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CASE STUDY

Public involvement as a tool to enhance nuclear safety☆

Phil Richardson [a], Katrin Rickwood [b,*], Peter Rickwood [b,1]

[a] Galson Sciences Ltd., 5 Grosvenor House, Melton Road, Oakham, Rutland LE15 6AX, UK
[b] Atomic Reporters, Badgasse 56, A2352 Gumpoldskirchen, Austria

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ABSTRACT

Safety remains the most important issue amongst the public throughout the life cycle of nuclear facilities. After the accident at the Three Mile Island Nuclear Power Plant in the United States in 1979 there has been increasing emphasis placed on dialogue with the public as a response to these concerns.

Five cases where the dynamic of relationships between the nuclear industry and the public has been well defined are examined in the following paper, a condensed version of a longer study commissioned by the International Atomic Energy Agency (IAEA).

Four of the cases provide evidence of public involvement making a significant contribution to improved safety; the fifth case, distinguished by a breakdown of accountability, reviews the continued failure after more than 40 years of a bid to establish a nuclear disposal facility.

While there is general agreement that the geological disposal of radioactive waste needs to involve the public, not only for siting purposes but also as regards its long term stewardship, at other stages of the life cycle of nuclear facilities the role of the public is less well defined. However, these findings suggest that public engagement is a potential untapped resource for enhancing safety assurance.

1. Introduction

The nature of the relationship as a dynamic between the owners and operators of nuclear facilities and the community, i.e. the public, has received little attention. How does the quality of such a relationship affect the operation of facilities throughout their life cycle and is it important?

There is general acceptance that the involvement of the public is an essential component in the management of radioactive waste [1], because long term stewardship and safety will require more than technical and institutional arrangements [2].

Less well considered, despite recommendations about the importance of dialogue (INSAG-20), is the outcome from such a process, particularly its potential to contribute to safety.

In a paper prepared for the Planning and Economic Studies Section of the International Atomic Energy Agency (IAEA), Phil Richardson and Peter Rickwood provide a brief overview of five cases of varying relations between nuclear facilities and the public [3].

The studies focus on nuclear facilities in operation: Three Mile Island in the United States; Pickering A in Canada; Sellafield in the United Kingdom (an integrated nuclear-industrial complex comprising reactors being de-commissioned as well as reprocessing and storage facilities); proposals for waste disposal at Gorleben, Germany, and at Östhammar, Sweden.

The study concludes that there are tangible benefits to be gained from a more frank relationship between the nuclear power industry and the public. Such involvement, offering access to the knowledge of the commons and its collective memory, appears to represent a possible untapped asset for enhancing and maintaining safety.

In the case of Gorleben, an unresolved 40-year long bid to establish a long term waste disposal facility in Germany, the absence of frankness and lack of involvement with the public appears to be a major factor in a breakdown of relations and continued opposition.

The paper does not challenge the view that the prime responsibility for nuclear safety rests with the operator, and robust independent regulation, but identifies some additional

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* Corresponding author.
E-mail addresses: pjr@galson-sciences.co.uk (P. Richardson), katrin.rickwood@gmail.com (K. Rickwood), peter.rickwood@atomicreporters.org (P. Rickwood).
[1] +43 664 248 9680 (mobile).

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benefits to be gained from engagement with the public, both locally and nationally.

Despite their differing circumstances the public involvement activities cited have provided improved levels of assurance to the industry and public. Three of the examples cited followed accidents or incidents that severely eroded public confidence. Following the March 2011 accident at Fukushima Daiichi in Japan, the industry may wish to reconsider its engagement with the public and heed the words of the manager of communications at Three Mile Island in the United States: "the more involvement there is by citizens in the operation of a nuclear power plant the safer is its operation" [4].

Given its scope the study can make no claim to offer a comprehensive assessment but should serve as the basis for further investigation.

2. Public involvement and the nuclear industry

2.1. Defence in depth

The nuclear industry universally embraces the notion of defence-in-depth to create multiple independent and redundant layers of safety to compensate for potential human and mechanical failures.

Such lines of defence were overwhelmed in March 2011 at the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi nuclear power plant in Japan. New ways of thinking about nuclear safety and new rules are now being considered and implemented.

More engagement with the public in a formal process that accepts and respects the validity of scrutiny from civil society represents an immediate step the nuclear industry can take that provides additional oversight, builds confidence and can contribute to increased safety.

