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Institute for Prospective Technological Studies (Seville)
Sustainable Production and Consumption Unit

Seville, 11 February 2013

Third Workshop on End-of-Waste (EoW) criteria for Biodegradable waste subject to biological treatment (compost and digestate)

Seville, Tuesday 26 February 2013

BACKGROUND PAPER (BP)

Purpose of this paper and of the Third Workshop

The objective of this background paper (BP) is to outline the main issues proposed to be discussed at the Third Workshop on End-of-Waste criteria for Biodegradable waste subject to biological treatment (compost and digestate).

The meeting objective is to discuss solutions for the outstanding open questions and to agree on the remaining work to finalise the end-of-waste proposals. In particular, it is proposed that the Workshop should focus on:

- General comments
    - Alignment of the EoW criteria with EU waste policy principles
    - Concerns about the benefits and costs of end-of-waste criteria
- Sampling and analysis campaign (Chapter 3 of working document)
- Product quality criteria (Chapter 4)
    - Measurement requirements and limit values for organic pollutants
    - Limit values for Cu & Zn, other PTEs and physical impurities
    - Need for the introduction and feasibility for a stability parameter
    - Other issues related to product quality criteria
- Input material criteria (Chapter 4)
    - Issues around the organic fraction from mechanical treatment, sewage sludge and manure as input materials
    - Possibilities for updating the positive list
    - Other issues
- Application of end-of-waste criteria (Chapter 4)
- Description of impacts (Chapter 5)

This BP includes:

- background information for the Third Workshop;
- the issues proposed for discussion at the Third Workshop (including a summary of major comments received on the Third Working Document on End-of-Waste criteria for Biodegradable waste and the JRC assessment of those comments);
- the proposed modifications to be made to the proposals for end-of-waste criteria arising from the comments of TWG members.

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Background information

Initial discussions on possible end-of-waste criteria for compost started in 2007 with a pilot study.

In 2010, a Technical Working Group was established for developing End-of-Waste criteria for Biodegradable waste subject to biological treatment. The publication of a first working document was followed by a first TWG workshop in Seville on 2 March 2011. During this First Workshop, the lack of harmonised and recent scientific data on organic and inorganic pollutants in different types of compost and digestate was identified as an important obstacle. As a result of the First Workshop discussions, the JRC launched a pan-European sampling and analysis campaign, which investigated more than hundred different chemical compounds in more than hundred compost and digestate samples, delivered through the help of the TWG members.

In October 2011, the JRC-IPTS published a Second Working Document (including preliminary results of the JRC sampling and analysis campaign) and organised a Second Workshop with the TWG in Seville (24-25 October 2011).

Following availability of the full dataset from the JRC sampling and analysis campaign in July 2012, the Third Working Document was published on 10 August 2012 and made available for technical commenting by the TWG. Feedback from TWG experts was received from 12 Member States (+Norway), 19 Industry organisations and 1 NGO. Based on the ample feedback from the TWG on this document, it became clear that certain parts of the Third Working Document still raise substantial questions and require further explanation and discussion.

Hence, it has been decided to organize a Third Workshop in order to clarify the open questions and to work on the end-of-waste criteria proposals with the aim to find solutions that are based on scientific evidence and can be supported widely by the TWG.

TWG members have been informed about the Workshop and selected external and TWG experts have received a personalized invitation. Moreover, all TWG experts received an overview of the comments for which publication authorization was available (20/11/2012). Prior to the Third Workshop the TWG was invited to provide further evidence and scientific arguments by 21 January 2013.

Before coming to the meeting (only for invited TWG members)

As a TWG member, you should read this BP as well as the Third Working Document before coming to the meeting, to determine your position on the identified issues. The Third Workshop will be characterised by deep technical discussions and represent the final opportunity for the TWG to discuss in group the contents of the end-of-waste proposals.

Whether or not your position differs from any proposal in this BP, you should come to the meeting prepared to justify your position and, **if you have a different view, to present an alternative proposal and the evidential basis for that proposal.**

IMPORTANT: Please bring at least the following documents with you to the as the *JRC will not be able to provide you with printed copies*:

- this BP;
- the Third Working Document on End-of-waste criteria for Biodegradable Waste (3rd WD)

Aim and structure of this background paper

The aim of this BP is to provide a resource which can be used to structure the discussions at the Third Workshop, in order to resolve the remaining open or controversial aspects of the proposed end-of-waste criteria. Some of the issues are proposed for discussion at the Third Workshop, while the other issues may be discussed only if requested in advance of the meeting. This is because, from an assessment of the TWG comments, some of the proposed criteria are considered to be either largely agreed upon or can be addressed without further discussion. Please note that the order of the discussion items in this BP will not necessarily be the order of the discussion at the meeting.

In order to keep this BP succinct and guide the discussions towards a solid workable proposal, this document does not contain items raised again by certain stakeholders on which extensive discussions have been held in the past and for which the 3rd Working Document proposal is supported by the majority of the stakeholders. Such requests may include individual demands by stakeholders to change a parameter, description, etc.

TWG members are requested to contact the JRC-IPTS by e-mail at jrc-ipts-end-of-waste@ec.europa.eu at least seven working days before the TWG final meeting **(i.e. by Monday 18 February 2013)** if they wish **to request any other items for discussion at the meeting or to propose additional agenda items** for the meeting. Please note that the possibility of including additional items in the meeting agenda is extremely limited due to time restrictions.

Source and weighing of comments

The present Background Paper summarizes the main comments received through the TWG consultation following publication of the Third Working Document. Experts often formulated comments similar to those of colleagues, but with specific nuances. This summary document cannot reflect all these nuances. Hence, an attempt was made to reflect the core message around a number of comments. For a detailed overview of the comments provided by the TWG, and for which publication authorization was granted, it is referred to the collection of feedback sheets made available by e-mail and through CIRCABC in November 2012.

Working plan

After the Third Workshop of 26 February 2013, a revised draft of the Technical Working Document may be prepared (Revised Working Document).
Afterwards, the TWG may be given the possibility to provide comments on the document, thereby focussing on the changes made as a result of the conclusions of the Third Workshop.

Abbreviations

3rd WD: Third Working Document on end-of-waste criteria for biodegradable waste (distributed in August 2012 to TWG)
BP: this Background Paper
EoW: end-of-waste
MBT: mechanical biological treatment
MSW: municipal solid waste
QA: quality assurance
RWD: Revised Working Document (a document that may follow the discussions at the Third Workshop)
TWG: Technical Working Group
WFD: Waste Framework Directive (2008/98/EC)

