

Collaboration for Compliance: Identity Tensions in the Interorganizational and Interdisciplinary  
Regulation of a Toxic Waste Storage Facility

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### **Collaboration for Compliance: Identity Tensions in the Interorganizational and Interdisciplinary Regulation of a Toxic Waste Storage Facility**

The safe transport, storage, and oversight of toxic waste involves coordination of effort across disciplinary and organizational boundaries (Cline, 2010; Perrow, 1999). The Environmental Protection Agency (EPA, 2012) has estimated that in the United States, over 20,000 registered hazardous waste generators make over forty million tons of regulated waste per year. One in four Americans live within three miles of a hazardous waste site (Trimble, 2013). The United States has generated a disproportionate share of the world's hazardous waste, but that balance is shifting creating pressing, global environmental problems (Orloff & Falk, 2003). The waste produced by industrial systems and the incumbent technical and political problems necessitate interorganizational and interdisciplinary collaboration (Wagner, 2004).

Collaborating helps organizations pool resources and expertise, manage uncertainty, accomplish technically complex, knowledge-intensive work, and address problems of great importance (Keyton, Ford, & Smith, 2012; Thompson, 2009). Collaboration has become a buzzword in part because of its promise for addressing such problems, but effective collaboration is a difficult communicative accomplishment (Bimber, Flanagan, & Stohl, 2012; Hardy, Lawrence, & Grant, 2005; Lewis, 2006). The communicative negotiation of individual and collective identities and the related struggle for what counts as legitimate knowledge will have important implications especially in collaboration that involves complex science, engineering, and regulation (Barley, Leonardi, & Bailey, 2012; Keyton et al., 2012). In collaboration for the management and regulation of complex industrial system, diverse organizations, professions, occupations, and disciplines can offer contradictory and competing premises for identification and knowledge work, and the distinctive mix of mandatory (i.e., fulfilling regulatory

requirements) and voluntary impetuses for collective action merit attention (Oliver, 1990). Research and practice should consider not only the structural attributes of collaboration (e.g., who to involve, when, where, about what, and what products must be produced), but also the communicative constitution of collaborating (Flanagin, Stohl, & Bimber, 2006; Keyton, Ford, & Smith, 2008; Lewis, Isbell, & Koschmann, 2010) including the negotiation of individual and collective identity (Keyton et al., 2012). This study builds on the literature on collaboration for compliance, addresses theoretically important questions about identity in collaborating, forwards a methodology—*mosaic portraiture*—well-suited to these questions, and contributes insights regarding the practical problems of the regulation of complex industrial systems.

### **Documenting Regulatory Compliance at a Toxic Waste Storage Facility**

This study focused on a toxic waste storage facility, comprised of the storage site itself and surrounding offices and support buildings (hereafter, the Facility). Facility staff and contractors inventoried, packaged, transported, and stored tons of waste that would slowly breakdown over thousands of years. They planned the Facility's development and managed day-to-day operations, engineered containment areas, and used complex modeling to simulate, thousands of years into the future, the condition of the Facility and the waste. The planning, construction, and management of the Facility required complex science, careful engineering, and intense project management, all monitored for regulatory compliance. Proponents of the Facility hoped too that it would provide a model for future sites, and thereby approaches for addressing global waste problems.

Every detail of the undertaking required documentation that was submitted to the EPA, the governing regulatory authority. The Waste Compliance Team (WCT) was the interorganizational and interdisciplinary collaboration formed to ensure and document the

Facility's compliance with applicable law, policy, and professional standards (including the act of law that created and provided a regulatory framework for the Facility). The regulatory framework that governed the Facility established formal cycles of evaluation to verify compliance. Scientific discovery, engineering, and regulatory oversight had to be negotiated together by the WCT on strict timelines to enable its continued functioning.

This study focused on the WCT's collaborative documentation processes—research, writing, reviewing, and styling. The documentation, a regulatory deliverable with legal and policy encumbrance (Lammers, 2011), necessitated knowledge-intensive, communicative work (Alvesson, 2001; Erhardt & Gibbs, 2014). More than record keeping, its creation involved decisions about how the Facility would be constructed and managed. Accomplishing the documentation was concomitant with accomplishing Facility's work, and the regulatory documentation and approval processes were meant to contribute to its safe operation.

WCT members came from multiple organizations including laboratories, engineering consultancies, contracting firms, and government agencies. The disciplines on the WCT reflected the diversity of expertise needed at the Facility (e.g., science, engineering, law, project management, and technical writing). The WCT's formal leadership came from the government agency responsible for the Facility, and the laboratories and contractors contributed leadership for specific projects. Most members of the WCT were long-tenured, and their home organizations depended on their involvement for funding on projects there and elsewhere.

The WCT offers a window on the problems of regulating complex industrial systems (Barbour & Gill, 2014; Perrow, 1999) through interorganizational and interdisciplinary collaboration (Barley et al., 2012; Lewis et al., 2010). In the sections that follow, we review the literature on the importance of identity in communicative models of collaboration (Flanagin et

al., 2006; Keyton et al., 2012) and the utility of a focus on identity tensions (Pepper & Larson, 2006). To build on and extend these literatures, we explicate and apply a methodology that we termed *mosaic portraiture*, weaving together the data gathered during a two-year long engagement with the WCT. Organized in a *findings gallery*, the results indicated that identity tensions and the related implications for what it meant to do knowledge-intensive work well, were integral to WCT collaboration. We conclude by discussing the contributions of the study to the theory and practice of collaboration; identity tensions; and the potential of mosaic portraiture for engaged communication scholarship.

