TECHNICAL GUIDANCE DOCUMENT FOR PREPARING THE CHEMICAL SAFETY ASSESSMENT

Chapter R.18: Exposure Assessment for the waste life stage

"Technical Guidance Documents in support of the New EU Chemicals Legislation (REACH) – V: Development of a Technical Guidance Document for preparing the Chemical Safety Assessment (REACH Implementation Project 3.2-2)"

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R.18 EXPOSURE ASSESSMENT FOR THE WASTE LIFE STAGE

R.18.1 Aim of this chapter

This chapter is intended to provide guidance to M/I how to identify the conditions under which the waste arising from the manufacture and use of a substance can be safely handled and disposed of. Section D.3.6.2.6 had its focus on highlighting the operational conditions of use and substance properties that may result in particular risks related to the waste life stage, and what risk management measures would be suitable. Also the different types of waste being generated during the lifecycle are briefly explained.

The current chapter aims to systematically guide M/I on how to build exposure scenarios for the waste life stage. This includes:

- Explanation related to the legal requirements
- Illustrating the scope of what has to be covered related to the waste life stage
- Giving guidance on the principal workflow to carry out exposure scenario building and exposure estimate for the waste life stage
- Apply the Environmental release classes (ERCs) as a tier 1 exposure estimations tool suitable to establish whether releases from the waste life stage may lead to uncontrolled risks and hence need more in-depth assessment in the CSA.
- Illustrate how an exposure scenario for the waste life stage may look like.

R.18.2 Obligations to assess the waste life stage under REACH

Waste as defined in Directive 2006/12/EC of the European Parliament and of the Council[1] is *not a substance, preparation or article under REACH* (Article 2(4)). Thus, companies handling substances in waste are neither downstream users nor recipients of articles, and consequently they do not have any duties under REACH.

Nevertheless manufacturers and importers of substances, downstream users and eventually recipients of articles have a number of duties under REACH related to waste.

- M/I shall document in the registration dossier available information on the amount of waste resulting from manufacture of the substance, from the identified uses and from use in articles, including composition of the waste streams.
- For dangerous substances > 10 t/a, the waste life-stages resulting from manufacture and use need to be covered in M/I's chemical safety assessment (see Annex I of REACH), including exposure estimation, and measures for safe handling to be communicated downstream in the exposure scenario and under chapter 13 of the extended safety data sheet (see Annex II).

Consequently, it is the duty of downstream users i) to consider the waste life-stage related information received with the exposure scenario, ii) to take action in case the internal handling of waste and the chosen route for disposal is outside the conditions set in the ES, and iii) to communicate the

1 OJ L 114, 27.4.2006, p. 9.

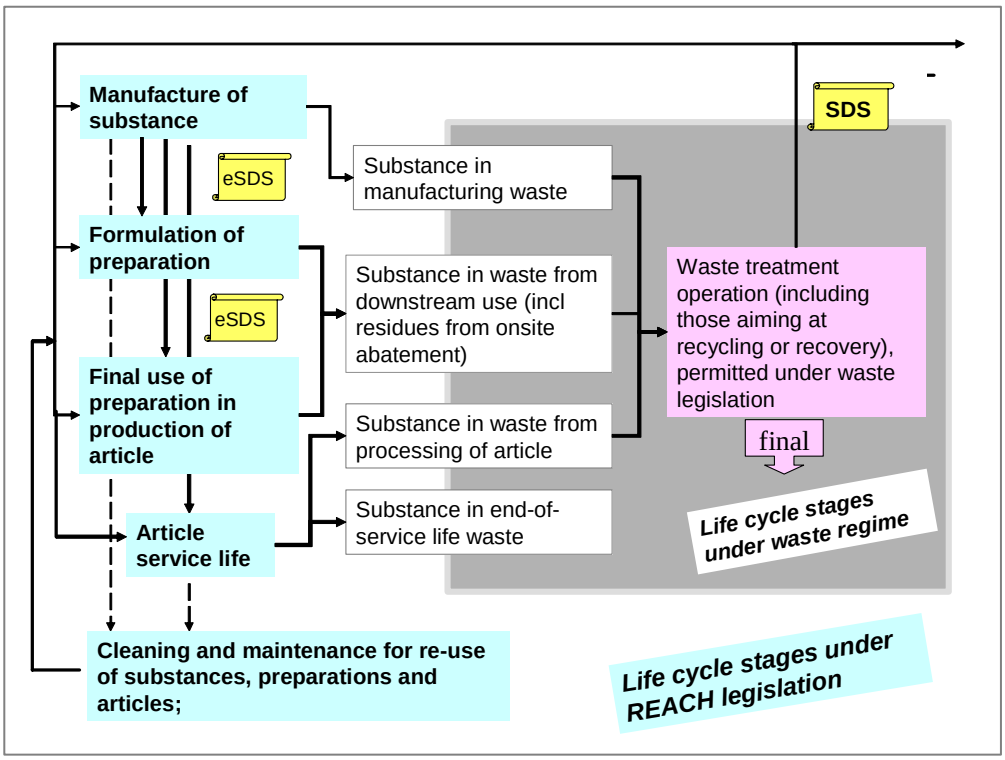
relevant information to further downstream users.. The tasks for MI and DU under REACH with regard to handling of waste are limited to the following:

- Implement waste related measures with regard to M/I's or DU's own activity, as stated in the exposure scenario.
- Forward waste related information received with the ES from the supplier to the next downstream user.
- Choose external waste treatment operations, in line with what is recommended in the supplier's exposure scenario.

