



BRITISH
BIOCHAR
FOUNDATION

Regulation of Biochar Emissions July 2014

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Catalysing the Low-Carbon
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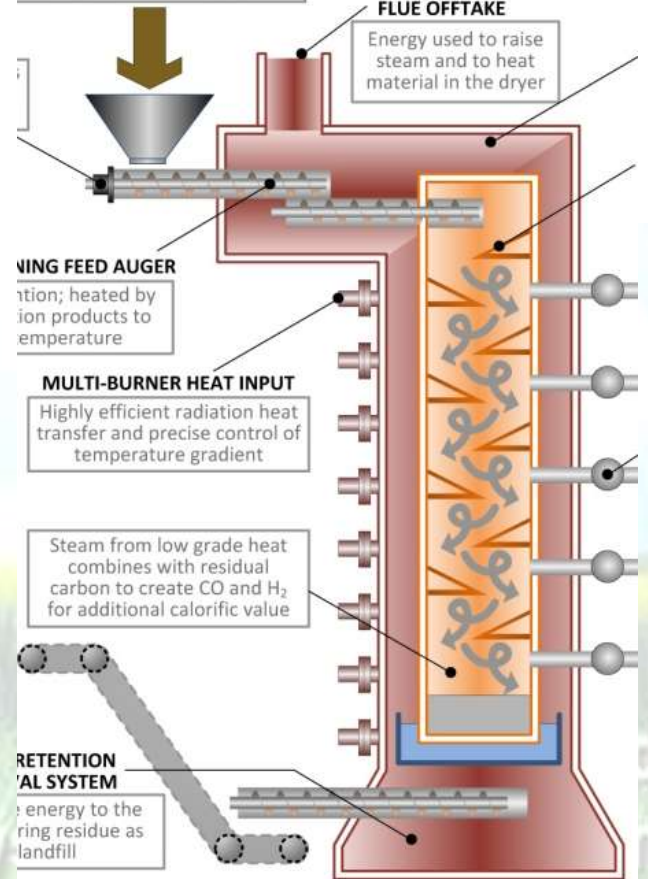


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**BIOMASS OR
DRIED STERILE CELLULOSE FIBER**
Waste pre-processed in autoclave
and dried to 10% moisture



