



# Practices of incident reporting in a nuclear research center: A question of solidarity



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## ABSTRACT

Incident reporting is usually considered as an effective means to improve the safety of “at risk” socio-technical systems (e.g. nuclear plants, large industrial facilities, hospitals), as it allows implicated actors to learn from past incidents. Safety could thus be enhanced via the use of an institutionalized Incident Reporting System (IRS), enabling organizations to improve the quality of actions and reactions in case of a deviation from normality, or to prevent such deviations from happening in the first place. Yet, there is a lack of inductive analyses of actual, on-site uses of IRS. In this paper, we address this gap, using the results of 28 semi-structured interviews conducted with agents from the Belgian Nuclear Research Center (SCK-CEN). The study relies on a vulnerability-oriented *Science and Technology Studies* (STS) approach. Our results show that practices of incident reporting are more varied than the institutionalized ones. Indeed, actual reporting practices are to be related to specific expressions of solidarity between colleagues within a *negotiated drift* – a pragmatic interpretation of the reporting procedure. These results are discussed in a vulnerability-oriented perspective. Overall, the paper displays a grounded analysis of incident reporting practices which may contribute to a better understanding of how safety is co-constructed by workers, and provides opportunities for further research and concrete path of actions for practitioners.

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## 1. Introduction

*To learn from past incidents!* This is most-heard reason why Incident Reporting Systems (IRS) are implemented, be it in a hospital, a chemical plant or a nuclear facility (Cooke and Rohleder, 2006; Drupsteen and Guldenmund, 2014; Jacobsson et al., 2011, 2012; Lawton and Parker, 2002; Lindberg et al., 2010; Mahajan, 2010). However, the analyses of the actual effects of this socio-technical system of reporting *within* these installations are scarce, as indicated by Maslen (2014) or Drupsteen and Guldenmund (2014). What are the different reporting practices? What are the justifications for different reporting practices?

These questions directly concern the co-production of natural, technical and social orders (Jasanoff, 2004) and are therefore central to the field of Science and Technology Studies (STS), on which our work draws. In this article, we adopt a constructivist STS perspective centered on the co-construction of users and

technologies (Oudshoorn and Pinch, 2003, 2008) with an emphasis on potential vulnerabilities (Hommels et al., 2014a). After introducing our approach (Section 2) and methods (Section 3), we present an analysis of 28 semi-structured interviews conducted in the SCK-CEN Belgian Nuclear Research Centre (Section 4). Our specific aim is to reconstruct the participants' understandings and representations of practices of incident reporting. Our research is investigative rather than hypothesis-testing. It captures actors' practices of, and justifications for, incident reporting. It shows that practices of incident reporting are both more varied than the institutionalized IRS approach and embedded in different expressions of solidarity within a *negotiated drift* – a pragmatic interpretation of the reporting procedure. In the context of a vulnerability-oriented approach, it discusses these findings and raises questions for further research.

## 2. Theory

### 2.1. Incident reporting

In general, incident reporting is described as a strategy for improving safety (Rooksby et al., 2007) by *learning* from previous

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events, in order to prevent future incidents and accidents to occur (Cooke and Rohleder, 2006; Drupsteen and Guldenmund, 2014; Jacobsson et al., 2011, 2012; Lawton and Parker, 2002; Lindberg et al., 2010; Mahajan, 2010; Maslen, 2014). The practices of incident reporting are to be observed in a wide range of activities such as chemical process industries, nuclear facilities, hospitals, civil aviation or rail transport (Drupsteen and Guldenmund, 2014). They have caught the attention of scientific literature since the late 1970s, within the framework of safety programs in hospitals (Morgan and Wozniak, 1977) or specific types of installations, for instance chemical plants (Cocks and Rogerson, 1978). In the nuclear field, at the end of 1978, the Organisation for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA) took the initiative to establish an international system for exchanging information on safety related events, and complementing the national incident reporting systems. In 1979, the Three Miles Island accident accelerated the development of such a system. In 1980, the “Incident Reporting System” was launched, and in April 1983, the IAEA extended the “Incident Reporting System” to all its Member States with nuclear power program (Fourest et al., 1984; IAEA, 2010; Ramos et al., 2010; Tolstykh, 1986).

In general, a link between “safety culture” and “incident reporting” is to be observed. Safety culture is a concept which emerged after the Chernobyl Accident in 1989 to address organizational aspects of safety (Henriqson et al., 2014). The relation between “safety culture” and “incident reporting” is bi-directional. On the one hand, practices of reporting may be studied as elements of the safety culture to be assessed (Choudhry et al., 2007; Guldenmund, 2000). On the other hand, the IAEA (2010: 5) considers that “a degraded safety culture” testifying of “a reduction of the socio-technical system defense in depth” constitutes an element to be reported into the IRS.

When it comes to papers addressing incident reporting in particular, three main lines of research are to be observed. First, certain studies aim at drawing lessons from longitudinal analyses of incidents reports, as observed in the nuclear field (Ishack, 1991), sometimes in combination with safety climate surveys (Fisher, 2007).

