A pragmatist approach of audit practices : safety demonstration and safety assessment through technical dialogue

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Introduction

This paper aims at contributing to the analysis of risk management through audit practices. The existing literature has shown that in finance, veterinary services, chemistry or oil and gaz industries, actors construct risks and value them through audit practices. This should contribute to the track's question *What values does the audit society promote and what values are placed*

at risk? And to a lesser extent to *Are oversight and monitoring a substitute for action?* We had identified from the literature that a very few papers describe the processes of audit practices in detail. And yet it promises to reveal the crafts of internal and external auditors. We thus chose to write a mainly empirical paper, putting our theoretical considerations a bit in the background to bring our interpretations of audit practices to the front.

We shed light on a very particular audit practice : the "technical dialog" currently used in France to govern nuclear risks (Rolina 2010). Our paper shows that nuclear safety is a founding value not only for cultural reasons (i.e. the existing "safety culture") but also due to very concrete audit practices that give safety its priority over any other competing industrial objectives. In order to get an authorization for creating, running, or dismantling a nuclear installation, each nuclear operator must demonstrate to the Nuclear Safety Authority (ASN), and the technical support Nuclear Safety and Radioprotection Institute (IRSN), that everything will be fine in the field. This technical dialog falls into the rise identified by Power (1997) of audit practices as a mode of managerial control of risks.
We study two cases of dismantling projects. This type of project is associated to a high level of uncertainty (IAEA 2016), which forces nuclear operators and regulators to adapt their practices of safety demonstration and safety assessment accordingly.

We rely on the Theory of Valuation of Dewey (2011, (1939)), which brings elements for understanding situated elaboration of values. Originality of our approach is that we don't rely on a pre-existing set of values, enacted by actors in situations or inscribed in traces. Instead, we are looking at methods by which actors prize and appraise objects related to the risks they manage through audit practices. We thus show that, far from having been crowded out by an impressive amount of paperwork, sense of mission is continuously enacted through paperwork done "for a good cause": safety.

1 Theoretical Background

1.1 Audit practices in risky industries

Our theoretical gap is found in risks management and audit practices literature. While these practices are related to very distinct dangers, they have common structure and processes, illustrated in figure 1, which tend to spread in contemporary societies (Power 1997).

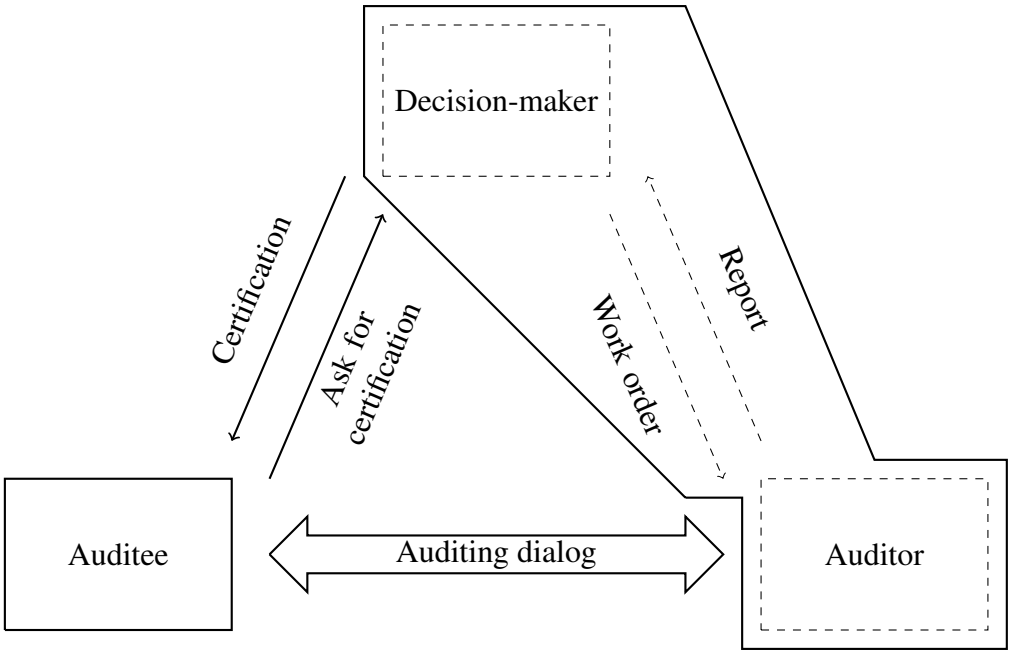

Figure 1: Auditor / auditee relationship

Two performance criteria of audit dialog can be found in the literature. First is the controller independence. In financial audits, Herda and Lavelle (2015) show that auditors can have their objectivity affected by a lack of independence from their client. The second criterion is the controller competence. Works of Bonnaud (2005, 2011) on classified installations' inspectors show how their professional skills evolved from technical to bureaucratic skills.
Literature also scrutinizes three characteristics of these relationships. First is the formalization of the auditing dialog in texts. In the Norwegian petroleum sector, Jordana, Jørgensen, and Mitterhofer (2013) show that risk maps are useful to articulate distributed actors and thus to support risk management. Second is the informal communicational dynamics overflowing texts' content. Grote and Künzler (2000) show with safety audits of seven petrochemical plants that safety culture audits are useful to measure safety perception, but that deeper inquiries would be needed to get information on behaviors and attitudes. Finally, literature shows importance of the vocabulary used. Erb and Pelger (2015) show that "reliability" is a hard to define word, even more in financial audit contexts where "fair value" has to be assessed.

