

Advancing Safety in the Oil & Gas Industry

Draft Safety Culture Framework

(Eric Nelson)

Who Is Eric Nelson?

I am a seasoned health & safety professional

I have been actively involved in loss control disciplines for most of my working career and have extensive risk management/loss control experience in safety, health, environmental protection, security and fire protection disciplines for regional, national and international organizations in both the private and government sectors. I hold the risk management designation, CRM (Canadian Risk Management) and am a Canadian Registered Safety Professional (CRSP). I draw on experience from a diversified background in:

- Manufacturing sector (aerospace, automotive and steel making);
- Natural resources sector (oil & gas exploration, coal & uranium mining & forestry);
- Veterinary medicine, and
- As a police officer in the Canadian Armed Forces.

I share this background with the NEB purely to highlight that I am not a newcomer to the business of loss control and business in general.

Eric Nelson is a pen name as I do not have a comfort level that if I provided my real name, that in some manner, it would come back to haunt me and/or my current employer; this is because currently there is not an atmosphere, a threat-free environment, between regulatory agencies and those of us who are prepared to speak up, to speak our minds, positively or negatively or something in between – and that too is part of the “culture” within our regulatory framework. The NEB is welcome to communicate with me on any of this subject via the contact information I have provided although I would be both surprised and ecstatic if the NEB did so.

There are organizations within Canada where health & safety professionals ‘gather’ and can be found, such as the Canadian Society of Safety Engineering and the Board of Canadian Registered Safety Professionals. If the NEB has not/is not engaging health & safety professionals within industry on this subject of a culture framework (which includes safety), it would behoove the NEB to do so.

NOTE

My comments are contained in the first five pages of this document. The remaining pages are the NEB’s Framework document. Throughout the Framework document, I have made comments/suggested working changes and perspectives; wording changes are shown in blue and ~~red with double strikethrough~~ and with the use of footnotes.

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Globally Competitive, World-Class Business Environment

In a globally competitive, world-class business environment, there is the concept of “full customer satisfaction”, those things that customers expect from those organizations from whom they obtain goods and services. These expectations are typically referred to as the **Five Elements of Full Customer Satisfaction**, (see sample depiction on Page 5) and they are, in no particular order:

Quality – Cost – Delivery – Safety (and) – Morale.

These elements are in no particular order, because they are all equally important, none more so than another, and like a juggler with five balls in the air, all five elements must be kept in play simultaneously. All five are dependent upon each other. Within the context of these five elements (QCDSM), the **S** for safety includes health, safety, environmental protection, life safety and security, sometimes collectively referred to as loss control or loss prevention disciplines.

With this view of a globally competitive, world-class business environment in mind, it is important to note that safety needs to be fostered as a belief, a value, and NOT a “priority” – this goes to QCDSM and the fact that priorities can and do change but that the importance of safety within an organization must always be paramount. The idea of safety as a belief, a value, is well described in *Values-Driven Safety*, by Donald J. Eckenfelder¹, Social Operating Systems, Ltd.

¹ <http://www.culturethesos.com/>

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So – what is this "safety culture framework" thing?

First and foremost, there is the culture of an organization (the culture of, and within an organization) and within this culture, there is a safety climate², or if you will, a sub-culture around safety. In the NEB's *Draft Safety Culture Framework* [the Framework], there is constant reference to "safety culture" and the perception is that the Board sees 'safety culture' as being something separate from organizational culture – and nothing could be further from the truth. How an organization manages its safety function is part and parcel, inseparable from, the culture of the organization as a whole.

The entire concept of culture and cultures, including safety, has been around since the dawn of mankind and is not, as suggested in the Frequently Asked Questions document, an "emerging discipline"³ in any sense of the meaning.

Within the Framework there are many references to "Safety Culture", whereby the words are capitalized and in some places, they are not. Capitalizing the words in the manner in which the Framework does, is inappropriate.

