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Governing the gap: Forging safe science through relational regulation

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Abstract

Designed to close the ubiquitous gap between law on the books and law in action, management systems locate the standard setting and implementation of regulation within the regulated organization itself. Despite efforts to more closely couple aspirations and performance, the gap re-emerges because the exigencies of practical action exceed the capacity of system prescriptions to anticipate and contain them. Drawing on data from a six-year ethnographic study of the creation and implementation of an environment, health, and safety management system, this article identifies relational regulation as the approach used by front-line managers to govern the gap: keeping organizational activities within an acceptable range of variation close to regulatory specifications. We identify four practices – narrating the gap, inquiring without constraint, integrating pluralistic accounts, and crafting pragmatic accommodations – and three conditions under which actors may develop a sociological orientation to enact relational regulation. Overall, the article concludes that the mechanism for assuring compliance resides in the apprehension of relational interdependencies rather than the management system per se.

Keywords: environmental management system, laboratory safety, regulatory compliance, relational regulation, sociological citizen.

1. Introduction

Organizational practice is often observed to be loosely coupled to or decoupled from regulatory requirements. Because organizations facing similar external pressures respond differently to regulations, explanations for why organizations comply or move beyond compliance consider a range of internal factors that influence an organization's regulatory behavior (Kagan *et al.* 2003; Howard-Grenville *et al.* 2008). While we have increasingly sophisticated hypotheses for *why* some organizations are committed to achieving compliance, we continue to have an impoverished sense of *how* this commitment is successfully enacted. What managerial practices consistently produce regulatory compliance?

To achieve better coupling between regulation and compliance, the design and standard setting, as well as implementation, of regulation have moved closer to the action, within the regulated organization itself (Coglianese & Nash 2001). In particular,

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environmental management systems, promoted in the US by the Environmental Protection Agency and internationally through ISO 14000, have become a widely adopted technology to improve organizational compliance (Gunningham *et al*. 2003; Howard-Grenville 2005; Howard-Grenville *et al*. 2008). Designed to make performance transparent and tractable to managers and external auditors, management systems purportedly enable organizations to move beyond compliance with environmental regulations, promising to close the ubiquitous gap between law on the books and law in action. However, the gap between regulatory expectations and performance is less a function of the distance between the source of prescriptions and the site of action than it is a product of the insufficiency of formalized, prescribed processes to handle the complex, situated demands faced in daily compliance work, whether written by regulators at a distance or managers within the organization. Training programs, manuals, inspection checklists, standard operating procedures, and databases cannot by themselves create compliance. Instead, "it is the uniquely human ability to vary and adapt actions to suit local conditions that preserves [organizational performance] in a dynamic and uncertain world" (Reason 1999, p. 9).

In this article, we identify a set of practices through which front-line compliance managers govern the gap between regulatory expectations and performance, managing to keep organizational activities within an acceptable range of variation in relation to regulatory specifications. We draw on data from a six-year ethnographic study of the creation and implementation of an environment, health, and safety management system (EMS) at Eastern University, an American research university. The management at Eastern University, in its commitment and style, exemplified "true believers" in environmental sustainability, approaching decisions "not purely in pragmatic terms" as a business case, "but also in terms of principle, as the 'right thing to do' " (Gunningham *et al*. 2003, p. 101). Eastern's administration believed that environmental excellence was an essential feature of the University's reputation and identity. "More inclined to define investment in beyond-compliance environmental measures . . . even if the numerical payoff can't be calculated ex ante," university administrators also accepted "the need to be fully transparent" (Gunningham *et al*. 2003, p. 101). Managers at multiple levels of the organization were committed to improving compliance, devoting a substantial amount of time, money, and effort to achieving this improvement. Despite this public and wholehearted commitment, we observed a struggle to align the aspirations of the environmental management system with its enactment. The exigencies of practical action repeatedly challenged efforts to comply consistently with regulatory standards, eluding the capacity of the system's prescriptions to anticipate or contain environmental, health, and safety hazards. The shift from professional to managerial control of environmental compliance merely moved rather than eliminated the gap between prescription and performance, from law and its implementation to management system and its enactment.

Observing these struggles, we analyzed and identified ideal-typical actions and supporting conditions that narrowed the gap between aspirations for compliance and its routine enactment. Specifically, we observed how front-line managers responsible for compliance generate relationships and information that facilitate pragmatic accommodations, keeping the organization's activities close to compliant. *Close to* compliant rather than compliant emphasizes our focus on governing rather than erasing the gap between regulation and performance. We call this relational regulation. Relational regulation governs the gap between regulatory expectations and performances with an appreciation

of the ongoing production of organizational and material life through a network of interdependent human transactions. Relational regulation acknowledges the impossibility of perfect conformity between abstract rules and situated action while nonetheless managing to keep practices within a band of variation surrounding, but not perfectly coincident with, regulatory specifications. We identify four practices that characterize relational regulation and three conditions that are necessary, if not sufficient, for actors to develop a sociological orientation and perform what we are calling pragmatic, relational regulation. Overall, we conclude that the mechanism for assuring compliance resides in the apprehension of interdependencies rather than the management system per se.

In the following sections, we first review the existing literature that considers the gap between regulatory expectations and organizational performance, following this with a description of the research setting and methods. We then describe how front-line managers responsible for ensuring compliance encountered and acknowledged a gap between the management system's prescriptions and the work needed to achieve regulatory compliance. We analyze how these managers developed and used a relational and pragmatic approach that enabled them to manage but not erase entirely the gap between regulatory expectations and the University's environmental performance. We conclude with irony. The mechanism – pragmatic, relational regulation – through which the front-line managers govern the gap between prescription and action was invisible to the middle- and upper-level managers overseeing the management system. While the front-line actors manage the traditional gap between regulation and compliance, the organization reproduces its own gap between managerial control and accountability.

2. The gap between regulatory expectations and organizational performance

Management systems locate the design, standard setting, and implementation of regulation within the regulated organization itself (Coglianese & Nash 2001), creating a form of private management in the public interest, or what students of governmentality call regulation at a distance[1] (Foucault 1995a,b; Silbey & Ewick 2003). Accounts of management systems (Hoffman 1997) claim that coordinated components – training, manuals, checklists, standard operating procedures, digitized databases, software, and user interfaces – provide administrators possessing only general managerial skill with the resources and competencies to achieve compliance working at arm's length from risk professionals.

By themselves, however, formalized, prescribed processes do not produce compliance. That standardized processes are often insufficient should not be surprising to students of organizations generally (Brown & Duguid 1991; Orr 1996) or regulation specifically (Thomas & Hawkins 1984; Kagan & Axelrad 2000). Formalized organizational procedures often fail to meet the situated demands that employees face (Lipsky 1980; Silbey 1981, 1984; Brown & Duguid 1991) and do not correspond to the contingent practices used to accomplish work. Many organizational models, including environmental management systems, fail to describe the way work is actually done, offering instead what turn out to be largely imaginary accounts of work and organizational performance (Sosa *et al.* 2003; Dekker 2006). Organizational designers too often understand work routines abstractly while those who enact the routines understand the particular variations required locally and contingently (Feldman & Pentland 2003). As a consequence, organizations routinely succeed because workers do not follow predetermined protocols or

designs; they interpret rules and recipes, adapt resources to innovative uses, develop workarounds, and invent *in situ* many of the routines that ultimately come to constitute the functioning organization.