Second, many papers address potential “barriers to reporting”, i.e. factors explaining why actors might be reluctant to report incidents in the system (Evans et al., 2006; Harper and Helmreich, 2005; Lawton and Parker, 2002; Pfeiffer et al., 2010; van der Schaaf and Kanse, 2004). More than the content of the reporting (as for the first kind of studies mentioned), it is the practices of reporting that matter. The aim of these studies is to identify and/or evaluate factors of non-reporting practices. Ultimately, the development – and even the engineering – of a “reporting culture” is considered (Reason, 1998; Reason et al., 2001). In this respect, “blame” – often identified as the “number one” barrier – has become a buzzword. By “blame”, authors mean that people worry about being blamed (in whichever way and for whatever reasons) if and when they report an incident and, as a consequence, are reluctant to participate in incident reporting. In order to oppose this feeling, and thus foster the reporting of incidents, “blame-

free” or “non-punitive” models of reporting have been promoted (Reason et al., 2001).<sup>1</sup> These papers can be related to studies concerning the conditions and failures to learn from incidents as the issues are linked (Drupsteen and Guldenmund, 2014).

Last, some studies center on, and examine, the learning aspects of incident reporting. This can be realized, from a managerial perspective, by evaluating the ability of incident reporting systems to produce learning outputs (Jacobsson et al., 2011, 2012). It can also be realized, from a constructivist perspective, by providing a situated perspective on learning which aims at understanding how actors rely on storytelling, tacit knowledge, mentoring and other informal modes of learning from incidents, in parallel to formal practices of incident reporting (Hayes and Maslen, 2014; Le Coze et al., 2007; Le Coze, 2013; Maslen, 2014; Sanne, 2008, 2012). These last studies rely on the observation that the implementation of incident reporting systems does not imply that all the incidents will be formally reported, which thus raises a question in terms of learning: how can an organization learn from events or practices that are not reported? Hence, parallel (and sometimes combined) dynamics of reporting are often to be observed: formal reporting on the one hand, and more informal “story-based” reporting on the other. In this respect, Maslen (2014) invites scholars to conduct further research sensitive to the way incident reporting is practiced *in situ* and to consider systems that might support storytelling, and thus provides a comprehensive form of organizational learning (Lam, 2000; Lave and Wenger, 2008). We act on this proposition in this paper.

## 2.2. A STS vulnerability-oriented approach to analyze practices of incident reporting

We use a STS vulnerability-oriented approach to analyze practices of incident reporting. This approach relies on a constructivist perspective (Guba and Lincoln, 1994) that conceives of reality as locally constructed and understandable only indirectly via transactional and interpretive methods.

In line with this approach, we see technologies as importantly social: they are socially constructed and play a role – as actor – in the functioning of socio-technical systems. Technologies (such as an IRS) attribute and delegate specific actions and responsibilities to users (Akrich, 1992). Yet, users are not to be considered as passive consumers of the technology but as active participants in the dynamic shaping of its use (or non-use) (Oudshoorn and Pinch, 2003, 2008). In addition, we acknowledge that different types of actors are involved in the use of technologies, and may have different views on the ways the technology *should* be used (Cowan, 1987; Oudshoorn and Pinch, 2008; Saetnan et al., 2000). In other words, the social and the technological participate in the co-construction of a specific incident reporting culture that we will characterize.

In order to provide a tentative assessment integrated to our analysis, we orient it toward a vulnerability heuristic. Vulnerability is generally and broadly defined as the possibility of being harmed. Although rooted in the study of natural hazards and climate change (Adger, 2006; Burton, 1997) and their impact on urban areas (Armaş, 2012; Quarantelli, 2003; Zahari, 2008), vulnerability is now a central concept in a variety of domains. In this paper, we use the concept of vulnerability as it is defined within a STS approach (Hommels et al., 2014a). In this view, vulnerability is considered as an *emergent* property of a socio-technical system, i.e. the result of an evolving social construction shaped by technological cultures (or in this case reporting culture). It consists in the possibility to be harmed, but in a very nuanced perspective, following the three major claims which are to be translated into research heuristics for identifying vulnerabilities (Bijker et al., 2014). First, vulnerabilities are to be characterized in relation to a specific

<sup>1</sup> The idea is that the “reporting culture” could become a “just culture of reporting”, i.e. “an organizational context in which [...] professionals feel assured that they will receive fair treatment when they report safety incidents” (Weiner et al., 2008). However, Waring (2005) invites to characterize reporting culture by going “beyond blame”. He shows the role of deep-seated cultural attributes that influence attitudes toward reporting in the healthcare sector. On a reflexive note, he suggests that “the prominence of the ‘blame culture’ as a justification for not reporting [is to be] found precisely because of its prominence in policy and managerial discourse” (Waring, 2005, p. 1934), providing a recognized reason for *not* reporting. He argues that establishing a “reporting culture” requires probably more than removing blame by establishing “just” processes: it actually forces to engage with the complex culture of the context in question.

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