

## Alternatives Assessment Examples Review

**Document Title:** Use of Sodium Dichromate as Corrosion Inhibitor in Ammonia Absorption Deep Cooling Systems

**Link to Document:** [https://echa.europa.eu/documents/10162/18584504/afa\\_sd-0042-01-sea\\_en.pdf/64219392-e0cd-47a8-beaa-2c2745e3322f](https://echa.europa.eu/documents/10162/18584504/afa_sd-0042-01-sea_en.pdf/64219392-e0cd-47a8-beaa-2c2745e3322f)

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**Date:** October 2015

**Purpose of the Report:** This “Socio-Economic Analysis” is part of the Application of Authorization submitted by LANXESS Elastomers B.V. The Application of Authorization consists of three reports: the [Chemical Safety Report](#), the [Analysis of Alternatives](#), and the Social-Economic Analysis itself. The application is to use sodium dichromate as a corrosion inhibitor in the Ammonia Absorption Deep Cooling (AADC) systems. The AADC systems are part of the process used to produce ethylene-propylene diene m-rubber (EPDM). The aim of this study is to demonstrate that the socioeconomic benefits associated with the continued use of sodium dichromate at the LANXESS facility outweigh the remaining risks to human health and the environment associated with prevalent use conditions.

The European Chemicals Agency (ECHA)’s Guidance on Socio-Economic Analysis recommends setting up an iterative process where an initial qualitative assessment is conducted based on readily available data. In subsequent iterations, a more detailed and quantitative assessment is used until all key impacts are covered in a sufficiently robust way to draw a conclusion.

**Report Summary:** The report analyzes economic impacts over a 20-year time frame. The methodology follows ECHA’s guidance on the preparation of Socio-Economic Analysis as part of an Application of Authorization. To monetize the human health benefits, the reference dose response relationship for carcinogenicity of hexavalent chromium substances <sup>1</sup> is used. Exposure data are taken from the [Chemical Safety Report](#). The outcomes of the [Analysis of Alternatives report](#) for sodium dichromate corrosion inhibitor are considered when defining the nonuse scenarios: replacement (change) of the cooling system, and replacement of the corrosion-prone parts.

### Key Findings:

Product requirements: The report describes the structure of EPDM and its applications in different product systems and industries. It also illustrates a simplified flow of the EPDM production process and a functional scheme of an AADC system. It then discusses the main essential and unique properties of sodium dichromate, but refers to the [Analysis of Alternatives report](#) for further details on the properties.

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<sup>1</sup> Reference dose response relationship for carcinogenicity of hexavalent chromium substances, agreed on at a meeting of the Committee for Risk Assessment in September 2012.

Identification of alternatives: Section 3.6 discusses previous research regarding alternatives for the current technology. This section summarizes the applicant's attempts to identify alternatives to sodium dichromate through literature review and individual company contacts. Section 4 discusses the different cooling technologies that may be used to remove the heat generated during the production of EPDM. This section also briefly discusses cost implications of changing the current cooling system to a different cooling system, such as a vapor compression system, and replacing the corrosion-prone parts made of carbon steel with stainless steel or surface-coated materials.

Economic Impacts: The report uses the approach set out in ECHA's guidance on the preparation of Socio-Economic Analysis as part of an Application for Authorization. Specific data used for this analysis are based on information gathered from questionnaires sent to the responsible staff in the company and site visits. Estimates of the cost of health impacts are based on the ECHA methodology and a worst-case approach. Human health impacts are monetized using exposure data from the applicant's [Chemical Safety Report](#), using dose-response relationships and the willingness-to-pay value from ECHA studies published in 2013 and 2015, respectively. Internal economic impacts are estimated for scenarios where the company stopped using sodium dichromate in its cooling system. These impacts include the costs associated with installing, operating, and maintaining a new cooling system, investment costs, downtime costs, and loss of production capacity.

Data gaps and uncertainty: The report justifies and uses a qualitative uncertainty analysis to describe potential sources of uncertainty related to the impact categories and to assess the effects of uncertainties on the overall result.