Shifting our gaze from managers to regulators confirms rather than challenges observations of a persistent gap between organizational design and implementation. The research on regulation has done little to challenge the canonical observation of the unintended consequences of purposive action (Merton 1936). Since the 1960s, a strong consensus has developed among scholars describing how things never quite work out as they ought when legislation is translated into administrative enforcement. Much research describes how agencies mandated to serve the public become ineffective and indolent, often ending up serving the very same interests they were meant to control (Edelman 1964; Kolko 1965; Shapiro 1968; Orren 1974; Sunstein 1990; Bernstein 1995). The standard explanations range from analyses of the symbolic nature of the legislative process that produces inconsistent mandates (Edelman 1964), and the inevitability of discretion (Davis 1972; Kadish & Kadish 1973), to analyses of the segmented structure of a system that encourages a division of the commonweal among interested parties to the exclusion of the unorganized public (Lowi 1969). Close observation of regulatory enforcement suggests that excessive or uncontrolled discretion impedes the efficacy of regulatory schemes and, more important, undermines the rule of law because it leads to lax and inconsistent enforcement colored by non-legal considerations. Since the publication of these classic studies, policymakers and regulators have adopted more varied approaches. Although there have been dramatic improvements through diverse policy initiatives (Bok 1996; Davis & Mazurek 1998; Portney & Stavins 2000), most scholarly observers believe that serious problems persist, especially in environmental protection (Elliott & Charnley 1998; Coglianese & Nash 2001), and that continued or sustained improvement using conventional policy models is unlikely. This is especially so in the new organizational forms characteristic of information societies that do not seem to respond any better than traditional organizations to external regulation.

Researchers in various disciplines have begun to argue that factors internal to the organization, not legislative or regulatory design, influence the dynamics of compliance. Although the size and age of a facility may be relevant (Shadbegian & Gray 2005), the more influential factors include local organizational cultures (Gherardi & Nicolini 2002), managerial incentives, organizational identity and reflexivity (Howard-Grenville 2006; Howard-Grenville *et al.* 2008), as well as managerial interpretations of requirements (Andersson & Bateman 2000; Sharma 2000). From this perspective, compliance improves as a result of increased managerial commitment and attention. These factors influence an organization's environmental management style, defined as "managerial attitudes and actions that mark the intensity and character of each management's 'commitment' to environmental compliance and improvement" (Gunningham *et al.* 2003, p. 97). While these styles[2] have been derived from managers' accounts of their actions and attitudes and seem to correlate with environmental performance, the underlying mechanism is unobserved. We do not know how managerial commitments produce higher levels of performance.

The potential of organizational and managerial factors to increase regulatory compliance underwrites the movement to develop environmental management systems. Lacking a general recipe for what will produce compliance in specific situations, firms, or jurisdictions, management systems rely on individual organizations *to identify for*

themselves the locally appropriate and effective means – roles, resources, and procedures. Adopting an environmental management system is itself taken as evidence of managerial commitment to compliance. Even so, it is widely reported that the adoption of a management system does not, in fact, ensure compliance, and some management systems produce greater compliance than others (Darnall *et al.* 2001; Herremans & Allwright 2000; Rondinelli & Vastag 2000; Steger 2000). Thus, substituting management system for organizational culture or management commitment merely extends the list of possible determinants but fails to address the basic conundrum: how an organizational culture, a management style, or a management system can foster and achieve regulatory compliance.

We undertook an ethnographic study of one organization's efforts to respond to environmental regulations to investigate this exact question: what happens when compliance with legal regulations is pursued through an environmental management system. Selecting an organization that had committed to design a system responsive to its local culture and allocate abundant resources to its enactment, we observed what would be an exemplary case in which to identify microprocesses and supporting conditions that constitute a well-functioning EMS. Eastern University, the organization we observed, illustrates the ideal-type "true believer" in environmental sustainability (Gunningham *et al.* 2003, p. 101). Nonetheless, we observed a reproduction of the proverbial gap between aspiration or design and implementation.

We introduce the concept of pragmatic, relational regulation to describe the ways in which front-line managers governed the gap between regulation and compliance. By the term relational, we indicate the adoption of a broader sociological perspective emphasizing a transactional approach to social organization where "relations between terms or units" are understood as being "preeminently dynamic in nature, unfolding [through] ongoing processes rather than as static ties among inert substances" (Emirbayer 1997, p. 289). From this perspective, achieving compliance in an organization is a daily effort that requires the overseer to be alert, in tune, and adaptive with respect to not only other employees but also the material circumstances, patterns of interaction, and time pressures operating in the organization. Recognizing compliance to be an iterative, ongoing achievement, work toward this goal approximates an asymptotic approach to desired compliance while being responsive to local situations and contingencies.

Practicing relational regulation, the actors we describe understand their organization as a complex web of interactions and processes, and themselves as links with in this emergent system. Rather than being constrained by the vertical and horizontal boundaries that make up the firm and the often unarticulated and unquestioned assumptions underlying current practices, a pragmatic, relational regulation approach involves understanding the organization as a set of interdependent yet malleable relationships. Through this process, actors discover what sociologists and others refer to as the "structures of everyday life" (De Certeau 1984). By constant inquiry, bred less of skepticism than of necessity, the actors we observed pierced the veil of objectified reality to observe and then make use of those face-to-face transactions that constitute the University as a human construction (Berger & Luckman 1966). Relational regulation occurs when actors recognize the organization not as static things or categories depicted on organization charts – offices, roles, and hierarchies – but as dynamic processes, and then mobilize those ongoing transactions as resources to accomplish role-specific obligations.

Our use of the term relational, drawing from Emirbayer's manifesto for a relational sociology (1997), is distinguished from the corpus of psychological work claiming a feminist proclivity and sensibility for relations with others (e.g. Miller 1976; Gilligan 1982). As such, our attention to the ongoing production of social organization eschews Fletcher's (2001) and Dutton and Heaphy's (2003) emphases on emotional development within growth-fostering connections. We also make no claim about the mutuality of transactions; we are not asserting as others have that to earn the term relational an interaction must be characterized by mutual respect, high-quality communication, and shared goals (Gittell 2000). Nor does our conceptualization suggest that all regulation is relational merely because rules need to be enacted and possibly translated in practice. More specifically, we use the term relational as Emirbayer suggests to refer to the apprehension of sociality as transactional and the specific mobilization of this understanding to achieve organizational goals. In a study of neo-natal intensive care, Heimer and Staffen (personal communication) describe a conceptually similar set of processes through which "parents' gradually emerging understanding that being responsible parents was not something they could accomplish on their own, but required that they work with others, even crossing boundaries into organizations where others were in charge," was essential to securing adequate care for their babies. In short, parents developed a relational understanding of responsibility. Medical staff also developed a relational understanding of responsibility as they came to understand that forging relations with parents was critical to their work (Heimer 2010, personal communication). Although others have also noted the importance of front-line workers' "awareness of their relationship to the overall work process and to other participants in the process" (Gittell 2000, p. 518), our use is more specific than mindfulness (Weick 1976) or systems thinking (Zuboff 1988).

We identify four practices through which actors perform relational regulation: by narrating the gap between expectations and performance, inquiring without constraint to reach out to actors across diverse networks, synthesizing and collating what they learn, and crafting pragmatic accommodations that recognize the interdependence between general policies and local variations. Then, we specify three conditions that are necessary, if not sufficient, that compliance managers will practice pragmatic, relational regulation: where actors experience external pressure, have unscheduled work time, and, finally, where there is an organizational culture of macromanagement. In the following sections, we review the setting and methods used in this study before turning to our analysis showing how front-line managers governed the gap between regulatory expectations and performance.

3. Background: Eastern University, the environmental protection agency, and a new environment, health, and safety management system

Eastern University, a major research university in the eastern US, houses more than 500 laboratories. These are places of learning and discovery, but also of danger. Researchers use combinations of radioisotopes, biological materials (including reagents and toxins), and chemicals. Although scientists are well versed in the research-relevant characteristics of these materials, they are not similarly attentive to the associated health and environmental implications related to the use, storage, and disposal of these materials. Further, they are not always familiar with the relevant regulations at the federal, state, and local levels.

Like other organizations that house these materials, Eastern delegated responsibility to experts organized in groups by area of expertise: health physicists, industrial hygienists, biosafety specialists, safety professionals, and environmental managers. From the Second World War through 2001, each group of specialists operated in loose connection to the administrative bureaucracy and self-managed in relation to professional standards and legal requirements. Each group demonstrated its accountability in an annual report that outlined the achievement of regulatory compliance and its activities for the year. A historical analysis of Eastern's records shows that during these 50 years, no events, problems, or mistakes upset this arrangement (Wojtas 2005).