Literature also highlights sociological factors impacting valuation processes of audit practices. Power (2015) underlines that accountability activities are embedded to social infrastructures. Hardy and Maguire (2016) show how risks are discursively elaborated, which is important as financial audits are retrospective and the technical dialog is prospective. Mennicken and Power (2015) on plasticity of valuation is also important, as dismantling projects are associated

with high uncertainties to be managed. Boholm and Corvellec (2015) can also help in analyzing how actors may overemphasize some types of risks.

Yet, literature little emphasizes the methods used by field actors to demonstrate or assess what has to be evaluated, depending on the risks to be managed. In order to do that, we propose a pragmatist approach of audit practices in risky industries.

1.2 A pragmatist approach based on Dewey's Theory of Valuation

To fill the gap, we fall within interactionist sociology (Becker 2007; Tillement and Gentil 2016) which is inspired from pragmatist philosophy. Like other pragmatists, Dewey disregard ontology in order to focus on method, i.e. the *conduct of action*. In his theory of valuation, Dewey (2011, (1939)) helps to think values aside from cultural explanations, and to focus on practices and how they (re)define values. Valuation is *an action elaborating a value judgment on a past action and a rule determining a future action*.
In order to distinguish modes of valuation in a context of demonstrations and assessments, we associate valuation with methods identified by Peirce for the fixation of beliefs. Beliefs are to be understood not at a strong religious level (Friedland 2014; Kouabenan 2009), but as a prerequisite for action, and more precisely a *habit of action* (Lorino 2014).

Reference	**Valuation by authority**	**Valuation by theories**	**Valuation by inquiry**
Fixation of beliefs (Peirce 1878, (1877))	Morally superior entities decide on the appropriate beliefs and crack down on the others	Beliefs are fixed from what pleases the individual's reason	Beliefs are elaborated by processes made controllable by other individuals

Table 1: Modes of valuation

As James (1916, (1896)) shows, believing or doubting in something is a voluntary choice. Regarding auditing practices, the three methods of fixation of belief help to think two methods found in auditing dialog. The first is *to manage interorganisational interactions*, which gathers stakeholder management through the audit, the interorganizational inquiry supported by the dialog and knowledge elaboration it produces. The second method is *to elaborate a demonstration or an assessment*. It is related to the making of a representation of the audited social reality, and the identification and collection of organizational beliefs and doubts related to it.

2 Methodology

Our research process is inductive and designed from the grounded theory of Corbin and Strauss (2015).

2.1 Research settings

We study two cases of technical dialogue. They are justified by regulation, as each nuclear operator wanting to construct, run or dismantle a nuclear installation in France must ask for an authorization from the Nuclear Safety Authority (ASN) since the law on transparency and nuclear safety (TSN) of the June 13, 2006. In order to get it, the operator must demonstrate its capacity to maintain operations within an acceptable level of nuclear safety, through a "safety demonstration". Legal definition of safety demonstration implies "economically acceptable conditions". ASN doesn't have the technical skills necessary to assess elements of the demonstration. Thus, it asks for an assessment from the Nuclear Safety and Radioprotection Institute (IRSN), which is the national public expert related to radioprotection and nuclear safety. This places the IRSN and nuclear operators into what actors call the "technical dialogue".

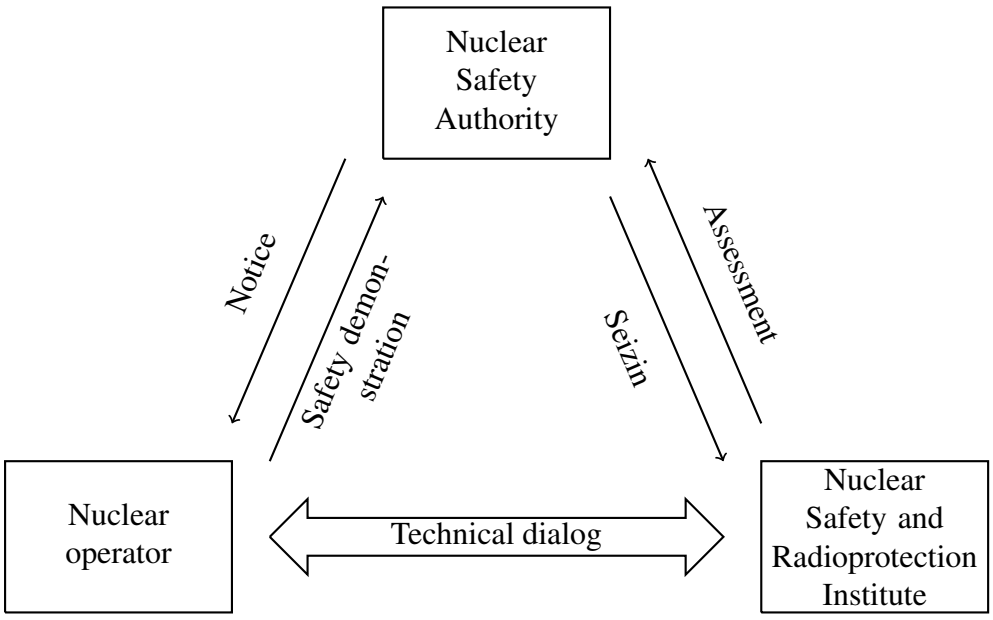

Figure 2: Technical dialog

Each case is related to a dismantling project of a nuclear installation involved in nuclear fuel production. The first one is called Demonstration case because it occurs within a nuclear operator's organization, and is about the elaboration of a safety demonstration. For the operator,