(*The devil is in the detail* The idiom "the devil is in the detail" derives from the earlier phrase, "God is in the detail," expressing the idea that whatever one does should be done thoroughly, e.g., details are important.)

On the subject of culture, the Board draws on expertise from a number of well-versed authorities, such as Mark Fleming who is known within the health and safety community. Another such authority is Charles Packer, Cherrystone Management, Inc.⁴, a Canadian safety culture expert who has conducted much work in the nuclear industry in concert with the Canadian Nuclear Safety Commission.

² Thomas R. Kraus, Behavioral Science Technology, <http://www.bstsolutions.com/en/>

³ Discipline - a branch of knowledge, typically one studied in higher education.

⁴ <http://www.cherrystone.ca/>

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In the Framework's related document, *Frequently Asked Questions - Advancing Safety in the Oil and Gas Industry: Draft Safety Culture*, in Question 3., the Board talks about concrete actions it will take, one being "Setting a path for continual improvement through collaboration with other regulators ...". The path for continual improvement has been set for decades with one of the most well-known 'fathers' of continual improvement being William Edwards Deming. I am sure the Board must know of Deming and his work.

In this same Question, the Board mentions "safety and enforcement tools" recently implemented such as administrative monetary penalties – **what are the other tools?**






On Page 3 of the Framework, the Board references the establishment of a technical working group (the NEB, C-NSOPB, and C-NLOPB) tasked with proposing a common draft safety culture definition and a framework designed to capture critical cultural dimensions, attributes, and descriptors. It is not clear within the Framework, whether or not these three regulatory agencies are going to produce one common framework for use throughout the oil and gas industry or if, after collaboration, the technical working group members (the NEB, C-NSOPB, and C-NLOPB) will go their separate ways. **It would be worthwhile in future Framework releases, for the Board to address this.**

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Five Elements of Full Customer Satisfaction



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The 5 Elements of Full Customer Satisfaction

- *Quality*
- *Cost*
- *Delivery*
- *Safety*
- *Morale*

A oil or gas product with **delivery** via a **quality** system (as it relates to system integrity), on time and at a reasonable **cost**. They also want to know that the system operator's **safety** and **morale** are valued.

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Background

What is Safety Culture and Why is it Important?

Major Accidents in High Hazard Industries and the Role of Safety Culture

Safety Culture Frameworks

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Draft Safety Culture Definition and Framework

Detailed Draft Safety Culture Framework

- Cultural Threat #1: Production Pressure
- Cultural Threat #2: Complacency
- Cultural Threat #3: Normalization of Deviance
- Cultural Threat #4: Tolerance of Inadequate Systems and Resources
- Cultural Defense #1: Committed Safety Leadership
- Cultural Defense #2: Vigilance
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Conclusion

Public Comment Period

Appendix A: Comparison of Safety Culture Frameworks

Endnotes

Related document:

Frequently Asked Questions - Advancing Safety in the Oil and Gas Industry: Draft Safety Culture

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Background

The operating environment of the North American oil and gas industry experienced a monumental shift on 20 April 2010 with the blowout of an offshore well in the Gulf of Mexico. Sadly, the accident killed 11 workers. It also created the largest oil pollution disaster in United States' history. That event was followed by other notable incidents across Canada and the United States including several pipeline ruptures, spills, and explosions.

As a result of these events and others, Canadians have begun questioning the inherent risks and benefits associated with oil and gas exploration, production, and transportation. Now, more than any other time, there is growing interest in what regulators are doing to protect the public and the environment, and to ensure that both regulators and energy companies are demonstrating an unwavering commitment to safety. Safety includes safety of workers and the public, process safety, operational safety, facility integrity, security and environmental protection.

Carefully designed and well-implemented management systems are essential to keep people safe and protect the environment. A management system is a set of interrelated or interacting processes and procedures that organizations use to implement policy and achieve objectives. In high hazard industries such as the oil and gas sector, these objectives are typically related to the management and reduction of operational risk. A management system includes the necessary organizational structures, resources, accountabilities, policies, and procedures to achieve that objective.