1 ITEMS PROPOSED FOR DISCUSSION AT THE THIRD WORKSHOP

1.1 General comments

1.1.1 Alignment of the EoW criteria with EU waste policy principles

Location in 3rd Working Document	Full document
Summary of comments	Many experts raised concerns about possible conflicts of the proposed end-of-waste criteria with other related EU legislation or recognised waste management principles: 1. Setting EU-wide end-of-waste criteria is against the principle of subsidiarity. It does not take into account the specific national aspects of use, market/demand, standards and need for environmental protection and human health. 2. Using the organic fraction from MBT treatment and sewage sludge as input materials for compost and digestate production is contradictory with the Waste Framework Directive that insists on separate collection of biodegradable waste.
JRC Assessment of comments	1. According to the Communication on Biowaste from 18/05/2010[1], the principle of subsidiarity should indeed apply on prevention and treatment of biowaste. Nonetheless, the same Communication states that standards for compost and digestate should be established to enable their free circulation on the internal market and to allow using them without further monitoring and control of the soils on which they are used. Hence a revised proposal should take into account where EoW criteria are best regulated at Community level, and where decisions should be left to the Member States, based on all 4 end-of-waste conditions. 2. The 2012 Guidance on the interpretation of key provisions of Directive 2008/98/EC[2] on waste states that "co-mingled collection of more than one single waste stream may be accepted as meeting the requirement for separate collection, but the benchmark of 'high-quality recycling' of separately collected single waste streams has to be examined; if subsequent separation can achieve high-quality recycling similar to that achieved with separate collection, then co-mingling would be in line with Article 11 WFD and the principles of the waste hierarchy". And although the Guidance document subsequently states that "practically, this usually excludes co-mingled collection of bio-waste and other 'wet' waste fractions with dry fractions such as e.g. paper", it also states that "the wording of Article 22 WFD leaves the introduction of separate bio-waste collection to Member States' discretion but obliges Member States to concretely encourage separate collection". This indicates that the advantages of separate collection are clearly recognized at Community level, whereas Member States can ultimately decide on the options. Hence the development of Community end-of-waste criteria should take into account both these central ideas.
JRC proposal	In the proposed modifications further on in this BP, it will be explained how the JRC intends to: • Refine the end-of-waste criteria proposals in the Revised Working Document (RWD) to strike a better balance between ensuring strengthening of the EU market and generating a level playing field on protection of the environment and human health on the one hand and allowing subsidiarity when recommended by the specific national characteristics of certain end-of-waste conditions on the other hand. • Stress in the RWD the consistency of the proposed end-of-waste criteria with EU

[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0235:EN:NOT

[2] http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf

	legislation and explain how the proposals follow the EU principles and waste management guidelines.

1.1.2 Concerns about the benefits and costs of end-of-waste criteria

Location in 3rd Working Document	Full document
Summary of comments	A clear majority of experts raised concerns about the costs related to the introduction of EU wide end-of-waste criteria. The following comments were made: 1. Costs linked to analysis requirements, mainly on organic pollutants may be (too) high 2. Costs linked to external sampling requirements may be (too) high 3. Costs linked to switching from national measurement methods to European (Horizontal) measurement standards may be (too) high, because of the costs for developing and accrediting tests. 4. Costs linked to quality assurance may be (too) high. 5. Disproportionate costs will arise for very small plants and community composting initiatives, making it by default impossible for these to join the EoW scheme.
JRC Assessment of comments	A financial impact assessment carried out by WRAP for compost and digestate[3] in the framework of the UK Quality Protocols demonstrated that the overall costs incurred due to introduction of end-of-waste systems can be outweighed by a.o. the gains from reduced compliance costs and by better marketing of the output materials. The costs related to the introduction of EU end-of-waste criteria have been described in Chapter 5 (3rd WD page 129 and further), but should be further analyzed in detail and reduced where reasonably acceptable. 1. It was discussed in the 3rd WD that the main new cost introduced by the current proposal would indeed be linked to the necessity for organic pollutant measurements. In response to the 3rd WD, several stakeholders have provided detailed data on costs related to the measurement of parameters from the 3rd WD proposal. The average costs for measuring PAH, PCB, PCDD/F and PFC were listed as 140, 180, 560 and 150 Euro, respectively. Furthermore, cost examples were calculated by the UK REA for analytical work and certification for several plant sizes. The costs varied between 0.97 Euro (excl. VAT) per tonne input material for a 6,000 tonne annual input plant in the recognition year to 0.11 Euro per tonne input material for a 50,000 tonne annual input plant in subsequent years (with only one measurement of organic pollutants). These figures illustrate the large differences in costs for the different organic pollutant measurements and plant sizes. It should therefore be analyzed in detail for every of these 4 organic pollutant parameters whether the cost for a mandatory measurement is justified by the probability of occurrence and the associated environmental risk. 2. The cost for external sample taking is estimated by the UK AFOR to be 420 Euro per sample (excl. VAT). Hence the cost in the proposed measuring scheme would be 420 Euro/year + 0.042 Euro per tonne input material in the year following the recognition year. It is also mentioned that costs will be higher if sample taking has to occur following a strict timing determined by the transfer to the next holder or own use, because of the lack of storage provisions under the currently proposed end-of-waste criteria. It must be stressed, however, that external sampling costs are partially recovered through savings on training and time usage of on-plant personnel and that only a minimum amount of external samples is required in the current proposal. In view of ensuring EU-wide market confidence and a level playing field, most

[3] http://ec.europa.eu/enterprise/tris/pisa/cfcontent.cfm?vFile=820090124EN.DOC

	stakeholders seem to agree that this is a necessary part of end-of-waste criteria and hence no substantial changes should be made to the demand for a minimum frequency for independent sample taking. In order to avoid additional costs due to strict sampling timing, it is proposed to provide for temporary storage possibilities in the end-of-waste criteria. 3. Standardization is generally known to lead to cost reductions on the longer term[4], e.g. by possible EU wide competition by laboratories for an expanding market for analytical services. Furthermore, project Horizontal was launched in order to have common measurement standards in the framework of EU legislation, and financed by many Member States[5], a clear indication for the willingness to harmonize standards. Information provided by stakeholders also indicated the difference in measurement results due to the use of different standards applied in various Member States, having a large potential impact on the pass/fail decisions for end-of-waste status for a candidate material. As such, in order to ensure the level playing field, uniform standards should be used whenever they are available. 4. Most compost/digestate producers operating under a national system similar to or equivalent with the end-of-waste concept already incur costs related to quality assurance measures. For plants with an existing QA system, the costs are unlikely to change substantially through the introduction of EU-wide end-of-waste criteria. For other plants, costs can be partially recovered through reduced compliance costs and better prices for their products. In view of the importance of a quality assurance system to guarantee the production of a safe high quality material, most stakeholders seem to agree that this is a necessary part of end-of-waste criteria and hence no substantial changes should be made to the demand for quality assurance. 5. It should be considered that a system such as EoW, aiming at a high quality process and output material, entails certain costs that may only be outweighed by the benefits at a certain production scale. A financial impact assessment in the UK showed that for composting installations with an annual input of less than 6,000 tonne, the PAS100 system did not yield economic benefits. As a consequence, there will be instances where quality composts or digestate cannot meet end-of-waste criteria, because of the costs involved. Discussions with TWG experts learned that the main concern for small scale installations is for their material not to be counted in the recycling targets and therefore being disadvantaged. However, Article 2(6) and Annex I and II of Commission Decision 2011/753/EU[6] allow Member States to count the input to the aerobic or anaerobic treatment as recycled where that treatment generates compost or digestate which, following any further necessary reprocessing, is used as a recycled product, material or substance for land treatment resulting in benefit to agriculture or ecological improvement. Hence, compost or digestate from small scale plants is not a priori excluded from this definition. Moreover, it should be stressed that the proposal from the 3rd WD already provides for certain requirements that are linked to the size of the plants. Nonetheless, it is recommended that further changes are made to the proposal that provide for a cost reduction of all possible plants, especially the smallest.
JRC proposal	• Concrete cost reduction proposals will be made in the RWD by limiting the number of parameters and requirements on measurement frequency for organic pollutants. Moreover, a proposal to allow for temporary storage of the stable ouput material should allow the producers to better plan sample taking and hence avoid additional costs incurred by a strict timing of the sampling.

[4] http://www.din.de/sixcms_upload/media/2896/economic_benefits_standardization.pdf

[5] Project HORIZONTAL started in December 2002 with the aim to develop horizontal and harmonised European standards in the field of sludge, soil, and treated biowaste to facilitate the regulation of these major streams in the multiple decisions related to different uses and disposal governed by EU Directives. Project HORIZONTAL was financed by the European Commission DG RTD under the Framework 6 Programme (Thematic Priority 8.1 STREP: Topic 1.5 Environmental assessment), the European Commission DG ENV, several EU Member States and the Joint Research Centre. The following Member States provided direct financial support: Austria (UBA), Belgium (ISSEP), Germany (UBA), Denmark (MST), Spain (MMA), France (ADEME), Nordic council of Ministries (Finland, Sweden, Norway, Iceland, Denmark), Italy (APAT), Ireland (EPA), Netherlands (VROM), United Kingdom (DEFRA, EA). (http://horizontal.ecn.nl)

[6] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:310:0011:0016:EN:PDF

	• The RWD will provide a more detailed cost overview, with the help of TWG experts' input.