Environmental Issues



Virgin Biomass

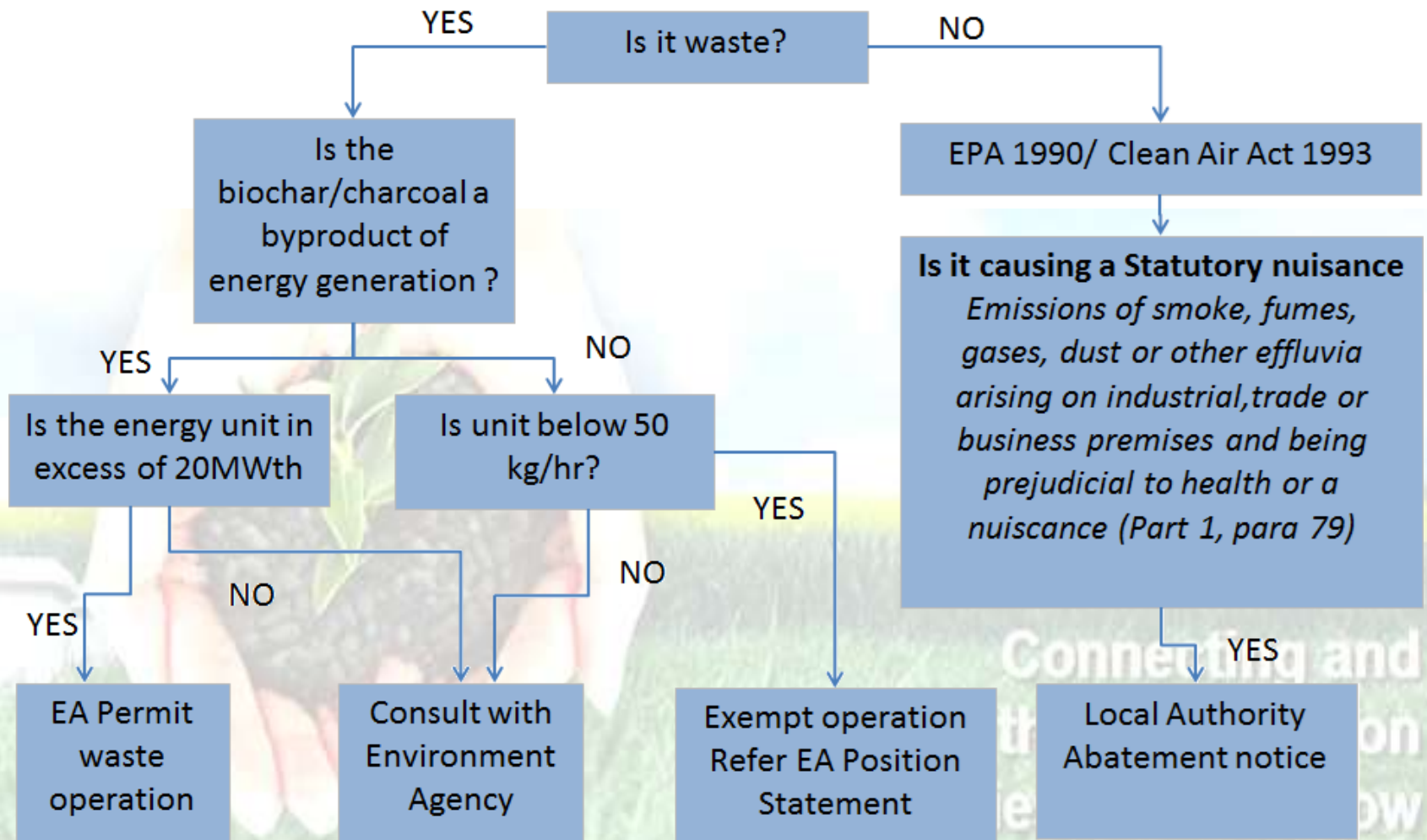
- Whole trees and the woody parts of trees including branches and bark derived from forestry works, woodland management, tree surgery and other similar operations (it does not include clippings or trimmings that consist primarily of foliage);
- virgin wood processing (e.g. wood offcuts, shavings or sawdust from sawmills) or timber product manufacture dealing in virgin timber.
- Miscanthus, switchgrass , short rotation coppice, wheat & barley straws
- **Virgin biomass** are not waste and are not subject to waste regulatory controls provided they are certain to be used for purposes to which virgin wood is commonly put.

Non-Virgin Biomass

- **Clean non-virgin biomass** is any biomass or biomass product that has not been treated
- Treated non virgin biomass (timber) - chemically treated
- **Non Virgin biomass** are waste and therefore subject to waste regulatory controls
- EA position statement
 - Use as fuel / particle board manufacture / landscaping / compost

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Environmental controls



Draft England Position Statement

- The biochar is manufactured by pyrolysis of waste in a unit specifically designed for this process with a maximum throughput of 50kg per hour.
- No more than 30 tonnes of waste is stored at the site at any one time.
- The activity must be consistent with ensuring the attainment of the relevant objectives.
- The biochar is spread on land to confer benefit to the land for the purposes of providing, maintaining or improving the soil's ability to provide a growing medium by adding, for example, nutrients, lime or biomass.
- The total quantity of waste spread on land does not exceed 1 tonne per hectare in any 12 month period.
- The location of any waste which is stored or land which is spread is at least 10 metres from a watercourse and 50 metres from a spring, well or borehole.