A recent comparative study^[1] of several major industrial accidents that occurred between 1982 and 1995 indicated that most of the affected organizations had management systems or programs developed; however they were not effectively implemented or reviewed on a regular basis to ensure adequacy and effectiveness. The study found that when major accidents occur, there is often an observable disconnect between the company's vision and policies (what they say) and their planning, implementation, monitoring and review (what they actually do). The authors of the final report shared several overarching lessons based on the findings of the study, including the conclusion that management systems and personal attitudes towards safety go hand-in-hand in creating robust defenses ~~to~~ against serious incidents.

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Similar findings have been echoed in more recent investigation reports. The Michigan oil pipeline rupture and the Gulf of Mexico blowout investigation reports noted that ~~effective~~ safety management systems were not effective, substantially increasing the negative effects of these incidents. Another key finding of major industrial accident reports is a disturbing pattern of **organizational cultures** that lack the commitment and necessary resources to ensure that each employee and contractor puts safety ahead of commercial pressures. There is clear evidence from analysis of global incidents that safety culture is a key factor in most high consequence accidents. This has highlighted the need for companies to develop a pervasive **organizational culture in which** safety is a core *value* ~~and preeminent priority~~ demonstrated by all personnel at all times.

For this reason, North American oil and gas regulators are collectively seeking to advance safety culture in concert with effectively implemented safety management systems. In May 2013, a special meeting of North American oil and gas regulators was convened in order to discuss improving safety and environmental outcomes by leveraging safety culture. This meeting included representatives from the National Energy Board (NEB), Canada Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), Canada Nova Scotia Offshore Petroleum Board (C-NSOPB), United States' Bureau of Safety and Environmental Enforcement (BSEE), and the United States' Pipeline and Hazardous Materials Safety Administration (PHMSA). Attendees discussed each other's philosophical and practical approach to safety culture advancement and assessment and explored possibilities for future collaboration. The dialogue highlighted more similarities than differences in the regulators' perspectives on culture including their collective desire to raise awareness of its importance in preventing adverse events.

During that meeting, several opportunities were identified by the regulators to move a concerted safety culture effort forward, including:

- Building a shared understanding of the term safety culture among regulators and regulated companies;
- Articulating clear regulatory expectations as they relate to safety culture; and
- Collaborating on the development of reference and resource material for industry in order to provide clarity and consistency in terminology, and safety culture dimensions and attributes, where possible.

Following that meeting, the NEB, C-NSOPB, and C-NLOPB established a technical working group tasked with proposing a common draft safety culture definition and a framework designed to capture critical cultural dimensions, attributes, and descriptors. This discussion paper represents the first deliverable of that coordinated effort. Its purpose is to promote learning and shared understanding of this emerging safety discipline across the oil and gas sector in Canada. It is also intended to express these boards' expectations of companies they regulate^[2] to build and sustain a positive safety culture while scrutinizing for potential cultural threats.

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What is Safety Culture and Why is it Important?

Culture influences what people see, hear, feel, and say. Perhaps most importantly, it influences the decisions and actions (behaviors) of people in an organization, and these behaviors ultimately drive ~~safety~~ all outcomes and performance.

A strong safety culture is one in which:

- leaders demonstrate that safety is their overriding value ~~and priority~~;
- everyone is aware of known hazards while remaining vigilant to new threats;
- every employee feels empowered and rewarded for making safe decisions;
- employees feel encouraged to report safety hazards, including instances where they have committed an error and introduced a threat themselves;
- the most junior employee would not hesitate to take action in response to a safety concern without fear of disciplinary action or reprisal;
- the supervisor does not have to be present for someone to do the right thing; and
- the organization is continually learning from its own and others' experiences with the goal of ~~advancing~~ improving safety.

Leadership is key to establishing, fostering and maintaining a healthy safety culture.