1.2 Sampling and analysis campaign (Chapter 3 of working document)

Location in 3rd Working Document	3.JRC Sampling and analysis campaign, page 69 and further
Summary of comments	A considerable number of experts provided general and specific comments on the JRC Sampling and Analysis campaign. 1. No detailed information on analysis methodology is given in the 3rd WD. 2. The exact sample composition is not known and may be wrong. 3. The data have little significance because not enough samples were measured, no seasonal variations were taken into account, participation was voluntary and certain samples have been refused. 4. Certain measurement results from the second working document are not listed anymore. 5. It was suggested that MBT compost is prone to more seasonal variations than other types of compost.
JRC Assessment of comments	The Chapter on the JRC Sampling and Analysis Campaign should be broadened to address the relevant issues raised by TWG experts. The strengths and the limitations of the campaign should be highlighted and results should be benchmarked against relevant and current scientific data. 1. The results presented in the 3rd WD are part of the FATE projects managed by JRC-IES. The JRC-IES provides full reports on the different FATE studies when the full results become available. Hence, the detailed methodology will be provided by an independent JRC-IES Report (publication expected in 2013). The major reason to include the FATE results in the 3rd WD was to have data from a uniform measurement platform that allowed for comparison between different types of compost and digestate materials, sampled at the same time, by means of the same methodology. 2. The sampling campaign set-up implied that information should be provided by the producers. On-site verification of sample composition would have been out of the time and budget possibilities. In case of doubt, an extra check was made by contacting plants or consulting available information. 3. Participation of the plants was voluntary and based on contacts provided through the TWG expert network. Time and budget limitations did not allow to measure over several seasons. Samples were refused because of late reply to calls for participation or overrepresentation of certain sample categories. Nonetheless, more than 6,500 measurement results were collected on more than 100 material samples. Hence, whereas the generated data set may not be extensive enough for a robust statistical analysis across the different material categories, its value for confirming certain trends or, conversely, rejecting certain hypotheses should be recognized. 4. Measurement results in the Second Working Document were obtained in house by the JRC, in order to have a quick first set of data available for preliminary discussion at the Second Workshop in October 2011. Hence these samples were measured under different conditions than the majority of the samples. In order to have a uniform comparison base, only new measurement results obtained under the same conditions have been listed in the Third Working Document. 5. No evidence has been encountered in the scientific literature or available independent databases that could confirm a larger seasonal variation for MBT

	compost/digestate materials, compared to compost/digestate materials from source separate collection. Brändli et al (2005)[7] reported in their review study on compost from source separated input materials that the highest concentrations of persistent organic pollutants were observed in summer samples. This suggests that seasonal variations of organic pollutants can indeed exist in compost/digestate materials and that they may not be limited to MBT materials only.
JRC proposal	The JRC proposes not to carry out any additional testing at this stage, in order not to further delay the possible introduction of end-of-waste criteria, but to • take a conservative approach with respect to organic pollutants, while providing for possibilities to reduce testing costs (see proposal under 1.3.1) • take a conservative approach with respect to controversial waste input materials at the EU level, while providing the possibility for more flexibility on national markets (see proposal under 1.4) • invite operators and quality assurance associations to acquire data on pollutants in view of a possible future revision of EU wide end-of-waste criteria (see 1.3.1) Furthermore the JRC will provide additional external references in the Revised Working Document to benchmark results from the JRC Sampling and Analysis Campaign. Special attention shall be given to high quality and recent peer reviewed scientific data.

1.3 Product quality criteria (Chapter 4)

1.3.1 Measurement requirements and limit values for organic pollutants

Location in 3rd Working Document	4.3 Product quality requirements for compost and digestate, page 95 and further
Summary of comments	A very large number of expert stakeholders questioned the measurement requirement for organic pollutants as formulated in the Third Working Document. Following main comments were received: 1. There is no need to perform organic pollutant measurements if only source separated materials are used as input, based on the results from the sampling and analysis campaign. 2. The costs for measuring organic pollutants cannot be justified. 3. It is not clear why the given set of organic pollutants and the specific limits have been proposed in the 3rd WD.
JRC Assessment of comments	It should be stressed that, in general, the comments made by a majority of TWG experts indicated a clear concern for disturbing the EU compost/digestate market by the introduction of materials with low (perceived) quality. Hence, adaptations to the requirements for measuring organic pollutants and the limit values should only be made where cost reductions can be realized without jeopardizing the environment or human health. The comments received, together with available studies may allow a balanced adaptation of the 3rd WD proposal. 1. A thorough evaluation of the measurement data available from the JRC Sampling and analysis campaign and from literature on compost/digestate from source separated inputs indicates that even these materials may contain elevated concentrations of organic pollutants. However, it turns out that the occurrence of

[7] Brändli, R.C., Bucheli, T.D., Kupper, T., Furrer, R., Stadelmann, F.X. and Tarradelas, 2005, Persistent organic pollutants in source-separated compost and its feedstock materials – A review of field studies, Journal of Environmental Quality, 34(3), 735-760

	elevated concentrations of PCB, PCDD/F and PFCs in such materials is exceptional. Nonetheless, the same studies show that, despite relatively low median values, there exists a non-negligible number of samples – in some case more than 10% of the sample population – for which PAH concentrations are clearly elevated and exceed the different existing limit values in Europe that are available as a reference today. Moreover, Brändli (2006)[8] indicated the potential accumulation of PAH above Swiss guidance concentrations in soils due to regular compost application. Hence, in a conservative approach, the end-of-waste criteria should avoid that materials with elevated PAH levels are placed on the market as products. 2. The costs for organic pollutant measurement have been discussed above (see section 1.1.2). The costs for the measurement of organic pollutants can be minimised by reducing the number of parameters for which testing is required to those cases with the strongest incidence of elevated values. Such an approach needs to maintain however an acceptable level of control. An additional option for cost reduction is to combine an initial screening (e.g. in the recognition year) with a reduction in measurement frequency for well performing plants. This should form a safeguard against pollution that is linked to some distinct sources of input materials. Taking into account the relatively higher occurrence of elevated PAH levels in compost/digestate from source separated collection, compared to PCB, PCDD/F and PFC, and also taking into account that the analysis costs for this class of compounds is the lowest of the 4 types and of the same order as the analysis costs for e.g. heavy metals, it would be advisable to keep PAH in the monitoring program, as already suggested by Brändli (2006). 3. The third condition for end-of-waste, as stipulated in Article 6 (1)(c) of the Waste Framework Directive stipulates that the object should meet the existing legislation and standards applicable to products. The 3rd WD indicated that the compounds PAH, PCB, PCDD/F and PFC appear in several pieces of national legislation for a number of biowaste and similar materials, as shown by the limits in Table 9 on p. 77 in the 3rd WD. Furthermore, the working group on the revision of the Fertilisers Regulation also proposed these 4 compounds, which are known for their role as indicator compounds for organic contamination. In addition, the available standards and limit values were checked with literature so that the fourth condition for end-of-waste was met as well. Nonetheless, for these four parameters, literature data and the results of the JRC sampling and analysis campaign coincided in that PAH_{16} is the priority parameter that requires control and hence a reduction of the number of pollutant classes to measure may be reasonable.
JRC proposal	Taking into account the comments made by many TWG experts that call for a protection of the EU market against products with low (perceived) quality, yet at reasonable costs, the following alternative proposal is made for the measurement of organic pollutants, provided changes are made to the allowable input materials (see section 1.4): • In the recognition year: the screening for organic pollutants is reduced to PAH16 according to the proposed minimum sampling frequency in the 3rd WD (page 104). The mandatory measurement of PCB, PCDD/F and PFC is no longer proposed. • If plants fail any PAH_{16} test in the recognition year, the same measurement frequency is applied in the following year as in the recognition year. • If all PAH_{16} tests are successful, plants will have to perform at least one PAH_{16} measurement per 50,000 tonne input material. The QA procedure shall foresee that the sample selection is done at random and that the measurement is performed on samples taken by the external sampler for measurement of the other quality criterion parameters. • Failure to meet the proposed PAH_{16} limits will reset the plant to the PAH_{16} measurement requirements of the recognition year. It is noted that the organic pollutants analysis results from the mandatory PAH_{16}

