

## 10.0 CHEMICAL SAFETY

### 10.1 Purpose of Review

The purpose of this review is to establish that there is reasonable assurance that the applicant has adequately provided for chemical safety at its facility. Chemical safety addresses the consequences of potential accidents involving hazardous chemicals,<sup>1</sup> and the controls used to prevent their occurrence or mitigate their consequences. The reviewer will determine that the applicant has (1) identified and evaluated all credible chemical safety hazards, initiating events, and accident sequences that could result in unacceptable consequences to the public or workers, and (2) identified and maintains controls that are adequate to prevent or mitigate the accident sequences that may result in unacceptable consequences.

### 10.2 Responsibility for Review

Primary: Chemical Process Specialist

Secondary: Certification Project Manager

Supporting: Primary Reviewer of Standard Review Plan Chapter 5.0

### 10.3 Areas of Review

As stated in the 1988 Memorandum of Understanding between the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Occupational Safety and Health Administration (OSHA), the NRC generally manages chemical safety issues related to: (1) radiation risk produced by radioactive materials, (2) chemical risk produced by radioactive materials, and (3) plant conditions that affect the safety of radioactive materials and thus present an increased radiation risk to workers. The NRC does not manage plant conditions that result in an occupational risk, but do not affect the safety nor use of radioactive materials under NRC jurisdiction.

A review of accidents that result in the release of hazardous chemicals from the processing of radioactive materials are covered in Standard Review Plan (SRP) Chapter 5.0, "Hazard/Accident Analysis." The chemical safety review encompasses the release of hazardous chemicals that have the potential to adversely affect radiological safety. The areas of review are as follows:

---

<sup>1</sup> As defined in Draft NUREG-1601, "Chemical Process Safety at Fuel Cycle Facilities," hazardous chemicals are toxic, explosive, flammable, corrosive, or reactive to the extent that they can cause significant damage to property or endanger life if not adequately controlled. Also included are substances that are not normally considered hazardous under ambient conditions, but that may, under extreme conditions or in combination with other chemicals, produce hazardous situations.

## Chemical Safety

1. A list of hazardous chemicals that are stored or used onsite, including the locations and amounts stored;
2. A description of potential interactions between chemicals stored and used onsite;
3. The methodology selected for identifying and evaluating chemical safety hazards, and the applicant's justification for selecting that methodology;
4. A description of the hazards identified, the accident sequences evaluated, and the potential consequences of a release of hazardous chemicals;
5. The controls or engineered features that prevent or mitigate the evaluated accident sequences; and
6. The application of the configuration management, quality assurance, maintenance, training, and procedures programs and policies to the chemical safety program.

## 10.4 Review Procedures

### 10.4.1 Acceptance Review

The staff review should start with the primary reviewer's determination that sufficient information has been provided in the contents of the application to satisfy requirements in 10 CFR 76.35, "Contents of Application," and 10 CFR 76.36, "Renewals," with respect to chemical safety for gaseous diffusion plants (GDPs). Verify that the topics discussed in SRP Section 10.5.1, "Regulatory Requirements," and SRP Section 10.3, "Areas of Review," have been addressed.

If significant deficiencies are identified in the application, the applicant should be requested to submit additional material before the staff resumes the application review.

### 10.4.2 Evaluation

The primary reviewer should establish that the applicant's chemical safety program provides reasonable assurance that it will function as intended. This reviewer also should identify the mechanisms that will allow the applicant to identify and correct potential problems.

The secondary reviewer should confirm that the chemical safety program is consistent with other sections of the submittal. Moreover, supporting reviewers should confirm that provisions made in the applicant's submittal are in accordance with specified sections of the SRP. Supporting reviewers should establish that the program described by the applicant provides reasonable assurance that the chemical safety program will not impede radiological safety at the facility.

On the basis of its review, the staff may request that the applicant provide additional information or modify the submittal to meet the acceptance criteria in SRP Section 10.5.

The final step in the review is the primary staff reviewer's writing of a Compliance Evaluation Report (CER) for chemical safety, as described in Section 10.6, and that summarizes the conduct of the review, identifies what material in the application forms the basis for a finding of reasonable assurance with respect to the acceptance criteria, and presents the bases for certificate conditions that may be necessary to conclude that reasonable assurance is achieved.