The attitudes of executive and senior management, their actions and decisions serve to shape corporate culture. Leadership uses its management systems' policies, priorities, processes, and procedures to formally communicate its values and expectations.

Through these mechanisms, executive management establishes the initial framework of the corporate culture. Where an organization is strongly in tune with establishing and maintaining a positive safety culture, it scrutinizes, as a normal business function, every decision to ensure that risk is considered and managed appropriately. It sets performance measures that provide a complete picture of the organization's current state in order to identify areas of weakness and to proactively manage safety in advance of an incident.

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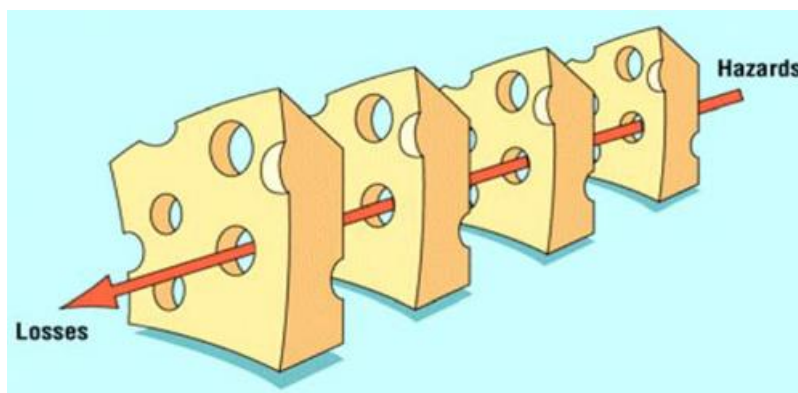
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Major Accidents in High Hazard Industries and the Role of Safety Culture^[3]

In high hazard industries such as oil and gas, there are two kinds of accidents: accidents that happen to individuals and accidents that happen at an organizational level. **Individual accidents** are more frequent and of limited consequence, although the consequences can be significant to those affected (e.g., worker injury or fatality). **Organizational accidents** are rare but the outcomes can be widespread and catastrophic. In the oil and gas industry, these accidents typically involve product releases or spills, blowouts, explosions and fires. **These accidents⁵ have multiple causes and contributing factors**, and involve many people operating at different levels within the respective companies. Organizational accidents pose the greatest risk to the safety of people and the environment.

Figure 1 - “Swiss Cheese” model - Accident Trajectory



James Reason, a well-respected psychologist who studies accident causation, has developed a model commonly referred to as the “Swiss Cheese” model (Figure 1). It is widely used to explain how an accident trajectory forms prior to an organizational accident. Reason’s model contends that defense against organizational accidents requires several layers of overlapping and mutually supporting protection. Protection layers are technical, organizational and people-based controls such as technical devices, physical barriers, protective equipment, system design, regulatory surveillance, rules and procedures, training and supervision.

⁵ This suggests “individual accidents” do not have multiple causes and contributing factors, which is not true. Soliciting input from H&S professionals would have pointed this out.

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The risk of a major accident occurring is determined by the quality of an organization's protective layers. When organizational deficiencies develop, the resulting holes impair the safety system's integrity over time. These vulnerabilities can lead to the system being breached by various hazards or threats. A number of seemingly insignificant failures and breaches in each protective layer may create an accident trajectory resulting in catastrophic losses (human and environmental). An organization's safety culture is the one element that influences the quality of all protective layers in the safety system, [and vice-versa](#).

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Safety Culture Frameworks

There are many conceptual frameworks used to describe safety culture and its characteristics. James Reason describes three characteristics of a positive safety culture^[4]:

1. The organization has a goal of maximum safety
2. The organization is not complacent and demonstrates a continual respect for threats to its defenses
3. The organization sustains a state of intelligent and respectful wariness through gathering the right kinds of data

“This means [corporate leadership] creating a safety information system that collects, analyses and disseminates information from incidents and near misses, as well as from regular proactive checks on the system’s vital signs. All of these activities can be said to make up an informed culture – one in which those who manage and operate the system have current knowledge about the human, technical organizational and environmental factors that determine the safety of the system as a whole.”