[8] Brändli, R, C. (2006) ORGANIC POLLUANTS IN SWISS COMPOST AND DIGESTATE , PhD Thesis, Lausanne, Switzerland, 275 p. (http://infoscience.epfl.ch/record/86076/files/EPFL_TH3599.pdf)

	measurements would clearly benefit from being listed in a European wide database, together with other pollutant measurements. Such a database may be used for future revisions on the requirements for (organic) pollutant measurements. It may also be discussed whether it would be desirable to allow national authorities to grant further exemptions to (small scale) producers following the recognition year on the condition that they participate in an available spot monitoring program. In this case, the provisions of such a program should be clearly agreed within the TWG.

1.3.2 Limit values for Cu & Zn, other PTEs and physical impurities

Location in 3rd Working Document	4.3 Product quality requirements for compost and digestate, page 95 and further
Summary of comments	A considerable number of TWG experts advocated an increase for the limit values of Cu and Zn, whereas some experts requested stricter, lower limit values. Some experts also expressed the wish to provide for less strict limits for other potentially toxic elements (PTEs) or physical impurities. The following arguments were presented: 1. Cu and Zn levels are too strict when performing a risk assessment, as they are necessary trace elements and appear in high concentrations in several types of input materials (especially manure). 2. Limits for Pb should be increased as some areas in the UK display high Pb contents in compost due to historical pollution by leaded fuel. Similarly, it is advocated that Ni limits should be increased as certain regions in Italy display naturally high background soil Ni concentrations. 3. Limits for macroscopic physical impurities should be increased because glass, plastic and metal particles only cause visual nuisance and are inert. 4. Too strict levels on pollutants will exclude a large number of compost/digestate materials from being eligible for end-of-waste.
JRC Assessment of comments	It should be stressed that, in general, the comments made by a majority of TWG experts indicated a severe concern for disturbing the EU compost/digestate market by the introduction of materials with low (perceived) quality. Hence, adaptations should only be made to the proposed limit values from the 3rd WD where clear net market benefits can be made without jeopardizing the environment or human health. The comments received, together with available studies may allow a balanced adaptation of the 3rd WD proposal. 1. Strict Cu and Zn limit values are needed to protect vulnerable areas and to avoid that contaminated input streams are used deliberately. Although Cu and Zn are micronutrients, scientific data is available that shows that mainly Zn levels in groundwater can be of concern in areas with high Cu and Zn loadings due to fertilization practices. This indicates that there might be a certain margin for increasing the limit values, but in a way that allows protecting the most vulnerable regions. 2. PTEs such as Pb and Ni are not known for having any beneficial effects for plants at concentrations above trace level. Increasing limit values to address certain regional phenomena could lead to more contaminated input streams entering the EU compost/digestate chain. Hence, any increase should be avoided. 3. Macroscopic physical impurities are not known for having any beneficial effect for plants or soils. Moreover, these materials are not completely inert as is sometimes suggested but are subject to leaching (glass and metal), dissolution (metals) and/or ingestion by soil fauna (all impurities). Allowing to increase the limit value could lead to more contaminated input streams entering the compost/digestate chain. Furthermore, macroscopic physical impurities constitute an important factor for market confidence, as their visibility leads to an immediate perception by the user of

	product quality, or the lack thereof. Hence, any increase should be avoided. 4. A majority of stakeholders have expressed a clear concern of undermining market confidence by opening up the market to a wide variety of materials with low (perceived) quality. Hence a conservative approach should be taken that safeguards the possible growth of a EU-wide compost/digestate market.
JRC proposal	A conservative but pragmatic adaptation of the 3rd WD criteria is proposed that recognizes the micronutrient value of Cu and Zn, but allows for protection of the most vulnerable areas through clear labelling. The latter provides a tool for national authorities to adapt legislation for specific vulnerable areas: • Compost/digestate materials with Cu and Zn levels below the currently proposed limits in the 3rd WD (page 101) receive EU-wide end-of-waste recognition and are exempt from a labelling requirement for their specific metal contents. • Compost/digestate materials with Cu and Zn levels above the currently proposed limits in the 3rd WD (page 101) receive EU-wide end-of-waste recognition if the Cu levels are between 100 and 200 mg/kg dry matter and/or Zn levels are between 400 and 600 mg/kg dry matter. In this case, the compost/digestate material or any derived product thereof should be clearly labelled as "Compost/digestate materials with high Cu and/or Zn content" and the exact content of the Cu and Zn concentrations should be indicated.

1.3.3 Need for the introduction and feasibility for a stability parameter

Location in 3rd Working Document	4.3 Product quality requirements for compost and digestate, page 95 and further
Summary of comments	A majority of stakeholders advocated the reintroduction of a stability/maturity[9] requirement, despite the absence of a uniformly recognized or Horizontal measurement standard. A slight minority of stakeholders argued that stability constitutes more of a market issue than a real quality parameter and that the market needs products with different stability. The latter were in favour of a declaration only or no obligations at all. 1. Stability is needed as a parameter to avoid that hardly treated "shred and spread" materials are put on the market and that high organic matter contents are used to mask large pollutant concentrations[10]. 2. Unstable materials can cause problems during storage, transport and/or application (e.g. gaseous or odour emissions). 3. The market needs materials with a high organic matter content (so called "fresh" materials) to provide the soil with organic matter. 4. It is not possible to introduce a parameter at this stage, as the different Member States use very different systems.
JRC Assessment of comments	Any adaptation to the proposal should take into account the concerns expressed by a large majority of stakeholders to avoid any introduction of materials with a low (perceived) quality on the market. Moreover, it should be avoided that uncontrolled gaseous and odour emissions can occur during storage, transportation and/or application. 1. It is believed that a minimum stability requirement should provide a safeguard against the introduction of materials on the market that have hardly undergone any

[9] Compost maturity and stability are often used interchangeably (http://www.ecn.nl/docs/society/horizontal/hor7_stability.pdf). PAS 110 provides a generic definition that can be used for both compost and digestate: "degree of processing and biodegradation at which the rate of biological activity has slowed to an acceptably low and consistent level and will not significantly increase under favourable, altered conditions" (http://www.wrap.org.uk/system/files/private/BSI%20PAS%20110.pdf)

[10] Pollutant values are defined on a dry matter basis and hence the less the organic matter is degraded, the higher the dry matter content and therefore the lower the pollutant concentration will be.

