

Safety Guidelines for the Chemistry Professional: Understanding Your Role and Responsibilities

Over the past decade, there has been steadily increasing professional and public concern about the effectiveness of chemical safety programs. Specific incidents in academic, industrial, and public settings have led to the need for a clear statement of the responsibilities of chemistry professionals regarding Environmental Health and Safety (EH&S) issues. Meeting this need is not a simple task for two reasons:

- No chemistry professional works in isolation and an effective chemical safety program is a partnership between individual professionals and the organizations for which they work; and
- Chemistry professionals often serve many roles. These roles can include teaching, conducting research, supervising specific laboratories, and managing large organizations, often in the same job. The emphasis among the responsibilities listed below may vary among these roles, but these responsibilities apply to all of these roles.

For this reason, this document, jointly authored by the American Chemical Society's (ACS) Committee on Chemical Safety and the Division of Chemical Health and Safety, outlines prudent expectations for the chemical safety roles and responsibilities for both chemistry professionals and their organizations. Additionally, this guideline identifies ACS resources which support these expectations.

Responsibilities of chemistry professionals include:

1. The chemistry professional has an **ethical**¹ and **legal**² responsibility to work with chemicals safely. This means that chemistry professionals must protect themselves, their colleagues and co-workers, their communities, and the wider environment from the risks associated with the hazards of chemicals. Chemistry professionals must also help identify and address emerging safety and health hazards when contributing to the scientific literature.
2. Chemistry professionals need to develop competency in **identifying and understanding chemical hazards, assessing and evaluating the risks of specific chemical uses, and managing those risks**. Throughout this process, chemistry professionals need to work with other stakeholders, including administrators with oversight and/or facility responsibilities, when planning for particularly hazardous activities and for potential emergencies
3. Chemistry professionals must actively participate in their organizational culture concerning the safe practice of chemistry. Chemistry professionals need to understand and observe **policies and procedures** at their institutions. As science professionals, they must contribute to the continuous improvement of their organization's safety programs.
4. Safety skills need to be included as part of the formal **education** of chemistry professionals. Safety is an essential component of how chemistry professionals work. Students need to learn how to incorporate both technical and cultural safety considerations in their work. As

¹ [ACS Chemical Professional's Code of Conduct](#)

² While a variety of regulatory agencies can impact chemical work, OSHA, EPA and DOT requirements should be the first consulted to determine specific impacts.

³ See [Safe Science: Promoting a Culture of Safety in Academic Chemical Research](#) (2014) from the National Academy of Sciences for an outline of the cultural information appropriate for this work.

part of this education, chemistry professionals need training in the use of **safety information**, including electronic resources, technical data, the broader safety literature, and literature on organizational culture.³

5. Chemistry professionals assume a crucial role in providing accurate chemical safety information to impacted parties in their communities. This role includes **supporting employer and professional organization communication** with the general public concerning health and safety issues.

Responsibilities of organizations that employ chemistry professionals include:

1. There is an essential connection between scientific excellence and excellence in safety; this connection must be recognized and encouraged. Safety attitude and activities must be important parts of **performance evaluation and career development**. Safety leadership activities such as service on safety committees, mentoring others in safety, or work in safety-oriented positions should be recognized and rewarded.
2. Organizations employing chemists should expect managers, faculty/Principal Investigators, and chemistry professionals to **understand their safety responsibilities**. All employees must be empowered to maintain a safe work environment.
3. Improving safety is a dynamic process and organizations need to provide **appropriate resources and support** for safety programs as the science they use evolves, with particular attention during times of rapid change in science and laboratory practice.
4. Organizations need to set **clear expectations that new chemistry professionals** be knowledgeable in and committed to safe practices. Organizations also need to provide specific training which supports these expectations. In academia, information on policies and procedures needs to be effectively communicated to teaching and research professionals, support staff, and students. Buy-in and demonstrated personal responsibility need to be supported by a proactive safety culture.⁴
5. Good safety programs include a commitment to **protect the environment**. Responsible stewardship of chemicals requires that organizations provide effective emergency response capabilities, consistent promotion of responsible recycling, waste minimization and disposal, and consideration of concepts such as sustainability and inherent safety. Security of chemicals must be appropriately maintained. Intentional or uncontrolled release of hazardous material is unacceptable anywhere in the chemistry enterprise.

In research communities, ongoing attention to **all aspects of chemical health and safety** should be prioritized. The ACS models this leadership role by producing state-of-the-art technical support materials (see Appendix).

ACS safety professionals recognize that any technological change incurs some level of risk. By managing this risk based on **continuous improvement of safety performance**, chemistry professionals and their organizations can meet their obligations to support the ACS commitment to ***“improving people’s lives through the transforming power of chemistry.”***

⁴ See [A Guide to Implementing a Safety Culture in Our Universities](#) from the APLU Council on Research Task Force on Laboratory Safety for specific organizational tools to support such a safety culture.

Appendix: ACS Chemical Safety Resources

Technical Resources

1. **Committee on Chemical Safety:** CCS is a Committee of the Society that provides technical and educational leadership within the Society with regard to safety issues. The Committee produces peer reviewed documents which provide guidance with regard to technical and management issues related to chemical safety in the laboratory, particularly in the educational setting. These can be found at <http://www.acs.org/safety>
2. **Division of Chemical Health and Safety:** CHAS is a Technical Division of the Society that pursues research into all elements of chemical and laboratory safety, including technical and management aspects. The Division hosts technical symposia at national and regional meetings, publishes a bi-monthly peer-reviewed journal (*Journal of Chemical Health and Safety*), and hosts educational workshops at national and regional meetings. <http://www.dchas.org>
3. **C&EN Safety Zone Blog:** The C&EN blog site includes the [Safety Zone](#) which provides ongoing updates on chemical and laboratory safety events and trends to the ACS membership and general public.
4. **Technical Programming:** Many ACS technical divisions include symposia specific to safety issues in their specialties in their international, national, and regional meeting programs.
5. **ACS publications:** ACS publications require technical papers they publish to identify hazards and risk management strategies associated with the work they describe, either through direct discussion of these issues or through citation of appropriate safety literature applicable to this work.

Educational Resources

1. **Division of Chemical Education Safety Committee:** is a new Committee of the Division of Chemical Education established in 2015. The CHED safety committee is reviewing safety guidance documents published by the division and plans outreach to members around safety issues. <http://www.divched.org/committee/safety>
2. **Committee on Professional Training:** The CPT provides guidance about how to including expectations address laboratory safety education in the undergraduate curriculum. <http://www.acs.org/cpt>
3. **American Association of Chemistry Teachers:** The AACT provides safety programming as part of its outreach to high school chemistry teachers. <https://teachchemistry.org>
4. **Society Committee on Education:** SOCED provides "[Guidelines and Recommendations for the Teaching of High School Chemistry.](#)"

Environmental Resources

1. **Committee on Environmental Improvement:** The CEI supports environmental stewardship of the chemical enterprise and its products. <https://www.acs.org/content/acs/en/about/governance/committees/cei.html>
2. **Green Chemistry Institute:** The ACS GCI advocates for research and development of Green Chemistry practices in both research and industrial settings. <https://www.acs.org/content/acs/en/greenchemistry.html>

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