In 1999, the Environmental Protection Agency (EPA), as part of a higher education initiative, inspected Eastern. To that point, Eastern had had a clean record regarding environmental matters; there had been no toxic emissions, no spills, no radioactive leaks, and no improper disposal of hazardous materials in its entire history. Nonetheless, when the EPA completed its five-day inspection, it recorded more than 3,000 violations of RCRA, CAA, CWA,[3] and their implementing regulations. Despite the large number of discrete violations, both the EPA and the University regarded all but one as minor. The University's major failure, according to the EPA, was its lack of uniform practices across departments and laboratories. There was no clear, hierarchical infrastructure for compliance with environmental laws, no systems approach to environmental management, no clear delineation of roles and responsibilities and, most important, no obvious modes of accountability for compliance. One laboratory or department was a model of good practice while another produced no accidents, spills, or emissions but could not demonstrate what practices it followed to prevent such events. The line of command from the laboratory or department through the distinct specialist groups to the leadership of the University was opaque to the inspectors and thus it was impossible to say who was responsible for what. The EPA inspectors concluded that Eastern lacked any discernible way of governing its environmental compliance. Facing a fine and public embarrassment, the University negotiated a consent decree. Without admitting any violation of law or any liability, Eastern promised that over the next five years, it would invent and publicly disseminate an environment, health, and safety management system (EHS-MS) for scientific laboratories.

Although the EPA identified only environmental compliance issues, senior university administrators decided to design a more comprehensive management system that would fully incorporate all issues concerning environment, health, and safety. At its core the management system formally transferred responsibility for compliance from the specialists to the research scientists and their departments. Scientists became responsible for ensuring consideration of environmental impact so that public and individual health and safety was integrated into research protocols. The specialists would provide general training, manage waste collection contracts, and help with licensing where relevant; they would, however, normally work at arm's length from daily practice, providing consultation on emerging as well as unique risks and practices.

To assist the scientists and academic departments with their responsibilities, a new position, EHS coordinator, was created. Front-line generalist positions, such as these EHS coordinators, are found in most management systems (Hoffman 1997). Their job is to ensure daily compliance at the operational surface of the organization. These positions, one in each department, or one to be shared among two or more smaller departments, were filled by individuals with experience working in laboratories and some general

knowledge of EHS issues. The coordinators did not have specialized knowledge or advanced degrees in the various hazards (e.g. radioisotopes, biohazards, and chemicals) as did the specialists, nor did they have deep experience with EHS management systems. For example, the coordinator hired for the biology department came from a local research hospital where she was a lab technician and where one of her many duties was to represent her lab at health and safety meetings. Another coordinator had a master's degree in environmental studies, but no extensive training in the particular hazardous materials, such as radioisotopes and biohazards, which are used in hundreds of laboratories using biological matter.

The coordinators' principal responsibility was to maintain compliant practices in the laboratories by inspecting labs, evaluating practices, and persuading researchers to correct persistent problems. To manage this continuous cycle of observing and correcting, the coordinators needed to know what hazards were regulated, what forms of containment the regulations required, and how to identify and evaluate the diverse research procedures and hazards in the different laboratories. These responsibilities were complex because coordinators had to ensure that the labs in their departments could pass inspections by a range of local, state, and federal agencies (such as the city building inspector and the state department occupational health and safety officer) not all of which were entirely consistent (Haines 2003). Although the coordinator position was designed to work in tandem as a peer with the specialists, most of the specialists regarded the new EHS coordinators as subordinate interlopers who lacked the requisite expertise. The EHS specialists ignored the coordinators as much as possible. However, department chairs, to whom the coordinators reported, also paid little attention unless a problem arose: an accident or persistent regulatory non-compliance. The EHS coordinators became a self-managed group, but unlike the history of the specialists' self-management, the EHS coordinators neither sought nor were satisfied with what appeared at first to be their practical, if not functional, isolation and independence.

Observation of the coordinators' first few months revealed that they were struggling to enact – make behaviorally tangible and efficacious – the new management system. To do their jobs, inspecting labs, evaluating practices, and working to correct problems, the coordinators needed to know what was regulated; how to evaluate the range of phenomena, practices, and circumstances found in labs; and what routines to prescribe. Little attempt was made to transfer the specialists' knowledge to the coordinators who now had day-to-day responsibility for regulatory compliance. The specialists "ambiguously accommodated" the EHS directors (Prasad & Prasad 1998) by participating in the ongoing design of the EHS system: writing an online manual, developing inspection checklists, and designing an information system to retain records of hazards, training, and inspections. When the coordinators began working, however, they found the specialists unwilling to help and the tools unhelpful. The coordinators found the documents to be cryptic, effectively useless. For example, the specialists and central EHS specified regulatory requirements with language such as: "Are chemicals stored appropriately when not in use?" The regulatory definition of appropriate storage was not provided and the range of what constitutes "not in use" (five minutes, an hour, or a few hours) was also not defined. The checklist, a tool designed to standardize the coordinators' lab inspections, contained similarly insufficient information and guidance.

The specialists continued to work as they had in the past, going through the motions required by the directors (Iedema *et al*. 2004; Waring 2005). They gave several reasons for

this course of action. First, they had, over the years, experienced many fleeting university-wide change initiatives and had learned, as one specialist explained, to "ignore it until it goes away." They had lived through zero-based budgeting, reengineering, and other fads. This was one more time when "we just need to duck," laughed another specialist. Second, most of the specialists could not conceive of the coordinators knowing how to inspect a lab or discuss compliance solutions with researchers. A biosafety specialist was incredulous, saying, "Do you think they [the coordinators] will ever be able to do *my* job?" It was difficult to imagine not only why but also how their expertise would be replaced by bureaucratic manuals and procedures. Third, they had always reported to a middle manager who had the same professional values and objectives. They did not expect the EHS Director to, as one specialist explained, "go corporate." Another specialist did not believe that "[EHS Director] is going to make us follow through on this." They had never experienced themselves as controlled by bureaucratic authority within the University and did not expect this to change.

Eastern University, a true believer organization (Gunningham *et al.* 2003), is a particularly useful site for identifying how these front-line compliance managers ensure that "environmentalism . . . is ingrained in the everyday practices of the firm" (Hoffman 1997, p. 185). While senior and middle managers were committed to improving regulatory compliance, the coordinators, front-line managers, had to develop practices to align these aspirations and daily activities.[4] They did not know how to reconcile these expectations with the conditions EPA, state, and city inspectors would define as compliant when next they visited. A coordinator complained, "We are literally flying by the seat of our pants, trying to inspect laboratories and ensure compliant practices. The scientists want a consultation on what they should be doing, and we just don't know what to tell them." Despite their central role in the system, the coordinators had neither the organizational resources nor the technical knowledge to perform their role. The analytic focus of this article identifies the practices the coordinators used to govern this gap between regulatory aspirations, system design, and daily activities.

4. Research methods

From 2001 through 2007, we conducted ethnographic fieldwork at Eastern University to document and analyze the creation and implementation of the EHS-MS. The fieldwork activities included observation, interviewing, and document collection. It was supplemented by data collection with standardized instruments for some observations and by several surveys of lab personnel and environmental management staff. This fieldwork was done in collaboration with a team of ethnographers. Each ethnographer observed and recorded the design and introduction of the management system from the perspective of different groups of actors: scientists in several science and engineering departments, administrators (within and across departments), specialists, and information technology designers. Some observed committee meetings where the system was being designed, and others worked in laboratories and waited for the changes planned at the meetings to trickle down through the coordinators into the academic departments and laboratories. We met weekly to share observations; read and code notes and interview transcripts; and produce, discuss, and revise synthetic and interpretive memos. Our notes were shared using Atlas.ti. For this article, we draw heavily on notes taken at academic department meetings and meetings among the

coordinators to understand how the coordinators achieved their relational perspective on regulation.

Because the substance of the exchanges among coordinators, specialists, and laboratory workers was primarily about compliance questions in labs, we identified and traced the life course of these issues. Analysis of our notes and interviews led to the identification of more than 30 compliance questions. The content of coordinators' questions ranged from the maintenance of eyewash stations in the laboratories to emergency response procedures. The majority of compliance questions pertained to issues such as how to store, handle, and dispose of chemicals, biological materials, and radioisotopes. We collected data on the nature of each issue as described by lab members, specialists, and coordinators; how the issue was resolved; and the roles of the coordinators and specialists in addressing the issue. Elsewhere we describe how these compliance problems became a device that generated behavioral and bureaucratic reorganizing processes (Huising 2010) and how different groups of scientists variously interpreted the demand to adopt compliant practices (Silbey 2008). Here, we focus on the process through which coordinators developed their local knowledge and how they discovered the relational interdependencies that constitute the University, using this insight to manage the scientists and their lab practices as close to regulatory conformity as possible.