Figure R.18-2.1 illustrates the scope of the waste related considerations in the CSA and the information mechanisms in the supply chain. **Please consider the following clarifications on the scope of waste in the CSA**:

- Internal handling of substances in waste to be disposed of in external operations is still part of downstream use under REACH. This regards for example occupational and environmental measures to prevent exposure from internal collection and storage of waste, and onsite pre-treatment of residues for example by extracting water.
- The waste regime *begins*, and hence duties under REACH *end*, when the residues have been transferred into the responsibility of an authorised waste management company.
- Cleaning and regeneration of contaminated/spent processing aids or product aids (e.g. re-destillation of cleaners, washing of cleaning wipes) outside waste legislation is regarded a downstream use under REACH. Such operations will not be covered in this section.
- Residues that may occur in onsite pre-treatment of waste-water and exhaust air (= result of environmental risk management measures) and which are to be disposed of in external waste treatment facilities are to be covered in the waste management section of the relevant exposure scenarios.

Figure R.18-1: Interface between REACH and waste legislation



R.18.3 Sources and emission pathways from waste treatment and recycling

Sources

Emissions from waste can occur via air, water and soil and are estimated for every environmental compartment and each relevant stage of the life cycle separately. Waste treatment may include recovery, chemical-physical treatment, incineration or disposal at landfills (see Figure R.18.3-1).

The direct release to soil is only considered at a regional scale. The split of releases between the different waste streams depends on the chem.-phys properties of the substances in combination with the process parameters in the relevant uses. The section below will give more detailed information on the emission pathways from waste treatment and recycling.

Substances may enter the waste life stage in the following form (see figure R.18.2-1):

- in residues from manufacture of a substance
- in residues from formulating preparations (e.g. cleaning operations, low quality charges)
- in residues from use of preparations (e.g. spent lubricants, overspray from coating, contaminated packages)
- in residues from production and processing of articles (e.g. discarded paper material from print shops, discarded plastic material or metal from cutting or drilling)
- in residues from onsite treatment of waste water or waste gas
- in articles at the end of their service life.

Recycling and recovery

Recovery processes usually involve a homogenisation and/or separation step (e.g. mechanical treatment) followed by recovery of the target substance/material. The recovered substance or material may be:

- reprocessed for the original type of product (recycling);
- processed into a new type of product;
- used as secondary fuel in heat production (energy recovery).

In the first option the substance returns into life-cycle stages already assessed before. In the second and third option the substance may enter into processing and final products from which new types and amounts of releases could occur. Unless benefiting from the exemptions in article 2(7)d (see Appendix R.18-3), for companies re-introducing substances in products made from waste into the market, the REACH obligation related to manufacturing/import of substances apply.

In some cases, another substance or product may be recycled, and the substance assessed is present in this product as a contamination. An organic substance present in a photographic bath for example, will be discharged to waste after silver recovery. A substance present in printing ink will be released with wastewater and de-inking sludge at paper recycling.

In addition to being recovered, incinerated or disposed of in landfills, substances in articles at the end of their service life may be released, either intentionally or unintentionally, to the environment. They may intentionally be left in the environment after their service life (e.g. cables buried in soil). Fragments of articles may also be lost during use (e.g. paint flakes, car undercoating). The emission during this life-cycle stage are addressed in chapter R.17.