### **Interorganizational and Interdisciplinary Collaboration for Compliance**

Collaboration centers on problems of interdependence—broadly, the extent to which individuals must rely on others to complete tasks and make sense of those tasks within and across boundaries (Barley et al., 2012; Keyton et al., 2012). It involves creating and sustaining a whole where the parts may have good reason to exert their own interests (Lewis, 2006; Lewis et al., 2010). Reviewing the literature on interorganizational relationships (IORs), Oliver (1990) argued that “Resource dependence and exchange approaches to IORs emphasize voluntary interactions and contingent cooperation among organizations” (p. 243), and that these approaches have dominated the study of IORs. Research in this vein may still overemphasize collaborative outcomes or decision-making satisfaction, neglecting the integrative moves inherent to collaborating (Lewis, 2006), a shortcoming communicative models of collaboration are well-suited to addressing (Bimber et al., 2012).

The WCT’s work involved multiple forms of interdependence, which we conceptualized per Hollingshead (2001) such that “each person’s actions have an impact on others’ outcomes and that individuals are more dependent to the extent that they cannot unilaterally guarantee

themselves good outcomes” (p. 1081). Team members contributed relatively separate pieces to the documentation (pooled) as well as deliverables that depended on others. For example, team members doing simulations depended on data from the teams inventorying waste (sequential). The actual writing of documentation involved complex interaction where team members’ sections were iteratively written, commented upon, rewritten, discussed, and so on (reciprocal).

However, a focus on interdependence in collaboration should not be conflated with volitional collaboration (i.e., where withdrawal is a viable tactic and a concern for collaborators, Lewis et al., 2010). In this case, the WCT had to work together to fulfill the requirements of the regulatory framework governing the site, and as such, it offers a theoretically useful vantage on collaboration. Oliver (1990) argued that the “distinction [between voluntary and mandated compliance] is important because the explanations and consequences of relationship formation associated with each are fundamentally different” (p. 242). Law and policy directed the work of the WCT, meaning that completing the work encumbered those involved differently than in collaborations generally (Lammers, 2011). The WCT existed in a “collective action space” marked by institutional engagement, “embedded in a larger system that defines and controls opportunities for engagement” (Flanagin et al., 2006, p. 37). The negotiation of collective standards of expertise and what counts as legitimate knowledge may be especially important in such settings, because in this sort of collective action space, “organizations need to maneuver within an interorganizational bureaucratic environment that requires special skills and knowledge” (p. 37). Such collaborations require then negotiating differing and overlapping notions of knowledge and skill enacted to varying degrees in the identities of those involved.

### **Identity Tensions in Collaboration**

Taking a communicative model of collaboration brings negotiations of individual and

collective identity to the fore. Collaborations “stimulate issues of identification” (Keyton et al., 2012, p. 182). The multiplicity and interdependence of identity and identification in collaborations makes tensions among identities an important concern for research (Lewis, 2006). Lewis et al. (2010) argued, “The collaborative process almost always requires accommodating multiple voices. This creates a tension where external demands are made upon a collaborative IOR at the same time that internal cohesion, loyalty, and identification are required.”

Grounded in a structurational view of identity and identification (Kuhn & Nelson, 2002; Scott, Corman, & Cheney, 1998), the study of identity tensions provides a useful way to understand the constitution of the collaboration in communicative action. Pepper and Larson (2006) defined identity tensions as “discursively created, conflicting premises that compete for the self-definition of organization members” (p. 51). They become salient through the pushes and pulls of team member identification (Williams & Connaughton, 2012). That is, the multiplicity of professions, occupations, disciplines, and organizations in the sort of collaboration under study may offer competing premises for the negotiation of individual and collective identity. Highlighting what was at stake, Pepper and Larson argued that identity tensions can sour creating or worsening organizational problems.

Taking an identity tensions framework locates identity as a space in which the collaboration is being decided (Larson & Pepper, 2003; Pepper & Larson, 2006). This contest is not just about collaborators’ self-categorizations or targets of identification (e.g., particular organizations, occupations, disciplines, or professions, Lammers, Atouba, & Carlson, 2013; Russo, 1998); it also includes their situational articulation of what action is appropriate or not based on who they are and who they believe they should be (Kuhn & Nelson, 2002; Scott & Stephens, 2009). Indeed, professional, occupational, disciplinary, and organizational self-

categorizations may be discrete, but in practice they are interwoven. For example, on the WCT, staff formally designated as project managers or technical writers had scientific and engineering backgrounds. Engineers and scientists worked for different organizations that contributed team members to fulfill diverse project roles.

This application of identity tensions joins the now substantial literature recognizing the necessity and utility of tensional approaches for the study of organizing as ironic, irrational, and paradoxical (Johansson & Stohl, 2012; Poole & Van de Ven, 1989; Tracy, 2004). Such tensions pervade collaboration (Lewis et al., 2010), knowledge work (Erhardt & Gibbs, 2014) and regulation (Barbour & Gill, 2014). Focusing on identity tensions addresses these complexities by orienting the analyst to competing premises and struggles for self-definition. These struggles matter too because individuals' acts of identification contribute to the structures on which they later draw (Kuhn & Nelson, 2002; Meisenbach, 2008). The decisions made in the collaboration affect and offer resources to members differently depending on their emergent identifications (Kuhn & Nelson, 2002; Scott & Stephens, 2009), and fostering shared identity may serve as a resource in collective action (Koschmann, 2013; Thompson, 2009).