We used an inductive approach to analyze the fieldnotes, interviews, and documents we collected. Line by line as well as paragraph by paragraph, we coded with linguistic markers all conversations, activities, and documentation related to each of the identified compliance questions (Charmaz 2006). This generated approximately 40 initial codes or keywords identifying common phenomena in the data. We bundled these codes into more general conceptual categories, creating axial codes (Corbin & Strauss 2007). For example, the initial codes of "discussing problem," "meeting," and "sharing experiences" were bundled into "narrating the gap," a code that refers to the collaborative communication practices. After performing this analysis for several compliance questions, categories of practices began to emerge that referred to the resolution or closure of a question. To test and refine these related codes and patterns, we compared and contrasted across compliance questions to see if the data brought together under the bundled codes were compatible and if the new code name was adequate or an additional code (or codes) was required. We continued this iterative process until we identified four practices that together could account for the resolution of compliance issues: narrating the gap, inquiring without constraint, integrating pluralistic accounts, and crafting pragmatic accommodations. These practices may not be an exhaustive representation of what it means to engage in relational regulation. In other settings or contexts potential exists for other practices to emerge. Nonetheless, as an ensemble, these practices enable front-line managers to apprehend, understand, and negotiate the system of relations to produce compliance at the base of the organization.

We use two examples – *What is a clear corridor?* and *What can go down the drain?* – to illustrate the process through which coordinators, despite their initial constraints, discovered and then managed the gap between the system in principle and its enactment. We selected these particular examples from the larger set of compliances issues to illustrate our analytic problem – managing the gap between regulations and performance – but also to reflect the diversity of issues coordinators were handling, ranging from the ordinary, non-scientific safety issue of corridor egress in a large building to the biological and chemical waste that constitutes one of the ubiquitous environmental hazards

associated with research laboratories. We first use the example of a clear corridor to display the uncertainty coordinators experienced, immediately challenging their strong commitments to environmental sustainability and regulatory compliance. We then turn to our analysis of the practices that constitute pragmatic, relational regulation followed by the conditions that enable those practices.

5. Confronting the gap: What is a clear corridor?

A coordinator had been told early in her tenure that the city's building inspectors would be coming around periodically to check whether the buildings were code compliant. City regulations require that "all exits and main corridors are free of obstruction," but inspectors conventionally also allow for situations where corridors will not be completely clear. The regulation reads, "*If the inspector believes* that the obstructions or hazardous substances present an impediment to the evacuation of the building or the access of the fire department, he *may have such obstacles and hazardous substances removed*." The phrases we have highlighted with italics such as "if the inspector believes" and "may have such obstacles and hazardous substances removed" signal flexibility and interpretive space in the regulation as well as authorizing discretion with regard to particular circumstances.

Walking the corridors one sees bicycles, desks, copy machines, freezers, centrifuges, and shelves with experiments in progress lining the walls. To keep the research going, yet acquiescing to material and pragmatic constraints – space shortages, equipment needs, delivery of and access to supplies – requires that the letter of the law be interpreted in sensible ways. As a consequence, small and sometimes large items live in the corridors.

To appreciate both the city and the University norms and to be able to respond effectively to anxious scientists desirous of uninterrupted research time, an EHS coordinator raised the issue of clearance in the corridors with the safety specialist in the central EHS office. "We need to know," he said, "how much clearance is required in a corridor? If you are talking about a clear corridor, well, what is clear? It's a real number. People call me and ask for it." The safety specialist explained that he judges what constitutes a clear corridor on the basis of experience and knowledge of hazards. He assesses each situation – the particular corridors, the inhabitants, the activities, the building, and sometimes even the city block – to determine what a reasonably clear corridor is. The safety specialist could give the coordinator no general rule or number of feet that must be clear in every corridor, only advice about a particular corridor, floor by floor, building by building. The interpretive space, contingency and flexibility in the regulations themselves, and the historical practice of safety specialists' tailoring advice to each specific situation unsettled the coordinators.

The distance between the formal guidance and the experience necessary to determine what would reasonably constitute a clear corridor turned out to be quite large. Although it was unclear how the coordinators would bridge this gap between regulations and reasonable interpretation, there was, nonetheless, an immediate demand to ensure that buildings were not "dumped" while the coordinators developed their experience and local knowledge. A city building inspector had recently "dumped a building" – emptied it of all persons until he deemed that the corridors were sufficiently clear. Many laboratories operate on a 24 hour, 365 day work schedule. Loss of "bench time" slows the research. More so, unplanned interruptions can destroy ongoing experiments. The scientists were

nervous, begging the coordinators to address the problem and figure out what would pass muster with the building inspectors so that the building would not be dumped and research would not be interrupted.

The coordinators were confronted daily with similar questions and requests for advice from scientists. Working at the interface between the system and the scientists, they worried about losing credibility. A department administrator explained, "These guys [the coordinators] who are on the front lines are being asked about this [compliance requirements] and they can't answer. And every time you can't answer a question, you lose . . . you lose some face." Appearing credible and developing relationships with the labs required that the coordinators be knowledgeable about risks and regulations, including what constituted a clear corridor. Being unsure how to fulfill their duties had the potential to damage their efforts to develop collegial relations with the scientists. A coordinator explained, "the worst thing to do is to go into a lab and say 'I'm not exactly sure what you need to do' or [let me see] where this is written'." To secure their legitimacy and the scientists' cooperation, the coordinators needed to establish independent authority. The specialists' technical knowledge, legal training, and information networks were unavailable. They were having difficulty extracting convincing rationales from the specialists who preferred to work on a case by case, "let me show you when you need to know" basis.

Being able to respond to scientists quickly and with practical insight was an important avenue to securing the scientists' commitment to the management system. To gain this trust, the coordinators needed to get inside the local linguistic codes[5] and opaque descriptions of their job to adapt abstract rules to the demands of scientific work: to serve as colleagues offering reasonable and consistent rationales for compliant practices, teaching and reminding the scientists rather than inspecting and sanctioning. They had to manage the gap between regulations and compliance; they did so, we suggest, by governing rather than erasing the gap. They governed it by keeping practices within reasonable proximity of formal requirements and did so, we show in the next section, by apprehending and mobilizing the interdependent relationships and processes that constituted the University.

6. Relational regulation

We describe this collective process of constructing a common coordinator's perspective – knowing what, knowing how, and accompanying rationales – with the persistent issue of *What can go down the drain?* of laboratory sinks. We show how the coordinators encountered and communicated the issue (narrating the gap), reached out to a diverse network of actors to find out more (inquiring without constraint), collated what they learned (integrating pluralistic accounts), and then developed a general policy with local variations (crafting pragmatic accommodations). Although these categories of action may not be exhaustive, they illustrate how a relational orientation is enacted and what it means to be embedded within ongoing sets of transactions, to apprehend that web of relations, and finally to mobilize that sociological orientation to achieve role-specific obligations. Certainly other practices may achieve the same outcome (cf. Heimer & Staffen 1998; Canales 2011; Coslovsky 2011; Pires 2011).

6.1. Narrating the gap

Several months after the coordinators had begun working in their departments, a senior administrator convened the coordinators, suggesting that this be the first of weekly

meetings that could develop into a "support network for each other." He was concerned about scientists' likely resistance to the new system (cf. Iedema *et al.* 2004; Waring 2005) and believed that the coordinators could "help each other with those kinds of situations." The meetings were a time to share experiences and be a "confidential space for complaining about PIs" (principal investigator scientists). There would not be an agenda; rather, the floor would be open. Within 30 minutes into the first meeting, discussion took another course, a direction that was sustained each week for several years. Rather than a place to air grievances, the coordinators turned the meetings into a venue for collaborative inquiry, a space in which they could exchange information and learn from each other.