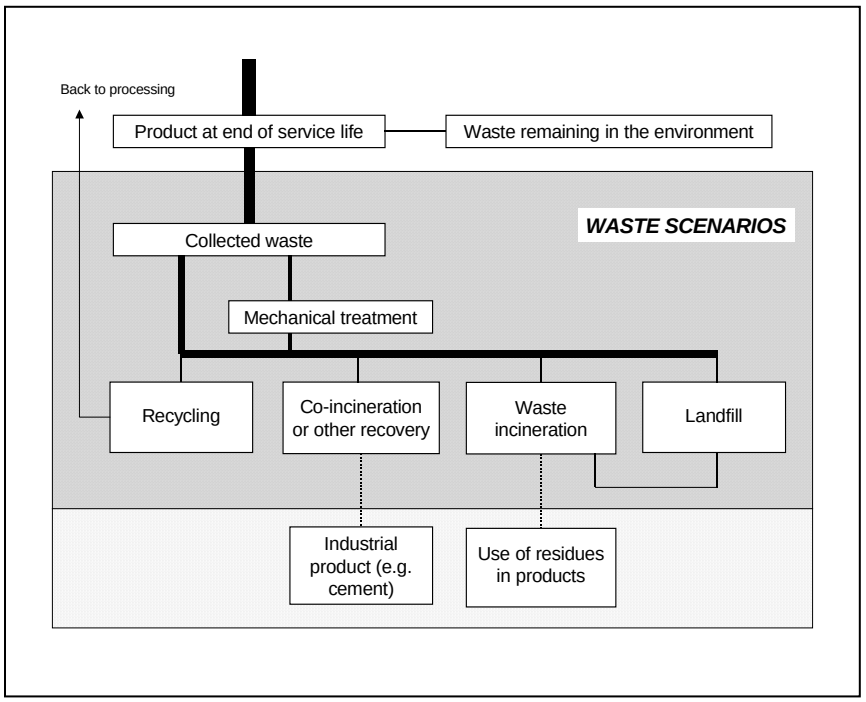


Figure R.18-2: Waste life stage of a substance

For substances that could form toxic and/or persistent degradation products under the waste treatment e.g. due to thermal stress or incomplete combustion, an assessment is needed how to minimise or prevent such emissions in the waste life stage.

R.18.4 General Workflow in M/I's assessment related to waste stage

1. Select the life cycle stage (LCS) for which the waste treatment should be examined; consult the exposure scenarios already developed for information on use conditions of the substance as such, in a preparation or in an article for the selected LCS. The type of use (see descriptor system) may help to identify i) suitable waste category from the European waste list (EWL) and ii) waste categories with special EU requirements under waste regulation. Where no information is available, contact representative customers. The **Outputs are:**

- Types of chemical products and articles that may become waste during the life cycle.
- Identification of residues from environmental risk management measures applied during the life cycle.
- Relevant requirements from EU waste legislation with regard to particular waste streams.

2. Document available information on the amount and the nature of generated waste; quantify the waste streams for the selected use; if necessary use a mass balance scheme for the quantification of waste streams. Check whether the substance may cause particular, waste related risks not yet covered in any of the ES for the other life cycle stages (see checklist under D 3.6.2.6).

3. Select one of the general waste management strategies that will be applied for the identified waste streams: chemical-physical treatment; destruction by incineration or co-incineration, landfill, recycling as material, recovery as fuel; consider if an EU waste legislation is available that regulates the treatment techniques to be applied; identify requirements for best available technique in the corresponding BREF Document (see Appendix R.18-1). The **Outputs are**:
   - Identification of particular risks that may occur in the waste life stage of the substance and the corresponding need for particular advice to be communicate to downstream users
   - Waste quantities and concentration of substances for waste stream of particular concern
   - Identification of suitable/required waste management strategies and/or techniques to be documented in the CSR.
4. Insert relevant information into the initial exposure scenario or select an available generic standard exposure scenario for the relevant waste operation. **Output**: First draft of initial exposure scenario related to the waste life stage.
5. If the available information does not provide a basis to carry out an emission estimate, assign an *environmental release category* (ERC) or more specific pre-set for the selected treatment operation. Section R.18.5 and appendix R.18.1 provides guidance on: i) Emission estimation of organic substances and metals from waste incineration, co-incineration and landfills, ii) emission estimation for dismantling of articles after service life and iii) any waste operation that can be assigned to one of the environmental release classes (ERCS) (see appendix R.16-1 and chapter R.16.2). Feed in information on the quantity of waste and the concentration of substance in that waste (from step 2), in order to arrive at a release estimate. If contacts with the waste treatment company exist, cross check whether the release estimate is reasonable. The **Output is**:
   - Tier 1 release estimates that can be fed into exposure estimation and risk characterisation.
6. If the comparison with relevant DNELs indicates that control of risk cannot be established based on the initial run of the tier 1 release estimates, further collection of available information may be needed: Literature; communication with downstream users; communication with waste management industries at a voluntary level. Iterate the CSA with the additional information.
7. Refine and complete the exposure scenario with information identified when assigning and adjusting the relevant ERCS, for example: fraction of waste life stage volume, amount of substance in waste per treatment site, more realistic emission factors.
8. Carry out a risk characterisation and derive the final exposure scenario information
9. Include the use specific waste management advice into section 7 of the exposure scenarios annexed to the extended safety data sheet. Include a summary of the relevant information into section 13 of the extended safety data sheet. Include the standard exposure scenarios for the relevant waste treatment operations into the annex of the safety data sheet.

Based on the workflow described, exposure scenarios covering the waste operations relevant for the identified use of the substance can be developed. The recommended standard formats are contain in appendix R.18-2.. This includes

1. advice on handling and disposal in the exposure scenario related to a certain use (section 7 of the ES) and

2. generic exposure scenarios related to certain waste treatment techniques.

Occupational risk management measures in waste treatment and waste handling can be identified via the risk management library (see section D.3.6.6)2. Occupational exposure during waste treatment operation can be assessed based on the tier 1 tools described in section D.4.1, since waste operations do not principally differ from processes applied in industrial and professional processing. The descriptor 3 of the use descriptor system (see Table 2 in appendix D-1) may support the integration of risk management advice into the generic exposure scenarios related to waste operations.