## **10.5 Acceptance Criteria**

The regulatory requirements, regulatory guidance, and regulatory review criteria applicable to this SRP are listed in the following sections.

### **10.5.1 Regulatory Requirements**

Section 76.87 of 10 CFR requires the applicant to establish Technical Safety Requirements (TSRs). Chemical safety is one of the listed safety topics and includes the chemical hazards derived from radioactive material, and plan conditions related to the hazards of chemicals on or near the plant site.

### **10.5.2 Regulatory Guidance**

Nuclear Regulatory Commission (U.S.) (NRC). Draft NUREG-1601, "Chemical Process Safety at Fuel Cycle Facilities." NRC: Washington, D.C. August, 1997.

### **10.5.3 Regulatory Review Criteria**

The staff could use the following regulatory review criteria or information demonstrating acceptable alternatives in its review of the application. Acceptability should be based on the following:

1. The list of hazardous chemicals results from a review of the entire process and considers both consumables used in the process and waste products resulting from the process. The list of hazardous chemicals includes the chemical form, maximum daily inventory, and storage location as appropriate. A material safety data sheet is available for all hazardous materials.
2. The list of potential chemical interactions considers the interaction between all chemicals used and stored on the site. The list identifies the potential hazard created by mixing chemicals having significance to nuclear safety.
3. The description of the hazard identification and evaluation methodology is acceptable if the reviewer determines that the applicant has provided a cogent description of the methodology and the basis for its selection. The methodology will be considered acceptable if it meets the requirements of the OSHA Process Safety Management rule,

## Chemical Safety

29 CFR 1910.119, and U.S. Environmental Protection Agency's Risk Management Plan, 40 CFR Part 68, for credible accidents and mitigation considerations.

4. The description of the identified hazards and evaluated accident sequences is considered acceptable if a description is provided of potential accidents that could result from the identified hazards and the possible initiating events (internal and external) are given. The accident sequence evaluation addresses all modes of operation (startup, shutdown, maintenance, etc.). Justification is provided if initiating events are deemed incredible and the resulting accident sequences are not evaluated. The description includes the possible consequences of the release resulting from the worst case accident sequence and a description of the method used to calculate the consequences.
5. The controls or engineered features that are expected to prevent or mitigate all accident sequences that could result in an impact on radiological safety are identified. The level of quality applied to each control is identified.
6. The application of the configuration management, quality assurance, maintenance, training, and procedures programs and policies to the chemical safety program is identified by the assignment of a quality rating. The application of these programs, as described in the respective SRP chapters, for the level of quality assigned is appropriate for the accident consequence of concern.

## 10.6 Evaluation Findings

The staff's review should verify that sufficient information has been provided in the application to satisfy the intent of requirements in 10 CFR 76.35, "Contents of Application," and 10 CFR 76.36, "Renewals," with respect to chemical safety and that the information is consistent with the guidance in this SRP. On the basis of this information, the staff should be able to conclude that the evaluation is complete.

The staff could document the evaluation of the application as follows:

*The staff has reviewed the applicant's chemical safety program according to SRP Sections 10.3, 10.4, and 10.5. The staff concludes that the applicant's plan for managing chemical safety and the chemical safety controls established to maintain safe facility operation meets the requirements of 10 CFR Part 76.*

*[The reviewer will describe the bases for this conclusion, addressing areas that were reviewed, and discuss how the acceptance criteria have been met. The reviewer should include a description of the general type, location, and controls used for the most significant hazards. The reviewer should also describe the applicant's approach to ensuring the quality and reliability of the controls. If acceptance criteria have not been met, the reviewer will recommend certificate conditions here.]*

*On the basis of its review, the NRC has staff concluded that the chemical safety program is acceptable to support the recertification.*

## **10.7 References**

Code of Federal Regulations, *Title 10, Energy*, Part 76, "Certification of Gaseous Diffusion Plants."

Nuclear Regulatory Commission (U.S.), Washington, D.C. "Memorandum of Understanding between Nuclear Regulatory Commission and Occupational Safety and Health Administration on Worker Protection at NRC Licensed Facilities." *Federal Register*: Vol. 53, p 43950. October 21, 1988.

Nuclear Regulatory Commission (U.S.) (NRC). NUREG-1601, "Chemical Process Safety at Fuel Cycle Facilities." NRC: Washington, D.C. August 1997.