Reason’s framework suggests that a positive safety culture is an informed culture in which everyone understands and is wary of hazards in the operating environment. In order to have an informed culture, an organization must also have several supporting sub-cultures (briefly described below).

1. *Reporting Culture* - A reporting culture is one where people have confidence to report safety concerns without fear of blame. Employees know that confidentiality will be maintained and that the information they submit will be acted upon
2. *Learning Culture* - A learning culture is one where the organization is able to learn from its mistakes and adverse events (and those of others) and take appropriate action to address lessons.
3. *Just Culture* - A just culture is one where errors and unsafe acts are not punished if the error was unintentional. However, those who act recklessly or take deliberate and unjustifiable risks will be subject to disciplinary action.

In addition to an informed culture, Reason suggests that a positive safety culture requires a *flexible culture* where the organization and the people in it are capable of adapting effectively to changing demands. The organization must have mechanisms in place to manage complex technology, and to constantly meet the fluctuating demands on its industry.

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All organizations in high hazard industries have a safety culture to some degree or another. While some may have healthy and positive cultures, others may have poor or degrading cultures. Negative safety culture dimensions attack the organizational safety system's controls and increase the likelihood that there will be weaknesses and resulting failures. In recognition of this phenomenon, Reason identifies a series of cultural threats that act to degrade existing safety defenses. Specifically, he references work pressure, complacency, normalization of deviance, and tolerance of inadequate systems and resources. These cultural threats are not simply the absence of positive safety culture dimensions but unique and separate dimensions that increase the risk of an organizational accident occurring.

A recent study by Dr. Mark Fleming, who holds the CN Professorship in Safety Culture, and Natasha Scott of St. Mary's University used Reason's framework to review 17 major petrochemical accidents that occurred between 1980-2010. It noted that poor safety culture contributed to 14 of the 17 accidents and identified several recurring cultural threats, including:

- Tolerance of inadequate systems and resources (identified ten times)
- Normalization of deviance (identified nine times)
- Complacency (identified eight times)
- Work pressure (identified four times)^[5].

This review emphasized the importance of not only nurturing and advancing positive cultural dimensions within an organization, but also the need to proactively identify and combat the negative cultural dimensions that impair safety performance. A poor or degrading safety culture is one of the greatest latent threats needing to be managed if the organization's protective layers are not to be undermined.

A second well-accepted framework related to safety culture is that of High Reliability Organizations (HROs). HROs such as air traffic control operations, naval aircraft carriers, and nuclear power operations enjoy a continuously high level of safety performance in operating environments that are characterized by uncertainty and threat. HROs consistently demonstrate a:

- Preoccupation with failure;
- Reluctance to simplify interpretations;
- Sensitivity to operations;
- Commitment to resilience; and
- Deference to expertise^[6].

These two models provided the foundation for the draft safety culture framework proposed by the NEB, C-NSOPB, and C-NLOPB. The key elements of each are captured in the framework and augmented with other notable features.

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Developing the Draft Framework

Safety culture frameworks serve to simplify and communicate a complex concept into distinct dimensions in order to support its understanding and assessment. It is generally agreed that safety culture is a multidimensional construct, but there is less agreement about its specific components. Some frameworks contain many dimensions (e.g., BSEE identifies nine) while other models have fewer dimensions (e.g., International Atomic Energy Agency (IAEA) has five). This can be confusing and lead people to conclude that one model is more comprehensive than another.