In these meetings, but also over coffee, via email, and in the corridors, they worked to create a coordinator's perspective on compliance. The EHS coordinators made sense of not only the legal regulations and scientific work that had been identified as requirements for the position, but also the institutional and material infrastructure of the University, which they discovered and actively mobilized to promote compliant practices. Importantly, the outcome of the processes of apprehending relational interdependence that we describe here as well as the compliance advice and rationales the coordinators eventually developed were not modifications of an existing practice. There was no template for the coordinators to adapt and no consultants or experts to whom they could turn to figure out how to do the job. As Gouldner (1954) described so long ago in his study of a gypsum plant, lacking access to the resources that had supported the previous managers (specialists in our case), new managers (coordinators) were forced to explore and experiment their way into a new pattern of organization.

The issue of what can go down the drain first came to the attention of a coordinator when a researcher raised the question. This sparked the broader inquiry. More generally, it was unclear what could be poured down the drain and what should be bottled and picked up by the hazardous waste contractor. The discussion began in a weekly meeting.

> Coordinator 1: We've been told a lot of conflicting stories and we need to resolve them.
> Coordinator 3: I'm also confused on what is considered biohazardous waste? Animal or human? I think human is.
> Coordinator 2: Joe [a biohazard specialist] said you need to sterilize everything having to do with animals [with bleach] and that the blood of certain species can go down the drain but you can't put bleach down the drain.
> Coordinator 1: I would be careful about taking what Joe says as fact – he knows what he is talking about from a biosafety perspective but he tends not to take into account EPA regulations, sewer regulations, waste regulations.

Relational regulation is accomplished, in part, by actors talking about, sharing, and making sense of their local experiences with those like themselves and with others. In this case, the meeting venue (Kellogg 2009) initiated the collaborative narration that continued in ever-widening arcs as each coordinator began his or her own lines of inquiry. Like Orr's (1996) Xerox repairmen, the coordinators developed their capacities through talk. By meeting together and sharing their experiences in the labs, they created "both a common opportunity to narrate and a common content to the narrative" of their difficulties in developing legitimate and responsive regulatory practices, "revealing the collective organization" that had first seemed like and may have continued to be experienced as individual, idiosyncratic situations in the different departments (Ewick & Silbey 1995,

p. 221). "The articulation and sharing of personal experiences" coupled with the groups' investigatory outreaches through their developing networks in the University allowed the coordinators to perceive commonalities and structural links that had been effaced in the distributed responsibilities and labor of the different groups of specialists (Ewick & Silbey 1995, p. 221). By meeting, talking, and sharing information, the coordinators learned about the organization, Eastern University, but also about the scientists' needs and how the legal regulations could be approximately if not perfectly implemented.

6.2. Inquiring without constraint

To manage the gap between formal expectations and performance, the coordinators identified actors who might know something about the compliance issue at hand – in the example we describe here what can go down the drain. Refusing to limit their sources to the specialists, the coordinators reached out to anyone who might have some insight into the situation including physical, legal, interpersonal, or scientific dimensions. The coordinators recognized, as Latour suggests (2005, p. 22), that "there exist many contradictory ways for actors to be given an identity," and that they would not be constrained by formal titles or official roles. From an ever-increasing network of informants far beyond the EHS central staff, including the scientists in the labs, EHS personnel at other universities or organizations where the coordinators had worked before, unionized laborers in the facilities department, and even family members, the coordinators acquired information: what it is that actors do and what they understand that they are supposed to do. In these inquiries, coordinators uncovered assumptions about their own expectations and working theories. At the same time, coordinators also identified fundamental material and organizational limitations, as opposed to perceived or assumed but not substantiated constraints. Again, as Latour (2005) suggests, there are "a great variety of agents" participating in any action and the types of agents and actions should not be presumed but investigated. What often seems incommensurable, especially in the modes of action of particular objects, may turn out to be malleable and reconcilable or truly incommensurate, but past practice cannot be presumed to be a template for the future or for improved compliance. Those agents include material substances as well as persons.

In the case of pouring liquids down the drain, the coordinators began by outlining the main issues. How to handle human and non-human fluids – do they pose the same hazards? How are these fluids to be treated before being disposed? And, if they are treated with bleach, can the mixture be poured down the drain? The discussion of treating blood continued over the course of several meetings. Individually, the coordinators collected different pieces of information and brought it back to the group. They learned from one of the biohazard specialists that non-human waste cannot be poured down the drain. Bleach can be used to sterilize human blood and other biological solutions but they were unsure about how much bleach should be used and whether bleach itself can go down the drain. From a coordinator's spouse, they learned that a solution of 10% bleach is sufficient for decontaminating blood, and that anything more than a 10% solution is unnecessary. In the labs, however, they observed variation in the time blood was soaked in bleach (independent of the strength of the bleach solution) prior to pouring it down the drain. The time varied from one to 30 minutes. They did some web searching and spoke with several biohazard and chemical waste specialists again. The coordinators decided that the appropriate time is 20 minutes.

Then, the coordinators took up the question of whether bleach can be poured down the drain. In a university training course they had learned that, technically, even coffee should not be poured down the drain because of its acidic content. It seemed contradictory that bleach could be poured down the drain if coffee could not. So although bleach neutralizes potentially dangerous fluids, allowing the otherwise acidic or hazardous fluid to be poured down the drain, the bleach itself raised a separate question. At this point, they talked with several of the scientists about the properties of the bleach and also about the formaldehyde that is often mixed with blood.

Coordinator 3: You can sterilize perfusion fluids (largely formaldehyde and blood) with bleach.
Coordinator 2: But then you have a problem with pH.
Coordinator 1: As long as it's between pH 5–10 its okay.
Coordinator 4: What's the pH of a 10% bleach solution?
Coordinator 3: I've never thought that was a concern – I don't know. I can find out.

The scientists became an important source of information for the coordinators. Regularly observing them at work, the coordinators began to appreciate the conflicts between the scientists' work needs and compliance requirements, understanding better the challenge presented by compliance requirements from the perspective of the research demands. However, the scientists' questions about and explanations of their current practices also encouraged the coordinators to seek out other informants, and ask additional questions to access and interpret the varied understandings and rationales for what turned out to be diverse "pouring practices."

Pouring practices varied not only by the material to be poured, which differed by the type of science, but also by the building and the kind of sink and drain. Although the specialists had information about the system of drains in all buildings, including the existence of treatment facilities in one or two buildings, they did not share this information with the coordinators or with the scientists. Instead, without articulating their reasons, the specialists took this information into account when they had, in the past, formulated specific compliance instructions for different laboratories. Working as professional experts, they merely advised rather than explained or justified their advice concerning the probable risks (Wrong 1979). The specialists' reservoir of local knowledge had accumulated slowly over the years without explicit articulation, documentation, or collation, which was unnecessary because they were, again in the past, the direct link with the labs. Now, the coordinators had to collect and synthesize the conflicting advice that had been produced and circulated over the years by the different groups of specialists.

The work of tracing social relations as well as physical and social structures took a concrete turn when the coordinators learned, only because they went to find out, about the history and current configuration of the University's plumbing system. A coordinator had noticed and remarked in the group meeting one day that many of the fume hoods designated for biological work had small sinks and drains in them, ostensibly for disposing of unused and probably untreated matter. It now appeared that not only were some scientists pouring blood down the drains in the large lab sinks but when working in hoods, they were also pouring chemical waste down the small drains in hoods as well. When approached about the function and use of the little sink drains within the hoods, the scientists explained that the fluids were draining into a treatment system that would purify the waste before it entered the drainage system. As a coordinator described it, they

thought there was some machine performing "alchemy in the basement." The coordinators were surprised about the existence of neutralization tanks in the basements or what they would treat, if they existed. Why had no one mentioned these treatment facilities when they were working out what to do about blood? The coordinators were also uncertain about the relationship between the use of the sinks draining to treatment tanks in the basements and the EPA-mandated satellite accumulation areas (SAA).[6]

Beginning with blood, then moving to pouring practices generally, the news of purifying or treatment centers in the basement of buildings opened yet another line of investigation for the group of coordinators. After speaking with the specialists (who were reticent to explain the plumbing system about which they lacked expertise, they said), the coordinators made use of the relationship one of them had developed with the University's Department of Facilities. Mobilizing this personal connection, a link in the social network that constituted the University this coordinator worked to find out what he could about Eastern's plumbing system, where the waste actually flows, and the locations and capacity of wastewater neutralization tanks. It took time, energy, and ingenuity.

