, under ISO lead.



## 1. INTRODUCTION

### **1.1 ISO technical committees and business planning**

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

### **1.2 International standardization and the role of ISO**

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: [ISO](#) (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of [IEC](#) (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of [ITU](#) (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its [Technical Committees](#) are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.



## 2. BUSINESS ENVIRONMENT OF THE ISO/TC

### 2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

- Ongoing development of water treatment around the world leads to increasing waste water treatment capacities as well as sludge production:
  - Rio 2012 + 20, june 2012. Nowadays, more and more countries are treating their wastewater and wish to do it in a clean and efficient way. Everytime water is treated, sludge is produced. This is why production, treatment, use, recycling and disposal of sludge are a global issue.
  - Millennium Development Goals (MDGs) of the United Nations Organization (UNO) : MDGs 7.C : to reduce of half, in 2015, the percentage of the population which has no access to drinking water supply, nor to basic water treatment services
  - ISO Workshop on Water, Kobe (25-26 july 2012)
    - Topic n°3) : “Standards on sludge use and generation” : one of the three “top priorities “ for ISO standardization in the field of water
    - Topic n°12) “Building on new energy opportunities utilizing water and sludge”

With increases in the extent and efficiency of wastewater treatment, more wastewater residues, known as either sludge or biosolids, are generated: about 10Mt solids per year in the European Union, 8Mt solids in the USA, already 10Mt of solids in China despite a poor sewage network. If all of the wastewater from the world’s urban population was collected and treated, 83 million tons of dry sewage sludge would be generated by 2017. Sludge management is the next decade major issue.

New solutions have therefore to be promoted to ensure safe recovery, recycling, treatment and disposal of sludge in the environment

ISO TC/275 sets up methods for recovery, recycling, treatment and disposal of sludge, that means, the ISO TC/275 is involved in procedure standardization and product quality compliance standardization.

Currently, the status of sludge is usually according to national regulations; waste or product, and the main final disposal routes are the agronomic recycling (reuse on farmland, soil improvers...), the thermal process (Incineration, Co-Incineration, pyrolysis ...), the anaerobic digestion, the landfilling, etc.

Nevertheless, the lack of common framework for good practices and international standards prevents extended sludge recycling and the general recovery of waste. Moreover public acceptance may be variable all over the world due to a lack of shared good practices.



The analytical methods ensuring an appropriate characterization of sludge as well as good practice guidelines are a support to the national regulations but are also a help for practitioners to ensure a safe sludge treatment and recovery. ISO TC275 will provide international standard to face this challenge.

Standards for sludge treatment provide solutions and tools for its characterization and management. They encompass sampling methods and guidelines for the analysis of physical, chemical and microbiological parameters to be used by operators of drinking-water production plants and sewage treatment plants, and by service providers in charge of the recovery and disposal of the sludge produced by such processes.

Recent technological and major innovations related to the industry sector, products or materials, addressed by the ISO TC 275 proffer a new paradigm on sludge perception: Ressource recovery and recycling. This new approach is mainly focused on the production of Energy and materials resources (digestate, compost) but other potential resources may be developed in the future such as organic raw materials (Biopolymers), minerals (struvite), Biofuel...

Very Important challenges concern the energy production through anaerobic digestion. Market perspectives at world scale are very important. Standards will provide secured operation conditions and high performance of processes which are the key success factors for such a development.

Organic material recovery is one of the most way of sludge recycling at international level where quality of products and traceability are key issues. Organics may be used either as dried organic product for energy production or as organic soil improvers.

As only good quality products can claim to be recovered or reused, there will still be some sludge to dispose. Sludge disposal has then to be done in a professional way and standards may help landfilling in safe operational conditions.

These different ways of treatment necessitate appropriate preliminary dewatering, purification and drying systems coupled in particular case which some mineral recycling if it is economically justified.

A wide range of actors/enterprises are working together on sludge's "lifecycle" without a common framework. This is why it is necessary to have common reference deliverables.

The stakeholders, who will be affected and who will at the same time benefit from this work, are:

- Industry and Commerce: Industries involved in treating, using and disposing sludge include;
  - Industrial and municipal sludge treatment plants: standards will enable to determinate the best way (on both environmental and financial aspects) to use or dispose of sludge.



