

Karlene Roberts and Paul Schulman, "Presentation Before the California Senate Subcommittee on Electric, Gas and Transportation Safety" May 14, 2019

Chairman Hill and members of the Subcommittee:

Thank you for allowing us to share some thoughts with you today.

In its report "Safeguarding Safety: Participation of Safety Advocates in a Regulatory Landscape" the California Senate Subcommittee on Electric, Gas and Transportation Safety raises many important questions about the role of safety advocacy in improving the safety regulation of the CPUC. The report also proposes two major options for this advocacy: the current, and still developing, Commission's Office of the Safety Advocate (OSA) and a possible independent board "dedicated to improving utility safety".

In assessing these options for safety advocacy, we think it might be helpful to the Subcommittee for us to identify some key functions that in our opinion need to be performed in effective safety regulation, and to consider what roles and in what locations they can best promote these functions. These functions we outline here are more specific than those typically identified with the four "pillars" of safety management systems.

Here, we believe, are some major functions necessary to support effective safety regulation:

1. Asking questions:

"What if ...?"; "Have you thought about ..."? "What are we missing or leaving out?"  
"Why does this keep happening?" "You seem to be assuming ... in making this decision. What is this assumption is wrong?"; "How do you think this will work?"  
"What if it doesn't?"

Being able to ask basic, if embarrassing, questions is a foundational function for the pursuit of safety. After the Deepwater Horizon disaster an investigator, after reading the elaborate Safety Handbook written to cover the Transocean rig asked: "How do you know it's bad enough to act fast?"<sup>1</sup> It was a question that should have been asked well before any drilling operations were even undertaken.

Currently OSA personnel from our perspective feel they as safety advocates must advocate *for* something specific, with a strong argument and justification to defend against push back from other advocates in adversarial proceedings. They do not feel they can advocate for safety through the asking of questions. They feel they will be expected and judged on their ability to supply the answers.

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<sup>1</sup> N.Y. Times, "Deepwater Horizon's Final Hours" (December 25, 2010).

But posing basic questions is a common practice in effective “high reliability” organizations we have observed. They are managing often catastrophically hazardous technical systems and operate under clearly identified events they simply never want to have happen. But they know that they have to constantly be on guard against errors in anticipation, calculation and understanding. They can’t be safe unless they are managing reliably with respect to detecting and mitigating these errors and they can’t detect them if they are not constantly asking themselves questions. In the history of catastrophic accidents hubris is a much more prominent factor than skepticism and doubt.

Right now we have observed that the OSA, with its still small staff and limited staff support, and preoccupation with formal proceedings has struggled to address a questioning role in safety advocacy within the CPUC. It is important to recognize that the effectiveness of the OSA as a safety advocate depends on its acceptance within the rest of the CPUC as it broadens its advocacy functions as a legitimate and complimentary unit within the Commission. We do not believe it has yet been institutionalized into the Commission and that some form of Commission-wide socialization and training to its role should have been done earlier and is still called for.

## 2. Safety research and analysis

A great deal of safety research is currently being conducted some of relevance to safety regulation and management. Safety regulators should be clients of some of this research if it is translated by staff or outside experts into a regulatory frame. Regulators can even contribute to it through R&D processes leading, for example, to the development of safety management and safety culture metrics and also from their own learning from accident and incident investigations, and their own regulatory experiences.

Right now the CPUC is considering in its OII Proceeding 15-08-019 Governance and Restructuring options it could adopt for PG&E to improve its safety culture. But there is little research to suggest that structural variables alone can determine the development of a safety culture. Safety culture is not “baked-in” to specific organizational structures. The National Academy of Engineering in a report on safety culture in the Offshore Oil and Gas Industry described this process of growing a safety culture as “a long and uncertain safety culture journey”<sup>2</sup>. Whatever options the CPUC may choose will have to be monitored and measured carefully to see what, if any effects, they are actually having on safety culture development.

Validating the effectiveness of Commission decisions requires the enlargement of the scope of its monitoring process, using various measures for safety culture

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<sup>2</sup> National Academy of Engineering, *Strengthening the Safety Culture of the Offshore Oil and Gas Industry* (Washington, DC: The National Academies Press, 2016), p. 9. <https://doi.org/10.17226/23524>.

assessment -- surveys, interviews and observations. It also means developing safety management metrics to assess what, if any, managerial changes, have taken place as a result of a chosen restructuring option. Other safety metrics should be developed and employed as leading indicators to track changes in safety processes before accidents occur.