there are uncertainties related to the dismantling project, which the auditing dialogue helps to solve. Installation dismantling will need specific and unusual technical solutions, namely the continuous mobilization of 80 rope access technicians, and the operator is afraid that regulators may stop its industrialization once started. Thus, it initiates an auditing dialog with IRSN after which it wrote a dossier summarizing its safety options (which is not a mandatory document for dismantling projects). The second case is called Assessment case because it occurs within IRSN's organization, and is about the elaboration of a safety assessment. For ASN, and then IRSN, there are uncertainties about the nuclear operator's management of its relationships with its subcontractors. Nuclear operator plans to massively hire subcontractors, but it delegates to them some of its responsibilities related to safety (for example management of safety documentation and safety skills). Thus, experts of human and organizational factors inquire about these issues in order to make recommendations to ASN.

2.2 Data collection and analysis

Our data collection methods were mainly based on collection of material traces of past audit practices. This is different from a neutral document collection (Bowen 2009) as we aimed at reconstructing actor activity from archives. Interviews, used to complement, were organized from the results of document analysis. Such a nonreactive approach (Brewer and Hunter 1989) was suitable for our setting. Field actors were willing to help us understand the technical dialog, while valuing an approach with as few as possible interferences between our inquiry and theirs. We thus adopted a "transactional relationship" (Cunliffe and Alcadipani 2016).
For the Demonstration case, the writing process in the nuclear operator was informal and related to the early stages of the project. Thus, we used interviews in order to complement the gaps in the documentary corpus. We collected 47 documents (mails, slide shows, reports... around 750p. total) and had 8 interviews (12h45).
For the Assessment case, we had access to a greater number of documents from IRSN. Interviews were used to confirm/troubleshoot our understanding of the documents. We collected 357 documents (mails, work documents, nuclear operator documents... around 9000p. total) and had 3 interviews (5h05).

Our data analysis techniques are based on document analysis and narrative analysis. First, we carefully read the documents and classified them by categories depending on their format, author, addressee and purpose. We then analysed the intertextuality of each corpus, in categories relevant for the field and consistent with academic literature. See table 2 for more details.

We used the Cytoscape software to analyze our two documentary corpus systematically. As it associates a database with a dynamic visualization of the resulting network, it keeps our categorizations of documents and of intertextuality in memory while giving us a big picture of the whole corpus.

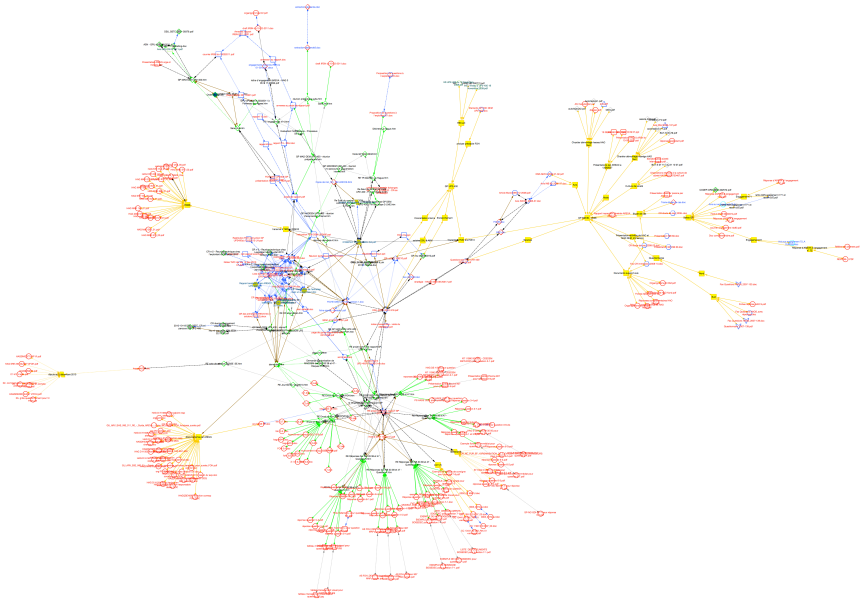

Figure 3: Big picture of the Assessment case corpus in Cytoscape

Our narrative analysis is based on two frameworks. Greimas' actantial model decomposes narration in four phases : manipulation (a character is committed to act) ; competence (it gets a capacity to act) ; performance (it acts) ; sanction (action is validated). Burke's pentad decomposes narration in five ingredients : agent (who acts) ; action (what the agent does) ; purpose (aim of action) ; scene (space and time of action) ; agency (tool used to act).

3 Main findings

Our findings may be summarized in three parts : in each case, because risks are not the same, we find different beliefs and doubts management practices ; in both cases, implying a text's production, we find the same 8 work categories ; putting each work back in its context, we find different valuation activities in audit practices.