	treatment. 2. It should be avoided that uncontrolled emissions occur during storage, transport and or application. Moreover, the introduction of a stability parameter may allow for a provision for temporary storage of end-of-waste materials, as requested by some stakeholders (see section 1.5). 3. End-of-waste status should only be granted to materials that have received a full stabilization treatment. Although the value of other, non-stable materials is recognized, it may be desirable that these are used under controlled conditions, outside the end-of-waste framework. 4. Many Member States already have requirements on compost stability (limits and/or declaration obligations, see Annex 1), often based on self-heating tests or a respirometric index. Studies on the evaluation of the different systems used for stability measurement indicate that the different approaches are actually highly correlated, at least for compost stability. As such, a Rottegrad IV index is very comparable with 15 mmol O_2/kg organic matter/h or 16 mg CO_2/g organic matter/day in a respirometric test. A WRAP study[11] suggested that there is no clear superiority of any given method. Nonetheless, EN standards exist for oxygen uptake rate and self heating tests (EN 16087-1 and EN 16087-2) and hence should be preferable over national standards or commercial measurement tools to provide a level playing field. For digestate stability, it appears that fewer measurement methods are being used at present. Most of them are based on organic acids testing or assessment of remaining biodegradability through an aerobic respirometric test or anaerobic biogas formation potential. Hence, it would be advisable to recognize a number of test methods and limits that are widely in use at present. A future revision may allow for the introduction of a standardized test method.
JRC proposal	In view of ensuring the highly advocated market confidence guarantees and avoiding any adverse environmental impacts, following adaptation is proposed for the RWD: • For compost stability, materials are allowed that display a Rottegrad IV or V (self heating test temperature rise of max. 20 degrees C above ambient temperature) or a respirometric index result of maximum 15 mmol O2/kg organic matter/h or 16 mg CO2/g organic matter/day. The methods to be used should be EN standards 16087-1 and 16087-2. If a Member State already has an official method in place that differs from the two methods above, together with an associated limit value, it may be used as well. • For digestate stability, materials are allowed that display a stability value that meets one of the currently existing limit values (respirometric index result of maximum 50 mmol O2/kg organic matter/h, organic acids content of max 1500 mg/l or residual biogas potential of maximum 0.25 l/ g volatile solids). • Should the competent authorities in a Member State introduce a new method for determining digestate stability and propose a corresponding limit value, it should be demonstrated that the requirements are at least as strict as the above proposed requirements according to the allowed methods. • Materials being produced in one Member State and used or put on the market in a different Member State shall meet the requirements of both Member States for the stability criterion unless the receiving Member State recognizes the method of the producing Member State. Member States and other stakeholders are encouraged to collaborate towards the development of a standardized measurement method and limit value for stability, one for compost and one for digestate, in view of possible future revisions of the end-of-waste criteria.

[11] http://www2.wrap.org.uk/downloads/BSI_PAS_100_Update.613d3810.6962.pdf

1.3.4 Other issues related to product quality criteria

Location in 3rd Working Document	4.3 Product quality requirements for compost and digestate, page 95 and further
Summary of comments	A number of experts also expressed a variety of comments on the product quality criteria: 1. The requirement of resetting the measurement frequency for pollutants to the one of the input year in case of a 5% change in input materials is questionable. 2. There seems to be an error in the proposed sampling and measurement frequency, whereby large plants have a lower number of measurements in the recognition year than in the following year.
JRC Assessment of comments	1. The requirement of resetting the measurement frequency for pollutants to the one of the input year in case of a 5% change should include a clear definition of changes and be revised in view of a proposed change to allowable input materials. 2. Possible confusion on the minimum measurement frequency should be clarified.
JRC proposal	Taking into account the proposed modifications to the allowed input materials (see section 1.4), it is proposed to adapt the criterion as follows: • A change of 10%, based on the annual input expressed in weight, of the input materials occurs • A change includes the change of supplier, the change of waste type (as defined in Annex 2) or the geographical change of input materials (change in origin of more than 25 km). • A change does not include seasonal variations, nor normal daily fluctuations that also occurred in the recognition year (e.g. natural fluctuations of input from municipal biowaste and green waste collection points) • For plants with regular changes (more than one per year), the measurement frequency should remain the one of the recognition year It is proposed to redraft the criteria to clarify that from the recognition year onwards the formula should be used to determine the minimum sampling frequency, with the additional requirement that a minimum of 4 samples be taken in the recognition year, so that the sampling frequency is always highest in the recognition year.

1.4 Input material criteria (Chapter 4)

1.4.1 Issues around the organic fraction from mechanical treatment of MSW, sewage sludge and manure as input materials

Location in 3rd Working Document	4.4 Requirements on input materials, p. 106 and further
Summary of comments	A clear majority of TWG experts have advised against allowing the organic fraction from mechanical treatment of MSW and sewage sludge as input materials. They regard the evidence from the analysis and sampling campaign as insufficient for allowing the possibility of an EU-wide end-of-waste status of the resulting materials. 1. Using the organic fraction from mechanical treatment of MSW and sewage sludge as input materials for compost and digestate production is not in line with the Waste Framework Directive. 2. Allowing the organic fraction from mechanical treatment of MSW and sewage sludge as input materials will destroy market confidence in compost/digestate.

	3. Certain input materials should be removed from the positive list as composting/digestion will be used as an inexpensive route to dispose of polluted waste streams, such as sewage sludge. 4. Broad EWC codes (e.g. ending on 99) will lead to certain materials entering the compost and digestate chain that are not suited. 5. MBT and sewage sludge should not be allowed at this moment, but only after a few years time, when their safe use has been proven. This should give manufacturers time to improve their technologies. 6. No MBT material in the study met all requirements for EoW, so all MBT materials should be banned from eligibility for End-of-waste. 7. Data show *generally higher* concentration ranges of pollutants in MBT and sewage sludge derived compost/digestate, even if many measured pollutant concentrations are below the proposed limits. Hence these materials should be excluded as a whole without judging on individual plant performance. 8. Only one country wants to keep MBT technology. 9. Allowing manure as input for compost/digestate will imply that all composts/digestates fall under specific, strict legislation (in the NL). 10. The positive list for compost and digestate should be identical. 11. There is no control mechanism available to ensure that plants will reprocess and dilute off-specification compost/digestate materials.
JRC Assessment of comments	It is clear from the type and number of comments that many TWG experts regard proven marketability at EU level as a prerequisite for EU-wide EoW criteria. Hence, many stakeholders are against a positive list that allows contentious input materials for end-of-waste materials destined for the EU market. In this respect, numerous experts claim that marketability is limited to national contexts for several materials. Hence it is clear that any system should provide the optimal conditions for the unhindered development of a European market for compost/digestate materials with high proven EU market acceptance potential. In the meanwhile, national markets should be given the opportunity to further develop and improve systems for which EU-wide acceptance is not guaranteed at present, in view of a future revision of input material eligibility. 1. See comments under 1.1.1. 2. In several countries, established markets exist for compost/digestate products derived from sewage sludge and/or MBT materials. However, it appears that an immediate opening of the EU market to such materials could lead to undesired effects and even an undermining of the whole market, based on the expert judgments of many stakeholders. Hence any modified proposal should take into account both the national and possible EU market impacts of provisions for sewage sludge and MBT materials. 3. Several Member States have good experiences with materials based on sewage sludge and/or MSW as input materials and the long-term use has suggested several benefits of these materials notwithstanding their inherent generally higher pollutant loading. Other Member States make a clear distinction between sludge and/or MBT materials and other forms of compost/digestate, by e.g. imposing additional measurements or limiting their use to certain applications, because of environmental and/or market concerns. In other Member States, any use of such materials is completely banned because of environmental and/or market concerns. Hence any proposal should take into account both the national and possible EU market impacts of provisions for sewage sludge and MBT materials. 4. EWC codes were listed in the 3rd WD for illustration purposes. As they seem to lead to confusion, it may be considered to remove them and rely on a material definition instead. Neither the Ecolabel for soil improvers (Commission Decision 2006/799/EC[12]), nor the Regulation on organic farming (Commission Regulation (EC) No 889/2008[13]) use EWC codes.