In general, the available frameworks are very similar, even when the number of dimensions varies considerably. A closer review of several models used in the energy sector reveals that the dimensions relate directly to one another. For example the BSEE dimensions 'environment for raising concerns' and 'inquiring attitude' are equivalent to the IAEA dimension 'safety is learning driven' (see Appendix A for a comparison of various frameworks). There is no one correct model, so it is important to select a model or framework that works best for the context in which it is to be used. Models with fewer dimensions tend to be more generic and applicable to a wider range of situations and are preferable if the model will be applied to different types of organizations (e.g., large and small).

As the proposed framework is intended to apply to several different types of companies with operations of varying size, scope, and complexity, the proposed number of dimensions was kept relatively limited. The draft safety culture framework is explained using three levels of detail:

1. Dimensions represent high level safety culture characteristics;
2. Attributes are intended to succinctly articulate the most critical themes found within each dimension; and
3. Descriptors are detailed examples of how the themes may be expressed within an organization.

Understanding and being able to recognize both positive and negative dimensions of safety culture provides great insight into a company's vulnerability for a catastrophic event. For this reason, the proposed framework includes both positive and negative cultural dimensions, attributes, and descriptors.

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Draft Safety Culture Definition and Framework

The NEB, C-NLOPB, and C-NSOPB propose the following draft safety culture definition for public comment:

Safety culture⁶ means “the attitudes, values, norms and beliefs, which a particular group of people shares with respect to risk and safety”^[7].

The draft safety culture framework being proposed for public comment is comprised of eight cultural dimensions. There are four negative dimensions that act as threats to existing organizational safety defenses: *production pressure*, *complacency*, *normalization of deviance*, and *tolerance of inadequate systems and resources*. On the other side of the spectrum, there are four positive dimensions that act as cultural defenses against these threats: *committed safety leadership*, *vigilance*, *empowerment and accountability*, and *resiliency*. These dimensions are shown in the table below.

NEGATIVE DIMENSIONS (CULTURAL THREATS)	7	POSITIVE DIMENSIONS (CULTURAL DEFENSES)
Production Pressure		Committed Safety Leadership
Complacency		Vigilance
Normalization of Deviance		Empowerment and Accountability
Tolerance of Inadequate Systems and Resources		Resiliency

The draft framework can be best articulated by considering the work of the dimensions in the context of James Reason’s “Swiss Cheese” model. In Figure 2, we see these negative dimensions acting as cultural threats that breach or degrade the protective layers within the safety system.

⁶ Include in the definition, that the culture around safety is an inseparable component of the culture of an organization as a whole and very clearly needs to be viewed in that light.

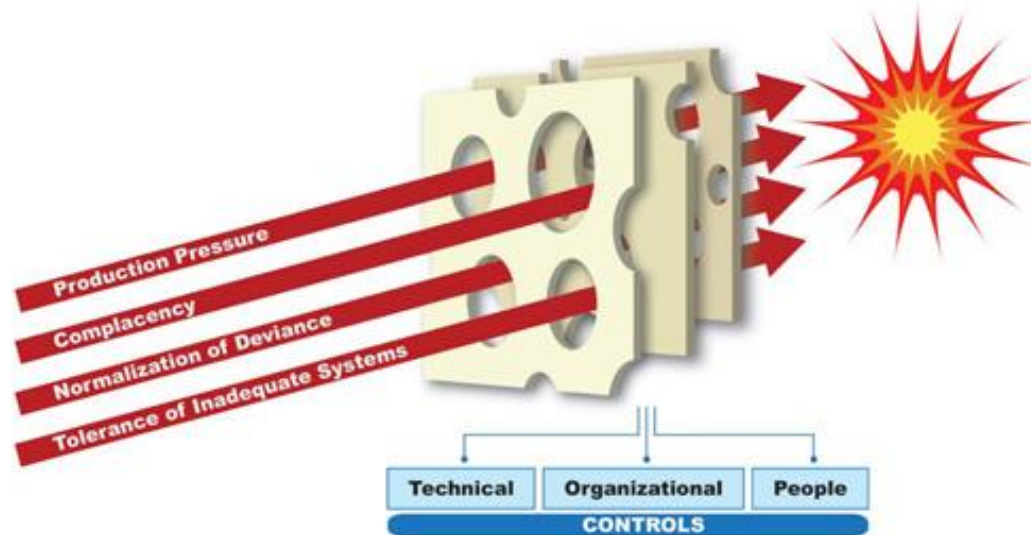
⁷ It is not clear what these arrows that point in both directions are saying! Further more, the arrows imply that each item (horizontally) only aligns with two points and that is not so.

