



# Accountability feedback assessments for improving efficiency of nuclear regulatory institutions



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## HIGHLIGHTS

- A general introduction to regulatory accountability is given.
- A definition of an effective accountability system is proposed.
- A method to assess accountability systems is proposed.
- A simplified simulation of a regulatory system demonstrates the method's capabilities.

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## ABSTRACT

The Fukushima-Daiichi Accident demonstrated the need of assessing and strengthening institutions involved in nuclear safety, including the accountability of regulators. There are a few problems hindering the path towards a greater understanding of accountability systems, the ensemble of mechanisms holding to account the nuclear regulator on behalf of the public. There is no consensus on what it should deliver and no systematic assessment method exists.

This article proposes a method of assessing institutions based on defence in depth concepts and inspired from risk-assessment techniques used for nuclear safety. As a first step in testing the proposal, it presents a simple Monte-Carlo simulation, illustrating some of the workings of the method of assessment and demonstrating the kind of results it will be able to supply. This on-going work will assist policy-makers take better informed decisions about the size, structure and organisation of a nuclear regulator and the cost-effective funding of its accountability system. It will assist in striking a balance between efficiency and resilience of regulatory decision-making processes. It will also promote the involvement of stakeholders and allow them to have a more meaningful impact on regulatory decisions, thereby enhancing the robustness of the regulatory system and potentially trust and confidence.

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## 1. Introduction

Prior to the Fukushima-Daiichi nuclear accident, both the nuclear operator and the regulator were seemingly aware that the plant would be unable to withstand a very large tsunami having predicted by some of having a credible frequency of occurrence. The failure of the operator to make the necessary improvements was caused by institutional shortcomings including in the regulatory system.

The commission charged by the Japanese government with investigating the causes of the Fukushima-Daiichi accident not only found that the plant was ill-defended against tsunamis with

waves above 10 m but also that such powerful tsunami have far from negligible frequencies of occurrence in the region (NAIIC, 2012). Despite these studies showing the risks for the plant of the tsunami hazard to be unacceptable, TEPCO did not make the necessary improvements and the regulator failed to force its hand.

In its comprehensive report on the accident (IAEA, 2015), the IAEA argues that the Nuclear and Industrial Safety Authority (NISA) lacked the authority to have the operator make these changes and traces this issue to several institutional failings. First, NISA lacked independence from both the nuclear industry it was charged to oversee and the ministry promoting nuclear power. Second, it lacked formal authority due to the complexity of the regulatory framework. Finally, the government staffing policy and the rule requiring job rotation every few years in particular hindered NISA staff from gaining the expertise needed (IAEA, 2015).

In 2007, the Japanese Government welcomed an IAEA team of expert to review its governmental, legal and regulatory

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framework. There were several unaddressed issues raised in the IAEA review report that were pertinent to the Fukushima accident. In particular, issues related to the independence and the competences of the regulator (IAEA, 2007). However, Japan resisted international calls for regulatory reform (Convention on Nuclear Safety, 2008).

Despite these deep-rooted institutional failings being identified as one of the root causes of the accident, the international nuclear community has so far focused predominately on engineering and operational lessons.

To address these needs, a three barrier defence in depth institutional model for national nuclear systems has been proposed, consisting of a strong self regulating industry, a strong independent regulator, both of which are held to account by the third barrier: strong, diverse and well-informed stakeholders (Weightman, 2015). The role of nuclear stakeholders is of the utmost importance to prevent and mitigate against dual failures of the regulator and operator such as the one which occurred in Japan. However, little attention has so far been given to their role in ensuring that both the operator and the regulator are adequately performing their duties. The article thus focuses on stakeholders and the diverse mechanisms which hold the nuclear regulator to account on their behalf. Collectively, these mechanisms will be referred to as the system of accountability for the nuclear regulator.

The first section provides some background on regulatory accountability. The following section outlines the literature on regulatory accountability and argues that progress in the field is held back by a lack of a systematic approach to assess the effectiveness systems of accountability. The article then proposes a novel method based probabilistic safety assessments to quantitatively evaluate the effectiveness of accountability systems. In the final section, a Monte-Carlo simulation depicting a much-simplified version of the method of assessment is presented. Its aim is to illustrate the inner workings of the method of assessment and demonstrate the kind of results it will be able to supply. This work is part of a wider development of using nuclear safety assessment techniques to assess institutions systems that may well have wider policy implementations beyond those for nuclear regulatory systems.

## 2. Background

### 2.1. Definitions

#### 2.1.1. Stakeholders

The International Nuclear Safety Group defines stakeholder as those who have a specific interest in a given issue or decision. There are two types of stakeholders: internal stakeholders, who are directly involved in the decision making process; and external stakeholders comprising any organisation or individual that has a legitimate interest in the decisions taken (INSAG, 2006).

The stakeholders are very diverse. They include members of the nuclear industry, the general public, its governmental representatives such as the national and local governments, and non-governmental entities such as NGOs and other interest groups.

#### 2.1.2. Regulatory accountability

The definition of regulatory accountability that will be used in this paper is the following: for a regulator, to be considered accountable it is required to justify both its decisions and actions and to make the necessary changes should the explanation given be judged unsatisfactory (see House of Lords Select Committee on the Constitution (2004), Bird (2012)).

#### 2.1.3. Accountability mechanisms

An accountability mechanism can be broadly defined as any structural control that is used to meet the challenge of an organisation's accountability (Ogus, 1994). In OECD countries, the mechanisms through which a regulatory body is held to account typically include the following (OECD, 2002):

- Stakeholder consultations such as NGO forums public consultations, public meetings, consultation with the nuclear industry etc.
- Parliamentary oversight in the form of annual reports, committee hearings, parliamentary questions etc.
- Oversight by the executive branch (i.e. by a ministry or a governmental agency).
- Financial and performance audits.
- Appeal processes.
- Appointment process for leadership role within the regulatory body.

### 2.2. Stakeholders and regulatory accountability

Whilst stakeholders may not know what the regulatory framework should look like or how the regulator should manage its activities, they can always provide valuable input on its decisions as they are directly affected by them and thus may perceive issues the regulator overlooked.

The House of Lords' Select Committee on the Constitution (2004) identifies three key elements to allow the stakeholders to have an impact on a regulator's actions:

- *The duty to explain*: Regulators must provide information on its activities to interested parties and explain the basis of the decisions they take.
- *Exposure to scrutiny*: Regulators must provide the means through which stakeholders can enquire about regulatory activities and decisions.
- *The possibility of independent review*: Stakeholders must be able to ask for an independent review of a regulatory decision so that it may be overturned or altered.

## 3. Problem description

Regulatory accountability is not a very active field of study. Accountability is mentioned in myriads of books and articles on public administration (Bishop, 1990; Chandler, 1996; Deleon, 1997; Harlow and Rawlings, 1997; White and Hellingsworth, 1999; Woodhouse, 1997) and on regulation (Baldwin and McCrudden, 1987; Baldwin, 1995; Baldwin and Cave, 1999; Ogus, 1994) as it is seen as a democratic requirement and a necessity to ensure an effective public administration and effective regulators. However the chapters dedicated to accountability only skim the surface and readers must content themselves with a basic explanation of its concept and brief descriptions of the various accountability mechanisms in place in the country in question.

The OECD (2002) provides details on what constitutes an effective system of accountability. These can be divided into two parts.

Firstly, a strong set of legal requirements for regulators to uphold is needed to foster transparency and accountability. It must include:

- A law setting explicitly the objective(s) of the regulator.
- Laws on information disclosure and requirements on responsiveness to information requests.
- Requirements for the regulator to seek the opinion of the

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