[12] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:325:0028:0034:EN:PDF

[13] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:250:0001:0084:EN:PDF

	5. Excluding MBT and sewage sludge materials now from *any form* of EoW status may create very uncertain market conditions for these materials and hence new investments will be very unlikely, leading to a de facto extinction of the technologies around them. A full exclusion of these materials will also destroy national markets. Hence, a solution should be considered that allows for national end-of-waste systems to be maintained at present for sewage sludge and MBT materials, in view of a possible future revision on their eligibility for end-of-waste criteria. 6. The study did not cover all existing plants in Europe. Other studies (e.g. Ineris 2012 study[14]) indicate that some MBT materials may meet all proposed EU-wide EoW requirements, even on physical impurities. The state of the art of the technology used in MBT shows large differences between plants and hence plants should be examined case by case. 7. Whereas it is correct that median heavy metal concentrations appeared higher for MBT and sewage sludge derived materials than their counterparts based on source separated input materials, this was not the case for e.g. PAH concentrations, in the JRC campaign. It is therefore believed that imposing strict parameter limits on the output material is more straightforward for assuring sufficient environmental and human health protection. 8. France has a major share in MBT technology nowadays, yet it is not the only MS using MBT technology to produce compost for agricultural or land restoration use. Furthermore, waste management plans for biodegradable waste are under development in many MS and it is unclear what role MBT will play in that. 9. Labelling of manure as input material could allow authorities to distinguish between compost/digestate materials that contain manure or don't and hence the legal conditions that should apply to these materials. 10. One positive list for compost and digestate input materials could be used in order to promote simplicity and to avoid the preferential market stimulation of certain technologies. 11. The Quality Assurance system should allow a strict follow up of the procedure. Plants could be sanctioned in case of unlawful practice (e.g. by fines or ultimate loss of EoW status).
JRC proposal	It is important to safeguard an EU level playing field with regard to environmental protection and human health for materials for which the EU market viability is widely accepted. It is not desirable to suddenly disturb national markets by imposing unwanted or, conversely, prohibiting desired input materials. Hence, it is proposed to currently limit certain input materials to the national context until future assessment of their eligibility for end-of-waste. Such an assessment shall be based on the 4 conditions of Article 6 of the WFD, on information to be collected by the competent authorities and/or other stakeholders. Therefore the following adaptation to the input material criterion is proposed for the RWD: • A unique list of input materials is established for both composting and anaerobic digestion. • Given the clear indications by the TWG on market viability for different materials, this list shall be based on materials from the separate collection of biowaste as well as biodegradable residues from agriculture, aquaculture, forestry, fishery and horticulture. • A generic definition, including criteria for acceptance, rather than a listing of specific input materials, should facilitate national authorities to decide on eligible input materials, especially when new materials enter the market (see also Annex 2). • The current exclusion of a material from the input material list excludes it from the current scope. This should allow national end-of-waste systems for non-scope materials to co-exist at present with the EU-wide end-of-waste framework. • Only additives are allowed that are needed to improve the process performance

[14] INERIS, 2012, Etude comparative de la qualité de composts et de digestats issus de la fraction fermentescible d'ordures menagères, collectée séparément ou en melange, 124 p.

	and/or environmental performance of the composting/digestion process (up to 15% of feedstock). • In line with the proposed generic definition and simplification, EWC codes are deleted from the positive list to avoid suitable materials being refused or unsuitable materials being allowed in composting/digestion installations based on their EWC code.

1.4.2 Possibilities for updating the positive list

Location in 3rd Working Document	4.4 Requirements on input materials, p. 106 and further
Summary of comments	Several TWG experts repeated the request to provide for a flexible update mechanism. 1. The EoW proposal has to foresee a workable and fast update mechanism that allows quick introduction of new waste streams on the positive list.
JRC Assessment of comments	1. The revised proposal on the allowed input materials list with generic definition should provide for a framework for national authorities in the different Member States to judge on the suitability of a new input material entering the market. Any new material that meets the proposed criteria should be eligible without the need for specific approval through the Comitology procedure. For materials outside the scope, it is advised to keep the Comitology procedure to ensure consensus on the eligibility for EU-wide end-of-waste criteria.
JRC proposal	• The newly proposed generic definition of input materials allows for the inclusion of new input materials that are within the scope, allowing for the fast introduction of new materials that have the highest chances for acceptance on the EU market.

1.4.3 Other issues

Location in 3rd Working Document	4.4 Requirements on input materials, p. 106 and further
Summary of comments	A number of other comments regarding input materials were communicated, such as on the use and need of additives or control procedures for input materials. 1. Certain additives have no specific usefulness for the composting process and should be removed from the list 2. Visual inspection may not be possible for liquid materials and supply agreements should be allowed as a viable alternative, because chemical analysis is too slow and too expensive.
JRC Assessment of comments	It is proposed that input material criteria could be adapted. 1. The additives should be limited to those that are absolutely necessary to improve the process or environmental performance of the composting/digestion process and to the lowest quantities needed to improve the process or environmental performance of the composting/digestion process. 2. Supply agreements should be allowed if they provide sufficient safeguards (e.g. regular analysis results).

JRC proposal	• The newly proposed generic definition of input materials also includes a definition for additives that limits the additives to those that are absolutely necessary to improve the process or environmental performance of the composting/digestion process. The quantities are also limited to those that are necessary to improve the process or environmental performance of the composting/digestion process. Any other additives should be added after obtaining end-of-waste status, e.g. in the production of soil improvers, growing media or fertilisers. • It is proposed that supply agreements can be used to replace visual inspection, if they provide better safeguards than can be obtained by visual inspection or chemical analysis by the composting/digestion plant.

1.5 Application of end-of-waste criteria (Chapter 4)

Location in 3rd Working Document	P. 123 and further
Summary of comments	1. How can one deal with storage of materials prior to sale (e.g. for digestate materials in moments were spreading is not allowed)? Waste regulations will complicate storage of the processed materials, especially in the case of off-site storage facilities.
JRC assessment	1. Storage of waste material should fall under waste regime to avoid that materials are stored for undetermined periods of time in uncontrolled conditions. It should also be avoided that uncontrolled storage is used for stabilization of an unstable material, leading to unwanted gaseous and odour emissions during the storage period. Moreover, waste legislation de facto applies to other parts of the waste treatment facilities as well. On the other hand, it should be considered to allow a limited storage time after obtaining EoW status, provided it is certain that the stable product will be used within a certain period. It is deemed that a maximum period should not be more than one year taking into account the seasonal fertilization needs. A provision in the end-of-waste criteria that allows for storage may also entail more flexibility in the timing of the sample taking and measurement, as the transfer to the next holder or own use does not have to immediately follow the analysis.
JRC proposal	• It is proposed that for compost and digestate materials for which all other end-of-waste requirements have been met (including the stability requirement), storage is allowed for a maximum period of 1 year, provided the producer can demonstrate through a purchase agreement or equivalent that the material will be transferred to a holder or used by himself before the end of that 1 year period. • The quality assurance system should contain provisions so that storage of materials is done under appropriate conditions to provide protection against humidity, heat or other factors that might negatively affect the compost/digestate quality, the environment or human health.