In Pepper and Larson's (2006) study, negotiations of identity tensions represented cultural performances that allowed organizational members to reclaim and make sensible their identities. To understand identification (and disidentification) with cultural premises was to understand the collective enactment of organizational culture, which could include attempts to stabilize the uncertainty participants faced and to manage the multiplicity and fragmentation of identity and identification in organizing. Understanding the negotiations of identity tensions may likewise shed light on the negotiation of the boundaries integral to individual and collective identity in the WCT's collaboration. Such insights should be useful in the context of



collaboration for compliance, because of their importance in navigating the interorganizational bureaucratic environment (Flanagin et al., 2006). The analysis was thus guided by the questions:

- (a) *What (if any) identity tensions were reflected in the WCT's accounts of their collaboration,* and (b) *How were identity tensions communicatively negotiated?*

### **Methodology**

In 2010, a member of the WCT contacted us for help with a communication assessment. We worked with the WCT and this team member over the following months to craft and implement an investigation/assessment, develop understandings of the data collected, and have discussions that enabled the WCT to reflect on their process and improve their practice (cf. commissioning, co-designing, and co-enactment in Dempsey & Barge, 2014). The research questions guided the analysis, but the literature review reflects understandings that developed *during* our engagement with the WCT. As engaged research, it developed through the concerted efforts of the researchers *and* participants (Dempsey & Barge, 2014). We operated with an openness to the research context, integrating relevant theory as the project unfolded. Initially, we focused on (a) the WCT's concerns understood through iterative conversations among and between researchers and (b) their accounts of their communication problems, strategies for addressing them, and reasoning for why a strategy worked or not (Barge & Craig, 2009). Per Barge and Shockley-Zalabak's (2008) recommendations, we developed a project involving multiple methods over an extended period of time that would serve all the interests involved.

Initially, we planned phone interviews followed by a survey of team members. As the project unfolded, we added a workshop to discuss, challenge, and enrich the preliminary results, which created additional opportunities for data collection. The WCT included core members ( $n \approx 13$ ), but membership fluctuated depending on where they were in the regulatory process and

project urgency ( $n \approx 18$  during our work with them). Our analysis focused on the range of identities enacted by WCT members at various moments, and the interviews, survey, and workshop included participation from a mix of formal roles (e.g., lead scientists, engineers, technical writers, project managers) and organizations (e.g., labs, contracting firms, the Facility).

### **Phone Interviews**

We began by interviewing our first contact to learn about the work of the Facility and the WCT (cf. “technical glossaries” in Bailey & Barley, 2011, p. 267). In three conversations lasting about 1.5 hours each, we explored what an assessment might include, developed a preliminary map of who comprised the WCT, and discussed the procedures needed to ensure human subjects protections (e.g., informed consent, voluntary participation, multiple confidential forms of participation, obscuring participant identities through paraphrasing and data aggregation).

Participants in the phone interviews included lab scientists, government employees, and contractors who could speak to all aspects of the WCT work ( $n = 7$ , each lasting 45-90 minutes). The semi-structured interview protocol was focused on the work of the Facility and the WCT, the communication problems team members faced, the solutions they offered and applied, and their accounts of what made those solutions effective or ineffective (Barge & Craig, 2009). Based on advice from our first contact, the interviews were not recorded to encourage candid conversations and build rapport. Instead, we were present for each phone interview and took notes independently. After each interview, we debriefed. The second author consolidated notes into interview reports, akin to participant dossiers. These intermediate research documents (cf. procedures in Bailey & Barley, 2011) later became integral in our mosaic portraiture. We also used them to articulate themes discussed during the workshop.

### **Survey**

Although the survey data are not the focus of this study, we report the following, because the results informed our ongoing conversations with participants and the workshop. Responses to the questionnaire ( $n = 9$  of 18 sampled) overlapped with the interviews ( $n = 6$ ), but not completely. Again, participants included lab scientists, government employees, and contractors. We selected measures based on the preliminary analysis of interviews and interests expressed by our first contact, including social network analytic measures of communication and attribute measures of expertise coordination and project management (per for example, Henderson, 2008; Huang, Barbour, Su, & Contractor, 2013). Differing criteria for the practice of their work (i.e., scientific excellence versus regulatory deadlines) emerged in the interviews, and we translated these into measures as well. The questionnaires provided a means to collect information across the team for discussion during the workshop, but the data were not included in this analysis.

### **Workshop and Facility Visit**

After completing the first round of data collection, we reflected on the preliminary results with our first contact (obscuring participant identities). Based on this conversation, we developed a workshop to discuss preliminary findings with the WCT. Completed in the summer of 2011, we facilitated the workshop as part of a site visit wherein we also observed four meetings, took a tour of the Facility, conducted field interviews, and had two debriefing conversations with our first contact, the morning of the workshop and the morning after. We took fieldnotes throughout. Because at this stage we were concerned generally with communication dilemmas (Barge & Craig, 2009) informed by the exigencies of the WCT, our fieldnotes focused on “initial impressions,” “key events or incidents,” and what seemed meaningful to participants (Emerson, Fretz, & Shaw, 1995, pp. 26-27).

We held the workshop on the first day of the visit. In the morning, we first toured a

contractor's office where the WCT often met. We then observed the team during a two-hour weekly meeting. Afterwards, we conducted a four-hour workshop. The first author facilitated while the second took fieldnotes. We presented preliminary results from the interviews and survey, and participants engaged, reflected on, and challenged the results ( $n = 16$ , nearly the entire WCT). The facilitation aimed at eliciting and developing recommendations they could enact through questioning rather than making specific authority-driven recommendations (Dempsey & Barge, 2014). The workshop checked our preliminary interpretations, and the participants reflected on their own and each other's practice (Seibold, 1995). Immediately after the workshop, we debriefed at a local restaurant, surfacing key moments and orienting the continued data collection. In the week after the workshop, the second author toured the WCT offices and the Facility, and conducted field interviews using by the semi-structured protocol used during phone interviews ( $n = 3$ , including 1 follow-up).

### **Mosaic Portraiture Analysis**

The project necessitated ongoing data analysis (Barge & Shockley-Zalabak, 2008), and we worked throughout to retain reflexivity and independence. We talked about our reflexivity, systematized rounds of independent and collaborative analysis, and created intermediate research materials. We developed *mosaic portraiture* during the iterative analysis. Mosaic portraiture supported a hermeneutic weaving of our initial pragmatic orientation, our emergent realization of the importance of identity tensions, and multiple rich data sources.