- Dewatering machinery companies: any type of sludge valuation starts with dewatering. It is a key point in the sludge value chain. Having common standards on this main stage of the process is crucial because all following stages will depend on this one. Good practices on dewatering stage present the following advantages:
    - reduction of sludge volume with low energy consumption
    - reduction of storage capacities and volumes for subsequent treatment
    - reduction of transport costs
    - decrease in quantity of chemicals for dewatering in some cases.
  - Screening; drying equipment and facilities manufacturers companies : standard may focus on technical performance of dryers (water content of final product, risk management etc..). Insurance may be an added value.
  - Anaerobic digestion manufacturing companies: technical performance (ie homogeneity of mixing) as well as security issues have to be addressed by standards to secure the market and confirm the high growth perspectives.
  - Incinerator manufacturing companies: As investment are important, appropriate best available solutions have to be identified. Being involved in standardization could guide the market to the technologies with the highest technical and economical performance balance
  - Lime producers and lime treatment equipment companies: When sludge is used as a soil improver, it has always been treated with lime. Standards could enhance lime treatment efficiency on sludge.
  - Composting equipment companies and digestate manufacturing companies: (SMEs): sludge composting and/or digestate management requires a special know how; a standard on this particular topic would enable all companies an access to this knowledge. Standards on this topic are all the more crucial as a range of small and medium enterprises are working on.
  - Spreader manufacturers companies:  
being involved in standardization would allow them to adapt their technology to sludge and develop new technology for emerging market.
- Standards application: Analytical service providers / conditioning chemicals for dewatering :

Laboratories will have to develop and to use common methods to characterize sludge. In order to transport (export or import) sludge, a common framework for analytic references is absolutely essential.

- Government: will as well benefit from standardization. In case of a lack of regulation, standards could be used as a temporary substitute.
- Consumers: Standardization will enable them to be confident in a traceability and guarantee of quality of the used products/sludge in land



- NGOs: NGOs could use standards in order to disseminate a message on good practices related to sludge management.

Sludge lifecycle is a worldwide issue, nevertheless the feeling, concerns and explanation around the world could be different and so a technical trade barrier. In this context, stakeholders need to determine common bases. The aim of the ISO TC/275 is to develop International standards with a view to eliminate these obstacles.

## **2.2 Quantitative Indicators of the Business Environment**

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC.

No official records on financial revenues of individual member states are available. This lack of data prohibits the production of an overview of the total market.

Nevertheless, what we do know is that efficient waste water treatment produces vast amounts of sludge. For example, in the countries located wholly or partly on the Baltic Sea watershed the amount of sewage sludge generated is about 3.5 million tonnes of dry solids annually – this is expected to increase to almost four million tonnes by 2020. Sludge management is an integral part of any modern waste water treatment plant: it is important not to lose the nutrients in the sludge, to make use of its material and energy, and to dispose of it efficiently and sustainably.

- **A listing of relevant existing documents at the international, regional and national levels:**

- ISO Standards (examples) :

- ISO 5667-13 "Water quality. Sampling. Part 13 : guidance on sampling of sludges from sewage and water treatment works
- ISO 5667-15 " Water quality - Sampling - Part 15 : guidance on the preservation and handling of sludge and sediment samples"

- European standards (examples):

All deliverables developed by CEN/TC 308 "Characterization and management of sludges" and especially the following ones:

- CEN/TR 13097:2010 Characterization of sludges - "Good practice for sludge utilisation in agriculture"
- EN 12832:1999 Characterization of sludges - Utilization and disposal of sludges - Vocabulary
- EN 13342:2000 Characterization of sludges - Determination of Kjeldahl nitrogen
- EN 15170:2008 Characterization of sludges - Determination of calorific value

- National standards (examples):

- ASTM D 4994 Standard Practice for "Recovery of Viruses from Wastewater Sludges"
- ASTM D 7243 Standard Guide for "Measuring the Saturated Hydraulic Conductivity of Paper Industry Sludges"
- ASTM D 5210, ANSI D 5210 Standard Test Method for "Determining the Anaerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewage Sludge"



- GB 4284-1984 "Control standards for pollutants in sludges from agricultural use"
- JIS B 9944 "Testing methods of activated sludge process equipments"
- JIS B 9945 "Testing methods of filtration equipments for dewatering"
- IS 8413 "Part 2 1982 Requirements for biological treatment end equipment: Part 2 Activated sludge process and its modifications"
- IS 10037 "Part 1 1981 Requirements for sludge dewatering equipment: Part I Sludge drying beds-sand, gravel and underdrains"
- IS 10037 "Part 2 1983 Requirements for sludge de-watering equipment: Part 2 Vacuum filtration equipment"
- IS 10037 "Part 3 1983 Requirements for sludge de-watering equipment: Part 3 Centrifugal equipment (Solid bowl type)"
- NF U 44-095 Organic soil improvers - "Composts containing substances essential to agriculture, stanning from water treatment"

➤ Identified Regulation:

- Basel Convention
- Council Directive 91/271/EEC concerning urban waste-water treatment
- Council Directive 2000/76/EC concerning waste incineration
- Council Directive 86/278/EEC concerning sewage sludge

➤ ISO committee's International Standards cited as normative references:

- ISO/TC 147 Water quality
- ISO/TC 190 Soil quality
- ISO/TC 224 Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators
- ISO/TC 134 Fertilizers and soil conditioners
- ISO/TC 255 Biogas

➤ A listing of relevant external international organizations or internal parties:

- IWA International Water Association
- WEPA Water Environment Partnership in Asia
- AfWA African Water Association
- IOW International Office for Water
- AWWA American Water Work Association

### **3. BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC**

Spurred by growing international interest in developing standards for sludge, with a particular focus on recovery processes, the committee aims at merging user (and societal) expectations and regulatory requirements by producing International Standards that are relevant and fit for purpose. To this end, communities and operators of water and wastewater systems need tools that will help them to select and implement networks capable of producing sludge of identifiable and traceable quality, and elect, among various recovery and disposal options, the ones they deem most suitable for a given situation.



It is also important to emphasize the issues – now increasingly identified – related to drinking water sludge, an area which has never undergone thorough investigation. Producing drinking water results in drinking water sludge. Industry professionals (water producers and water network administrators in particular) point to the need for harmonized professional practices in order to monitor production, recovery and disposal techniques. The development of benchmarks for classification and recovery is consequently also one of the target objectives.

The development of common international guidelines for converting sludge into energy will be another major objective of ISO/TC 275. Heat or electricity can be recovered from sludge through biogas production units involving a methanization process. Energy recovery encompasses a number of other technologies for converting the organic fraction of sludge into energy. Such recovery may provide an additional or alternative disposal channel when sludge re-use for agricultural purposes is not possible. Again, the goal of ISO/TC 275 will be to provide a code of good practice for these new international challenges.

- Main benefits:
  - Economic: growing economic activity; how to rationalize the costs. National commercial interests... very much related with health and environment issues;
  - Health: hazardous practices; prevention of risks during storage, use and disposal of sludge;  
Example: Storage of sludge: means have to be taken in order to prevent risks in consequence of rise in temperature
  - Protection of the environment: risks of pollutions; protection of soil, water, wildlife,...  
Example: sludge use and/or disposal: parasites elements have to be measured and controlled before sludge use or disposal

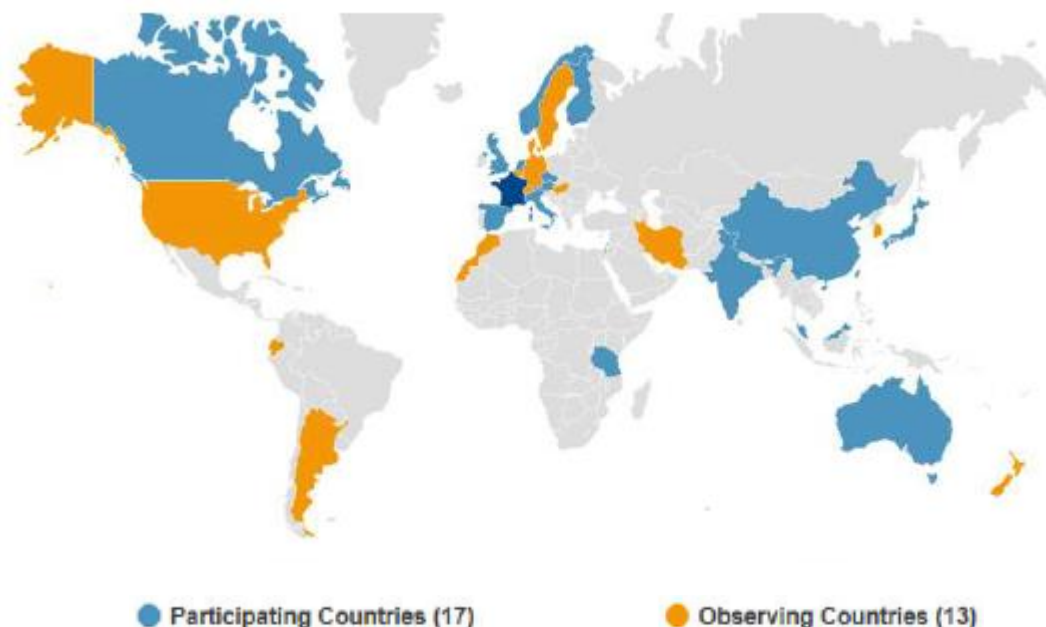
Generation of economic benefits on a topic very much related with health and environment issues.