Theory		Category	Demonstration case	Assessment case
Transtextuality (Kuhn 2008)	Intertextuality	**Reference :** document formally quoted in another document	X	X
	Metatextuality	**Elements :** document whose some of its components are extracted from another document	X	X
		Answer : email wrote as an answer to a previous email		X
	Paratextuality	**Attached document :** document attached to an email	X	X
		Duplicate : document which is a copy of another document	X	X
	Architextuality	**Framing :** document defining in advance content or format of another document		X
	Hypertextuality	**Development :** document whose content develop content of another document	X	X
		Version : document whose content is a rewriting of the content of another document		X
Language repertoire (Detchessahar and Journé 2007)		**Preceding :** link between mails, used as a red wire, identified by dates	X	X
		Concatenation : researcher action, assemblage of documents by dates in lack of a common file formally present in the archive	X	X
		Contained : relation between a file and the documents it contains		X
Will to write Foucault (1967)		**Continuation :** email following on from a subject initiated in a preceding email		X
		Transmitted : email forwarded to another person	X	X
		Echo : document having a clear influence on another, despite a lack of formal reference	X	X

Table 2: Categories of identified intertextual relations

3.1 Risks management and audit practices : different beliefs and doubts management

In both cases, the organization (operator or IRSN) makes *valuation by theories* in order to produce a text. Resulting texts make *valuation by authority*. The two cases present a different management of beliefs and doubts. In the Demonstration case, nuclear operator is afraid regulators may stop its project because it shall involve very specialized technicians :

- 2011 - Jan. 2013 : Theorizing of solutions occur. Then, nuclear operator finds some doubts that, if continued by ASN and IRSN, could make them stop dismantling project industrialization,

Box 1: Dossier interest for dismantling project risk management, by one of the contracting authority's engineers

For me, the aim of such a document is to have technical or organizational safety options that are shared with IRSN. And about which we could quickly have a notice, even if. (Researcher : This is not a notice in the regulatory sense of the term.) Even if this is not a notice in the regulatory sense of the term. But to have a notice from them, more precisely on rope access technicians. In the sense that it was still something quite new, and that it should normally be relatively large teams. Here too we had to avoid failing because, we can't afford to change, a few months or a few years before operations, our minds by saying *well OK, we heard you're against rope access technicians, at leats you don't agree with us on this subject, thus we'll use scaffolding everywhere*. This is not possible. [...] On the one hand, in terms of delay, it would mean we are not OK. And in terms of costs we would also not be OK. Thus, it would mean that even the funds we made for the dismantling project wouldn't be appropriate with what is really in the till.

Commentary 1

Risk of having to abandon at the last moment rope access technicians for the scaffolding, following an authorities' assessment, comes under industrial disaster for nuclear operator.

- Jul. - Oct. 2013 : Nuclear operator organizes meetings with IRSN in order to continue its theorizing of these doubts, particularly by learning relevant vocabulary to express them,

Commentary 2

Nuclear operator had initially planned to be direct in his words, in order to be clear in terms of technical obligations.

Box 2: Nuclear operator's initial writing strategy, by the project manager's writing engineer

As I just said to you, [Contracting authority's safety manager] said *we provoke*, from the start we write *this is not possible. You bother us with your criticality, we would never be able to measure. We can't, this is not adapted to our context. Besides, we need to dismantle in ten years. So if you measure each diffuser in two days, there are 1400 diffusers and dismantling shall take 40 years*. This isn't their interest. This isn't the interest of anybody. But well, the thing is that this is not robust, that is we don't ensure. We aren't in the safety fundamental rule which says we ought always to, we ought to free ourselves from every safety accident. Functional redundancy, the thing and all. We're not in this mindset at all.

- Jan. - Nov. 2013 : Writing of the dossier, in which nuclear operator gathers its beliefs and doubts in order to make it authoritative regarding them,

Commentary 3

Content of the dossier has been substantially reworked thanks to the technical dialogue. Document gain legitimacy, while losing some of its clarity.

Box 3: Modification of nuclear operator's writing strategy, by the project manager's writing engineer

This makes that in the end. Initial wording which was *we go straightforward we say things as they are* and we say well you see, *we won't be able to do otherwise we'll invent a process which would let us free from risks*. In fact it has become something. Honestly when I look at it almost a year later even me, I can't say what we wanted to say at all. Well, I exaggerate, I know it very well. But, you know what I mean, we said something but. (Researcher : You have been forced to go back to conventional form so that it fits.) Yes, that's it, we went back to conventional form of criticality analysis. And we tried to put, to spread almost everywhere messages as, *this is too big, this would never fit*, *material balance is impossible*, *uncertainties are much too important so that material balance be valid*. In fact we wrote that, but in the end we lost a large part of it, we gain in legitimacy if you know what I mean.

- April 2014 : Notice from ASN to nuclear operator, which rule on doubts that hadn't been continued and for which later justification will not be needed.

Commentary 4

From the nuclear operator's point of view, the document helped to inform IRSN and ASN on safety options judged uncertain in the operator's organization, and thus to avoid bad surprises.

Box 4: Reception of IRSN notice by nuclear operator, by the project manager's writing engineer

For us it has been useful to prepare ourselves for the production of the next demonstration document. And mainly it gave us. In fact the most important was that they were knowing, you see. It was clear that we were able to go forward, but the most important if you want when we received the notice was to say *that's it, we have a text, we have transmitted the document at this date, they venture some critics on some points* that I've just presented to you, *however, on the safety options we retained, including rope access technicians, including mechanical diggers, including the big shear press and all of that, criticality a little bit not done as usual, well they judge that as reasonable*. They didn't make a, they didn't reconsider these. So we told ourselves, *they won't be surprised when they open the next demonstration document in one year*.