Mosaic portraiture is a modified version of portraiture methodology (Lawrence-Lightfoot & Davis, 1997). However, unlike similar approaches (e.g., constant comparative analysis), portraiture centers on the creation of dossiers that organize data into holistic cases that lend more context to the data than themes. Portraits evoke context through imagery and narrative.

Portraiture is particularly useful for triangulating varied data sources around central loci of analysis, allowing us to analyze data from multiple sources simultaneously rather than discretely. As in other methodologies, portraiture involves “synthesis, convergence, and contrast” to look for repetitive refrains, resonant metaphors, and rituals, but those are woven together into portraits and then themes and patterns are derived from those portraits (Lawrence-Lightfoot & Davis, p. 193). As we analyzed the data, traditional portraiture presented shortcomings. For example, traditional portraiture focuses on entities (i.e., schools) not individuals. To retain the benefits of portraiture, but, for example, protect the participants’ confidentiality, we created instead mosaic portraits, amalgams of stories, examples, and discourse. *Mosaic portraiture* organized the data analysis process into (a) the gathering and sorting of *tesserae*, (b) the playful exploration of data and theory-driven *mosaic structures*, and (c) the crafting of *mosaic portraits* (see Table 1).

**Tesserae.** Tesserae are individual tiles that comprise a mosaic. This stage of analysis involved gathering and collating the data and analytic materials we had produced (e.g., interview notes, fieldnotes, and intermediate analyses and reports, and initial dossiers). We focused on participants’ accounts of their collaboration, which necessarily involved thinking about individual, team, organizational, and interorganizational phenomena. We reviewed the tesserae through rounds of independent reading and discussion highlighting key stories, moments, and quotes. For example, the second author reviewed the original dossiers with a focus on key moments of conflict and problems as described by the participants. He then enumerated the ideals that seemed to be guiding the practice we observed or learned through interviews. Then, the first author reviewed the dossiers, and through conversation, we clustered them looking for consonance and dissonance.

**Mosaic structure and portraits.** Second, we developed and applied multiple

frameworks for organizing the tesserae. This stage reflected our efforts to create a lattice that held together the parts and the whole emerging in the analysis. Our goal was a sensible, data- and theory-driven structure. For example, through this process we created multiple charts on which we attempted to array the tesserae. The second author created structures through conversation with the first and applied them. We would then interrogate the fit of the tesserae in the mosaic structure. The mosaic structure evolved as we tried different frameworks for making sense. Early structures reflected, for example, Lewis et al.'s (2010) tensional framework with additions based on our analysis. The mosaic structure that proved the most robust was organized around illuminating the identity tensions and the term became a common refrain as we arrived at a structure that captured and conveyed the spirit of the tesserae (see Table 2). That mosaic structure reflected competing premises and arrayed tesserae in terms of the implications of those premises for decision making and managing conflict, concerns about safety, the criteria that each premise used to guide their collaborative work. Third, the mosaic structure guided the writing of portraits, which follow in the findings gallery.

### **Findings Gallery**

The resulting premises for self-definition do not represent a single person, self-categorization, or role. Instead, they represent *coherent sets of ideas* about what the WCT did, including differing but overlapping meanings of their collaboration and knowledge-work. Multiple voices are present in each mosaic portrait (cf. polyphony in Belova, King, & Sliwa, 2008). They are interwoven with self-categorizations, but a particular individual might (and did) draw on different or multiple premises at different times in their role, as part of their occupation, for their organization, and informed by their professional and disciplinary attachments and beliefs. That is, a given team member might be trained as a scientist or engineer, working as an

employee of an agency, and acting at different times in the interests of science, engineering, regulation, and/or project management. Indeed, the mosaics are useful *because* they acknowledge the overlap with category and role without conflating them with concomitant logics and beliefs.

We distilled four coherent premises through the analysis: *knowledge creating/scientist*, *knowledge checking/regulator*, *knowledge applying/engineer*, and *knowledge scheduling/project manager*. They reflect four different answers to the question “who are we, first and foremost?” A given member of the WCT might give a different answer under different circumstances. Each one embodies a different way of viewing their collaboration and the relative priorities of their work. The creation of mosaic portraits allowed us to capture the competing premises without limiting the portraits to descriptions of particular participants; however, in the gallery we use the terms scientist, regulator, engineer, and project manager to refer to those moments when a particular participant was enacting a particular premise.

### **Knowledge Creating/Scientist**

WCT scientists described themselves as creators of knowledge. During interviews, scientists took pride in their work, discussing the Facility as an opportunity to build knowledge. For scientists, involvement offered unique access for scholarship. Their work was not merely complex; it required that they produce the science that guided the construction of the Facility. A participant explained, “I think of myself as [my lab] first, then the Facility.” Scientists privileged in their accounts knowledge gained through experimentation, modeling, and hypothesis testing. They talked about the importance of partnering with other scientists and the unique opportunities afforded by the Facility. Scientists described their work as fun, speaking about their contributions to scientific discovery. The desire for scientifically sound understandings of

complex phenomena was their core premise.

Scientists described relishing the inherent, ongoing uncertainty of discovery. They described working in “unchartered territory” as a mission and a calling. They argued that knowledge building was important for regulatory functions like documentation and for safely securing toxic waste for an extended period of time. Scientists expressed anxieties about the safety of the long-term storage of toxic waste, and dealt with it by relying on their expertise. Participants described safeguards like specially designed site markers that could alert people to hazards far into the future.

Perceptions of the importance of scientific discovery for the Facility played out in our observations of meetings. For example, we observed a lab scientist and a contractor joking about not seeing each other. When asked why they had not seen him around lately and if he had been “lost,” the scientist remarked, “No, I have to do some real work. If it weren’t for me, you wouldn’t be allowed to put anything in [the Facility].” Although the interaction seemed jocular, it reflected a prioritization of scientific knowledge over others. During our workshop, a participant questioned the efficacy of the assessment methods, asking if the data meant anything at all. The first author responded that the point of the workshop was to make space to answer that question. The participant seemed unimpressed, and did not return after the break.