But the CPUC has denied itself the R&D process necessary to develop safety and safety culture metrics with the utilities and experts in a cooperative process. Federal safety regulators such as the Nuclear Regulatory Commission and Federal Aviation Administration both conduct and contract for safety research. The NRC and has its own research publications, some of which are written by NRC staff. The FAA collects and analyzes flight data and gives research grants to university and other researchers on a variety of aviation safety topics.

It could well be a function of an independent safety board to conduct the research and development the CPUC does not now have the resources nor the flexibility to conduct cooperatively with the utilities.

### 3. Accident and Incident Investigation

When significant incidents and accidents happen the CPUC as does other regulatory agencies will order an investigation. Transportation safety regulators such as the FAA rely on independent accident investigations undertaken by outside organizations such as the NTSB. The NRC has its own Office of Investigations (OI) to conduct investigations but other NRC staff might participate in them. The OI unit also has special agents who can conduct their own accident investigations when there is a likelihood of criminal or regulatory violations of law underlying the accident.

Other safety regulators may appoint special investigative panels to investigate an accident, as the CPUC did when it appointed a, Independent Review Panel to investigate and report on the San Bruno pipeline explosion. The NTSB also conducted an investigation of the explosion. The CPUC often conducts its own investigations under the direction of an ALJ. Currently the ALJs do not receive training in root cause analysis, safety management systems or safety culture.

It might be a useful task for an Independent Utility Safety Board, as one of its functions to conduct accident investigations, through its own staff, augmented by its appointment of outside experts to participate. An external board could also independently assess the role that existing CPUC regulations or absence of regulation might have played in an accident under its review and offer recommendations for changes in CPUC regulations or inspection processes.

### 4. Inspections and enforcement

Inspections are an important part of all safety regulation, providing information to regulators about compliance and regulatory effectiveness. Inspections can also be an important source of information about regulatory error and problems of compliance. Inspectors can also be educators about regulatory requirements and shifting safety standards to the utility personnel from the top down to shop level personnel they encounter.

Currently the CPUC has inspectors and auditors under specific branches (Electric, Gas and Rail) in the Safety and Enforcement Division. But it's not clear that the CPUC inspection staff have training of this staff in organizational and safety management issues to sufficiently support high quality CPUC safety regulation. They, like the AIJ's, do not receive any special training in safety management systems or safety culture.

In our interviews with inspection personnel at the CPUC we found significant variation in perspectives on what constitutes safety between different branches of SED and among inspectors within the same branch. They ranged from one perspective in the gas safety and reliability branch that "if they're following the rules they're safe" to another in the rail branch" who observed "what does it say about the concern for safety in a utility when I observe a railyard worker walking around with his boot untied?". Yet the National Academy of Engineering asserted in its safety culture report noted earlier that "One challenge for all regulators is changing the mind-set of inspectors from inspecting for compliance to advocating for safety culture."<sup>3</sup>

A number of inspection personnel believe that utility managers and workers will know more about their systems and their operation than inspectors will. They also believe they will know more about industry safety standards than inspectors are likely to. But this is not what inspectors at the FAA or NRC or a variety of other federal safety agencies believe. Also, by way of contrast, the NRC has two full-time resident inspectors on site every day and all day at every one of the nuclear power plants and nuclear fuel processing stations they oversee (150 in all).<sup>4</sup> They can attend any meeting at any level and observe any operational or maintenance activity that occurs at these facilities. While the CPUC may not be able to increase its inspection force to this level it should recognize the need to upgrade its own inspection capacities if it hopes to regulate and sustain safety management and safety culture improvements in the utilities it oversees.

An independent Board can also perform inspection functions with a highly trained and large inspection staff. But a trained and professionalized inspection staff can energize the culture of safety regulation and management within a regulator itself.

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<sup>3</sup> National Academy of Engineering, *Strengthening the Safety Culture of the Offshore Oil and Gas Industry* (Washington, DC: The National Academies Press, 2016), p. 5. <https://doi.org/10.17226/23524>

<sup>4</sup> For a description of this force and its functions see, NRC, "Backgrounder on NRC's Resident Inspection Program." <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/resident-inspectors-bg.html>

Further, the inspection staff can be an important source of information and advice about the effectiveness of CPUC regulations and policies themselves at the operations level.

Right now there is a rigid (if not always similarly understood) distinction in the minds of inspectors and others we talked to at the CPUC between advisor and advocate roles and between policy and enforcement roles. Many inspectors do not believe they should be advocates, and at the same time they should not be policy advisors because as we heard throughout the SED, “policemen should not make the rules they enforce.” The sum of these distinctions seems to be that inspectors do not think they can talk to upper level CPUC officials about deficiencies or ineffectiveness they may see or improvements they could suggest, in existing regulations or important safety activities currently devoid of needed regulation. This denies to Commissioners, ALJs and others at the policy level an important source of information to improve both regulations and their enforcement.