R.18.5 Tier 1 Emission estimation

R.18.5.1 Pre-sets for the emission pattern in time and space

Emissions to the environment from the waste life stage of a substance have to be considered in the registrant's chemicals safety assessment. If particular risks related to emissions from the waste life stage need to be controlled, REACH requires the registrant to communicate appropriate measures down the supply chain in order to enable the final downstream user in the chain to dispose of the waste accordingly. The following section provides guidance on how M/I can identify releases of the substance from the waste life stage into the environment. The ERCs are used as a starting point to derive the input to a first tier exposure estimation. For the most abundant waste operations, appendix R.18-1 gives an overview on information sources that may contain information, from which emission factors can be derived. Most of the waste operations can be assigned to an environmental release category (ERCs), based on similarities in conditions of use related to processes and products.

Releases from the waste life stage may occur several decades after production and processing of the substance under assessment. These delays are determined, inter alia, by:

- the service life span of the substance as such, or in a chemical product or article;
- intermediate storage after service life before waste collection (e.g. exhausted batteries);
- exposure of residues (secondary waste) from waste incineration to water. This source could be of particular relevance if the residues are re-introduced into the market as products (e.g. building material) exposed to water;
- exposure of waste in landfills to water.

Thus, when carrying out the CSA, the registrant needs to consider the time pattern of releases. This should be done by applying the following rules:

- Project the releases from the waste life stage into the year when marketing of the substance takes place, in order to take account of the stocking up processes (see Chapter R.17). Assume steady state: What is disposed of will be replaced with a new product containing the same substance.

[2] Four guidance documents related to occupational risks in waste operations have been identified in Germany: Classification and labelling related to handling of waste to be disposed of (TRGS 201, July 2002). Guidance related to the handling of dangerous chemical in recycling of end-of-life-vehicles (LASI/ALMA recommendation 26, 2002); Guidance related to manual dismantling of screens and electric devices (LASI/ALMA recommendation 27, 2002): Guidance related to recycling of plastic (LASI/ALMA recommendation 32).

- If applicable, include building material produced from residues of waste incineration into the release estimates from the waste life stage
- Assume a landfill situation where the properties are based on construction waste (no capture of fugitive emissions, rain water and radiation access to the waste, waste water collection), since bio-reacting landfills will not be allowed anymore under the EU Landfill Directive. Assume that the conditions are similar to outdoor use of construction material.

The registrant also needs to consider, which fraction of his market volume enters into the waste life stage (fraction of waste life volume). The following differentiation can be made for a tier 1 release estimate:

- For substances manufactured into articles which are not used under release promoting conditions (see ERC 10b/11b). it can be assumed that 100% of M/Is market volume enters into waste treatment operations.
- For substances used in processing aids, the assumption which fraction enters into the waste life stage depends on whether the processing aid is disposed of to the sewer (e.g. water based cleaning agents) or released into the air (solvents) from the processing stage. After having assessed the earlier life-cycle stages in the CSA, M/I will have sufficient information to make a reasonable estimate on the fraction of the substance entering into the waste life stage.
- For substances in processing aids typically used in closed systems (e.g. motor oils, hydraulic fluids), for a Tier 1 exposure estimate it can be assumed that 85% to 95 % enters into the waste life stage, taking into account the losses over service life (see nota 5) to ERC 9b in Appendix R.16-2)
- For intermediates and substances reacting on use, only a minor fraction can be expected to enter into the waste life stage, since the substance is designed to be consumed in use. It should be assumed that usually less than 5% of the manufactured volume will enter into emissions including waste (see ERC 6 and 8d).

Regarding the spatial distribution of emission sources from treatment of the substance amount that enters into the waste life stage (fraction of waste life volume), M/I can make the following assumptions:

- **Treatment of municipal waste and related article waste streams**: Treatment of municipal waste (including small industries) can be compared to the discharge of preparation in wide dispers use to the municipal sewage system. As also suggested in section R16.2.5.1 for releases from indoor service life of articles, it can be assumed that the emissions from waste treatment operation are released from point sources to local air and water. These point sources are for example municipal waste incinerators, landfills, installations for milling end-of-service-life consumer equipment (vehicles, electric and electronic articles). The assumption in ERCs on diffusive emissions at the local scale (‘town scenario’) is that the local emission is 0.2% of the regional market volume of articles (fraction of main local source). The number of emission days is assumed to be 300 days, like for an industrial installation in continuous operation.
- **Treatment of hazardous waste and other waste non-municipal waste operations:** To get a tier 1 exposure assessment started, the processes can be regarded as industrial point sources covered by ERC 1 to 7. This will lead to a very conservative release estimate due to the default of 100% regional emission (fraction of main source = 1) and 20 release days. However, wherever M/I has collected information on the overall number of installations in a typical region, the distribution of capacity and the way of operation (continuous or batch), he can overwrite the default with more realistic assumptions.
- **Use of primary or secondary mineral waste in open applications** (e,.g. slags from incineration, crushed demolition material) as construction material would best be addressed by a regional scenario based on ERC 10a.