This kind of information search is unlike that conducted through and by contemporary information technologies that so effectively help manage organizational information and that have become a model of information transfer and communication. Those information searches that can "find an obscure article by a long-distant colleague, identify the supplier of a critical component, read about the benefits and side effects of new pharmaceutical products or medical procedures, or find the fact that immediately settles a disputes about the performance of an opera, an athlete, or a mutual fund . . . are precisely the wrong kind to answer the more fundamental problems confronting organizations today" (Stark 2009, p. 1); they are also not the kind of inquiry the coordinators could or did conduct. For the coordinators, their problems were lacking the precise definition required for information technology searching. Rather, their problems were defined through the search process. What originally seemed to be a simple question – "What is a clear corridor?" or "What can go down the drain?" – slowly unraveled into a stream of unbounded contingencies. At its heart, the management system approach acknowledges that what needs to be known in any organization to achieve compliance may not be already discernible and may be evolving. Thus, the feedback loops that constitute a system qua system are designed and expected to produce over time an increasing, almost asymptotic approach to desired compliance while being responsive to local situations and contingencies. In this conception of regulatory implementation, compliance problems are developed rather than found (cf. Huising 2010); solutions invented rather than located. Practicing what we are calling relational regulation, the coordinators engaged in what scholars recognize as research, others as innovation, and Dewey described as inquiry (Dewey 1933).

6.3. Integrating pluralistic accounts

Relational regulation also requires that the compliance worker have in hand or mind a working comprehensive yet flexible representation of the relations, practices, and resources available throughout the organization. This broader perspective of the connections among diverse roles and information loops, side effects, and complex feedback from actions and decisions is achieved, incrementally of course, by synthesizing and integrating the pluralistic accounts collected. The coordinators iterated back and forth among new informants and additional data, sifting through what was incommensurate and what

could be generalized, to create a relational understanding and narrative of not only past and current but also possible future practices.

Putting together the information they collected from scientists, facilities managers, blueprints of the buildings, as well as consultations with some of the specialists, the coordinators learned what no one person could tell them. There were two separate routes to the circulating belief in the "alchemy in the basement." It turned out that in the far past, one building had been equipped with a treatment facility on its wastewater and, as a consequence, in that building there had been fewer restrictions on what could go down the drain. But this was a very limited facility in one building. Because the contingent nature of the specialists' advice had not been revealed – that is, that acidic and other hazardous waste could go down the drain in this particular building because it would be treated before being released into the general wastewater – scientists continued to use the same practices even after relocating to different labs in buildings with different facilities. A pouring practice that was legitimately compliant in one building spread like a virus to many buildings, including those lacking the wastewater treatment facility.

The coordinators learned that in addition to this one historic building with a unique treatment facility, a series of buildings constructed in the 1960s were also equipped with limestone chip tanks for treating wastewater. Drainage pipes from older buildings were plumbed over to the newer buildings with these tanks. However, renovations over the past 40 years periodically disconnected some of the older buildings from the tanks and removed others from some basements where space was needed for other purposes. Not all tanks were removed, and not all connections were removed. To complicate matters further, five-gallon chip tanks for purifying waste were installed under the sinks in laboratories on some floors of some renovated buildings, but not all labs, sinks, and buildings.

Many scientists, primarily older scientists who had worked with the original system or the 1960s system and those whom they told about the system, believed that this wastewater treatment system existed in all buildings. These beliefs and the associated pouring practices were spread by common assumptions as well as by empirical evidence of relatively standardized building design for laboratories. The practices, assuming the existence of such neutralization facilities, were transferred from one scientist to another when older scientists mentored younger scientists, getting them started and showing them the ropes at Eastern, and when scientists and their labs were moved from one building to another.

The existence of tanks in some buildings but not others accounted in large part for the range of specialists' advice about appropriate and inappropriate pouring practices as well as the rumors and misunderstandings. As the coordinators came to understand the connections among buildings and then among tanks, they also came to understand the limits of the tanks. They learned that the tanks were useful for neutralizing acids but that biological material might interfere with the operation of the tanks. Finally, the tanks themselves required permits and it was unclear whether anyone had established the current legal status of the 45-year-old tanks.

To secure compliance with environmental regulations concerning hazardous waste, the coordinators had to discover the relationship of the varied pouring practices they observed in the laboratories to the architecture of the buildings. This discovery process illustrates the coordinators' work mapping the social relations and physical structures that constituted Eastern University. Developing a systemic perspective of the organization

rather than focusing on only one part of the whole, uncovering and then appreciating the interdependencies among different roles and units of the University, was critical to the coordinators' ability to manage the gap between requiring and enacting compliance. As the contours of the organizational and physical structure emerged, so did all sorts of resources, including supporters within the faculty, contacts in facilities and buildings, and communication networks across the laboratories and at other universities. The coordinators' compliance strategies met legal requirements and sustained scientific work to the extent the law and science were seen as mutually collaborating processes (Jasanoff 2004). Thus, to fulfill their obligation to oversee laboratory compliance, the coordinators also considered variations in local facilities and experimental conditions, the different scientists' protocols and habits, and the locally embedded assumptions and attitudes toward regulation (Silbey & Gray 2011).

6.4. Crafting pragmatic accommodations

Appreciation of the dynamism and malleability of the organization led the coordinators to craft pragmatic accommodations between regulations and local practices. In doing so, the coordinators acknowledged compliance to be an ongoing, sometimes erratic, and always unstable accomplishment. They accepted their inability to close the gap. Instead, they worked toward *good enough compliance*; that is, variation within an increasingly narrow band surrounding perfect consistency with regulatory specification.

In the case of pouring practices, the coordinators developed a pool of information that they worked to make sense of together. They tracked and mapped the various threads and bits of data. They analyzed and traced what had been treated, by either the scientists or the specialists, as material facts, challenging and investigating what appeared to be assumptions without empirical evidence. They sought out and collated the range and contours of current compliance practices in the different laboratories. They dissected the legal basis of the specialists' advice to scientists and parsed what was required by regulations from what was embedded and reflected in the specialists' preferences and precautions.

From the coordinators' perspective, the infrastructure was too complicated, confusing, and, as a consequence, unreliable. They decided after much discussion that they wanted a standardized message about what could go down the drain. This would give them a common set of rules and rationales, a clear foundation with which they could work. With this set of indigenously developed rules in place, they planned to exercise discretion in relation to locally varying conditions. They could modify practices in collaboration with the scientists where needed; for example, in the laboratories where hoods were fitted with purifying drains. Critically, this pragmatic adaptation of the rules to the local situations acknowledged the inescapable variability that would develop across the different science laboratories, as it enacted a general standard of what would be "good enough" to be compliant. In this way, the coordinators could respond to scientists' needs and regulatory requirements, achieving a form of responsive regulation (Silbey 1984; Braithwaite 2002).

A foundational standard set of rules for pouring practices was achieved despite the specialists' objections that no single rule could be applied to all laboratories and thus any standard document would not perfectly embody the meaning of the regulations. In effect, the specialists adopted a not unfamiliar strategy that makes the perfect an obstacle to the

good. The specialists were, nonetheless, required to create specific, standardized documents, which could – importantly – be used by those without the specialists' experience or knowledge. Across the University, a sticker, 8 by 11 inches, can be found above laboratory sinks. The sticker lists 11 categories of substances that can be poured down the drain. All other liquids must be bottled and picked up by a waste vendor for disposal. Notably, the list is not a simple codification of existing legal regulations or the knowledge of the specialists; rather, it reflects the coordinators' perspective – and the scientists' – on what can go down the drain.

