



Recommendation Response Evaluation
U.S. Chemical Safety and Hazard Investigation Board
Office of Recommendations

Report:	Improving Reactive Hazard Management
Recommendation Number:	2001-01-H-R10
Date Issued:	October 8, 2002
Recipient:	American Chemistry Council (ACC)
Date(s) of Response(s):	February 10, 2003; November 22, 2004; December 28, 2007; April 30, 2014
Status recommendation to the Board:	Closed – Reconsidered/Superseded

Background:

After a number of high-consequence incidents resulting from runaway chemical reactions, including the April 21, 1995 explosion and fire at the Napp Technologies specialty chemical plant in Lodi, New Jersey, which killed five workers, and the April 8, 1998 explosion and fire at the Morton International dye manufacturing plant in Paterson, New Jersey, which injured nine, the CSB undertook a comprehensive study of reactive chemical hazard management in the United States.

In total, the CSB identified 167 serious accidents in the United States between 1980 and 2001; 48 of these accidents resulted in 108 fatalities. In addition, more than half of these incidents involved chemicals not covered by existing Occupational Safety and Health Administration (OSHA) or Environmental Protection Agency (EPA) standards. While the bulk of incidents were in the chemical manufacturing industry, thirty percent occurred at industrial facilities that use or consume chemicals in bulk quantities.

One of the conclusions of the report was that, “there was no publicly available database for sharing lessons learned from reactive incidents...[or] to share reactive chemical test information.”¹ Therefore, the CSB issued a recommendation (R5) to the National Institute of Standards and Technology (NIST) to develop a publicly available database for reactive hazard test information.

The CSB also issued two recommendations (e.g., R10 and R14) to two major chemical trade associations, the American Chemistry Council (ACC) and the Society of Organic Chemical Manufacturers Association (SOCMA), to work with NIST in developing a database for reactive hazard test information. This evaluation only addresses the recommendation that the CSB made to the ACC (e.g., R10).

¹ *Improving Reactive Hazard Management*, pp. 99-100

Recommendation:

Work with NIST in developing and implementing a publicly available database for reactive hazard test information. Promote submissions of data by your membership.

Response Summary:

September 25, 2002	Initial Recommendation Letter sent
February 10, 2003	Initial response from ACC
November 22, 2004	Meeting with ACC on open recommendations
November 27, 2006	E-mail follow-up with ACC on open recommendations
December 28, 2007	E-mail from NIST concerning database progress
January 2008 – August 2012	No follow-up due to staff shortages, higher priority recs.
September 20, 2012	E-mail follow-up on ACC open recommendations
May 8, 2013	E-mail follow-up on ACC open recommendations
April 15, 2014	30-day letter on ACC open recommendations
April 30, 2014	Response from ACC
May 2014 – Nov 2015	No action due to staff shortages, office move, higher priority recommendations
November 11, 2015	New Board meets with ACC to discuss open recommendations
January 13, 2016	Office of Recommendations proposes Board vote to change status to: “Closed – Reconsidered/Superseded”
February 16, 2016	Board member Engler calendars NI 2016-27 for discussion at public meeting
April 20, 2016	Split Board vote on calendared NI 2016-27 which coupled Recommendations nos. 2001-01-H-R9 and R10; status of Recommendation no. 2001-01-H-R10 remains unchanged

Evaluation of Recipient Action(s):

in January 2003, SOCMA hosted a meeting with representatives from NIST, chemical companies, and other interested trade associations, including ACC, to explore various options for development of the database. While a number of promising ideas were proposed at that meeting, some obstacles were also identified pertaining to the creation of the database.

On February 10, 2003, Dorothy Allen Kellogg, Leader, ACC Plant Operations Team advised the CSB (see **Attachment 1**) that:

We held an initial meeting with NIST, SOCMA and others on January 9, 2003 to discuss the creation of such a test database. A white paper describing options

discussed at that meeting is under development. We will remain in contact with you as the project develops.