Table R.18-1: Pre-sets for the tier 1 exposure estimate from waste life stage

	Fraction of substance volume entering into waste life stage *(= Fraction of waste life volume*)	Fraction of substance in waste treated in one local source (= *Fraction of main source from waste life volume*)	Emission days
Articles and cured preparations	1	0.002 for municipal treatment + disposal	300 or 365
Processing aids in closed systems	0.85 to 0.95	1	20
Processing aids in open systems	Follows from assessment of previous life cycle stages	1	20
Substances reacted on use	0.05	1	20

For some waste operations (incineration, solvent recovery), emission calculation modules are being developed by waste industries. M/I is advised to make himself aware on progress made in these developments that could help to replace the conservative release estimations based on ERCs with more realistic emission factors.

The table in appendix R.18.1 assigns ERCs to a selection of relevant waste treatment operations. In order to carry out an initial tier 1 exposure estimate, the fraction of main source in the selected ERC should be overwritten with the product of *the fraction of waste life volume* multiplied with the *fraction of main source for the treatment operation* (as indicated in Table R.18.1*)* Also the pre-set emission days can be adjusted accordingly. While at tier 1 assessment, processing of waste can be largely treated like any other industrial or professional processes, there are no specific ERCs yet available for incineration and land-filling. However, the next section also includes advice on a preliminary work-around for this problem.

The subsequent exposure estimation and risk characterization is not different from assessment for other life-cycle stages, and thus does not need particular guidance in the current chapter (see chapter R.16).

R.18.5.2 Examples for treatment specific pre-sets

R.18.5.2.1 Emission from landfills

Although various models exist to predict releases from landfills, none of these models is sufficiently checked against reality to suggest substance specific release factors. It is therefore suggested either i) to assume landfills operated under the requirements of the EU landfill directive as safe for any substance properties, volume and waste composition allowed to be land-filled or ii) to treat substances in land-filled article-waste as if this was a prolonged service life (e.g. for construction and demolition waste). Option b) is based on the consideration that landfill of “inert” waste materials will go on in future, and that construction waste landfills are usually operated without top layer sealing. If option b) is to be applied: The release estimation would start from ERC 10a:

Fraction of waste life volume: 100%

- Fraction of main municipal source: 0.2%
- Release time: 365 days
- Sewage treatment plant: leachate is collected and disposed of in the municipal STP
- Annual release to air: 0.05%

- Annual release to waste water (before treatment): 3%

The releases from landfills and residues from waste incineration residues usually take place over a long time period, thus the load from the single waste batch is diluted in time. In order however to take account of the stocking up process of waste in landfills, the emission is projected into 1 year (accumulated over the waste life stage). The emission factors above assumes a waste life stage under leaching conditions of about 20 years. If available, monitoring data may be a valuable source of information to refine these assumptions. The need for a long-term release assessment should be decided on a case-by-case basis, in particular for metals or organic substances that are persistent and toxic.

R.18.5.2.2 Emission from incineration and co-incineration

Modern incineration processes can be expected to achieve destruction rates of more than 99.99 %. For metals emission factors can be calculated from information available in EU Reference Document on best Available Techniques for Waste Incineration (August 2006), By comparing average ranges of metal concentrations in municipal waste with average ranges of metal emission from municipal incinerators, the following conservative emission factors to air and water can be derived:

Table R.18-2: Emission factors for metals from municipal waste incinerators[3]

	To air after abatement (controlled emission)	To water after abatement (controlled emission)
Hg	0.1	0.0002
Cd	0.002	0.0002
As	0.002	0.0002
Pb	0.002	0.0001
Co	0.002	
Ni	0.0003	0.0002
Cr	0.0003	0.0001

The emission factors for hazardous waste incineration, municipal waste incineration and co-incineration in industrial combustion plants do not need to be differentiated at tier 1. For municipal waste incineration the same pre-set as for land-filling should be applied (except for the emission factor). For hazardous waste incineration and co-incineration the complete pre-set for a local industrial site should be applied (ERC 1-7). It is assumed that co-incineration takes place in compliance with the EU Incineration Directive (2000/76/EC)

Municipal waste incineration

The release estimate should start from ERCxxx (to be developed)

- Fraction of waste life volume: 100%
- Fraction of main source: 0.2%
- Release time: 300 days
- Release to air: 0.01% [organic substance] and 0.2% [metals except mercury]

Hazardous Waste incineration and Co-incineration

[3] Documentation see Appendix R.18-4; to be inserted at a later stage.

- Fraction of waste life volume: Depending on technical purpose of the substance; to be determined based on the emission during previous life-cycle stages.
- Fraction of main source: 100%
- Release time: 20 days
- Release to air: 0.01% [organic substance] and 0.2% [metals except mercury]

Recovery of slag from waste incineration

Regarding metals, the process aims to include the substance into a matrix (slag) or to filter it out. Land-filling of secondary waste from waste treatment is not further considered here, but assumed to be safe by definition. The fraction that leaves the incineration bound into a slag-matrix and which is likely to be used as construction material needs to be included in release estimates. The most appropriate ERC would be again 10a.