#### **4. REPRESENTATION AND PARTICIPATION IN THE ISO/TC**

##### Countries/ISO member bodies that are P and O members of the ISO committee

ISO/TC 275 has 16 P members and 13 O members, among these almost all European States.

## 4.2 Analysis of the participation



Sludge lifecycle is a worldwide issue; all continents are represented in P or O membership. The participation of threshold countries and developing countries might be improved.

All stakeholders working in sludge treatment need to ensure that the adequate networks will be selected and implemented professionally, including:

- Laboratories that measure chemical and biological parameters
- Engineering departments
- Contractors, constructors and operators of wastewater treatment plants and drinking-water production plants
- Manufacturers of sludge conditioning and treatment equipment
- Equipment manufacturers and treatment plant builders
- Agricultural recycling companies

There is a growing challenge given the large number of wastewater treatment systems in the world that generate sludge production. As a result, a concerted international approach is needed that integrates all aspects of sludge processes, recovery and characterization.

This involves reconciling the needs of various international stakeholders on two important, but related points: technical, ecological and environmental challenges and economic attractiveness. The latter refers to the development of management systems for sludge characterization and recovery.



## 5. OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

### 5.1 *Defined objectives of the ISO/TC*

How do you re-use or recover the waste material contained in sludge, particularly when it originates from wastewater treatment or the production of drinking water? How do you dispose of sludge when recovery is not possible? At what cost? How do you manage the associated risks? And how do you communicate about this issue? What does sludge contain, especially when it is a by-product of urban wastewater treatment or water purification? These are just some of the questions that need to be addressed by new technical committee ISO/TC 275, *Sludge recovery, recycling, treatment and disposal*, with the development of ISO standards and good practice guidelines.

ISO TC/275 addresses the Standardization of the methods for characterizing, categorizing, preparing, treating, recycling and managing sludge, also called biosolids in some countries, and outputs from their treatment and handling from any water treatment system.

It addresses also the Standardization of measurement methods for characterizing and categorizing encompasses: sampling methods, preservation of samples, physical, chemical and microbiological parameters analysis, laboratory conditioning of sludge, physical behaviour of sludge, all required for the characterization of sludge with a view to facilitate decisions on the choice of the treatment procedures and of the use and disposal of sludge. Are excluded: hazardous sludge from industry and dredged materials already covered by ISO/TC 190 "soil quality".

### 5.2 *Identified strategies to achieve the ISO/TC's defined objectives*

ISO TC 275 uses the experience acquired in the European Union where industry currently has a leading international position in these technologies. Indeed, CEN/TC 308 develops measurement methods for regulatory parameters, standards on physical behavior of sludges, guidance on sludges treatment and management which provide with a consistent basis, each time it's relevant, for the international issue and the development of ISO TC/275 Standards i.e. to assess working in the framework of the Vienna Agreement, either through implementation of the international work results or through joint development with CEN TC 308, with ISO lead. Also, priority is given to methods needed or proposed by the member countries.

**To achieve the ISO/TC's defined objectives, the specific structure of the ISO committee created as follow:**

<b>WG</b>	<b>WG</b>	<b>Pays</b>
<b>WG1</b>	Terminology	Austria
<b>WG2</b>	Characterization methods	France
<b>WG3</b>	Digestion	France
<b>WG4</b>	Land application	Canada/Israël
<b>WG5</b>	Thermal processes	France
<b>WG6</b>	Thickening and dewatering	Italy
<b>WG7</b>	Inorganic & nutrients recovery	UK



### **Co-operation and liaisons with other ISO committees ISO International Standards:**

- ISO/TC 147 Water quality
- ISO/TC 190 Soil quality
- ISO/TC 224 Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators
- ISO/TC 134 Fertilizers and soil conditioners

### **Co-operation and liaisons with relevant external international organizations or internal parties:**

- IWA International Water Association
- WEPA Water Environment Partnership in Asia
- AfWA African Water Association
- IOW International Office for Water
- AWWA American Water Work Association

## **6. FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME**

The financial resources allowing experts to actively participate in the development of standards require continuous attention. It is almost impossible to predict the participation of experts because this is subject to market trends and the priority which is given to water quality within the distinct countries.

Mostly European experts participate and the input from other regions like Russia, Africa and South America is welcome.



## 7. STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scope, projects and publications. All of this information is updated regularly and is available on ISO's website, ISO Online.

The link below is to the TC's page on ISO's website: [ISO TC 275 on ISO Online](#)

Click on the tabs and links on this page to find the following information:

- About (Secretariat, Secretary, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work program (published standards and standards under development)

### Reference information

[\*Glossary of terms and abbreviations used in ISO/TC Business Plans\*](#)

[\*General information on the principles of ISO's technical work\*](#)