On November 22, 2004, Office of Recommendations staff held a meeting with Dorothy Allen Kellogg at ACC to discuss open CSB Recommendations (see **Attachment 2**). The following issues were raised regarding development of a database for reactive incident/test information:

- The key issue for their members is always anonymity for information submitted to any database.
- When CSB was doing its strategic plan, ACC recommended that CSB create an incident database.
- Some ACC members have expressed interest in FAA database that relies on anonymous incident reports from pilots. Anonymity is very important to ACC.
- They are also very interested in improving the ways to create "lessons learned" databases." She expressed some concern about the success of the CCPS database in this regard. She believes ACC would be open to further discussions on this matter.
- A key issue for ACC is what the barriers were in earlier attempts and what has changed that may make efforts today more successful.
- She suggested CSB talk to the HCN group, which has done a successful database of incidents. Also to Scott Berger and Sam Mannan.

In February 2005, Eric Clark from SOCMA and Dave Frurip from Dow Chemical Company, with substantial input from representatives at NIST, finalized a white paper (**Attachment 3**) explaining the vision for the database and proposing a number of solutions to the identified obstacles. SOCMA and Dow presented that paper at an April 2005 Center for Chemical Process Safety symposium. The paper was subsequently presented at an October 2005 Mary Kay O'Connor Process Safety Center symposium.

On December 28, 2007, Office of Recommendations staff received an e-mail from Dr. Edward White in the Chemical and Physical Properties Division at NIST summarizing their attempts to implement R5 (**Attachment 4**). Dr. White stated that that an ad hoc group of industry experts was formed with the support of NIST and SOCMA, who developed a proposal for the database. Dr. White reported that this proposal was rejected by industry due to their concerns for potential liability and/or adverse public reaction to firms submitting test data to the database. The ad hoc group believed the only viable solution for the liability concern was for federal legislation that would relieve industry data contributors of liability and assure confidentiality of the sources. As no one was "championing" any legislative efforts to accomplish this, no further efforts have been taken on the development of the database since June of 2006. Moreover, Dr. White stated that creating a reactive test database would be impossible without contributions from industry and NIST wouldn't have sufficient funds without a dedicated funding source to support the quality control system needed to maintain it.

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Based on the information that Dr. White supplied, the Board voted² on March 7, 2008 to change the status of R5 to: “Closed – Reconsidered.” The status change letter issued by CSB to NIST on March 28, 2008 stated the following:

The Board has concluded the obstacles NIST encountered when trying to develop the database for reactive chemicals were valid. Dr. Edward White of NIST’s Chemical and Physical Properties Division reported that NIST attempted to develop a proposal with an ad hoc group of industry experts but came across substantial legal and resource obstacles. The Board still believes, however, that the goal of the recommendation remains important because a comprehensive data source is needed to identify and track reactive incidents. The existing sources of data are inadequate to identify the number, severity, frequency and cause of reactive incidents.

After a period of inactivity (2008-2011) and several attempts by Office of Recommendations staff to follow-up on this recommendation by both e-mail and letter (2012-2014), the CSB received a response from Ms. Rachel A. Meidl, Director, Regulatory and Technical Affairs at ACC on April 30, 2014 (see **Attachment 5**). Regarding R10, Ms. Meidl stated:

ACC believes that action on this recommendation should be reconsidered in light of the fact that CSB has Closed (reconsidered/superseded) its related Recommendation 2001-01-H-5 to the National Institute of Standards and Technology (NIST): Develop and implement a publicly available database for reactive hazard test information. Structure the system to encourage submission of data by individual companies and academic and government institutions that perform chemical testing. Since NIST will not be developing this database, it is not possible for ACC to participate in its development; therefore, CSB’s Recommendation 2001-01-H-10 to ACC should likewise be closed.