R.18.5.2.3 Emission from milling vehicles and electric/electronic goods

Dismantling and milling of vehicles, household appliances and electronic goods at the end of there service life is to be treated as an industrial source. The process aims at homogenization and pelletisation in order to allow for further separation. Dust may be formed and emission on water pathway could occur if swim-sink operations would by applied. ERC 3 is the most appropriate category since the substance is included in a matrix and the process aims at homogenization. Significant emission to air in form of dust can occur:

- Fraction of waste life volume: 100%
- Fraction of main municipal source: 0.2%
- Release time: 300 days
- Release to air: 0.5% 4
- Release to local waste water: 0.2 %

Other waste operations

In the same way as here demonstrated for landfill, incineration and dismantling processes, the releases from other waste treatment operations can be estimated. If safe disposal cannot be demonstrated based on the ERC-pre-sets, further information needs to be collected. This includes OECD Emission Scenario Documents and the relevant EU BREF Documents (see appendix R.18-1). Also, some waste industries may prepare emission calculation tools and other information relevant to exposure from waste life stage to support Chemicals Safety Assessment at M/I and the communication down the chain.

[4] 30% air emission as in ERC 3 over-conservative for dismantling; to be adjusted to 0.5% based on the EU RAR on DEHP (*Matrix* Report 2006, UBA FKZ 204 67 456/RIVM Report no 60120006, Branch and product related emission estimation tool for manufacturers, importers and downstream users within the REACH system,2006)

R.18.6 Appendices

APPENDIX R.18-1: ENVIRONMENTAL RELEASE INFORMATION FOR 14 WIDELY APPLIED WASTE TREATMENT TECHNIQUES

Waste treatment techniques	Type[5]	Available reference documents	ERCs	Reasoning for selection of ERC
• Municipal waste incineration (including slags exposed to leaching) • Hazardous waste incineration in dedicated facilities (including slags exposed to leaching), operated according to the EU Waste Incineration Directive • Co-incineration in industrial facilities, operated according to the EU Waste Incineration Directive	D10	Reference Document on the Best Available Techniques for Waste Incineration, August 2006 (638 pages) Reference Document on Best Available Techniques for Large Combustion Plants, July 2006 (618 pages) → Co-combustion of waste and recovered fuels	./. 10a	No suitable ERC available for incineration processes yet; to be developed; Utilisation of incineration slags is well covered by ERC 10a on outdoor use of articles.
• Landfills operated according to the EU Landfill Directive; (construction and demolition waste only)	D1 D4		10a	For a construction waste landfill without top-liner containment over operation time, outdoor use of construction articles with connection to sewer is the most suitable ERC.
• Oil-water separation and/or chemical/physical treatment of emulsions and/or aqueous overspray-sludge from spray painting	D9	Reference Document on the Best Available Techniques in Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector, February 2003 (472 pages) → OECD ESD No 12: Metal Finishing	4	Substance processed based on its partitioning behaviour at industrial site, no chemical reaction. Wide range of emission factor possible.
• Chemical oxidation of aqueous waste from industrial processing	D9		6b	Reactive processing of waste at industrial sites
• Chemical-physical treatment of metal- containing aqueous waste (e.g. precipitation, ion-exchange)	D9		6b	Reactive processing of waste at industrial sites
• Shredder and other dismantling activities related to end-of-life vehicles, home appliances, electronic waste	R4		3	Similar to milling of solid materials as a process step within production of granulates for solid preparations.
• Washing of drums	R	OECD ESD No … on transport and storage	4	Substance processed based on its partitioning behaviour at industrial site, no chemical

[5] Waste treatment type according to Council Directive 91/156

Waste treatment techniques	Type[5]	Available reference documents	ERCs	Reasoning for selection of ERC
		of chemicals (……)		reaction. Wide range of emission factor possible.
• Preparing waste fuels from waste	D13/R1		2	Mixing process at industrial sites
• Refining waste oils	R9	OECD ESD No. 10 Lubricants and Lubricant Additives	1	Similar to chemical or refinery processes in the manufacture of substances
• Regeneration of waste solvents • Brake fluid recovery	R2		1	Similar to chemical or refinery processes in the manufacture of substances
• Paper recycling		Reference Document on Best Available Techniques in the Pulp and Paper Industry, December 2001 (509 pages) OECD ESD No 17 on Recovered Paper Mills (2006) OECD ESD No …. On Recycling Paper (….)	4 6b	Substance processed based on its partitioning behaviour at industrial site, no chemical reaction. Wide range of emission factor possible. If bleaching step involved, ERC 6b may be more appropriate
• Plastic Recycling		OECD ESD No 3 (2004) on Additives in Plastic	3	Process similar to primary plastic compounding and conversion
• Battery recycling			./.	Multi stage process, to be assessed case by case
• Recycling of photographic baths	R4	OECD ESD No. 5 (2004) , Photographic industry	6b	Reactive processing of waste at industrial sites