Scientists argued that project management deadlines should work around scientific processes. For them, discovery was paramount, and it did not obey timetables. They emphasized needing to retain scientific uncertainty in documentation even as others pushed for certainty to proceed (e.g., to build the site, to submit the documents). A participant argued that the regulatory documentation is “hard for scientists to write” because they have to look for the “politically correct ways of saying things.” Scientists argued that really the science *should* speak for itself.



They argued that the requirements of sound science were essential in making decisions about the Facility and documentation. They explained that a common point of disagreement was the formatting of and use of different standards in documentation. Whereas others described heated disagreements between scientists as of “little consequence,” for scientists, decisions about such standards were at the crux of their identity. In interviews, participants described scientists as preoccupied in meetings with “unproductive” and “philosophical” discussions. Scientists explained that they had a duty to scientific commitments: To get the science right was to get the reporting right, which was key for scientific reputation and the integrity of the documentation. Yet at the same time, a participant argued that the project was multidisciplinary and that “everyone wants to use *their* language.”

Participants without the same focus on discovery argued that the scientists’ behavior could be counterproductive, especially when meetings bogged down in “pedantic” or “petty” matters. For example, disagreements between the scientists and technical editors were heated. Scientists argued that the technical writing contractors would change the meaning of statements in efforts to give the documentation a consistent voice. At times, what seemed to others as only subtle differences seemed of essential importance to the scientists who valued precision and accuracy in knowledge creation.

Participants explained that leadership expressed reluctance to intervene in scientific disagreements, balking at contradicting the experts. Participants mentioned that some of the scientists involved were among only a handful of people in the entire world with the requisite expertise. Others argued that documenting regulatory compliance should trump such debates regardless of their importance in the scientists’ knowledge creation.

### **Knowledge Checking/Regulator**

Regulators checked the WCT's work. Although the formal regulator was an external agency, participants evoked the knowledge checking/regulator to advocate for particular ways of seeing their knowledge work, making decisions, and conceptualizing safety concerns. Principal tasks for regulators included checking and coordinating the compliance of procedures with relevant policy and law. Their focus on compliance meant that they prioritized drafting the regulatory documents in accordance with applicable rules, policy, and law. Regulators lived in the language of compliance, meaning that seemingly trivial changes could corrupt the meaning and encumbrance of a document. During a meeting, a participant argued of changes being discussed that they had to be correct. He responded to disagreements over language in the document, "Well, *I ain't* going to jail. It's just that simple." His comment, made part in jest, nonetheless emphasized the potential legal ramifications of their work. According to another participant, collaboration required give and take, and although legal ramifications might have seemed straightforward, there was a subtle nuance necessary to crafting compliance documents. To the extent that they expressed anxiety about the safe storage of toxic waste, regulators vested faith in application of sound oversight.

Operating procedure manuals and technical guidelines were specific; however, because of the complexity of the work, participants explained that the regulator had to make interpretations. Regulators valued just the right amount of ambiguity, which allowed flexibility within the compliance documents to ensure task completion. During one meeting, we observed a participant change one word in a draft, changing a "can" to a "should." A contractor jumped into the conversation: "what does *that* mean!?" The participant fired back, "Exactly! What does it mean? [Laughter ensued]." These exchanges appeared in good humor, but at other times, the tone became more serious. Meetings were interrupted because of language use. The regulator

required consistency, in the documentation and with the formal rules that guided its creation and evaluation. Being the keeper of those regulations was the crux of their identity.

Engineers came to regulators with questions, such as, “Can I use chemical solvent Y and still be in compliance?” Regulators drew on expertise or referenced formal documents to render judgment. A meeting we observed and excerpt here from fieldnotes reflected this dynamic:

After a brief discussion of the previous night’s weather, the discussion shifted to accomplishing the “meeting’s goal.” The goal, as the facilitator explained, was to eliminate a gap in a containment wall five stories deep in one of the waste storage areas. The facilitator quipped that before the day concluded, they *would* have a solution. ... The group hashed out different facets of the same problem. An independent contractor from an engineering firm interjected, “engineers need to know all the parameters to a problem, so that they can engineer around stated parameters.” Eyes rolled, and another member jumped up from the table and left the room. A few minutes later he came back to the table with an operating procedure manual and tossed it across the table. He then walked over to his colleague and thumbed to a specific page. He held the page out to the contractor.

The regulators explained they could not simply tell engineers all the parameters, as they were breaking new ground in the Facility daily. Engineering around a problem might involve developing a “work-around” that circumvented compliance. For the regulator, laws could *not* be worked around.

Likewise, participants explained that these documents required scientific rigor, but for example, one regulator stated he did not see the need for “unproductive scientific discussions.” If they did not follow regulations, they were “moot.” Scientists countered that the nature of their work meant that rendering legally and scientifically sound interpretations was not straightforward. Regulators had to make interpretations nonetheless.

Procedural norms and government oversight also led to conflict, but for the regulator, deciding those conflicts was in principal about the correct interpretation of relevant policy, rules, and law. Again, participants argued that the conflicts that did occur especially about the scientific

language in documentation were “minor” or of little importance even as they argued that the regulatory language had to be correct. For example, a participant described technical editors as “glorified wordsmiths who don’t realize that when they change a word to make it ‘sound better’ they change the legal ramifications behind the document.” Whereas scientists saw conflicts about language as about scientific accuracy and the standards of reporting, regulators emphasized the legal ramifications of documentation.

### **Knowledge Application/Engineers**

Engineers applied specific knowledge to solve problems. Engineers were described as analytical and linear thinkers. For example, in an interview, we asked an engineer to describe their work with a metaphor. After a long pause, the engineer explained that the work at Facility was precise and “could not be compared to anything else in the world.” Precision and accuracy in language was key for the engineer, but determined by the actual functioning of objects in the world, not by scientific discovery or regulatory documents. During a presentation, a contractor explained that he had been working on solutions for a “fire door” problem, and an engineer interjected rolling his eyes, “you can’t say fire door, it’s a ‘control door’ – but go on.” Again, language mattered, but for related yet different reasons.

