



September 1974

U.S. ATOMIC ENERGY COMMISSION

# REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

## REGULATORY GUIDE 1.70.8

### ADDITIONAL INFORMATION NEARBY INDUSTRIAL, TRANSPORTATION, AND MILITARY FACILITIES

#### A. INTRODUCTION

In October 1972, the Commission issued Revision 1 of the "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants."<sup>1</sup> This document provides a standard format for the safety analysis reports required by the Commission's regulations and identifies the principal information needed by the Regulatory staff in order to conduct its safety evaluations.

In its review of recent applications for construction permits and operating licenses, the Regulatory staff has identified information that has often been missing from these safety analysis reports. To obtain the information needed to perform its evaluation, the staff has had to request this information by directing written questions to each applicant. The Foreword of the Standard Format states: "Any revisions of the Commission's needs for information will be conveyed to the industry and the public in various ways such as (1) amendments to the Standard Format, (2) in the Information Guide series, (3) as part of future Safety Guides, or (4) in Public Announcements." This guide identifies information related to nearby industrial, transportation, and military facilities that has often been missing from the applicant's safety analysis report at the construction permit and operating license stages of review.

The Commission plans to revise the Standard Format within the next year to include this modification. In the interim, the information requested here should be included in safety analysis reports submitted for AEC review.

<sup>1</sup> The "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" has been designated as Regulatory Guide 1.70.

#### B. ADDITIONAL INFORMATION

The additional information requested should be incorporated into Chapter 2 of the safety analysis report as indicated below. Section 2.2 of Regulatory Guide 1.70 should be replaced with the following:

#### 2.2 Nearby Industrial, Transportation, and Military Facilities

The purpose of this section is to establish whether the effects of potential accidents in the vicinity<sup>2</sup> of the site from present and projected industrial, transportation, and military installations and operations should be used as design basis events for plant design and to establish the design parameters related to the accidents so selected.

##### 2.2.1 Locations and Routes

Provide maps showing the location and distance from the nuclear plant of all significant manufacturing plants, chemical plants, refineries, storage facilities, mining and quarrying operations, military bases, missile sites, transportation routes (air, land, and water), transportation facilities (docks, anchorages, airports), oil and gas pipelines, wells, and underground gas storage facilities; show any other facilities which, because of the products manufactured, stored, or transported, may require consideration with respect to possible adverse effects on the plant. Also, show any military firing or bombing ranges and any nearby aircraft low-level flight, holding, and landing patterns.

<sup>2</sup> All facilities and activities within five miles of the nuclear plant should be considered. Activities at greater distances should be included as appropriate to their significance.

#### USAEC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the AEC Regulatory staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Published guides will be revised periodically, as appropriate, to accommodate comments and to reflect new information or experience.

Copies of published guides may be obtained by request indicating the divisions desired to the U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Director of Regulatory Standards. Comments and suggestions for improvements in these guides are encouraged and should be sent to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Docketing and Service Section.

The guides are issued in the following ten broad divisions:

1. Power Reactors
2. Research and Test Reactors
3. Fuels and Materials Facilities
4. Environmental and Siting
5. Materials and Plant Protection
6. Products
7. Transportation
8. Occupational Health
9. Antitrust Review
10. General

The maps should be clearly legible and of suitable scale to enable easy location of the facilities and routes in relation to the nuclear plant. All symbols and notations used to depict the location of the facilities and routes should be identified in legends or tables. Topographic features should be included on the maps in sufficient detail to adequately illustrate the information presented.

## 2.2.2 Descriptions

The descriptions of the nearby industrial, transportation, and military facilities identified in 2.2.1 above should include the information indicated in the following sections.

**2.2.2.1 Description of Facilities**—A concise description of each facility, including its primary function and major products and the number of persons employed, should be provided in tabular form.

**2.2.2.2 Description of Products and Materials**—A description of the products and materials regularly manufactured, stored, used, or transported in the vicinity of the nuclear plant should be provided. Emphasis should be placed on the identification and description of any hazardous materials. Statistical data should be provided on the amounts involved, modes of transportation, frequency of shipment, and the maximum quantity of hazardous material likely to be processed, stored, or transported at any given time. The applicable toxicity limits should be provided for each hazardous material.

**2.2.2.3 Pipelines**—For pipelines, indicate the pipe size, pipe age, operating pressure, depth of burial, location and type of isolation valves, and the type of gas or liquid presently carried. Indicate whether the pipeline is used for gas storage at higher than normal pressure and discuss the possibility of the pipeline being used in the future to carry a different product than the one presently being carried (e.g., propane instead of natural gas).

**2.2.2.4 Waterways**—If the site is located adjacent to a navigable waterway, provide information on the location of the intake structure(s) in relation to the shipping channel, the depth of channel, the location of locks, the type of ships and barges using the waterway, and any nearby docks and anchorages.