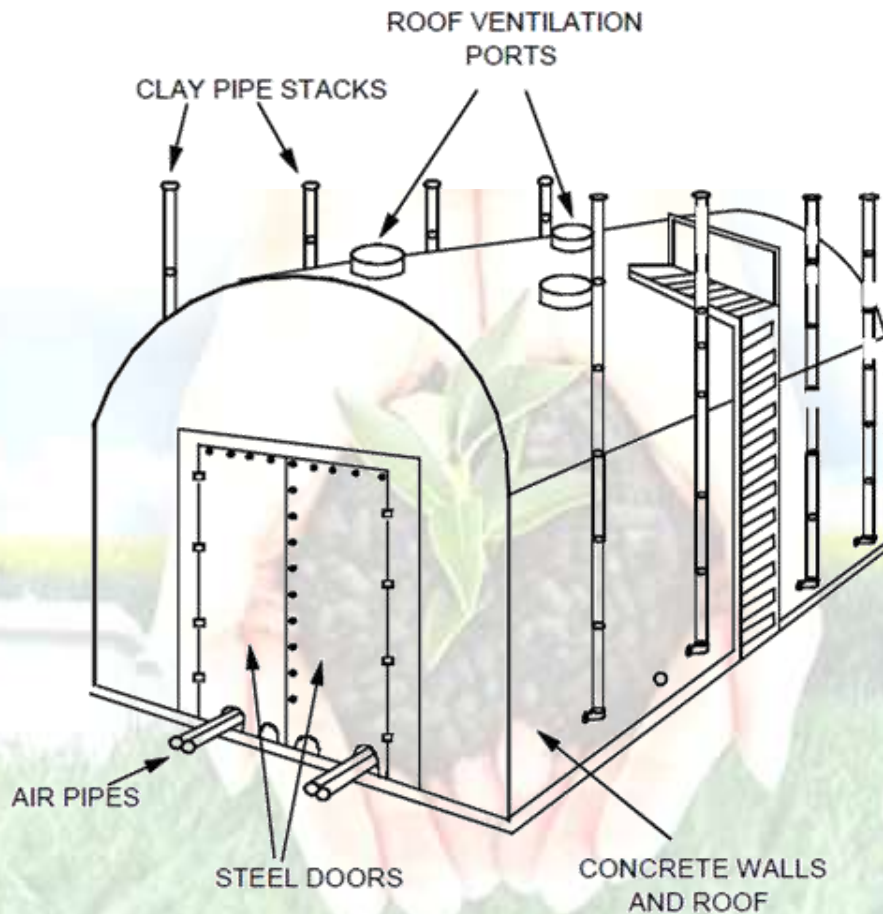
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Current EA Position

- The biochar is manufactured by pyrolysis of waste in a unit specifically designed for this process with a maximum throughput of 50kg per hour.
- **Production and use of biochar from clean waste biomass is considered a low risk activity and therefore there is no requirement for a position statement**
- The biochar is spread on land to confer benefit to the land for the purposes of providing, maintaining or improving the soil's ability to provide a growing medium by adding, for example, nutrients, lime or biomass.
- The total quantity of waste spread on land does not exceed 1 tonne per hectare in any 12 month period.
- The location of any waste which is stored or land which is topped is at least 10 metres from a watercourse and 50 metres from a spring, well or borehole.

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History of Emission Controls



Best Available Control Technology

- Emission control devices (time/temp);
- Emission limits for: visible smoke, particulates, VOCs, CO, fugitive emissions;
- SOPs;
- Standard reporting;

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Air emissions (charcoal kilns)

	CO (g kg ⁻¹)	CH ₄ (g kg ⁻¹)	NMHC ¹ (g kg ⁻¹)	TSP ² (g kg ⁻¹)
Uncontrolled batch	160-179	44-57	7-60	197-598
Low control batch	24-27	6.6-8.6	1-9	27-89
Controlled continuous	8.0-8.9	2.2-2.9	0.4-3.0	9.1-30

¹ NMHC – non-methane hydrocarbons (includes recoverable methanol and acetic acid)

² TSP – total suspended particulates

Shafizadeh, Fred, 1982, Chemistry of pyrolysis and combustion of wood, in Sarkanen, K.V., Tillman, D.A., and Jahns, E.C., eds., Progress in biomass conversion: London, Academic Press, p. 51–76.