## 5. Monitoring safety drift

Our research on reliability and safety management has indicated that safety management is not the achievement of constancy and invariance in behavior and performance. It is actually the careful management and containment of fluctuations that naturally occur in organizations in human attentiveness, problem-solving intensity, communication and trust.<sup>5</sup> Well managed safety organizations are always on the lookout for precursor signals of fluctuation in these organizational properties. A successful safety management system is always internally watchful for its own decay – of the rise of mindlessness in the face of routine, or lapses in inter-departmental communication and coordination or the loss of wider system perspectives by personnel who become preoccupied with their own departmental or unit tasks.

The CPUC also has to develop sensitivity to “weak signals” about its own regulatory lapses – perhaps losing a safety focus under the distracting challenges and pressures of attending to other policy mandates it has been given, such as the promotion of renewable energy, protection of the environment, regulating to reduce climate change, keeping utility rates affordable for all customers while preventing the financial collapse of key infrastructures and any consequent loss of service.

Potentially a strong and institutionally well-developed OSA could monitor and report on safety drift within the CPUC. An external Utilities Safety Board could also have monitoring the CPUC and annual reports on its regulatory quality as part of its formal responsibilities.

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<sup>5</sup> See Paul Schulman (1993). “The Negotiated Order of Organizational Reliability.” *Administration and Society*, v. 25, no.3 (November).

## 6. Searching and pushing for continuous safety improvement

Finally, effective safety regulation should also be a process that advances the state of the art of safety management in its regulated utilities, through its efforts to learn and improve the effectiveness of its own regulatory approach – including lengthening its time horizons through research, and in stimulating forces for safety improvement among its regulated utilities. It has been asserted that an important factor in the strength and effectiveness of safety management systems in regulated organizations is the attention, strength and prestige of the safety regulatory organizations that oversee them<sup>6</sup>. Safety management personnel in compliance units, for example have more respect and impact in their organizations when the safety regulators themselves are respected for their expertise and competence.

Currently, the CPUC has less public prestige and utility respect than it should have in the area of safety regulation. The Northstar report on PG&E's safety culture concluded that "[w]hile PG&E is committed to safety and efforts have been made to reduce incidents and increase the organizational focus on safety, these efforts have been somewhat reactionary – driven by immediate needs and an understandable sense of urgency, rather than a comprehensive enterprise-wide approach to addressing safety."

This, it seems to us, could also be a description of the CPUC's approach to its regulatory oversight with respect to safety. Much of its focus on safety is also reactive to specific events, and then is driven by a sense of immediate urgency for a finding a "solution", a process encased within formal proceedings that are adversarial and rigidly structured with respect to information gathering and communication.

One particular area in need of improved safety regulation it seems to us is interconnected infrastructure risk. Our research on a variety of infrastructures in Northern California found the complexity of possible interconnections and interdependencies among them to be formidable -- more complex than even managers and operators of each infrastructure realized. One important set of risks lies in latent interdependencies among the infrastructures (water, electricity, gas, telecoms, shipping, levees) that can appear in the shift from normal operation to periods of disruption, failure and then in recovery<sup>7</sup>.

Right now, in its corporate structure, PG&E's separate utilities or "asset families" have separate management, budgets and operating personnel. Asset families compute and manage their own risks separately and compete with one another for priority in a general risk register which determines corporate risk mitigation

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<sup>6</sup> See Swiss Re, *Safety Management in Context: Cross Industry Learning for Theory and Practice* (2013).

<sup>7</sup> For a description and analysis of these complex interconnections see E. Roe and P. Schulman, *Reliability and Risk: The Challenge of Managing Interconnected Infrastructures*. Stanford University Press, 2016.

investment decisions. Meanwhile the CPUC itself is not organized and has not undertaken (with its separate safety branches) to research, identify and regulate interconnected risks.

It's possible that the creation of an independent utility safety board with respected safety experts among its board members and staff could help advance respect for the CPUC role as a safety regulator if the CPUC could base its regulatory actions on recommendations of that board. It's also possible that the board could be a safe space for collaboration among CPUC and utility officials, together with Board experts to advance the quality of safety regulation and utility safety management.

We believe that considering functions such as those listed above could help the Subcommittee think through organizational options for safety advocacy in the regulatory context. We would be happy to answer any questions or comments now and would be happy to work with the Subcommittee in the future in sharing our research findings and experience where they might prove helpful to its efforts to advance the quality of safety regulation in California.

Thank you,

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