

CHEMICAL ALTERNATIVES ASSESSMENT

Chemical use in modern society should consider a variety of factors, including performance, costs, potential adverse effects to human health and the environment, and societal impacts. Chemical alternatives assessments are designed to facilitate consideration of these factors by assisting users in identifying alternative chemicals or approaches that are safer and have reduced environmental impact. [NRC 2014]

The NRC defined alternatives assessment as a process for identifying, comparing, and selecting safer alternatives to chemicals of concern on the basis of their hazards, comparative exposure, performance, and economic viability. A chemical of concern can be a chemical in any material, process, or technology. A safer alternative represents an option that is less hazardous to humans and the environment than the existing chemical or chemical process. A safer alternative to a particular chemical of concern may include a chemical substitute or a change in materials or design that eliminates the need for a chemical alternative.

The NRC noted that there are differences between an alternatives assessment and other approaches. The definitions below explain three other assessments used. Typically, alternatives assessments do not include these factors.

- A safety assessment is when the primary goal is to ensure that exposure to a particular substance is below some prescribed standard.
- A risk assessment is a calculation of the risk associated with a given level of exposure.
- A sustainability assessment examines all aspects of the life cycle of a chemical and alternatives, including energy and material use. Ideally, in an alternatives assessment, it is important to at least consider all life cycle segments that would be affected by chemical substitutions to get the most comprehensive view of potential impacts and trade-offs. However, such a detailed assessment is rarely attainable given the limits in current life cycle assessment tools and could potentially lead to inaction. [NRC 2014]

The NRC also suggested a series of steps for the proper identification of chemical alternatives. See Figure 1 below for an overview of this prescribed process.

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