Biochar Quality Mandate

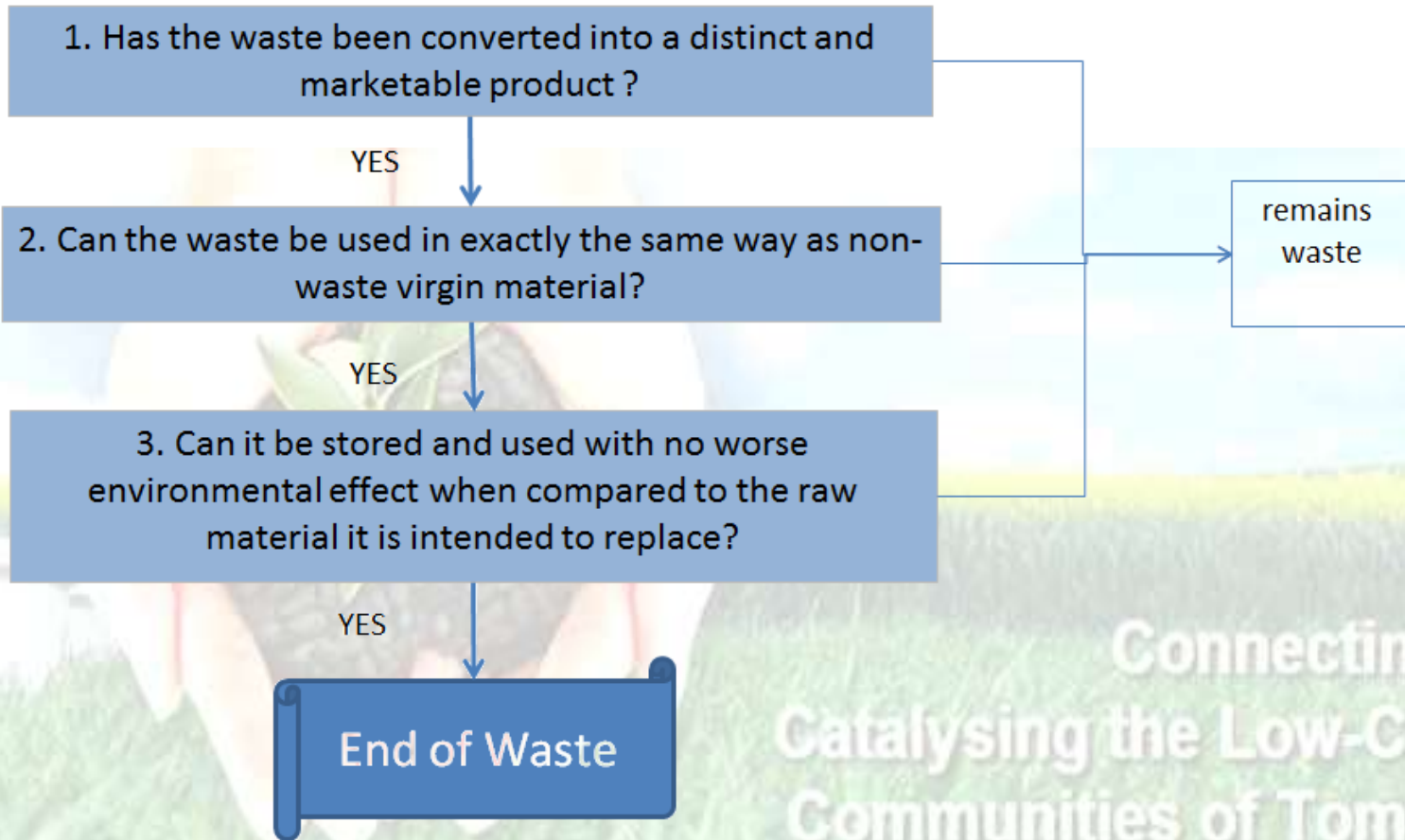
- Equivalent to a Quality protocol
- Sets out criteria for a substance to be defined quality biochar (high/standard grade)
- Producers not obliged to comply with BQM
- Quality biochar must meet the following:
 - Safe for application
 - Stable carbon storage in soils
 - Favourable carbon balance
 - >10% organic carbon by mass
 - H: C ratio <0.7
 - Meet threshold values/MPLs for high grade or standard grade biochar
 - Biomass feedstocks only
 - Achieve end of waste status for application to soil
 - Designated market sectors (agriculture, horticulture, forestry)