In such a process important, previously unaddressed issues may be raised, critical questions posed and novel solutions offered. The industry asserts that it is safe and sustainable: increased public involvement would give it the opportunity of demonstrating this is in fact the case — with the caveat that there is no absolute safety.

There remains a prevailing attitude that the general public cannot be trusted with technical information because it is regarded as having limited scientific knowledge and its involvement is therefore irrelevant.

Nonetheless, it is this very same public lack of knowledge about nuclear energy that is frequently raised by the industry as a stumbling block to its acceptance. Broader public participation would be an iterative and deliberative process and help increase public understanding. It does not however guarantee the fortunes of nuclear power.

2.2. The genesis of public involvement in the life cycle of nuclear facilities

During the last two decades there has been increasing emphasis on the public taking a role in the life cycle of nuclear facilities as well as the need for greater transparency. But the contribution to safety from public involvement has been less well examined.

The IAEA Nuclear Energy Basic Principles state that the use of nuclear energy should provide benefits that outweigh the associated costs and risks and its use should be based on open and transparent communication of all its facets [5]. Building on such principles, public participation represents a means by which a direct or indirect contribution to nuclear safety can be made.

A review of IAEA publications since 1994 provides a scale for assessing increased awareness of the importance of engagement:

- Nuclear Communications: A Handbook for Guiding Good Communications Practices at Nuclear Fuel Cycle Facilities [6]
- Stakeholder Involvement in Nuclear Issues INSAG-20 [7]
- Factors affecting Public and Political Acceptance for the Implementation of Geological Disposal [8]
- Stakeholder Involvement throughout the Life Cycle of Nuclear Facilities [9]

In the IAEA 2007 publication *Milestones in the Development of a National Infrastructure for Nuclear Power* it was pointed out that reliance on engineered safety systems is by itself insufficient to ensure nuclear safety: an infrastructure needs to be put in place requiring recognition of the specific requirements of nuclear power technology and appropriate conditions to deal with them, to ensure safe and secure operations [10].

Concomitantly, in western democracies there has been growing emphasis on open government and access to data, stimulated by a variety of initiatives, from the Aarhus Convention in Europe, providing citizens' rights to access environmental information, to programmes in the United States (Data.Gov), in Canada (Government of Canada Open Data Portal), and many others.

Such institutional developments are also paralleled by the advent of a variety of new media platforms, including so-called social networking, that capitalise on the continued expansion of internet and mobile wireless services.

These innovations are occurring against a background of mistrust in government and rejection of authority in many countries. Crowd-sourced data after the Fukushima accident was compiled by citizens using their own monitors to detect radiation. NTT DoCoMo, Japan's largest mobile phone provider, began offering smartphone radiation monitoring covers to its customers in October 2011 [11], and another mobile phone provider, Softbank, in 2012.

There also appears to be a reservoir of public enthusiasm for getting involved in collaborative efforts such as Wikipedia and Galaxy Zoo, an online community of more than 250,000 amateur astronomers who pore over photographs from the Hubble Space Telescope, creating a detailed map of the known universe. Their linked intelligence has been hailed as forming the world's most powerful pattern-recognition supercomputer.

But recommendations for enhanced public participation in radioactive waste management (RWM) in Europe, developed as part of the COWAM in Practice EU-funded project, published in 2009, point out that despite great efforts and progress to involve citizen participation in environmental decision making, particularly in RWM, dissatisfaction remains. The recommendations are not designed to transform traditional decision-making frameworks, which typically aim at informing the public or at gathering input at designated times. Their main objectives are "to make decisions more acceptable and to reassure civil society that an adequate job is done by mandated decision-makers".

"There is little notion that citizen participation might continue past those goals, and that citizen participation actually forms a vital requirement for the quality of RWM over time." [12].

In its infancy the domestic nuclear power industry lived by the creed that in general, the less the public knew the better, because the issues were too complicated for the general public to understand. Nuclear power also had its roots in weapons programmes and was initially cloaked in secrecy.

3. Case studies

3.1. Three Mile Island

Since the Three Mile Island (TMI) accident in 1979 there has been increasing demand for explanation and engagement with the public. The accident was a turning point, the first major nuclear incident that unfolded in front of the world's media. It exposed severe shortcomings in the plant management's ability to communicate satisfactorily with both the authorities and with the public. It also highlighted shortcomings regarding the news media, marked by a lack of suitable expertise among journalists covering the event.

TMI resulted in a major overhaul of the industry in the U.S. [13], particularly its safety culture, and perhaps, for the first time, offered the lay public an active role in