**2.2.2.5 Airports**—For airports, provide information on length and orientation of runways, type of aircraft using the facility, the number of operations per year by aircraft type, and the flying patterns associated with the airport. Plans for future utilization of the airport, including possible construction of new runways, increased traffic, or utilization by larger aircraft should

be provided. In addition, statistics on aircraft accidents<sup>3</sup> should be provided for:

- (1) all airports within five miles of the nuclear plant,
- (2) airports with projected operations greater than  $500d^2$  movements per year within 10 miles,<sup>4</sup> and
- (3) airports with projected operations greater than  $1000d^2$  per year outside 10 miles.<sup>4</sup>

**2.2.2.6 Projections of Industrial Growth**—For each of the above categories, provide projections of the growth of present activities and new types of activities in the vicinity of the nuclear plant that can be reasonably expected based on economic growth projections for the area.

## 2.2.3 Evaluation of Potential Accidents

On the basis of the information provided in Sections 2.2.1 and 2.2.2, the potential accidents to be considered as design basis events should be determined and the potential effects of these accidents on the nuclear plant should be identified in terms of design parameter (e.g., overpressure, missile energies) or physical phenomena (e.g., concentration of flammable or toxic cloud outside building structures).

**2.2.3.1 Determination of Design Basis Events**—Design basis events external to the nuclear plant are defined as those accidents which have a probability of occurrence on the order of about  $10^{-7}$  per year or greater and have potential consequences serious enough to affect the safety of the plant to the extent that Part 100 guidelines could be exceeded. The determination of the probability of occurrence of potential accidents should be based on an analysis of the available statistical data on the frequency of occurrence for the type of accident under consideration and on the transportation accident rates for the mode of transportation used to carry the hazardous material. If the probability of such an accident is on the order of  $10^{-7}$  per year or greater, the accident should be considered a design basis event and a detailed analysis of the effects of the accident on the plant's safety-related structures and components should be provided. The accident categories discussed below should be considered in selecting design basis events.

**(1) Explosions.** Accidents involving detonations of high explosives, munitions, chemicals, or liquid and gaseous fuels should be considered for facilities and activities in

<sup>3</sup> An analysis of the probability of an aircraft collision at the nuclear plant and the effects of the collision on the safety related components of the plant should be provided in Section 3.5.

<sup>4</sup> "d" is the distance in miles from the site.

the vicinity of the plant where such materials are processed, stored, used, or transported in quantity. Attention should be given to potential accidental explosions which could produce a blast overpressure on the order of 1 psi or greater at the nuclear plant, using recognized quantity-distance relationships.<sup>5</sup> Missiles generated in the explosion should also be considered, and an analysis should be provided in Section 3.5.

**(2) Flammable Vapor Clouds (Delayed Ignition).** Accidental releases of flammable liquids or vapors which result in the formation of unconfined vapor clouds should be considered. Assuming that no immediate explosion occurs, the extent of the cloud and the concentrations of gas which could reach the plant under "worst-case" meteorological conditions should be determined. An evaluation of the effects on the plant of detonation and deflagration of the vapor cloud should be provided. An analysis of the missiles generated as a result of the detonation should be provided in Section 3.5.

**(3) Toxic Chemicals.** Accidents involving the release of toxic chemicals (e.g., chlorine) from onsite storage facilities and nearby mobile and stationary sources should be considered. If toxic chemicals are known or projected to be present onsite or in the vicinity of a nuclear plant or to be frequently transported in the vicinity of the plant, releases of these chemicals should be evaluated. For each postulated event, a range of concentrations at the site should be determined for a spectrum of meteorological conditions. These toxic chemical concentrations should be used in evaluating control room habitability in Section 6.4.

**(4) Fires.** Accidents leading to high heat fluxes or to smoke, nonflammable gas- or chemical-bearing clouds

from the release of materials as the consequence of fires in the vicinity of the plant should be considered. Fires in adjacent industrial and chemical plants and storage facilities and in oil and gas pipelines, brush and forest fires, and fires from transportation accidents should be evaluated as events which could lead to high heat fluxes or to the formation of such clouds. A spectrum of meteorological conditions should be included in the dispersal analysis when determining the concentrations of nonflammable material that could reach the site. These concentrations should be used in Section 6.4 to evaluate control room habitability and in Section 9.5 to evaluate the operability of diesels and other equipment.

**(5) Collisions with Intake Structure.** For nuclear power plant sites located on navigable waterways, the evaluation should consider the probability and potential effects of impact on the plant cooling water intake structure and enclosed pumps by the various size, weight, and type of barges or ships that normally pass the site, including any explosions incident to the collision. This analysis should be used in Section 9.2.5 to determine whether an additional source of cooling water is required.

**(6) Liquid Spills.** The accidental release of oil or liquids which may be corrosive, cryogenic, or coagulant should be considered to determine if the potential exists for such liquids to be drawn into the plant's intake structure and circulating water system or otherwise to affect the plant's safe operation.

**2.2.3.2 Effects of Design Basis Events**—Provide the analysis of the effects of the design basis accidents identified in Section 2.2.3.1 on the safety-related components of the nuclear plant and discuss the steps taken to mitigate the consequences of these accidents, including such things as the addition of engineered safety feature equipment and reinforcing of plant structures, as well as the provisions made to lessen the likelihood and severity of the accidents themselves.

---

<sup>5</sup>One acceptable reference is the Department of the Army Technical Manual TM 5-1300, "Structures to Resist the Effects of Accidental Explosions," for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.