Biochar Quality Mandate (extract)

Toxicant	Suggested test Method ¹	Maximum limit suggested for high grade quality biochar ²	Maximum limit suggested for standard grade quality biochar ³	Unit	Frequency of testing
Arsenic	DIN EN ISO17294-2 (E29); BS EN 13650 (soluble in aqua regia)	10	100	mg/kg	
Cadmium	DIN EN ISO17294-2 (E29); BS EN 13650 (soluble in aqua regia)	3	39	mg/kg	
Chromium	DIN EN ISO17294-2 (E29); BS EN 13650 (soluble in aqua regia)	15	100	mg/kg	
Copper	DIN EN ISO17294-2 (E29); BS EN 13650 (soluble in aqua regia)	40	1,500	mg/kg	

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End of Waste Criteria (application to land)



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Use of biochar

Virgin biomass

Applied to the soil on a commercial scale provided it meets the requirements of legislation including the EU Water Framework Directive and the provisions of the Environmental Protection Act (EPA) 1990

Waste or byproduct

It falls under the waste regulations . The regulator needs to be consulted prior to any addition to public, agricultural or horticultural land, even for experimental purposes

BQM uses

- land restoration and soft landscape operations;
- domestic or professional horticulture;
- agriculture and soil-grown horticulture; or
- forestry.

Emission standards (1)

State	Emission Requirement
Massachusetts	43 – 85 g particles per GJ in fuel content of biomass input
Missouri	Visible emissions less than 10% 1.5 lbs per hour PM 0.24 lbs per hour VOCs 1.75 lbs per hour CO
Renewable Heat Incentive	30 g per GJ PM 150 g per GJ NOx
Clean Air Act 1993	No dark smoke shall be emitted where dark smoke is defined as being at shade 2 or greater on the Ringelmann chart (Clean Air Act 1993)

Compliance certificate (i)

1. TEST HOUSE	
a) name and address of testing laboratory	
b) name and signature of the person authorised by the testing laboratory to issue the certificate	Name:
	Signature:
c) date of issue of this certificate together with certificate reference number	Date: dd/mm/yyyy
	Ref:
d) Details of laboratory accreditation	Date: dd/mm/yyyy
	Accreditation number:
2. PLANT	
a) name of the plant tested	
b) model of the plant tested	
c) manufacturer of the plant tested	
d) (i) the date the plant was tested* (ii) please confirm that NO _x , CO, OGC and PM have been tested on the same occasion	dd/mm/yyyy
	yes/no
e) list of all the plants in the type-testing range* of plants to which the certificate applies,	

Compliance certificate (ii)

3. FUELS	
a) types of fuels used when testing	
b) based on the testing, list the range of fuels that can be used in compliance with the emission limits set out in Table x	
c) moisture content of the fuel used during testing	xx%
d) maximum moisture content* of the fuel which can be used with the certified plant(s) so as to ensure that the emission limits are not exceeded.	yy%

4. TESTS	
a) Confirm which standards have been used to test the emissions. <u> </u>	
b) please confirm the plant was tested at $\geq 85\%$ of the installation capacity of the plant	yes/no
c) please confirm the test shows that emissions from the plant were no greater than the values set out in Table #.	yes/no
d) measured* emissions of compounds in g/GJ net heat input	
i. Carbon Monoxide	
ii. Organic gaseous compounds	
iii. NO _x	
iv. Particulate matter	