Dealing with the safe, long-term storage of toxic waste meant addressing the fundamental engineering problems of the Facility in ways that would work in the real world. A participant argued that sometimes the concern for safety seemed to take a “backseat,” enveloped instead by emphasis on language and compliance. Others argued that unfolding scientific discovery and regulatory interpretation meant that the safe solution of engineering problems was hard to make concrete. In a meeting we observed, an engineer complained, “This is just unfair, we’ve been assigned a moving target...no, not even a target, just something that is constantly moving.”

They argued their work was hampered because of stringent yet seemingly arbitrary compliance demands. These demands exasperated engineers in meetings. The material disconnect between the language games and the problem-to-be-solved contributed to engineers not knowing how to proceed, unable to conceptualize specific parameters needed. In an interview, one participant noted that a charter document was widely assumed to have some incorrect information because they were working with imperfect science. He explained some calculations were “too complex” and unnecessary. In one meeting we observed this conflict when another engineer said, “We don’t want all this crap...” referring to detail in the documents, and then commented that errors were commonplace. We followed up with the participant later who explained that he had seen a glaring mistake. He said that its existence proved that it did not necessarily need to be “that technical” all the time. Emphasizing actually making the Facility work in practice, engineers exalted the importance of “engineering around a problem.”

### **Knowledge Scheduling/Project Manager**

Project managers organized the processes through which scientists, regulators, and engineers implemented and documented the site. Not beholden to any Facility specific expertise, they were facilitators. A participant explained that they were the “owners of the schedule,” and that project managers called meetings as they decided they were needed. Project managers described themselves as “planners,” and during our tour of the WCT offices, they were excited to show us their project tracking documents—an essential tool in their work. We observed these plans posted on walls and spread out on tables. The project tracking documents resembled elaborate architectural blueprints rather than mere charts. Arrayed in massive spreadsheets, the plans were color coded and crisscrossed with arrows, dates, and project abbreviations. The documents printed with small text and arrayed altogether covered an entire wall with critical

work still remaining or off schedule flagged in red.

These documents captured in an artifact the project managers' fixation with time. The crux of their identity centered on pulling together all of the work of the team members on a deadline driven timeline. Each piece of documentation required rounds of writing, review, and revision with parts of or the entire WCT. Participants explained that project management's focus was keeping all these disparate parts coordinated and on deadline. Regarding safety, project managers argued that keeping everyone in good contact and keeping the project on schedule were most essential.

Project managers also described disagreements about scientific standards as "trivial," but argued they could see why the conflicts occurred. They explained that they too had relevant expertise (e.g., one project manager pointed out that his undergraduate and graduate degrees focused on disciplines at work at the Facility), but their principal concern was getting it right *and* getting it on time. A participant argued he could of course appreciate the scientific and engineering complexities, but the documentation had to be submitted. During the workshop, a participant, walked up to the whiteboard where the facilitator was taking notes to diagram the flow of scientific advancement. He explained that science is always advancing (drawing a stair-stepping line), but that the project needed to take the best action given the best available science (marking an "x" earlier on the line). Another participant explained that it "takes two years to write it up, but the research doesn't just stop."

Participants also explained that project managers had an interest in making the WCT processes run smoothly. For project managers, good knowledge work occurred through effectively managed and minded processes. Formally designated project managers could not direct participants to act, because although they worked closely with leadership, they were

distinct from leadership. Instead, a participant explained that he had to move projects along with email reminders and appeals through multiple hierarchies.

To be clear, project management was not just the responsibility of dedicated staff. The four premises that we have presented overlap with formally defined occupations and roles (e.g. the laboratories, contractors, and government agencies contributed individuals with diverse backgrounds). The operation of the premises represents communicatively constituted ideas about what the work should be, negotiated in their collaboration. At times, formally defined project managers directed meetings, negotiating the concerns of knowledge creating/scientists, knowledge checking/regulators, and knowledge applying/engineers from different organizations. We also observed them take a back seat, letting the members of the WCT work out these concerns themselves. We observed those formally designated as scientists and engineers direct meetings too, minding the concerns of knowledge scheduling/project managers. For example, a participant whose home organization was a laboratory explained, “My biggest task is getting them focused on *what* we’re delivering *when*.” Yet, even for this scientist, playing a project management role with his colleagues was challenging, explaining that it is like “herding cats.” Team members accomplished their work through their expertise and the clout of their respective home organizations. Project management relied on appeals to common goals, deadlines, and more rarely on leadership intervention to move the projects forward.

The exigencies of knowledge scheduling/project managers were no less true when a scientist was playing a project management role, but they were complicated by the presence or absence of other acknowledged credentials. For example, during one interview, a participant explained that despite his background, scientists did not engage those they saw lacking expertise. A participant told the story of a scientist cutting a conversation short, noting that he probably did

not have the background to understand. At the same time, in their capacity as facilitators, knowledge scheduling/project managers exercised power indirectly by organizing the work of the WCT. For example, participants talked about the politics involved in selecting a meeting site. Holding the meeting on home turf, they argued, offered advantages (e.g., having more members present). More neutral ground (e.g., at the offices of project management) focused them back on their collective space and identity rather than individual interests. Project managers also facilitated the crafting of explicit expectations for what information would be shared among the collaborators on what schedule. For example, a scientist explained that he had struggled in the past getting information, but that now there were concrete expectations in place. He explained that project managers had tried to moderate conflict among the scientists. At the same time, he argued that project management as well as formal WCT leadership lacked the “technical background to evaluate who is right.”