APPENDIX R.18- 2A: WASTE RELATED INFORMATION IN THE EXPOSURE SCENARIO FOR AN IDENTIFIED USE

1. Short title of Exposure Scenario	Sector of use [SU], Preparation category [PC], Process category [PROC], Article category [AC]
2. Description of activities/processes	
3. Duration and frequency	
4.1 Physical state	
4.2 Concentration	
4.3. Amount per activity	
5. Other operational conditions	• Fraction of substance entering into waste during the identified use; • Source and type of waste (e.g overspray; residues in containers;)
6. Risk management measures	
7. Waste related measures needed to ensure control of risk at the different life cycle stages (including articles at the end of service life)	Waste types from EWL and suitable waste treatment and/or recycling routes (including concentration thresholds if relevant) Reference to technical requirements for safe disposal operations, documented in BREF or waste legislation, Information about measures to control particular risks related to waste, e.g.: • Substance may significantly contribute to the halogen or metal content of a waste. Make sure that the input thresholds of the chosen waste treatment company are kept. • Substance as such or in waste should/must be disposed of ore recycled separately. • Do not dispose of into sewage system Apply suggested measures unless national legislation or local waste schemes require different measures.
8. Exposure prediction and reference to its source	
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	

APPENDIX R.18- 2B - WASTE RELATED INFORMATION IN AN EXPOSURE SCENARIO FOR SPRAY PAINTING

1. Short title of Exposure Scenario	SU 19: Manufacture of building and construction PC 9: Coating PROC 7: Spraying in industrial setting
2. Description of activities/processes	Manual spray painting indoor in spray booth
3. Duration and frequency	
4.1 Physical state	Liquid (low viscosity)
4.2 Concentration	Max. 10% of the material (w/w)
4.3. Amount per activity	
5. Other operational conditions	• 5% to waste from residues in containers and spray equipment[6] • 50% overspray waste with conventional gun[7]; (35% HVLP spray gun)
6. Risk management measures	
7. Waste related measures needed to ensure control of risk at the different life cycle stages (including articles at the end of service life)	Dispose of waste paint or sludge from cleaning of equipment under *European Waste Code*[8] 0801 11 or 0801 13 to incineration. Dispose of aqueous sludge or suspensions containing substances > 10% [9] under *European Waste Code* 0801 15 or 0801 17 to incineration. Dispose of dry filters and other material contaminated with dried coating xyz > 10 % under *European Waste Code* 0801111 to incineration. The incineration should take place under conditions as defined in the EU BREF Documents on Waste Incineration (08.06) and Waste Treatment (08.06) and the EU Directive on Hazardous Waste Incineration (2000/76/EC). Apply suggested measures unless national legislation, local waste schemes or IPPC permit conditions state otherwise.
8. Exposure prediction and reference to its source	
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	

[6] OECD ESD 11 Automotive spray (2004), ESD No on Coating Applications (…..) [under development]

[7] comments CEPE, 01.08.2007

[8] European Waste Catalogue (EWC 2002)

[9] Waste classification limit for an R41 substances according to annex III to Directive 91/689/EEC

APPENDIX R18-2C: STANDARD EXPOSURE SCENARIO FORMAT FOR A WASTE OPERATION

1. Short title of Exposure Scenario	Waste Treatment Operation xyz [BREF titles or Categories from EU waste legislation]
2. Description of activities/processes	Types of waste in which the substance could be contained (for identified uses only) and suitable waste operations
3. Duration and frequency,	Not relevant
4.1 Physical state	Physical state of waste if relevant to control the risk
4.2 Concentration	Concentration of the substance in the relevant waste streams if relevant for suitability of waste treatment operation
4.3. Amount per activity	Amount of substance expected to enter into the relevant waste operations [not to be communicated down the chain]
5. Other operational conditions	Relevant processing parameters like temperature, oxygen-content of combustion air, residence time of substance;
6. Risk management measures	Particular waste gas or waste water techniques needed Particular occupational protection needed
7. Waste related measures needed to ensure control of risk at the different life cycle stages (including articles at the end of service life)	Amount and type of secondary waste: If not land-filled or incinerated, indicate recovery operation; [not to be communicated down the chain]
8. Exposure prediction and reference to its source	PECs to be expected [not to be communicated down the chain]
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	

APPENDIX R18- 2D: STANDARD EXPOSURE SCENARIO FORMAT FOR A WASTE OPERATION (EXAMPLE)[10]

1. Short title of Exposure Scenario	Waste Treatment Operation xyz [BREF titles or Categories from EU waste legislation]
2. Description of activities/processes	
3. Duration and frequency,	
4.1 Physical state	
4.2 Concentration	
4.3. Amount per activity	
5. Other operational conditions	
6. Risk management measures	
7. Waste related measures needed to ensure control of risk at the different life cycle stages (including articles at the end of service life)	
8. Exposure prediction and reference to its source	
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	

[10] To be worked out, once the concept is agreed and testet.

APPENDIX R.18-3 – LEGAL REQUIREMENTS

Obligations related to substances or preparations recovered from waste

Substances recovered from waste and re-introduced into the market (as such, in preparation or article) must be registered unless the company can benefit from the exemption of article 2(7) (d). A registration is not needed under the following conditions:

1. The recovered substance has already been registered under REACH. The substance already registered must be the same, i.e. have the same chemical identity and properties, as the substance being recovered. For example, if the substance itself was modified in the recovery then the recovered substance is not the same and need to be registered: For example, the product from recovery may be

   - a substance as such (e.g. hydrocarbon stream with an EINECS number), which however contains certain contaminants outside the range of contaminants typical for the registered substance, or
   - A preparation (including various substances, intentionally combined with each other in the first life cycle of each of these substances) for which it not possible to relate the major ingredients to substances already registered.

