

SECTION V — ANNEX 9

GreenScreen Transformation Product Worksheet & Resources



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TABLE A9.1: **Worksheet for Identifying Feasible and Relevant Environmental Transformation Products**

The table below is provided as a worksheet that can be used to identify feasible and relevant environmental transformation products for each parent chemical. (Note: Not all identified transformation products may end up being feasible and relevant.)

Possible Transformation Pathways	List chemical name and CAS# of Transformation Products based on pathways	Use-Phase analysis: Describe how the chemical is typically used, released and/or managed at end of life. Describe the likely environmental transformation pathway (e.g., the product is typically disposed of down the drain, aquatic biodegradation of the chemical is a feasible transformation pathway)	Identify potential hazards using GreenScreen hazard endpoints
Hydrolysis			
Oxidation			
Reduction			
Substitution or elimination reactions			
Photochemical; photolysis			
Microbial biodegradation (aerobic)			
Microbial biodegradation (anaerobic)			
Other			

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 TABLE A9.2: **Common Sources Used for Identifying Environmental Transformation Products**

Resource	Description
Hazardous Substances Data Bank (HSDB)	An online toxicology data file on the National Library of Medicine's (NLM) Toxicology Data Network (TOXNET®). It focuses on the toxicology of potentially hazardous chemicals. It is enhanced with information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, nanomaterials, and related areas. All data are referenced and derived from a core set of books, government documents, technical reports and selected primary journal literature. HSDB is peer-reviewed by the Scientific Review Panel (SRP), a committee of experts in the major subject areas within the data bank's scope. HSDB is organized into individual chemical records, and contains over 5000 such records. The records also include a section on 'Metabolism/Metabolites'. These sources often just recap what is in the scientific literature, but you can check them first before going on to look at the literature directly. (https://toxnet.nlm.nih.gov , accessed 12/22/17)
Perform a literature search using sources such as Web of Science to search peer-reviewed journals	Success with Web of Science typically depends on known occurrence and toxicity data (i.e. if it's known to be present in the environment or has established toxicity). Well-known journals with relevant information may include (but are not limited to): <ol style="list-style-type: none"> i. Environmental Science & Technology ii. Environmental Toxicology and Chemistry (ET&C) iii. Environment International iv. Chemosphere v. Science of the Total Environment vi. Environmental Pollution vii. Journal of Environmental Monitoring
Published Risk Assessments	Those conducted by regulatory bodies such as the European Union (EU), Canadian Environmental Protection Agency (CEPA), Japan's National Institute of Technology and Evaluation (NITE) and others often contain information on transformation products.
Human and Environmental Risk Assessment (HERA)	Chemical or functional class risk assessments on ingredients of household cleaning products. (http://www.heraproject.com , accessed 12/22/17)
European Chemical Agency (ECHA) — REACH	Registered chemicals listed under European Chemical Agency (ECHA) – REACH
Textbook resources	Chemical class specific information such as degradation products of surfactants; examples of textbook resources may include (but are not limited to): Swishers Handbook of Surfactant Biodegradation or S.S. Talmage, Environmental and Human Safety of Major Surfactants (1994)
The SRC FatePointer	(http://esc.syrres.com/fatepointer/search.asp , accessed 12/22/17)
University of Minnesota Pathway Biocatalysis Biodegradation Prediction Program	While the MN DB has about 1,300 chemicals in it and addresses microbial degradation, it is less comprehensive than a literature search. (http://eawag-bbd.ethz.ch , accessed 12/22/17)
The Organization for Economic Co-operation and Development (OECD) QSAR Tool box	Use of models for predicting chemical biodegradation/metabolism (http://www.oecd.org/env/ehs/risk-assessment/theoecdqsartoolbox.htm , accessed 12/22/17)