

Executive Summary

Introduction

Over the past decade, the Committee on Nuclear Regulatory Activities (CNRA) has produced a series of guidance documents known as the “Green Booklets”. These reports, prepared and peer reviewed by senior regulators, have provided unique source material primarily for nuclear safety regulators, but also of interest to government authorities, nuclear power plant operators and the general public. The focus of most of these reports has been on specific regulatory challenges although a few have been addressed to broader regulatory issues.

A common theme throughout the series of green booklets is the premise that the fundamental objective of all nuclear safety regulatory bodies is to ensure that nuclear facilities are operated at all times in an acceptably safe manner including the safe conduct of decommissioning activities. In meeting this objective, the regulator must keep in mind that it is the operator that has the responsibility for safely operating a nuclear facility, while it is the nuclear regulator’s responsibility to oversee the operator’s activities in order to assure that a plant is operated safely.

This publication, for the first time, presents all of these reports in one edition. As such, it is intended to serve as a knowledge management tool both for current regulators and the younger generation of nuclear experts entering the regulatory field. While the audience for this publication is primarily nuclear regulators, the information and ideas may also be of interest to nuclear operators, other nuclear industry organisations and the general public.

Each of the fourteen booklets in this series was overseen by a Task Group of senior regulators from a wide range of OECD countries, and each was prepared by experienced former regulators as consultants to the CNRA. As a result, the booklets in this compilation represent the collective experience and insights from a broad range of OECD nuclear regulatory experts.

Qualifications on the contents

The reports contained in this publication were produced starting in 1999. They are reproduced in this publication in their original form. While there have been evolutionary changes and advances in regulatory practice over the years, these reports continue to provide valuable guidance for regulators in their approach to nuclear regulation. As noted in many of the reports, the experts utilised international experience, such as IAEA Standards, in addition to their own national experience.

In selecting the issues and developing and preparing the individual reports, the senior regulators of the CNRA based their work on priorities in regulatory safety issues set forth in the CNRA report on Future Nuclear Regulatory Challenges¹ and the safety relevance determined by the CNRA. The reports have been rearranged in this publication to provide the reader a systematic and logical categorisation for reading and learning. The original order of the publication for the CNRA green booklets is provided in Annex A.

Outline

In order for the reader to have a systematic and structured understanding, the series has been divided into three categories: regulatory challenges, regulatory effectiveness and regulatory assessment.

The first section is divided into nine chapters and looks at regulatory challenges, including areas of human and organisational factors, socio-economic issues, use of operating experience to promote safety, nuclear plant decommissioning and licensee. The second section contains three chapters showing how regulators assess and measure their own performance, and the third section has the final two chapters which explain how regulators assess safety information and make judgments for their regulatory actions. Annex A provides the original publication order for the reports. Reference and additional reading material related to the various booklets are located in Annex B. Annex C contains the complete compilation of survey results used to produce the report on Licensee Safety Assessment.

The following paragraphs provide a short synopsis of each section and its chapters.

Regulatory Challenges

Chapters 1 and 2: The Role of the Nuclear Regulator in Promoting and Evaluating Safety Culture and Regulatory Response Strategies for Safety Culture Problems

Safety Culture is that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, nuclear power plant safety issues receive the attention warranted by their significance.²

The first chapter looks at how the relationship between the regulator and operator can influence plant safety culture either negatively or positively and discusses how regulators can recognise early signs of declining performance. The second chapter explores regulatory responses strategies for dealing with declining performance and follow-up activities.

1. NEA (1998), *Future Nuclear Regulatory Challenges*, OECD, Paris. ISBN 92-64-16106-6.

2. IAEA (1991), Safety Series No. 75-INSAG-4, *Safety Culture: a Report by the International Nuclear Safety Advisory Group*, Vienna. Definition of Safety Culture from INSAG-4.

Chapter 3: Nuclear Regulatory Challenges Related to Human Performance

This chapter discusses how and why human performance is important in relation to nuclear safety and challenges faced by regulators in developing better tools for handling the complex nature of this issue.

Chapter 4: Regulatory Challenges in Using Nuclear Operating Experience

The primary focus of this chapter is on how regulatory bodies can assure that operating experience is used effectively to promote the safety of nuclear power plants.

Chapter 5: Nuclear Regulatory Review of Licensee Self-assessment (LSA)

Licensee Self-Assessment (LSA) by nuclear power plant operators is described as all the activities that a licensee performs in order to identify opportunities for improvements. This chapter provides an overview of regulatory philosophy on and approaches to self-assessment as performed by licensees.

