Table 1 - Pros and cons of different approaches to setting levels of destruction or irreversible transformation for POPs wastes
(Where a country is cited in brackets, this refers to a specific comment previously made to the POPs working group)

Measure	Pros	Cons	Examples of regulatory use & comments on current OEWG-3 proposals
Generic Approach A : Direct monitoring of destruction efficiency			
General comments applicable to any method of direct monitoring of destruction efficiency *(Comments on specific methods such as DE or DRE, and on setting a specific numerical level such as 99.9999%, are given below)*	• The intuitive approach to setting levels of destruction achievable by a technology • Favoured by environmental NGOs	• Technology dependent (and also possibly time dependent, as achievable levels of destruction may increase over time) • The environmental acceptability of the outputs depends on the POPs content of the waste input • Difficult to measure for less concentrated POPs inputs (constrained by the analytical detection limits on the outputs) • Generally a theoretical calculation - 'may be useful for comparison purposes, but usually determined under test conditions which do not reflect real practice' (*Germany*)	• Not used in the EU due to its complexity
Destruction Efficiency (DE) *[Defined as 100 x (input - output)/ input)]*	• Considers outputs to all environmental media (air and wastewater and solid residues of treatment)	• Requirement to measure all releases makes this a very complex calculation (*US*) • Heavy analytical requirements and thus costs (*US*) (a particular concern in developing countries) • Unclear if DE should be applied to individual POPs separately, or to	• Complexity means that this has tended not to be used for regulatory purposes • Current 'starting point' proposed by OEWG-3 specifically excludes unintentional POPs, so there is ambiguity as to how the DE should be calculated

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		total POPs. Should 'unintentional POPs' produced in the treatment process be included in the 'outputs'?	• The OEWG-3 wording was crafted carefully to restrict measurements to testing of the generic technology. The US has proposed an amendment to require each individual treatment unit to be tested.
Destruction and Recovery Efficiency (DRE)	• Similar to DE but focuses on outputs to air • Easier to measure than DE	• Only considers emissions to air • Does not on its own guarantee 'complete destruction'	• One of a number of requirements used to control waste treatment in the US
99.9999% DE or DRE	• Setting a challenging numerical standard would seem the intuitive way to 'guarantee' destruction	• Does not of itself ensure environmental protection • Why 6 '9s' rather than 7 or 5? For high concentration POPs wastes, 6 '9s' could still leave unacceptable levels in the residues, while for lower concentration wastes, detection limits could limit measurement to 3, 4 or 5 '9s'. • New technologies may not be capable of achieving 6 '9s', but that does not mean that they may not represent 'BAT' for some types of POPs wastes • Clean-up of contaminated soils to meet acceptable levels may only require 90% or 99% destruction.	• US Air Emission Regulations for Dioxins/Furans from Hazardous Waste Incinerators, Cement Kilns and Light Weight Aggregate Kilns (40 CFR 63.1203, 1204 and 1205) requires for non-dioxin wastes a DRE of 99.99% for each Principle (sic) Organic Hazardous Component (POHC), and for dioxin-wastes, 99.9999% for POHCs.

Measure	Pros	Cons	Examples of regulatory use & comments on current OEWG-3 proposals
Generic Approach B: Setting absolute limits on emissions to the environment			
General comments applicable to setting absolute limits for any environmental medium *(Comments are given below for individual media)*	• By setting limits on emissions, environmental safety can be targeted directly	• More difficult to set appropriate limits for solid treatment residues than for emissions to air or discharge of wastewaters	• Used as one component of the control scheme by all countries. • 'Recognizing that the destruction efficiency is a function of the POPs content, absolute levels could be established for each media based on feasible destruction efficiency at a particular input waste concentration' (*proposal from Canada, contained in Issue Paper 2 submitted to OEWG-3*)
Absolute limits on emissions to air	• Stringent limits on emissions to air control the most direct exposure route for humans and the environment	• Limits are so low that continuous monitoring for POPs is generally not feasible • Measuring every constituent separately is not feasible	• Both the US and the EU use a TEQ to measure PCDD/PCDF (The EU now uses the WHO-TEQ, which also includes dioxin-like PCBs). • The EU controls other organic emissions (including POPs) via total organic carbon (TOC)
Absolute limits on treatment wastewater	• All countries control industrial wastewater discharges, both to sewer and to surface waters	• Separate monitoring for each POPs chemical is resource intensive and expensive	• The US Universal Treatment Standards (CFR 268.48) set out maximum allowed values in wastewater from hazardous waste treatment. Specific values are specified for most of the POPs listed in the Stockholm Convention. Wastewaters below these values may be discharged (under permit) to surface water.

Measure	Pros	Cons	Examples of regulatory use & comments on current OEWG-3 proposals
Absolute limits on solid treatment residues	• Air and water pollution control generally concentrates the residual pollution into the solid residues, on the rationale that these are easier to manage so as to protect the environment • Setting an absolute concentration limit on the solid residues is thus a measure of the destruction efficiency	• Absolute values for POPs concentrations in treatment residues depend on their subsequent management or use: e.g. some residues are handled as hazardous wastes; contaminated soils are cleaned to meet national standards based on the use to be made of the land; levels in sewage sludge for application to agricultural land are strictly controlled; as are PCB levels in waste oil that may be reused or used as a fuel. • Absolute values that are acceptable depend both on the technology and on the particular POPs. E. g. high temperature incineration should be capable of destroying PCBs or DDT so that they are not detectable in the solid residues, so neither a DE nor an absolute concentration limit would necessarily guarantee that the technology is being operated properly.	• The US Universal Treatment Standards (CFR 268.48) set out maximum allowed values in solid residuals from hazardous waste treatment. Specific values are specified for most of the POPs listed in the Stockholm Convention. Solid residuals from hazardous waste treatment must be landfilled unless there is some legitimate reuse for the material. • The EU includes some solid residues from waste treatment on its hazardous waste list, so that eg solidification prior to landfill may be required.

Measure	Pros	Cons	Examples of regulatory use & comments on current OEWG-3 proposals
Generic Approach C: Technologies should be operated in accordance with Best Available Techniques (BAT)			
Best Available Technique (BAT) or Best Environmental Practice	• By setting BAT (or BAT/BEP) for each technology, can ensure that the technology is both capable of achieving proper destruction, and operated so as to do so • For incineration, achieving destruction depends primarily on the temperature and residence time, and this can best be regulated via a BAT approach • The approach is flexible, and can be tailored to the needs of each new technology • The BAT approach can be dynamic, i.e. periodic updates allow improvements in BAT with time to be incorporated.	• Requires a mechanism for determining 'what is BAT?' • Such a mechanism can be complex and bureaucratic • If the aim is to destroy stockpiles in developing countries as soon as possible, should we insist on the 'best available' technique, or rather a good technology operated to 'best environmental practice'?	• BAT is used in EU legislation, and an institutional mechanism has been set up to establish BAT. • A BAT/BEP Working Group under Stockholm is preparing guidelines for BAT/BEP for processes which produce unintentional POPs. These include several incineration technologies which can be used for destruction of POP stockpiles.