### **Identity Tensions in Collaboration for Compliance**

This study contributes insights for understanding and negotiating the struggle among premises for self-definition in collaboration. These premises reflected different ideas about the purpose of the collaboration: creating knowledge in the pursuit of discovery; checking knowledge against law, policy, and rules; applying knowledge to solve practical problems in the Facility; and scheduling knowledge to keep the process on time. The negotiation of these premises of self-definition were woven into the work—the production of a document that required the integration of multiple, overlapping, and conflicting knowledge bases. The identity tensions approach treated collaboration as more than an economic problem of divergent interests (Oliver, 1990) by acknowledging that these premises reflect the very ideas team members hold about who they are and who they should be together. Such commitments are not reducible to



costs and benefits analysis, and persist even when they produce seemingly irrational dynamics (Pepper & Larson, 2006). The four premises are empirically useful too, because they may be common to collaboration involving regulation, science, and engineering, which is the case in toxic waste management (Cline, 2010; Wagner, 2004). Understanding conflict and decision making in such collaboration or collective action spaces (Flanagin et al., 2006) may depend on understanding the ways that collaborators invoke these premises.

To that end, the analysis yields at least two important theoretical contributions: First, identity tensions influenced how WCT made sense of their work by offering competing premises for resolving power struggles, deciding project assignments, managing conflict, and thus, the very constitution of their collaboration. Second, the negotiation of collective identity occurred even though their collaboration and thus aspects of their communication were mandated to a greater degree than others. If anything, the mandate complicated and made more important the negotiation of their collective identity as they navigated bureaucratic systems with competing notions of legitimate knowledge.

### **Identity Tensions in Conflict**

The WCT members described their conflicts in contradictory ways. They described them as habitual, trivial, petty, and “childish brouhahas.” Even as they were dismissive, they described choosing carefully when to engage and to avoid conflict. They talked at length about conflict. During the workshop, they expressed frustration about how conflict management and fears about recriminations for talking about specific conflicts. A participant argued that “heads will roll” should they challenge the individuals they saw as instigators.

At first, we struggled to reconcile (a) the protestations that they had few conflicts and that they were trivial against (b) the sheer recurrence of conflict as a theme and the intensity of their

feelings about conflict during the workshop. However, an alternative reading of their description of the triviality of their conflict is offered by identity tensions. Calling a conflict trivial was not just to mark it, but the premises on which it rested, as unimportant. They may not have been dismissing conflicts as not worthy of concern, but devaluing the premises for self-definition that underpinned them (e.g., a participant talking about persistent, trivial conflicts also described scientist as “babies”).

Relatedly, we had expected more interorganizational conflict. As the participants themselves noted, the laboratories, for example, were in direct competition for funding. Participants did explain that turf guarding occurred but argued it was uncommon, because they had dealt with those problems in the past and defined the domains of work by lab specific expertise. Another participant argued that a lab might be favored by leadership making it more likely to get new projects. Yet, participants argued that on the whole, there were not that many large-scale turf-wars or conflicts over project ownership that impeded collaboration. During a meeting, we observed two lab representatives argue about who should own a project, but it seemed more an argument about the domain of the project. Deciding the relevant expertise (an identity-laden accomplishment) would shape who got to do the work.

Although turf was salient in their accounts of conflict as suggested by previous research (Lewis et al., 2010), the operation of differing premises for self-definition seemed more relevant. Each organization had a clearly delineated set of responsibilities. Power struggles seemed to focus less on who would do which projects and more on whose expertise would count in making decisions. A participant argued that whoever “yelled the loudest” or “had the last word in a meeting” would hold sway over the final document. The struggles reflected in identity tensions constituted their navigation of bureaucratic systems (Flanagin et al., 2006) that were, in this case,

relatively fixed. The importance of these struggles is precisely what made a straightforward reading of their roles problematic and the concept of identity tensions useful.

### **Fostering Shared Collective Identity in Collaboration for Compliance**

Although research has suggested the utility of fostering collective identity in collaboration (Koschmann, 2013; Thompson, 2009), this study demonstrated that the character, negotiation, and utility of shared collective identity varies. The encumbrance of the regulatory frameworks (Lammers, 2011) may have made the negotiation of identity tensions *more* integral. The legal context acted as an external force keeping the team together without offering much of an impetus for the formation of collective identity. Conceptualizing identity as tensional was productive because it allowed us to reconcile in a focus on identity the competing individual, organizational, and institutional frameworks for their work including self-categorizations (i.e., profession, organization, discipline, occupation). They had an individual stake in the work as integral to who they were. At the same time, there were multiple organizational stakes in the work. Macro-forces influenced the collaboration through rubrics for the work (e.g., engineering standards and methods, scientific disciplines, regulatory policy and procedure, and project management) and the regulatory context. The collaboration of the WCT cobbled together by law, professional status, and history may have offered a weakened impetus for shared collective identity. Yet, the waste was coming. The deadline was approaching. They could not but collaborate. Instead, the team found common ground in the day-to-day necessity of doing the work within bureaucratic systems, and this study underscores the importance of the negotiation of identity tensions in sustaining and enabling this sort of collaboration.

### **Practical Applications for Recalibrating Identity Tensions**

Based on the findings, we offer the following practical applications, which may be

especially useful in more mandatory collaboration. Collaborators should take care with “trivial” conflict. The framing of conflict as trivial may have undermined efforts to manage it. Labeling conflicts as trivial seemed to misrepresent the types of conflicts participants mentioned (e.g. racial epithets by a lab leader, refusals by some to speak to colleagues). In dismissing conflicts, WCT members may have missed opportunities to negotiate the identity tensions integral to the collaboration. At the same time, when participants reflected on the communication strategies that seemed to work best for dealing with conflict, they did highlight avoidant strategies (Poole & Van de Ven, 1989; Tracy, 2004). Participants explained that conflicts were handled best when project managers shifted those disagreements to offline conversations between the experts rather than the team as a whole. Participants also argued that conflicts were well handled when leadership authoritatively decided in favor of a particular view even though formal leaders expressed a reluctance to do so, because of the technical complexity involved.