1.6 Description of impacts (Chapter 5)

Location in 3rd Working	5 Description of impacts, p. 126 and further

Document	
Summary of comments	Apart from the issues around cost and market impact discussed above, several TWG experts raised a number of comments related to the impact of introducing EU-wide EoW criteria. 1. REACH legislation is ambiguous and seems to discriminate between compost and digestate. It should be adapted to allow an equal legal framework for compost and digestate. 2. Links to other legislation such as the Fertilisers Regulation currently under revision should be explained.
JRC Assessment of comments	1. Within the framework of proposing EoW criteria, the process is restricted to analyzing existing legislation, such as REACH. REACH provisions cannot be modified through the EoW process. If stakeholders deem a change to REACH provisions for compost and digestate advisable, the existing legal procedures should be followed. 2. EoW is independent from Fertilisers Regulation or any other legislation (such as the Sewage Sludge Directive or EU Ecolabel). The Fertilisers Regulation is currently under revision and therefore cannot be used as reference. The EC discusses on a regular basis on developments in the different Working groups to assure alignment of the legislation where desirable or needed.
JRC proposal	• The proposals for end-of-waste for compost/digestate will be provided to the EC services dealing with the work on the revision of the Fertilisers Regulation, Sewage Sludge Directive and the EU Ecolabel for soil improvers/growing media.

2 ITEMS NOT PROPOSED FOR DISCUSSION AT THE THIRD WORKSHOP

2.1 Legal issues around EU-wide end-of-waste criteria

2.1.1 Issues around the Waste Framework Directive Article 6

Location in 3rd Working Document	Full document
Summary of comments	A few experts raised concerns about or questioned the feasibility of end-of-waste criteria at EU level. The following reasons were given that are related to the conditions for end-of-waste as set out in Article 6 of the Waste Framework Directive Condition 1: the substance or object is commonly used for specific purposes 1. The use of compost/digestate is limited to soil improvement and agricultural land and other uses are limited Condition 2: a market or demand exists for such a substance or object 2. In some Member States, there is no market or demand for compost and/or digestate. 3. Compost/digestate material has a very low market value. 4. There is hardly any cross-border movement of compost/digestate, so EU-wide EoW criteria have little additional value to the existing compost/digestate markets governed by national legislation. 5. The enforcement of a possible EoW regulation at EU level will destabilise well established markets. Condition 3: the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products 6. Legislation and standards in different Member States widely varies and is difficult to reconcile. Condition 4: the use of the substance or object will not lead to overall adverse environmental or human health impacts 7. The proposed limit values are either too strict or not strict enough to provide an appropriate protection of the environment and human health
JRC Assessment of comments	1. National initiatives on end-of-waste criteria show that there is a clear use for compost and digestate as a soil improver and/or organic fertiliser. More than 14.5 Mtonne of compost and 2 Mtonne of digestate from biodegradable waste is put on the market in the EU per year. 2. The markets for compost and digestate clearly vary in the different Member States. Nonetheless, several Member States have successfully developed markets for compost and digestate over the years, proving the market feasibility of the materials. These markets are supported by systems equivalent or similar to end-of-waste, such as the UK PAS 100 and 110 systems. 3. The market value for compost/digestate in bulk is indeed only a few Euro per tonne, largely below its agronomic value that is around 20 Euro per tonne fresh matter for compost and around 5-7 Euro per tonne fresh matter for digestate. This indicates the potential for improving prices through a better development of compost/digestate markets. Nevertheless, derived products such as growing media or dried fertilisers already benefit from clearly higher market prices (as described in Chapter 2 in the

	Working Document). 4. National compost/digestate markets indeed are dominant, with only about 1% cross-border trade at present. However, this is not the case for the markets of many derived products such as agricultural produce. Confidence in EU-wide recognised end-of-waste compost/digestate through the EU food market could provide for a stimulus to the compost/digestate markets. Furthermore, the compost/digestate industry is linked to other sectors for which markets are clearly international, such as technology providers, analytical laboratories, quality assurance organisations, etc. These sectors may clearly benefit from a unified market at EU-level, which in turn may lead to a wider choice and better services for the compost/digestate producers. 5. The enforcement of a possible EU-wide EoW regulation may cause some adaptation needs to well established markets where these are present. Nonetheless, the proposed criteria from the 3rd WD are predominantly in line with existing legislation and practices in many Member States. Moreover, EU-wide available EoW legislation could provide for a possible accelerated market development in Member States in which compost/digestate markets are currently in an initial state, thanks to legal certainty. 6. The majority of the proposed criteria are well in line with existing requirements in Member States. The proposed adaptations for the RWD also take into account specific national legislation and market conditions by focussing on the materials that receive wide support for an approach at EU level. 7. The third condition for end-of-waste, as stipulated in Article 6 (1)(c) of the Waste Framework Directive stipulates that the object should meet the existing legislation and standards applicable to products. Hence, any proposed criteria should be derived from existing standards and legislation. In addition, the available standards and limit values have been checked with literature so that the fourth condition for end-of-waste is respected as well. Limit values should be strict enough in order to ensure a safe use under all circumstances, including in the most vulnerable areas.
JRC proposal	• The proposed modified set of end-of-waste criteria outlined above in this BP includes specific requirements to ensure that the 4 basic conditions for end-of-waste, according to Article 6 of the Waste Framework Directive, have clearly been met.

2.2 Product quality requirements (Chapter 4)

2.2.1 Need for independent sampling

Location in 3rd Working Document	P. 95 and further
Summary of comments	A few experts expressed their concern about the introduction of independent sampling requirements. 1. Independent sampling and measurement requirements would lead to additional costs for plant operators in MS that currently allow plants to provide samples themselves.
JRC assessment	1. See also section 1.1.2. A minimum number of independent samples to be taken is necessary to guarantee confidence and maintain a level playing field across the EU. The 3rd WD proposal only provides for such a minimum number of samples to be sampled independently. The QA system may provide for additional sampling, which can be performed by plant personnel.

JRC proposal	• No further change proposed to 3rd WD proposed requirement of a minimum frequency of independent sampling.

2.2.2 Need for the use of uniform standards from project Horizontal

Location in 3rd Working Document	4.3 Product quality requirements for compost and digestate, page 95 and further
Summary of comments	A few experts expressed their concern about the introduction of Horizontal standards. 1. A switch from national measurement standards to EU Horizontal measurement standards will induce high costs for accreditation.
JRC Assessment of comments	1. See also section 1.1.2. Standardization is generally known to lead to cost reduction on the longer term[15] (e.g. EU wide competition by laboratories for analytical measurements). Furthermore, project Horizontal was launched in order to have common measurement standards in the framework of EU legislation, and financed by many Member States.[16] Moreover, discussions at the various Workshops indicated that using different measurement standards can lead to conflicts about mutual recognition and that the use of national standards may jeopardize the level playing field (e.g. discussions on the accuracy of the optical sieving method versus bleach destruction for impurities).
JRC proposal	• No further change proposed to the formulation used in the 3rd WD. It is advised to continue using Horizontal standards where available and otherwise allow CEN/TC 223 methods (for compost) where available and otherwise national standards.

2.3 Input material requirements (Chapter 4)

Location in 3rd Working Document	P. 106 and further
Summary of comments	1. Additional waste codes should be added (to include other materials falling under the description) or removed (to avoid that other wastes with the same EWC code can be used as input materials).
JRC assessment	1. The EWC waste codes were only given for illustration and the description should have been the primary source of information to judge whether a material is suited as input material or not.

[15] http://www.din.de/sixcms_upload/media/2896/economic_benefits_standardization.pdf

[16] Project HORIZONTAL started in December 2002 with the aim to develop horizontal and harmonised European standards in the field of sludge, soil, and treated biowaste to facilitate the regulation of these major streams in the multiple decisions related to different uses and disposal governed by EU Directives. Project HORIZONTAL was financed by the European Commission DG RTD under the Framework 6 Programme (Thematic Priority 8.1 STREP: Topic 1.5 Environmental assessment), the European Commission DG ENV, several EU Member States and the Joint Research Centre. The following Member States provided direct financial support: Austria (UBA), Belgium (ISSEP), Germany (UBA), Denmark (MST), Spain (MMA), France (ADEME), Nordic council of Ministries (Finland, Sweden, Norway, Iceland, Denmark), Italy (APAT), Ireland (EPA), Netherlands (VROM), United Kingdom (DEFRA, EA). (http://horizontal.ecn.nl/)

JRC proposal	• The RWD proposal shall no longer contain EWC codes to avoid confusion.