Here, *valuation by theories* helped to elicit doubts that IRSN and ASN may use to stop industrialization, and *valuation by authority* makes the two texts statutory (dossier and notice).

In the Assessment case, IRSN express its disagreement towards nuclear operator delegating its nuclear safety responsibilities to its (massively hired) subcontractors :

- 2008 - Feb. 2010 : Theorizing of ASN and IRSN's initial doubts, from the transmitted safety demonstration from nuclear operator,

In its seizing directed toward IRSN, ASN asks for an assessment of two topics : (1) the overall dismantling strategy of the nuclear installation, and (2) the consideration of interfaces (operations organization, coactivity risks...), in terms of safety, especially between operating installations and installations under dismantling activities.
In the IRSN, the non-specialized engineer leading the safety assessment asks for a contribution from the department specialized in Human and Organizational Factors (HOF). He wants the experts to investigate upon : (1) the announced evolution of the organization (2) the interfaces between staff management (3) the consideration of HOF in design processes (4) the application of this consideration on several cases and (5) how the operator manage its multiple subcontractors.

- Feb. 2010 - Oct. 2010 : Discussions between IRSN and operator and ASN, by which IRSN theorizes its very own doubts concerning dismantling project,

The HOF expert wrote a questionnaire raising several questions from the safety demonstration, and calling for argumented and documented answers. These questions are related to eight themes : (1) operator organization (2) HOF consideration in the design processes (3) experience feedback (4) sensitive operations in dismantling operations from a HOF point of view (5) safety analysis and safety managers (6) subcontracted activities management (7) documents management and (8) skills and competence management.
While the nuclear operator gathers additional documents, the expert does fieldwork related to those same themes. She mainly relies on interviews, complemented by observations of work.
The non-specialized engineer makes his own assessment, related to cases for which there are similar previous cases for which specialized department has made an assessment. For example, he assesses drop load risks in heavy handling by applying the "determinist approach" by which the drop load is presumed and consequences ought to be contained.

- Oct. 2010 - Feb. 2011 : Assessment's writing, in which IRSN gathers doubts it believes relevant in order to make it authoritative regarding its very own expertise,

Two months and a half before HOF department communicate its contribution, non-specialized engineer sends a summary draft to all the experts involved in the assessment. Then, HOF expert and non-specialized engineer exchanges a series of emails related to the position of the HOF contribution in the final report. At first, engineer doesn't think about giving a distinct place for the HOF. The expert doesn't agree, as HOF are a cross thematic, according to her. Non-specialized engineer answers that he shall make cross reference where needed, and HOF expert start to collect elements to convince him of her opinion.
Expert produces an analysis the HOF aspects of the dismantling project. It is structured in six parts : (1) organizational structure managing the project and interfaces with other entities (2) HOF consideration approach for the dismantling project (3) experience feedback (4) subcontractors follow-up during their operations (5) documentation management and (6) skills and competence management. It becomes the proposition of the department after it has been reviewed by the department manager and when it is being proposed as the contribution of the HOF expert department.
After the proposal, non-specialized engineer does almost what he thought initially. He introduces part of the HOF contribution in the analysis of dismantling strategy, and he locates the most original elements in a subsubsubsection of the safety analysis.

- Feb. 2011 - March 2011 : Preliminary meeting with the operator, then meeting of ASN's experts group, which rule on which IRSN's doubts are continued by the two other organizations.

Before the preliminary meeting, the nuclear operator makes engagements related to the recommendations included in the IRSN's report. IRSN's experts, and the non-specialized engineer, read them carefully. The preliminary meeting is about them and how they satisfy recommendations. After the preliminary meeting, a few contributions from the HOF are modified at the margins, adding a word in one of them and deleting an expression in another.
At the meeting of the ASN's experts group , the whole of HOF recommendations is followed by satisfactory engagements by the nuclear operator. ASN doesn't make any comment on HOF management by the nuclear operator. As the experts group meets a few times a year, engagements took by the nuclear operator are then considered mandatory for the next similar projects.

Here, *valuation by theories* helped to clarify doubts consistent with IRSN expertise, and *valuation by authority* makes assessment authoritative regarding this expertise and makes the two meetings statutory regarding its consequences on risk governance.

3.2 Auditing practices as involving the same 8 work categories

Because audit practices imply organization of the auditing dialog and a text's production, whether for nuclear operator or IRSN, we found in each case that actors do similar work categories, summarized in table 3. Each work category is differentiated by the ingredients of document elaboration it involves and by its position in the global process of document's writing.