2. The legal entity that did the recovery must ensure that information on the registered substance is available to it, and that information must comply with the rules on information provision in the supply chain. This means that the person who did the recovery must have obtained one of the following:

   - a safety data sheet, as required by Article 31 (1) or (3), on the registered substance,
   - other information sufficient to enable users to take protection measures, as required by Article 31 (4), for the registered substance, or
   - an information package comprising the status of the registered substance under the authorisation part of REACH, any applicable restrictions under REACH, other information necessary to allow appropriate risk management measures and the registration number, as required by Article 32 (1).

There are no legal mechanisms foreseen in REACH how to transfer the eSDS or other information on the registered substance to those companies re-introducing the same substance recovered from waste onto the market. Manufacturers, downstream users and recycling companies are free to agree on suitable mechanisms to make such information available to the recycling company.

If the material manufactured from waste is re-introduced into the market in form of an article, no SDS is required, however the REACH requirements according to article 7 may apply: For articles containing substance of very high concern (identified under article 59) in a concentration > 0.1% and an amount of > 1t/a per producer, the producer or importer may want to supply instruction to the recipient of the article on how to handle the article in a way that no exposure will occur during use, including disposal. Otherwise he would be obliged to notify the article to the Agency and possibly to register the article on request of the Agency. Under Article 33 the suppliers of articles meeting the above criteria are obliged to sufficiently inform the recipients on safe use, and on the name of the substance as a minimum.

A guidance that particularly addresses the situation of plastic recyclers has been worked out by EUPC and is contained in an appendix to part G of the cTGD.

2. Interfaces with other community legislation

The assessment of the emission from the waste life stage of a substance under REACH has a particular interface with community legislation on waste management and integrated pollution prevention and control (IPPC). For example, EU waste legislation and the IPPC Directive set out the requirements for the authorisation of waste treatment operations. Waste treatment operations however are not covered by REACH, unless the output of that operation is a substance as such, in a preparation or in an article to be placed on the market (e.g. recycling paper, recovered solvents, recovered fuels). Companies receiving and treating waste do not have duties to communicate information up the supply chain under REACH. Thus the access of M/I to information is fundamentally different compared to the other life cycle stages.

The following section provides a brief overview on the relevant community legislation, M/I should take into account when building the exposure scenario(s) for the waste life stage(s) of his substance:

- Annex III to Directive 91/689/EEC (Hazardous Waste Directive) sets out a list of criteria and parameters based on which a waste is to be classified hazardous. Some of these criteria are copied from the classification rules for preparations (however not as amended by Directive 99/45/EEC). Other criteria are based on waste testing, however harmonised methodology is not available yet. Under REACH the hazard assessment of the single substance and the assessment of exposure related to the waste life stage are the basis to characterise the risk, not the classification rules for waste under waste legislation.
- Decision (2000/532/EC) includes a *Harmonised European Waste List*, including classification of wastes as hazardous or not. The waste classification system is a hybrid of material based codes and codes indicating the source of waste. Some classes of waste origin are directly compatible with the use descriptor system for ES building outlined in section D.3.3 and Appendix D-1 of the TGD. For example: waste Category 4 (waste from textile, fur and leather processing), waste category (5-7) petroleum and chemical processing, waste category 8 (manufacture, formulation, supply and use of coatings).
- The Landfill Directive (1999/31/EC) and the Waste Incineration Directive (2000/76/EC) set out technical requirements for final disposal of waste, including co-incineration in industrial facilities.
- Various single Directives set requirements related to the restriction of certain hazardous substances in certain articles, the separate collection of certain products at end of service life as well as processing and recycling of certain waste streams, e.g. Waste Electric and Electronic Equipment (WEEE 2002/96/EC), End-of-Life-Vehicles (2000/53/EC), Batteries and Accumulators (2006/66/EC), Waste Oils (75/439/EEC
- Under the IPPC-Directive, information on best available techniques is available for nearly all common waste treatment techniques in the BREF 08.06 and in BREF 02.03. on *Common Waste Water and Waste Gas Treatment/Management Systems*
    - Handling and treatment of waste resulting from transfer of substances and related cleaning operations (e.g. floor cleaning from spillage or leakage; cleaning of road and railway tankers), or cleaning of equipment (e.g. pipe systems, painting equipment, mixing equipment).
    - Biological treatments
    - Chemical-physical treatments
    - Treatments to recover material
    - Treatments to produce fuel material
    - End of pipe waste techniques

- Waste gas treatment techniques, also applicable in waste treatment operations
- Waste water treatment techniques, also applicable in waste treatment operations

The rules and requirements set out in waste legislation and in BREF Documents can be used to build generic exposure scenarios for waste operations. This regards the applicability of certain techniques to certain waste streams as well as the effectiveness of the measures to destroy, immobilise or recover the registered substances at the end of their service life.