The crafted sticker is a pragmatic accommodation in the sense that it will always be incomplete and not a perfect interpretation, according to different and competing experts, of the regulations. New materials, combinations of materials, and circumstances will emerge in which the sticker will be found to be inadequate, at which point an altogether different accommodation may be necessary. The sticker is not a final answer but a moment in a continuing process of achieving environmental sustainability, or more narrowly producing compliance. The specialists argued vigorously against the pragmatic logic underlying the production of the sticker because it would produce less than the highest standards of compliance. The coordinators agreed that no document could fully capture the actual pouring practices in all the labs, but argued that this was the best solution for the moment. The specialists also opposed the list because it did not allow for the minimization of waste. The list was conservative – reducing what can go down the drain – in order to produce more general compliance; it could have been customized to optimize compliance and minimize waste collection. The coordinators rejected that possibility in order to achieve what they believed would ultimately be a higher baseline of compliance.[7] Perhaps it merits repeating. The sticker above the lab sinks names what can go down the drain without negative impact on the environment. The list of items identified on the sticker keeps wastewater within a band of variation surrounding perfect consistency with regulatory specification, thus governing the gap between regulation and compliance.

6.5. Summary

The EHS coordinators developed a relational perspective collaboratively, working case by case, issue by issue. They canvassed their labs about the existence, characteristics, and dimensions of compliance issues raised by researchers. Was the problem particular to a lab, a floor, a building, or a department? What forms and variations did it take in other labs in the University? Through these efforts, what initially arose as a relatively narrow concern in one lab was aggregated into a general problem that was collectively analyzed and interpreted and for which a standard response was developed. For each non-compliant or unsafe material or practice, they collected any and all information they could over several weeks including scientists' queries, specialists' advice, and accounts of current Eastern practices, as well as information from websites, spouses, facilities workers, and EHS staff at other universities. These data almost always contained conflicting and confusing accounts. The coordinators worked through the information they assembled, sometimes seeking additional clarification from the specialists or some of the researchers, to create a shared understanding of what the current practices were, the conventional advice, and the alternatives available. They tried to figure out what could be done regularly and reliably that would be seen to be reasonable compliance. When they determined what the practice should consist of, they developed shared rationales that could be

provided to the lab scientists as justification for the new practice. They lobbied the EHS staff and administrators to adopt their recommendations.

Instead of trying to reproduce the specialists' behavior, the coordinators created their own approach to producing compliance through this collaborative exploratory process. This was not the only path forward. Alternatively, each coordinator might have worked independently to cope day to day, responding as best as he or she could to questions as they arose, seeking information and treating problems alone. Each coordinator might have operated exclusively within his or her own department without inquiring whether problems he or she encountered were arising elsewhere and how others were handling the same or similar problems. Instead of remaining within their departmental silos, the coordinators worked together to situate a problem, its solution, and rationale in a broader context, in this way developing an appreciation of and orchestrated response to the gap between the abstract goal of compliance and the behavioral performances that would achieve compliance. Working as a group, the coordinators developed an appreciation for the complex interdependencies that collectively constituted the university as a functioning organization.

7. Conditions for governing the gap

Under what conditions might we expect organizational actors to engage in relational regulation? Under what conditions are actors likely to reach out to a diverse network of actors, solicit information, collate and synthesize what they learn, and identify pragmatic accommodations? Our study suggests three necessary, but not sufficient, conditions.

7.1. External observation

Relational regulation works – that is, it produces close to compliant practices and a good enough negotiation of the gap – in situations where external observers, government inspectors, or third-party auditors provide a credible threat of periodic review and demand for accountability. Although the creation of the EMS system was part of the EPA's policy to shift responsibility for standard setting and implementation from its own resources to the regulated organization itself, self-regulation fails if it relies entirely on the goodwill and self-interest of the regulated; that is, if external pressure is removed altogether (Karoly 1993; Baumeister & Heatherton 1996; Neale 1997). As we have described in our example, the system could not enact itself and succeeded because the coordinators apprehended and made use of the interdependencies that constituted the organization. Because the consent decree that had established the obligation to create and implement the system had also stipulated that the EPA would return to assess the functioning of the system and to certify compliance with the consent decree, the coordinators worked with a clear sense of ultimate accountability to this external agency. What we describe as close to compliant turned out to be a good enough because the EPA declared Eastern University compliant and lifted the consent decree in its return inspection in the seventh year following the original decree. The EPA acknowledged that some regulations were not perfectly implemented 100% of the time; they were convinced, however, that the University now had a means of knowing of and responding to these events. The system for managing, or in our words governing, environmental hazards was working.

The external pressure can be analogized to what we usually think of as surveillance, which "to varying degrees is a property of any social system – from two friends to a

workplace to government . . . a supervisor monitoring an employee's productivity; a doctor assessing the health of a patient; a parent observing his child at play in the park; or the driver of a speeding car asked to show her driver's license" (Marx 2005). While the EMS system was designed to provide just this kind of traditional surveillance for the laboratories as well as additional features of contemporary surveillance using technical means of observation and information gathering (Marx 2005), the city, state, and federal inspectors constituted the formal surveillance of the system itself. As the EPA hoped and advocated, the oversight by the organization as well as the government agencies was performed more easily, and at a distance, because of the information technology portion of the system (Foucault 1995a,b).

Although the pragmatic, relational regulation practiced by the EHS coordinators can be interpreted as an informal accommodation to formal rules and as such a reproduction of the gap between law on the books and law in action (which we will suggest in the conclusion), we emphasize here the important, complementary role played by the authority established and aspirations articulated in formal law without which the inhabiting and enacting practices would not exist or be legitimate (Ewick & Silbey 1998, 2003). The layers of accountability from laboratory through the academic hierarchy coming from the EHS administrative hierarchy and hence to the system qua system were enabled and ultimately normalized by the probability of external audit (Power 1997; Strathern 2000).

7.2. Slack time

Reaching out, inquiring, investigating, watching others at work, regularly meeting, and continuously talking requires time, time not tightly scheduled or tracked. From the very beginning, the position of EHS coordinator was described in the EHS system manual as a person with wide responsibilities, but also with enormous discretion simply by virtue of the indecipherability of the job description itself. Although job descriptions are notoriously cryptic, leaving out more than they specify of the job to be done, the EHS coordinator description provides a typical example of the extent to which the system failed at its outset to make apparent what means and methods were being provided to achieve the system goals. In a half-page litany of responsibilities inscribed in the system manual, the coordinators identified three time-bound, scheduled obligations: at least once a year have a meeting of all laboratory EHS representatives in the coordinator's department; inspect department laboratories twice a year; and attend monthly university-wide meetings organized by the central EHS office. Although assigned formal responsibility to co-chair local department EHS committees, it turned out that these faculty committees – organization, function, and meeting schedules – varied enormously across the University. Few met often, and most not more than once a semester. Thus, the EHS coordinators found themselves with great responsibility but very few specified activities and therefore with lots of time in which to figure out what to do. The temporal space permitted the coordinators opportunity to interact regularly with each other, becoming familiar and ultimately interdependent. It also provided the flexibility to explore the University, its physical and human resources. Without this slack time, it would have been impossible for the coordinators to have discovered the variations in the plumbing system and the history of the common assumptions underlying the pouring practices. With the freedom to explore the archives, meet with facilities staff, and visit more labs than were within their scope of responsibility, the coordinators could make sense – tell a reasonably coherent narrative – of what seemed like an irrational, unscientific belief in alchemy in the basement.

7.3. Macromanagement

We use this term – macromanagement – to suggest the opposite of the negatively valenced concept of micromanagement, where supervisors closely monitor and control subordinates with an obsessive attention to detail. At Eastern, the EHS coordinators worked with little monitoring, creating, with few exceptions, the details of their own work. They were unconstrained by professional silos, hierarchy, their own lack of knowledge, or the boundaries of the organization itself. Educational institutions are often described as loosely coupled, a system where elements are "responsive but retain evidence of separateness and identity" (Weick 1976; Orton & Weick 1990, p. 203). Although most professional bureaucracies (Mintzberg 1981) include a bureaucratically controlled component with descending lines of authority and increasing specialization alongside a second side of collegial governance with shallow lines of hierarchical differentiation, the formal authority at Eastern was distant and itself more consensual than commanding. Despite formal lines within and boundaries between professional silos, collaboration was active among the departmental and professional hierarchies. Although coordinators were careful and deferential in transactions with faculty members and researchers in the labs, they actively engaged, often confronting and challenging, the leadership of the EHS office. They were neither reserved nor reticent. With their academic departments behind them, they were unafraid. They argued. They criticized. However, we never observed them going beyond the EHS leadership to the University upper administration. As important as their freedom to engage those higher in the EHS hierarchy, the coordinators explored beyond the boundaries of the University itself, reaching out to other schools, hospitals, government agents, and businesses that might be able to offer some useful information. Macromanagement enabled the coordinators to function as brokers of information and compliance (Burt 1992; Padgett & Ansell 1993); Eastern's loosely coupled organization generated, as theoretically predicted, adaptive and effective action (Orton & Weick 1990). If slack time provided temporal space in which to search, macromanagement provided the behavioral space for self-directed action and thus the authority to explore.

