



Chemical Security: Regulatory Implications of Terrorism Risk Assessment Methodology

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The [Chemical Facility Anti-Terrorism Standards \(CFATS\) program](#) imposes security requirements on certain facilities that manufacture, process, or store chemicals of interest—i.e., chemicals that bad actors might steal, divert, or exploit for nefarious purposes, including terrorism. Some Members have introduced legislation in the [House](#) and [Senate](#) that would provide a long-term extension of existing authorities. Several major industry groups have [signaled support](#) for CFATS extension. However, other Members, as well as some researchers and industry stakeholders, have raised concerns about the program, including questions about the risk assessment methodology used to inform CFATS regulatory activities and cost-benefit analyses. Sub-optimal risk methodologies may impose needless regulatory burdens on some stakeholders or fail to protect the public as well as intended.

The Department of Homeland Security (DHS), which administers CFATS through the Cybersecurity and Infrastructure Security Agency (CISA), designed [program rules](#) and security requirements in reference to a [basic risk model](#), which defines risk as a function of threat, vulnerability, and potential consequence (TVC). This model has been widely used within DHS and the broader homeland security enterprise for decades, but has also been [criticized on conceptual and methodological grounds](#). Some industry stakeholders and members of the scientific research community have proposed modifications and alternatives, or called for greater oversight of the risk methodology development process. As Congress considers reauthorization of CFATS, it may consider risk methodology issues, available oversight options, and whether current program authorities should be extended, modified, or allowed to expire. Current program authorization will expire on July 27, 2023, absent congressional action.

Current DHS Risk Assessment Concepts and Methods

DHS [defines](#) risk as the “potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences,” which has the three TVC components noted above. DHS has long used this model—[originally developed](#) to inform homeland security grant award allocations—to inform various other planning, programs, and budget activities. A variety of formal and informal methods may be used when applying this model to specific analytical tasks. Depending on the method or approach, the TVC terms may be either multiplied together (as they

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were originally) to quantify risk in terms of probabilities, or used qualitatively as a philosophical framework for assessing components of risk.

Because CFATS regulatory activities are fundamentally driven by risk assessments, CISA's application of the DHS risk methodology may have regulatory implications. For example:

- coverage and tiering—inclusion or exclusion of facilities in the “high-risk” tier subject to regulatory compliance requirements;
- chemicals of interest—regulation of certain chemicals and mixtures or exclusion of others; and
- risk-based performance standards—covered facilities are required to implement each of the 18 CFATS performance standards to mitigate assessed risks.

CISA introduced an [enhanced tiering methodology](#) in 2016 based on the TVC model, partly [in response](#) to previous Government Accountability Office (GAO) findings. Previously, assessments were predominantly consequence-based, largely omitting threat and vulnerability considerations, according to a [2013 GAO report](#). The enhanced methodology uses site-specific information submitted by chemical facilities to assess facility vulnerability, relevant threats, and possible consequences, in order to assign a risk tier.

CISA has not made details of the methodology public on security grounds, but states that it sought expertise from public and private sector organizations, and that Sandia National Laboratories provided third-party “verification” of the methodology. In June 2023, House Committee on Energy and Commerce leaders [wrote CISA Director Jen Easterly](#), requesting information on any prospective changes to the CFATS risk methodology and related efforts to ensure increased transparency of the process.

Alternative Risk Models

Statistical methods used to assess risk of frequently recurring events such as natural disasters are difficult to apply to terrorism for several reasons, according to experts. Terrorist attacks on chemical facilities are rare, and so do not provide enough data for ordinary statistical analyses. Further, they involve adaptive human behavior that complicates independent measurement of threat and vulnerability. Quantification of consequences is similarly difficult, given that the effects of terrorist attacks are often unquantifiable experiences of collective fear, anxiety, and grief. Finally, critical infrastructure tends to be multitiered and networked, creating complex interdependencies between single facilities and broader systems.

Experts have [proposed alternatives or enhancements](#) to the basic TVC model that address some of the complicating factors discussed above. A 2010 [National Academies study](#) recommended that DHS find alternative approaches to the TVC model that would emphasize analysis of overall system resiliency over risk to single facilities assessed in isolation. Much of the technical literature on terrorism risk aligns with this recommended approach to terrorism risk modeling in its broad outlines, with a focus on networks, defender-attacker dynamics, and deterrence. Other [potentially relevant contributions](#) (concentrated in the environmental safety field) focus on regulatory compliance as the outcome of interest, providing insights on such matters as the optimal frequency and character of agency site visits to ensure program buy-in and participation.

Industry Stakeholder Concerns

Industry stakeholders have provided input on the CFATS program through a variety of channels, including rulemaking proceedings, [comments on a 2014 non-regulatory study of the program by DHS](#), [court proceedings](#), and the [trade press](#). General support is widespread, but tempered by concerns about

certain aspects of the program, such as [coverage criteria for certain chemicals; exemptions of certain industries or industrial processes said to pose minimal risk](#); and use of performance standards that may [overlap with existing regulations or incur excessive compliance costs](#). Some stakeholders seek to justify their concerns or requests by highlighting perceived flaws in risk methodology, or alleging inadequate transparency and inclusion of affected stakeholders.

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