Work category	**Managerial stake**	**Meta-category**
(1) To take note of the addressee (2) To measure what it can understand (3) To read addressee reactions	Preparation of the interorganizational articulation produced by the document Adjustment of the articulation to the addressee organization Appraisal of articulation's profitability	Attention paid to the document's reading
(4) To identify the problem to solve (5) To clarify the writing context (6) To size the text in order to meet expected outcomes	Explication of the subject for which organization needs stabilization Control of the relation between this subject and empirical reality Wording design from the subject and its empirical reality	Use of the document to solve a problem
(7) To collect material for writing (8) To establish author legitimacy	Robustness of organization's wording facing facts Coherence between organization's wording and identity	Collection of writing resources

Table 3: Work categories for document elaboration and their managerial stakes

In our analysis of the Demonstration case, taking note of the addressee is made during design phases, through the identification of ASN as an organization to speak with (alongside safety at work regulators), as it can stop the project during its industrialization, and through discussion with ASN and IRSN preliminary to the technical dialogue. This work helps the nuclear operator to prepare its interorganizational articulation with ASN and IRSN, produced by the dossier. Measuring what the addressee can understand is made through involvement of the non-specialized engineer of the IRSN in the meetings where the nuclear operator presented his safety options. Those meetings helped the operator to avoid basing its design on an unacceptable solution for ASN. Thus, this work helps to adapt the content of the dossier to what is understandable for ASN and IRSN. The reading of the addressee's reactions is made by observation of the behavior of IRSN, especially to involve its HOF experts during the meeting dedicated to rope access technicians, and by reading of the advice of IRSN. This work enables the nuclear operator to assess the profitability of the technical dialogue and of the document's elaboration. In fact, it has ensured his role by testing its chosen safety options facing safety authorities.

Identification of the problem to solve is made through design activities and first discussions with ASN where the strategic role of the dossier is identified. This work helps to explicit the subject to stabilize with the document : avoiding the risk of investing in safety options unacceptable pour ASN and IRSN. The writing context is clarified through the decision to get in touch with

ASN to present the safety options, through design follow-up and the design of HOF analysis. These activities help to control the relation between the subject to stabilize and empirical reality. Sizing of the text in order to meet expected outcomes is done through interactions with IRSN, which helped to modify the nuclear operator's writing strategy, and through the operator's choices in his dossier. This work contributes to dosing out the wording in the document, depending on the specific problem to solve with the document and the empirical reality of the dismantling project.
Material collection is done through design activities, especially interactions between project managers and contracting authority, noticeable in the design review meetings, and through the interactions between contracting authority and a subcontracting company of rope access technicians. Elements collected at these moments help to ensure robustness of the nuclear operator's words facing facts. Establishment of nuclear operator's legitimacy as the author of the dossier is made through design processes engaged by the operator, which involve technical and bureaucratic advanced competences and skills (design of the work site and of the rope access technicians activity, writing phases management...). These processes ensure coherence between the words of the nuclear operator in his document and the identity he builds himself through dismantling design.

In our analysis of the Assessment case, we identify that taking note of the addressee of the assessment report is essentially made through ASN's seizin (which was preceded by discussion between IRSN and ASN). The seizin prepares the interaction produced by the assessment report between ASN, IRSN and nuclear operator organizations, by defining what matters for ASN's decision. Measuring what the addressee can understand is made through a midway meeting with ASN, a presentation of IRSN's HOF inquiry to operators' actors, and through interactions aiming at articulate IRSN's demand to nuclear operator's opportunities. These activities help in adjusting, during the writing, document content to ASN and nuclear operator. Reading of the addressee's reactions is made through the reviewing of nuclear operator's engagement proposal by IRSN's actors (which correspond to IRSN's recommendations). This reading activity, and the preliminary meeting going with it, help IRSN's actors to assess the profitability of assessment report elaboration, and of the inquiries it needed, through its effects on the nuclear operator's safety.
Identification of the problem is in itself made through an engagement meeting between IRSN and the nuclear operator, and is continued in the writing and reading of the non-specialized engineer's demand to HOF department. These activities clarify the multiple subject IRSN needs to stabilize regarding the system proposed by the nuclear operator, in order to assess dismantling

project safety. Clarifying of the writing context is made through the non-specialist engineer own analysis and his interactions with the nuclear operator, through the HOF questionnaire and the HOF department's contribution, and through the activity by which he non-specialized engineer gathers results from the specialists. All of this produces a collective control of coherence between the subject to stabilize with the assessment report and its empirical reality. Sizing of the text in order to meet expected outcomes is made through interactions between the non-specialized engineer and the HOF expert and related to HOF position in the assessment report, as much as through recommendations made by IRSN in his report. These elements show the wording design, made from the subject to stabilize for the IRSN and its empirical reality observed by the actors.
Material used as a writing resource is collected in demonstration elements from the nuclear operator, in his answer sheets and his help during the HOF experts fieldwork, from this fieldwork itself and through the internal meeting of IRSN's team. Elements collected here help to make the assessment report's content, especially recommendations, robust when facing facts. IRSN's legitimacy is established through the clarification of the amount of contamination on the population's infants in the case of a drop load in the worst case, through the organizing of the HOF fieldwork by the expert herself, and through the modification of two recommendations at the margins. These elements ensure coherence between assessment report's content and IRSN's identity of national expert of radiological and nuclear risks.

Meta-categories refer to distinct intertextuality. Each of them helps to manage the contingencies identified by Rorty (1989) so that the technical dialogue produces stakeholder management (Maier 2015).

- Attention paid to the document's reading is made through peripheral and normative relations (Kuhn 2008), as well as through relations as interpretive framework (Detchessahar and Journé 2007). It helps to manage the contingency of selfhood by decentralizing each organization from itself.

- Use of the document to solve a problem is made through relations where a text is getting back over another (Kuhn 2008), and through relations as the place where the will to write is formed (Foucault 1967). It helps to manage the contingency of the community by leading each organization to produce something new.

- Writing resources collection is made through formal quotations and through commentaries (Kuhn 2008). They help to manage the contingency of language by keeping each organization open to alternative vocabularies.