Chapter 6: Nuclear Regulatory Challenges Arising from Competition in Electricity Markets

Over the past ten years, changes have taken place in electricity markets which has included more open competition (e.g., deregulation) both nationally and internationally. This chapter provides insights on the potential challenges and the safety implications and possible regulatory strategies for dealing with them.

Chapter 7: The Nuclear Regulatory Challenges in Judging Safety Backfits

Economic pressures have led nuclear power plant operators to seek ways to increase production and reduce operating costs. Corresponding pressures on the regulator includes operator demands to reduce regulatory burdens perceived as unnecessary and general resistance to consider safety backfits sought by the regulator. This chapter describes potential situations giving rise to safety backfit questions and discusses regulatory approaches for judging them.

Chapter 8: The Regulatory Challenges of Decommissioning Nuclear Reactors

Decommissioning in this chapter is defined in its broadest sense, that is, to cover all of the administrative and technical actions associated with early planning for cessation of operations through termination of all licenses and release of the site from nuclear regulatory control.

The chapter describes the broad set of safety, environmental, organisational, human factors and public policy issues that may arise during the decommissioning of nuclear reactors and that the regulatory body should be prepared to deal with in the framework of its national regulatory system.

Chapter 9: The Nuclear Regulator's Role in Assessing Licensee Oversight of Vendor and Other Contracted Services

Contracted services are an integral part of the design, construction and operation of a nuclear facility. The licensee must ensure that throughout any contracting process, the licensee must retain ultimate responsibility for the quality of work performed, whether by its staff or by contractors, and for maintaining the safety of the licensed facility. This chapter provides guidance to assist regulatory bodies in assessing their current practices on the oversight of the licensees' use of contractors, and in adapting their practices where necessary to meet the changing situation.

Regulatory Effectiveness*Chapters 10 and 11: Improving nuclear regulatory effectiveness and direct indicators of nuclear regulatory efficiency and effectiveness pilot project results*

Given the necessary authority and resources as prerequisites, the regulatory body is effective when it: ensures that an acceptable level of safety is being maintained by the regulated operating organisations; develops and maintains an adequate level of competence; takes appropriate actions to prevent degradation of safety and to promote safety improvements; performs its regulatory functions in a timely and cost-effective manner as well as in a manner that ensures the confidence of the operating organisations, the general public, and the government and strives for continuous improvements in its performance.

Chapter 10 covers the basic concepts underlying nuclear regulatory effectiveness, while Chapter 11 describes the results of a pilot project carried out to test a set of indicators for measuring and assessing regulatory efficiency and effectiveness.

Chapter 12: Improving versus maintaining nuclear safety

The concept of improving safety versus maintaining safety has been discussed at a number of meetings of nuclear regulators in recent years, and national reports have indicated that there are philosophical differences between NEA member countries about whether their regulatory approaches require licensees to continuously improve safety or to continuously maintain safety.

This chapter provides an overview of current regulatory philosophies and approaches as well as insights into a selection of public perception issues. It concludes that, while the actual level of safety achieved in all member countries is probably much the same, this is difficult to prove in a quantitative way. In practice, all regulatory approaches require improvements to be made to correct deficiencies and when otherwise warranted.

Regulatory Assessment

Chapter 13: Nuclear Regulatory Decision Making

The fundamental objective of all nuclear safety regulatory bodies is to ensure that nuclear utilities operate their plants at all times in an acceptably safe manner. In meeting this objective, the regulatory body should strive to ensure that its regulatory decisions are technically sound, consistent from case to case, and timely. In addition, the regulator must be aware that its decisions and the circumstances surrounding those decisions can affect how its stakeholders, such as government policy makers, the industry it regulates, and the public, view it as an effective and credible regulator. In order to maintain the confidence of those stakeholders, the regulator should make sure that its decisions are transparent, have a clear basis in law and regulations, and are seen by impartial observers to be fair to all parties

This chapter discusses some basic principles and criteria that a regulatory body should consider in making decisions and describes the elements of an integrated framework for making regulatory decisions.

Chapter 14: The Regulatory Goal of Assuring Nuclear Safety

There are currently many sources of information available to the regulator pertaining to safety at any nuclear facility, such as inspection reports, operating experience reports, research results, periodic safety reviews, probabilistic safety analysis (PSA) results, insights from IAEA reviews and other similar information. A major challenge for the regulator is to systematically collect and analyse this information in order to arrive at an integrated assessment of the level of safety of the particular facility and then to make a judgement about its acceptability.

The primary focus of this chapter is on how the regulatory body can systematically collect and make an integrated analysis of all the relevant safety information available to it and arrive at a sound judgement on the acceptability of the level of safety of the facilities that it regulates.