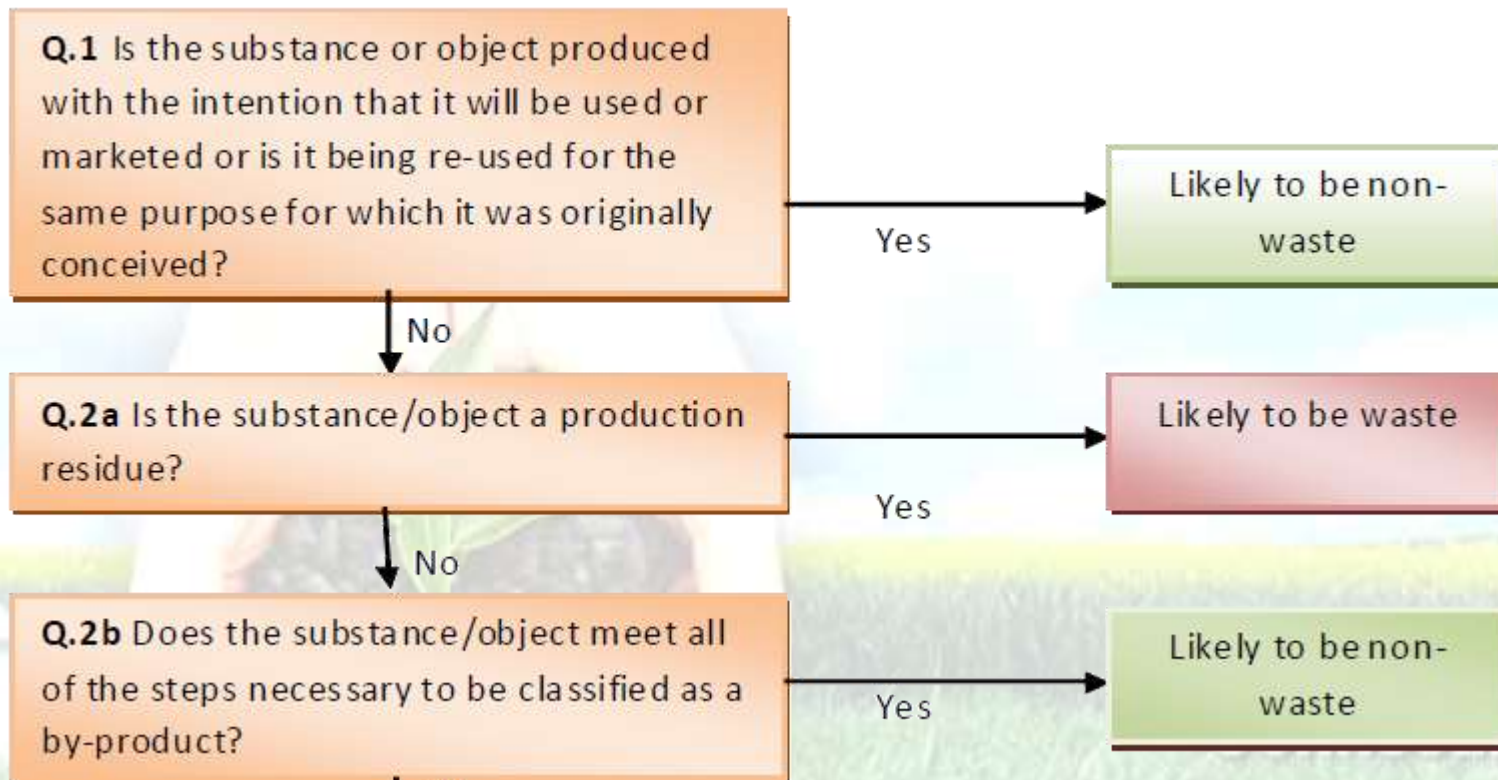


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QUESTIONS

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Definition of Waste



Guidance on the legal definition of waste and its application . A practical guide for businesses and other organisations . Date: August 2012