3.3 Valuation activities for risks management in audit practices

As previously stated, the problem to be solved is different in each organization. In Demonstration case, operator aims at testing its safety options facing ASN and IRSN. In Assessment case, IRSN aims at giving an independent and informative assessment to ASN. Put back in its context, each work category is a category of valuation activity. And each category of valuation contributes to the management of auditing dialog.

In Demonstration case, paying attention to the document's reading, by appraising what is important for IRSN, helps to prepare to make it competent and independent regarding dismantling project characteristics, to set up relevant vocabulary to discuss with the institute, and to size informal agreements. Taking note of the addressee mainly contributes to the management of the informal communication dynamics, but also to manage IRSN's independence and to set up relevant vocabulary to use with safety authorities. Measuring what ASN and IRSN can understand helps to manage both the independence and the competence of IRSN. And the reading of its reactions contributes to the management of its competence and independence, plus it contributes to management of informal communication dynamics.
Using the document to solve a problem help in identifying the wide array of possible problems and, by appraising and formalizing what are the core problems threatening dismantling project, to materially contribute to IRSN's competence and independence. Identifying the problem to solve with the dossier help to manage informal communication dynamics, and to a lesser extent the management of IRSN's independence and of the vocabulary to use in order to express risks. Clarifying the writing context mainly contributes to formalization of the auditing dialog in texts, and to a very little extent to the vocabulary. Sizing of the text helps to manage both IRSN's competence and independence, and to a lesser extent to the management of the vocabulary.
Collection of writing resources, by determining what is important for the dossier, formalized the auditing dialog and also helped to manage informal dynamics. Collection of the material for writing helps to manage the formalization of the auditing relationship in texts, and to a lesser extent to informal communicational dynamics and to IRSN's competence. Establishment of the nuclear operator's legitimacy as the author of the document contributes to the management of formalization of the relation in texts, and to a lesser extent to management of informal dynamics.

In Assessment case, paying attention to the document's reading, by appraising what is important for the ASN and nuclear operator, contributes to the grounding and building of IRSN's

independence from the informal communication dynamics and from its determination of relevant vocabulary. Taking note of the addressee, which is mainly ASN, contributes to the management of informal dynamics. Measuring what ASN can understand helps to manage informal dynamics, and measuring what the nuclear operator can understand helps to manage IRSN's independence and the vocabulary to be used in order to express risks. Reading of the addressee's reactions, made essentially with the nuclear operator, contributes to the management of informal communication dynamics.

Using the document to solve a problem, by determining core problems of the dismantling project, also helps to get a general picture of possible problems and to elaborate IRSN's competence in order to inform ASN properly. Identifying the problem to solve contributes to the management of IRSN's competence, and to a very little extent to the management of informal communication dynamics. Clarification of the writing context also mainly contributes to management of IRSN's competence, and to a lesser extent to its independence and to the formalization of auditing dialog in texts. Sizing of the text in order to meet expected outcomes helps to manage all the aspects of auditing dialog, helping mainly the management of IRSN's competence and the definition of relevant vocabulary.

Collection of writing resources, by appraising what is important to include in the assessment, helps to ground IRSN's independence and competence and to define relevant vocabulary. Collection of the material for writing essentially contributes to the management of IRSN's independence and competence, and to a lesser extent to the formalization of the interorganizational dialogue. Establishment of IRSN's legitimacy as the author of the assessment report contributes to management of IRSN's independence and of the definition of relevant vocabulary to express risks.

4 Contributions

4.1 Theoretical

Our research gives a few elements towards a pragmatist approach of audit practices. By investigating *What values does the audit society promote and what values are placed at risk?*, we find that, in order to fulfill the value of safety (a founding value of French nuclear risks governance), actors implement a range of works, of valuation activities, materialized in text production. We also find that *valuation by inquiry* is absent despite the fact that nuclear risk governance is claimed to be science-based. Our research suggests looking at which methodologies bear discourses and infrastructures of risk management (Hardy and Maguire 2016; Power 2015) and

valuation practices of risks (Boholm and Corvellec 2015; Mennicken and Power 2015). Our research underlines interest of a focus on field actors' methods in order to articulate performances criteria of auditing dialogue, independence and competence (Bonnaud 2005, 2011; Herda and Lavelle 2015), with its characteristics, formalization, informal interactions and vocabulary (Erb and Pelger 2015; Grote and Künzler 2000; Jordana, Jørgensen, and Mitterhofer 2013).

4.2 Methodological

As we see auditing dialog as a relation, we needed to go on both sides. A contribution of our research is thus to combine in one study a data collection and analysis of what is going on in the auditor and in the auditee. Furthermore, we collected data on both sides in each case in order to grasp the back and forth communication dynamics. Another contribution of our research is about how to take charge of more than 400 documents, containing almost 10.000 pages, in order to analyse them without gradually forgetting their content. We would deeply recommend the Cytoscape software to colleagues working with a great number of documents who want to track their literary links, while warning about limits related to transition from a computer to another medium.

4.3 Managerial

Our focus on methods underlines that auditing dialog is something to be managed. It thus proposes ways to improve audit practices by introducing a healthy dose of skepticism. First, our study suggests asking *does the auditing relation responds to the scale of the decision to take?* Then, to ask *do the auditing dialog support management of risks of a huge magnitude?* And finally to ask *do these audit practices actually help in taking into account a wide variety and number of stakeholders into account?*

References

Becker, Howard. 2007. *Telling About Society*. The University of Chicago Press.