Creating oblique communicative spaces to talk about the tensional character of communication processes (Tracy, 2004) also offered useful resources. Such strategies work in part by surfacing tensions and encouraging integration of the competing premises. They seemed to work in this case, because they engaged the tension without getting bogged down. For example, we observed a participant ask during a routine meeting, “and this is important because...?” The participant then reiterated the need for this questioning practice as routine. He explained that these questions made explicit why their approach to a particular issue in a particular way mattered according to their common interests. It served as an appeal to the needs that pulled the team together—aspects of their shared collective identity as members of the team (cf. similar practices for collective communication competence in Thompson, 2009). Although we observed such practices, they were not mentioned in the interviews when we asked about

effective strategies for communication, perhaps reflecting a preference in the team for avoidant strategies or an unawareness of their usefulness.

However, workshop participants did argue that they relished the extended opportunity for meta-communication. A participant commented, “We never get to talk about this stuff.” We asked if making such conversations a routine part of their work might help, and they expressed a shared commitment to continuing them. When we presented the observations from participants about taking conflict into offline conversations and leadership stepping in to decide issues, the participants also reaffirmed their utility. It is likely that the enabling negotiation of identity tensions depends on a contingent mix of strategies (Poole & Van de Ven, 1989; Tracy, 2004).

Mosaic portraiture used in practice may also enable the negotiation of identity tensions by making concrete the premises for self-definition in play. The workshop provided a means to uncover and sustain reflexivity with respect to identity tensions. Mosaic portraiture could likewise allow for delving into identity and organizing where there are heightened confidentiality or anonymity concerns. Piecing together rich, mixed method data can prove particularly challenging in engaged scholarship. Framing the data as tesserae gave us a means of organizing commensurate data. At the same time, we were able to sustain the intimate exposure to the site, context, and polyphony (Belova et al., 2008).

### **Conclusion**

These insights must also be understood against the backdrop of this study and its limitations. For example, we were unable to talk to every member of the WCT. Our mosaic portraits are shaped by, to some extent, louder voices and those willing to talk to researchers. That was clear during the interviews and workshop. At the same time, the workshop offered a space for participants to resist our interpretations and the robustness of the data. Despite their

optimism for the process, participants also expressed doubts that the WCT would be able to change. Cognizant of the study's limitations, the methods and analysis nonetheless offered a useful approach for managing the richness of the data produced.

These results reflect too a principal advantage of engaged scholarship. Through reflection in the workshop, for example, we were not only able to talk about the competing premises for their work but also to develop an awareness of the strategies employed to negotiate them. The workshop offered an opportunity to enhance collaboration through reflexive practice. We were also able to cope with the tension between representation and intervention (Dempsey & Barge, 2014), negotiating of the representations of the data collected *and* the interventions reflected in this paper and the practice of the WCT. The mosaic portraits proved useful for interpreting the complexity and multiplicity of individual and collective identities offering insights for the challenges of collaboration in regulatory contexts. They helped decipher the ambiguous, fragmented, polyphonic, and tensional character of the WCT's important work.

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Table 1

*Mosaic Portraiture Methodology*

Process	Definition	Example
Tesserae	Gathering and sorting individual tiles (i.e., fragments, snippets) from the data that may contribute to the mosaic.	We looked for stories, moments, resonant metaphors, language use, and descriptions from observations that were meaningful to the analyst and/or seemed meaningful to the participants. Tesserae came from interview and observation notes, dossiers, and a tensional analysis of the corpus of research notes completed for the workshop.
Mosaic Structures	Charting and mapping through iterative data conversations to organize the tesserae guided by emerging data and relevant theory.	We created multiple charts (akin to Table 2) and attempted to organize through iterative rounds of analysis and conversation the diversity of our tesserae, playing with different theoretical frames.
Mosaic Portraits	Crafting amalgams from analysis that center on particular entities described across dimensions emergent in the data and theory.	In this case, knowledge creating/scientist, knowledge checking/regulator, knowledge applying/engineer, and knowledge/scheduling project manager captured the premises for self-definition in the data, and we explored them across theoretically and practically important dimensions (see Table 2).

Table 2

*Mosaic Structure: Premises for Self-Definition with Implications for the WCT's Knowledge Work*

<b>Premise</b>	<b>“First and Foremost, We...”</b>	<b>Conflict and Decision Making</b> “...how we should decide...”	<b>Safety Concerns</b> “...how we should deal with safety...”	<b>Frames for Documentation</b> “...how we think about the WCT...”
Scientist	Create knowledge	scientifically sound insight, scientific standards, “lab first,” discovery as “real work,” science speaks for itself vs. being politically correct	safety anxiety managed through expertise, safe guards, site markers, “uncharted territory”	collaborating with other scientists, scientific discovery process
Regulator	Check knowledge	interpretation of rules, policy, and law; language of compliance; written documents, operating procedures, manuals; “I ain’t going to jail”	sound oversight produces safety, safety boundaries specific to emerging situation	interpreting rules, policy, and law to answer questions about Facility projects, producing documentation per regulatory framework
Engineer	Apply knowledge	“real world” functionality, engineering skill and know-how, “what will really work”	“back seat,” solving engineering problems correctly produced safety	creating precise, accurate, logical language to guide the real building of the Facility
Project Manager	Schedule knowledge	being on time, proper coordination, consensus of all the experts, best possible certainty at a given point in time, patience	keeping process smooth, people in touch and communicating, on-time would produce safety	“baby sitting,” tight timeline with hard dates, “project management flow cart”

*Note.* This chart is a simplification meant to represent the collated notes organized through the iterative analysis process. These fragments stood for narratives and meaning that we then described in the findings gallery. The chart is not meant to summarize all the data, but to exemplify the form and function of tesserae and mosaic structures.