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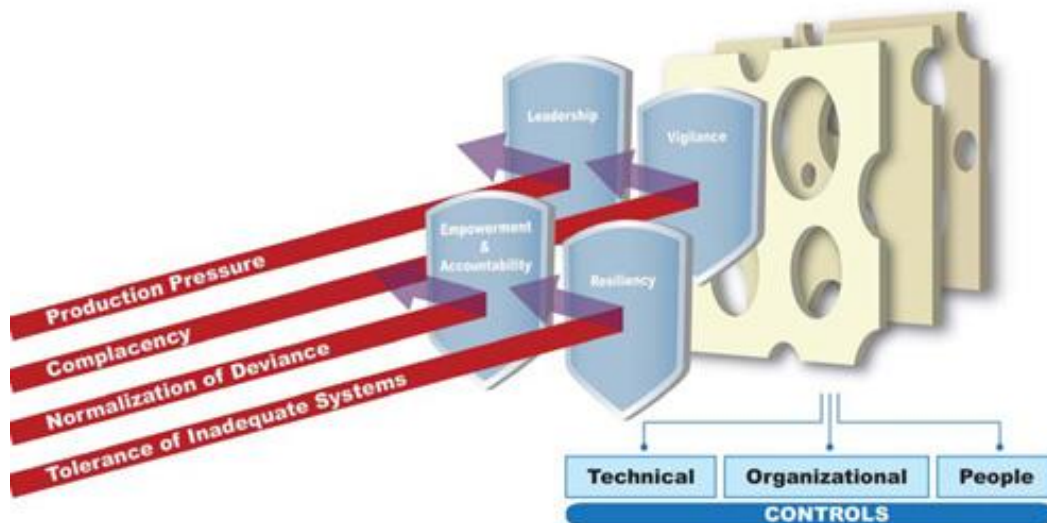
(Eric Nelson)

Figure 2. Safety Culture Model: Negative Cultural Threats Breaching Safety System



Conversely, in Figure 3, we see the positive safety culture dimensions acting as overarching defenses, which act to deflect the cultural threats and reduce the risk that latent conditions or active failures will impair the safety system.

Figure 3. Safety Culture Model: Positive Cultural Defenses Deflecting Cultural Threats



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Detailed Draft Safety Culture Framework

Cultural Threat #1: Production Pressure

Production pressure occurs when there is an imbalance between production and safety as leadership overly values production, such that the emphasis is placed upon meeting the work demands, schedule or budget, rather than working safely. Organizational goals and performance measures are heavily weighted towards commercial and production outcomes over protection and safety. Business strategy, plans, resourcing and processes fail to adequately address safety considerations.

Production Pressure Attributes:

- Leaders making decisions based upon short-term business objectives without sufficient consideration of long-term impact to safety outcomes
- Leaders failing to see the impact of their actions in eroding safety as an organizational value

Descriptors:

1. There are time and workload pressures because not enough time or resources are assigned activities.
2. There are excessive budgetary pressures.
3. Leaders are less strict about adherence to procedures when work falls behind schedule.
4. Project deadlines are set based upon overly optimistic assumptions.
5. There are frequent project overruns.
6. The constant tension between production and safety results in a slow and gradual degradation in safety margins.
7. Shortcuts are necessary to meet unrealistic deadlines.
8. Rewards and incentives are heavily weighted towards production outcomes.

Eric Nelson Comment ...