Boholm, Åsa, and Hervé Corvellec. 2015. *The role of valuation practices for risk identification*. Tech. rep. Gothenburg Research Institute.

Bonnaud, Laure. 2005. « Au nom de la loi et de la technique : L'évolution de la figure de l'inspecteur des installations classées depuis les années 1970 ». *Politix* 24 (69): 131–161.

— . 2011. « De la catastrophe de Feyzin (1966) à l'explosion d'AZF (2001) : La naissance du métier d'inspecteur des installations classées ? » *Responsabilité & Environnement*, no. 62:35–42.

Bowen, Glenn. 2009. « Document Analysis as a Qualitative Research Method ». *Qualitative Research Journal* 9 (2): 27–40.

Brewer, John, and Albert Hunter. 1989. *Multimethod Research: A Synthesis of Styles*. SAGE.

Corbin, Juliet, and Anselm Strauss. 2015. *Basics of Qualitative Research, Techniques and Procedures for Developing Grounded Theory*. SAGE.

Cunliffe, Ann, and Rafael Alcadipani. 2016. « The Politics of Access in Fieldwork. Immersion, Backstage Dramas, and Deception ». *Organizational Research Methods* 19 (4): 535–561.

Detchessahar, Mathieu, and Benoît Journé. 2007. « Une approche narrative des outils de gestion ». *Revue Française de Gestion*, no. 174:77–92.

Dewey, John. 2011. *La formation des valeurs*. Traduit de *Theory of Valuation* (1939) par Alexandra Bidet, Gérôme Truc and Louis Quéré. La Découverte.

Erb, Carsten, and Christoph Pelger. 2015. « "Twisting words"? A study of the construction and reconstruction of reliability in financial reporting standard-setting ». *Accounting, Organizations and Society* 40:13–40.

Foucault, Michel. 1967. « La Bibliothèque fantastique : À propos de *La Tentation de saint Antoine* de Gustave Flaubert ». *Cahiers Renaud-Barrault*, no. 59.

Friedland, Roger. 2014. « Divine Institution: Max Weber's Value Spheres and Institutional Theory ». *Research in the Sociology of Organizations* 41:217–258.

Grote, Gudela, and Cuno Künzler. 2000. « Diagnosis of safety culture in safety management audits ». *Safety Science*, no. 34:131–150.

Hardy, Cynthia, and Steve Maguire. 2016. « Organizing Risk: Discourse, Power and "Riskification" ». *Academy of Management Review* 41 (1): 80–108.

Herda, David, and James Lavelle. 2015. « How Client Identification and Client Commitment Uniquely Influence Auditor Objectivity ». *Current Issues in Auditing* 9 (2): 36–41.

IAEA. 2016. *Managing the Unexpected in Decommissionning*. International Atomic Energy Agency Technical Reports.

James, William. 1916. « La volonté de croire ». Chap. La volonté de croire, 21–52. Traduit de *The Will to Believe, and Other Essays in Popular Philosophy* (1897) par Loÿs Moulin. Flammarion.

Jordana, Silvia, Lene Jørgensen, and Hermann Mitterhofer. 2013. « Performing risk and the project: Risk maps as mediating instruments ». *Management Accounting Research* 24:156–174.

Kouabenan, Dongo Rémi. 2009. « Role of beliefs in accident and risk analysis and prevention ». *Safety Science* 47:767–776.

Kuhn, Timothy. 2008. « A Communicative Theory of the Firm: Developing an Alternative Perspective on Intra-organizational Power and Stakeholder Relationships ». *Organization Studies* 29 (08&09): 1227–1254.

Lorino, Philippe. 2014. « Charles Sanders Peirce (1839-1914) ». Chap. The Oxford Handbook of Process Philosophy and Organization Studies, ed. by Jenny Helin et al., 143–165.

Maier, Craig. 2015. « Public relations as humane conversation: Richard Rorty, stakeholder theory, and public relations practice ». *Public Relations Inquiry* 4 (1): 25–39.

Mennicken, Andrea, and Michael Power. 2015. « Accounting and the Plasticity of Valuation ». Chap. Moments of Valuation: Exploring Sites of Dissonance, 208–228. Oxford Scholarship Online. Oxford University Press.

Peirce, Charles Sanders. 1878. « Comment se fixe la croyance ». Traduit de *The Fixation of Belief* (1877), *Revue philosophique de la France et de l'étranger* VI:553–569.

Power, Michael. 1997. *La société de l'audit, l'obsession du contrôle*. Translated from *The Audit Society: Rituals of Verification* (1997) by Armelle Lebrun. La Découverte.

— . 2015. « How accounting begins: Object formation and the accretion of infrastructure ». *Accounting, Organizations and Society* 47:43–55.

Rolina, Grégory. 2010. « Prescrire la sûreté, négocier l'expertise ». *Gérer & Comprendre* 101:84–94.

Rorty, Richard. 1989. *Contingency, irony & solidarity*. Cambridge University Press.

Tillement, Stéphanie, and Stéphanie Gentil. 2016. « Entre arrangements et empêchements dans le nucléaire. Une analyse par l'activité de la coordination au travail ». *Sociologie et sociétés* XLVIII (1): 117–142.