Regardless, ACC has evaluated CSB’s recommendation. As explained in ACC’s March 31, 2014, response to comments on OSHA Docket No. OSHA-2013-0020, RIN 1218-AC82, 78 Fed. Reg. 73756-73768, Request for Information, Process Safety Management and Prevention of Major Chemical Accidents (December 9, 2013), analysis of reactive chemistry hazards requires the evaluation of both the thermodynamic and kinetic nature of the reactive substance in question. Thermodynamic evaluation is a straightforward computation, using standard references and quantitative lab tests. In contrast, kinetic evaluation is a far more difficult evaluation and is situation-dependent. The rate of chemical reaction is highly dependent on small variations and changes in composition, concentration, or temperature. Thus, to create a database for kinetic expressions at best could

² BAR Notation Item 618

lead to misrepresentation of the hazard, which would likely focus resources on protective measures that are unnecessary. At worst, it would lead to a false sense of security, likely resulting in under-protection and the potential for a severe incident. Additionally, catalysis systems are amongst the most highly protected trade secrets that chemical companies possess, and there are numerous unresolved questions regarding legal protections that would necessarily need to be overcome for any companies volunteering thermodynamic data for such a database.

ACC also notes that, since this recommendation was issued in 2001, other organizations have developed publicly available reactive chemical resources, software and databases which we believe satisfy the intent of recommendation 2001-01-H-10:

- The National Oceanographic and Atmospheric Administration (NOAA) has contributed significantly to the management of reactivity hazards through its publication of the "Chemical Reactivity Worksheet" (now Version 3.0, and soon to be upgraded), available at <http://response.restoration.noaa.gov/reactivityworksheet>. This electronic worksheet creates potential reaction interaction matrices, as well as for generic classes of chemicals, in a succinct, referenced, and easily transmitted format. This tool is also the centerpiece of CCPS's Reactivity Management Tool (RMT), available at <http://www.aiche.org/ccps/resources/tools/reactivity-management-tool>.*
- The Center for Chemical Process Safety (CCPS), an industry-technology alliance of the American Institute of Chemical Engineers (AIChE), produced and published, with the financial backing of OSHA, EPA SOCMA, and ACC, the book "Essential Practices for Managing Chemical Reactivity Hazards" (Johnson, Unwin and Rudy, 2003), available at <https://www.aiche.org/ccps/publications/books/essential-practices-managing-chemical-reactivity-hazards>, which provides tools for identification and further evaluation of reactivity hazards. Through the financial support of the above-mentioned organizations, this book was made available via electronic download free of charge for three years after publication, resulting in more than 12,000 electronic downloads. Additionally, CSB gave CCPS an "Exceeds Expectation" rating for its recommendation as a part of CSB's 2002 study when the book was published.*
- Launched in 2007, The Organisation for Economic Co-operation and Development's eChemPortal (www.echemportal.org) is a free international website linking to, among other data, physical chemical properties of over 500,000 substances from over twenty-nine international databases. eChemPortal was created as a step towards achieving longstanding international commitments to identify and make information on chemical properties publicly available.*

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Together, these and other similar resources provide a much more effective means for reactivity hazard management that effectively accomplishes the goal of reactivity risk reduction. ACC encourages agencies to promote awareness of existing industry evaluation tools, references, and guidance on how to evaluate reactive hazards.

Therefore, given that the related CSB recommendation to NIST has been closed, and the existence of other publicly available sources of reactive chemical data, ACC requests that CSB consider this recommendation Closed-Reconsidered/Superseded.

Since the related CSB recommendation to NIST has been designated with the status, "Closed - Reconsidered," there is no process for developing a NIST reactive hazard database to which the ACC can contribute. In addition, the other resources described by ACC partially address the recommendation. Therefore, the Board should designate Recommendation No. 2001-01-H-R10 as: "**Closed – Reconsidered/Superseded.**"

Evaluator: Mark Kaszniak Date: 5-3-2016
