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Development of a Company-Specific Consequence Severity Model to Improve Efficiency and Consistency in PHAs

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Abstract

The consequence severity of hypothetical release scenarios developed during a Process Hazard Analysis (PHA) can be difficult to evaluate consistently. Even though most companies now have clear and concise consequence category descriptions for impacts to people, environment, assets, and business, PHA teams continue to struggle with determining the worst-credible consequence level(s). Such reasons include:

- Scenario has not occurred at the site, and is being ranked too low or too high.
- Scenario has occurred at the site, but with variable outcomes each time
- PHA team leader or team members influencing the ranking based on their experience/ judgment.

In the AIChE Center for Chemical Process Safety (CCPS) publication *Layer of Protection Analysis – Simplified Process Risk Assessment* (2001), a hypothetical model is presented in Chapter 3, as the "Category Approach without Direct Reference to Human Harm", and is presented as an example only. Developing and applying this model in a practical PHA team setting requires defining, refining and adjusting each consequence category to the facility's hazardous chemicals and risk matrix.
This paper describes adapting the hypothetical model from the CCPS LOPA book for a facility's use. This includes defining the consequence categories, working with/ modifying existing risk matrices, consequence modeling, interpreting the results, developing/ implementing the finished Consequence Severity tool, and the benefit to future PHAs.