8. Conclusion: The gap persists

The coordinators developed a pragmatic, relational approach to manage the varied and contingent laboratory practices in ways that minimize violations and contain those that occur. Sharing and making sense of their experiences, ground-level managers interactively mapped the roles and structure of the organization, developing in the process an appreciation of its relational interdependencies. Instead of focusing closely and only sporadically taking account of the larger connections and reverberations of their actions, these actors view their work, the laboratory practices, and the organization itself as the outcome of dispersed and indeterminate human decisions and indecisions rather than as rationally coordinated action. The community of regularly interacting participants – exchanging information, sharing stories and techniques, and making explicit what is often unarticulated – enabled members to make the organization, as a set of interrelated responsibilities and resources, simultaneously more cognizable and tractable. By swapping accounts of difficulties encountered, obstacles overcome, and habituated routines discovered, the coordinators come to see their work and themselves as links in this complex web of transactions and processes rather than as offices of scripted responsibilities and delimited interests. As such, the coordinators govern rather than close the gap

between regulation and compliance. The mechanism for assuring compliance resides in the apprehension and mobilization of interdependencies rather than in the management system per se. Thus we refer to this as relational regulation.

Describing how members of one organization overcome the gap between descriptions of tasks and procedures incorporated in environmental management systems and the work necessary to enact those tasks and achieve those goals, this article offers five contributions to our understanding of organizational governance and regulatory compliance. First, efforts to close the gap between law on the books and law in action through management systems create their own gap between the system and its enactment. By distributing local and expert knowledge through codified recipes, standard operating procedures, and information technology, management systems cannot by themselves as formalized procedures deal with the contingent, situated demands of routine compliance work. Accomplishing the task of regulatory compliance demands that those with immediate responsibility literally explore uncharted ground not captured in the system's documentation to discover what must be done in pursuit of environmental sustainability. Front-line actors must interpret and adapt the generalized prescriptions for contingent situations. Thus, "the persistently observed gap is a space, not a vacuum" (Ewick & Silbey 1998, p. 248), a space in which actors inhabit (Hallett & Ventresca 2006) and perform the institution.

Second, although gaps between design and enactment seem irreducible, they can be governed. Relational regulation is a form of sociological citizenship (Silbey *et al.* 2009), a label we apply to workers, observed in numerous occupational and work contexts, who understand themselves and their work as links in a complex web of interactions and processes rather than as offices of delimited responsibilities and interests (Canales 2011; Coslovsky 2011; Haines 2011; Pires 2011; Silbey 2011). Sociological citizens have.

> The capacity to see interdependence and to use this systemic perspective to meet occupational and professional obligations . . . [Sociological citizens] see their work and themselves as links in a complex web of interactions and processes rather than as a cabin of demarcated responsibilities and limited interests . . . these actors view their organizations or states as the outcome of human decisions, indecisions, trial and error, rather than formally rational action. In this dynamic entity, they reconceive their own role as insignificant by itself yet essential to the whole.
>
> (Silbey *et al.* 2009, p. 203)

Relational regulation governs the gap with the same appreciation of the ongoing production of social and material life; that is, by acknowledging the impossibility of perfect conformity between abstract categories, rules or norms, and situated action, nonetheless managing to keep practices within a band of variation surrounding but not perfectly coincident with regulatory specifications.

Third, we identify four practices through which actors work as sociological citizens enacting relational regulation: identifying actors in a diverse network, searching for information, synthesizing and collating what they learn, and crafting pragmatic accommodations that recognize the interdependence between general policies and local variations.

Fourth, we specify three conditions that are necessary, if not sufficient, for it to be more likely that actors will develop this sociological orientation and compliance managers will practice relational regulation: actors are subject to external authority and

review, actors enjoy unscheduled work time, and there exists an organizational culture of macromanagement.

Finally, we conclude by reiterating that the practices we observed were never explicitly discussed as working procedures among the coordinators. They never articulated a need to create common understandings or become a coherent group with a collective sense of purpose. The coordinators came together in frustration because of their independently experienced difficulties of fulfilling their formal responsibilities. Importantly, too, coordinators' participation in generating the collaboration and the common practices varied. Those who were central in this developing network stood out to senior administration as exemplary workers. They were identified as being technically strong, creative, personable, and productive. In attributing this individual competence, administrators failed to recognize the collective effort to develop common resources. Some coordinators were peripheral members and a small number of coordinators did not participate in the community at all. Not surprisingly, some members of the latter group did not remain at the University for more than a few months. Newly hired coordinators did not necessarily join the group whom we observed and characterized as exemplars of sociological citizenship, practicing relational regulation.

Thus, from one perspective, the gap between what needs to be done and what is known about how to do it is once again reconfigured. Despite the fact that the coordinators' collaboration is an important resource for governing the gap between rules and their implementation, it remains invisible to the EHS management system put in place to assure regulatory compliance. We cannot count on collaborations such as we described in this article to emerge spontaneously or to adequately fill the gap. Nor can we assume that where they emerge, collaborating managers will develop the sociological perspective that made compliance possible without impeding production, in this case scientific research. The conditions we identify facilitated the development of the relational perspective. Future research needs to explore further the variation between actors who adopt and practice sociological citizenship from those who do not. Without such additional research, we may be left with the potential of the ungoverned gap between regulatory aspiration and achievement.

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Notes

1 Here distance refers to the remove or remoteness from the ultimate source of power and authority, the state, and proximity to the sites of action, on the ground in the organization.
2 Differences in managerial styles have been discerned based on four variables: intensity of search for environmental information, degree of responsiveness to outsiders and information, routines to ensure environmental consciousness, and a vague ethos or reputational sensitivity. Based on combinations of variation in these four variables, five types of managerial styles are discussed: true believers (most committed), environmental strategists, committed compliers, reluctant compliers, and environmental laggards (least committed).
3 RCRA, Resource Conservation and Recovery Act 1976, 40 C.F.R. part 260–280; CAA, The Clean Air Act 1990 Title 42, Chapter 85; CWA, The Clean Water Act P.O. 92–500, 86 Stat. 816 (1972), 33 U.S.C. 1251 et. seq.
4 While the leadership of Eastern University was committed to achieving full compliance with the consent decree to fulfill Eastern's responsibilities and secure its good reputation, the EHS staff had been unable, before the failed EPA inspection, to convince the administrative ranks just below the highest that the upcoming inspection was important, a challenge to the existing management, and a threat to the University's reputation.
5 Conversation among Eastern University faculty and staff is littered with acronyms, some of which were unique to the EHS-MS, developed as the system was being invented and implemented. The acronyms eventually traveled out from the committees designing the system but in the first few years, the terminology was sufficiently local that senior administrators and faculty members were unfamiliar with the terms (e.g. DLC, referring to departments, labs, and centers).
6 To be clear, chemical waste is supposed to be stored in specifically labeled waste containers standing within secondary containers to catch any overflow or spills. The use, placement, and temporal duration of waste in satellite accumulation areas (SAA) are explicitly specified in EPA regulations that were incorporated in the EHS-MS. The contents of the SAA are to be moved to 30- and 90-day storage facilities weekly.
7 This argument reproduces historically common debates concerning legislative craftsmanship: whether to provide general proscriptions and prescriptions, leaving it to the implementers to adapt to local circumstances, which may exceed anticipated action or fail to achieve desired action; or alternatively, provide a detailed list of prescriptions or proscriptions, which might prevent future adaptations and appropriate but unlisted applications because the list is interpreted as complete.

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