2.4 Requirements on treatment processes and techniques (Chapter 4)

Location in 3rd Working Document	P. 111 and further
Summary of comments	1. References to animal by-products legislation in the text is not needed as it applies de facto and could cause confusion.
JRC assessment	1. References to animal by-products legislation should be removed where it can cause confusion.
JRC proposal	• Remove references to animal by-products in the RWD where it could possibly cause confusion.

2.5 Requirements on the provision of information (Chapter 4)

Location in 3rd Working Document	P. 115 and further
Summary of comments	1. How can a batch be defined in continuous production systems, such as in anaerobic digestion?
JRC assessment	1. A batch code should allow to trace the materials produced and could have numerous forms that may e.g. include production date and time for simple identification, even in the case of continuous production.
JRC proposal	• A batch code should be defined as any identification code that allows the producer to trace back a certain output material to the input materials used and the process parameters that were applicable.

2.6 Requirements on quality assurance procedures (quality management) (Chapter 4)

Location in 3rd Working Document	P. 120 and further

Summary of comments	1. The document does not specify how to deal with delays between sampling and availability of measurement results and what to do in case of non-compliance.
JRC assessment	1. The QA procedure should contain provisions on how to work with delays between sampling and availability of measurement results.
JRC proposal	• No action required as it is believed that details can best be addressed by QA organizations/certification bodies.

Annex 1

Overview of compost and digestate stability measurements and limits in various Member States (Source: information provided by stakeholders; NIA= No Information Available)

	Compost				Digestate			
MS	**Description of principle**	**Method**	**Limit**	**Unit**	**Description of principle**	**Method**	**Limit**	**Unit**
AT	No	-	-	-	No	-	-	-
BE (FL only)	Oxygen consumption	CMA/2/IV/25	15	mmol O2/kg organic matter/h	Oxygen consumption	CMA/2/IV/25	50	mmol O2/kg organic matter/h
BG	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
DE	Self heating test	Rottegrad (Methodenbuch BGK)	Minimum II (IV or V= Stabilized)	Class	Organic acids	NIA	1500	mg/l
DK	Method freedom (Org C/N ratio in water extract, oxygen demand in 96h, Solvita compost test, selfheating test)	Various	Only declaration	Various	NIA	NIA	NIA	NIA
EE	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
ES	No	-	-	-	No	-	-	-
FI	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
FR	According to current standards	Biochemical fractionation of organic material (prXP U 44-162) and others	Only declaration required for sludge compost	-	NIA	NIA	NIA	NIA
IE	PROPOSAL: oxygen uptake rate	NIA	13 (10 from 2014)	mmol O2/kg organic matter/h	NIA	NIA	NIA	NIA
IT	Combination of C and N characterization and germination rate	Various	Various	Various	NIA	NIA	NIA	NIA
LU	Self heating test	Rottegrad (Methodenbuch BGK)	NIA	NIA	NIA	NIA	NIA	NIA
MT	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
NL	Self heating test, oxygen uptake rate	Various	Only declaration	-	NIA	NIA	NIA	NIA
RO	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
SE	Self heating test, respirometric test	Rottegrad, Solvita (CO2 and NH3)	-	Various	No	-	-	-
SI	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
UK	Microbial respriration rate	ORG 0020	16	mg CO2/g organic matter/day	Residual biogas potential (following screening of VFA)	OFW004-005	0.25	l/g volatile solids

Annex 2

Overview of proposed allowed and non-allowed input materials for EU-wide end-of-waste criteria:

<u>General scope</u>: compost and digestate materials obtained through a waste treatment process using materials from the separate collection of biowaste as well as biodegradable residues from agriculture, aquaculture, forestry, fishery and horticulture.

Allowed input materials = in scope of EU end-of-waste criteria

Input material sources	**Specification**[2]
Parks, gardens, cemeteries and other green spaces[1)]	Examples: Leaves, grass, branches, fruit, flowers, plants and plant parts
Households[1)]	Examples: Bio-waste from households: Fruit and vegetable remainders coffee and tea remainders, food remainders, egg shells, plants and soil attached to plant parts Bags for source-separated household waste shall be biodegradable (consisting of paper or biodegradable plastics according to EN 13432 or EN 14995).
Caterers and restaurants[1)]	Examples: Fruit and vegetable remainders, coffee and tea remainders, food remainders, egg shells.
Food and beverage related retail premises[1)]	Examples: Bio-waste from markets, food and feed remainders
Food and beverage processing plants [1)]	Examples: Food waste, food washing waste, sludge from food and feed processing plants not containing pollutants
Horticulture[1)]	Examples: Leaves, grass, branches, fruit, flowers, plants, plant parts bark, weeds, mushrooms, soil attached to plant parts and peat
Forestry[1)]	Examples: Bark, wood, wood chips, sawdust
Agriculture[1)]	Examples: Straw, harvest remainders, silage, plant material, energy crops[3] and catch crops[3]
Fishery and aquaculture[1)]	Examples: Slaughter waste and fodder residues from traditional fisheries and aquaculture industry, crustacean shells and similar residues, seaweed
Animal by-products Category 2	Manure, digestive tract content separated from the digestive tract, milk, milk-based products, colostrum, eggs and egg products which the competent authority does not consider to present a risk for the spread of any serious transmissible disease, following or without prior processing.

Animal by-products Category 3	See the ABP Regulation (EC) No 1069/2009
Additives (up to 15 % of the feedstock) [1)]	Only additives that are needed to improve the process performance and/or environmental performance of the composting/digestion process, such as flocculating agents, polymers for dewatering, trace elements to enhance micro-organism functioning, precipitants, enzymes to improve anaerobic biodegradation process, anti-foam agents, complexing agents, macronutrients, emulgators, antiscalants. The used quantity of any additive must be justifiable by its necessity to improve the process performance and/or environmental performance of the composting/digestion process.

[1)] If this category includes animal by-products the Regulation (EC) No 1069/2009 for animal by-products should be followed.
[2)] Only 'source-separated' input materials; digested or composted materials derived from these materials may be used as well, unless being rejected for not meeting the end-of-waste specifications due to exceeding the limit value for any of the PTEs or PAH.
[3)] Only if the treatment process is a waste treatment process

Not allowed = outside scope of EU end-of-waste criteria

Input material sources	**Specification**
The organic fraction from mixed waste separated through mechanical, physicochemical, biological and/or manual treatment	Example: The organic fraction from MSW obtained in a MBT installation
Sludges other than those falling under the scope of allowed materials	Examples: Sewage sludge, sludge from paper industry, industrial sludges
Possibly contaminated material	Examples: Materials carrying considerable risk for contamination with inorganic or organic pollutants or microbial contamination, possibly contaminated waste from pharmaceutical production, medical waste
Material collected from sites with elevated risk of pollution through atmospheric deposition, irrigation, leaching or other pathways	Examples: Material from roadsides and areas featuring intensive motorized traffic, sites with elevated industrial pollution, landfills, (bio)remediation sites, radio-actively contaminated sites
Non-biodegradable materials	Examples: Non-biodegradable polymers and plastics (including oxo-biodegradable plastics), metal, glass, stones, ground rock, sand, soil other than that attached to plant parts, non-biodegradable oils and fats
Biodegradable material containing non-biodegradable fractions	Examples: Biowaste and similar material containing visually detectable non-biodegradable bags, flower pots, packaging material. Wood containing veneers, coatings, chemical additives or preserving substances.

Materials containing any ingredients that might negatively affect the composting/digestion process	Examples: Materials with an assumable presence of biocides, preservatives or other substances that negatively affect the composting/digestion process