If an organization is behaving in this manner (cultural threats 1 – 4) about safety, in all likelihood the same threats will be seen in most, if not all, aspects of its business – not just safety; this goes to my comments that you cannot separate safety within the culture of an organization, as though safety is an island unto itself.

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Cultural Threat #2: Complacency

Complacency occurs when there is a widely held belief that all possible hazards are controlled and the organization has forgotten to be afraid resulting in reduced attention to risk. The organization views itself as being uniquely better (safer) than others and as a result, does not need to conform to industry standards or best practices. This can be the result of an overreliance on occupational injury data that leads them to erroneously believe that they are not at risk for a major accident. The absence of a safety failure over a period of time results in a reduction of organizational vigilance.

Complacency Attributes:

- Overconfidence in the safety system and its performance
- The organization's inattention to critical safety data
- The organization failing to learn from past events
- [Lack of continual improvement focus](#)

Descriptors:

1. Safety data gathering is inadequate and may focus on the wrong indicators or a limited set of indicators.
2. Performance management, incentives and rewards are related to a limited set of safety indicators (e.g., occupational injury rates), [or not even present](#).
3. Control of risks is weak and/or reactive.
4. There is a sense of invulnerability at various levels of the organization.
5. Supervisors do not perform frequent checks to confirm that workers (including contractors) are obeying safety rules.
6. The organization only seeks information to confirm its superiority.
7. The organization discounts information that identifies a need to improve.
8. There is no interest in learning from other organizations or industries.
9. Those who raise concerns are viewed negatively.
10. Response to safety concerns focuses on explaining away the concern rather than understanding it.
11. Investigation of incidents is superficial with a focus on the actions of individuals.
12. Failures are viewed as being caused by bad people rather than system inadequacy.

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Cultural Threat #3⁸: Normalization of Deviance

Normalization of deviance occurs when it becomes generally acceptable to deviate from ~~safety~~ systems, procedures, and processes. The organization fails to implement or consistently apply its management system across the operation (regional or functional disparities exist). Safety rules and defenses are routinely circumvented in order to get the job done.

Normalization of Deviance Attributes:

- The organization failing to provide adequate or effective systems, processes, and procedures for work being performed
- The organization failing to provide necessary financial, human, and technical resources
- Impracticable rules, processes and procedures, which make compliance and achievement of other organizational outcomes mutually exclusive
- Employees finding workarounds in response to operational inadequacies
- The organization failing to provide employees with effective mechanisms to resolve operational inadequacies

Descriptors:

1. Operational deviations are not managed using change and risk management processes.
2. Some safety rules and operational procedures are not practical in the operating environment.
3. There is an extended time between reporting of safety issues (hazards, inspection and audit findings, other deficiencies, etc.) and their resolution.
4. There is a backlog of scheduled maintenance activities.
5. Processes and procedures are not routinely assessed for accuracy, completeness, or effectiveness.

⁸ This is invariably an organization wide dilemma!

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Cultural Threat #4⁹: Tolerance of Inadequate Systems and Resources

Tolerance of inadequate systems and resources occurs when it becomes acceptable to work with inadequate systems and resources, which often occurs when the organization tries to do too much with too little. No allowance is made in business and operational planning for unanticipated problems and changing conditions, which would include resource contingencies for completion of work. The organization is slow to react to changing conditions. Most attempts to make the operation safer through enhanced systems and resources happen following an incident or regulatory action.

Tolerance of Inadequate Systems and Resources Attributes¹⁰:

- A pervasive belief that organizational success or survival is dependent upon making do with what is available
- A reactive stance towards safety management
- The organization stretching human and financial resources in order to “manage” costs
- The organization’s failure to provide adequate skills and tools to manage risk

Descriptors:

1. The management system is inconsistently implemented.
2. Inadequate human and financial resources are assigned to safety activities.
3. A single person is assigned responsibility for multiple positions/portfolios.
4. No competent backup personnel for critical safety functions exist.
5. Poor working conditions exist.
6. Operational workarounds are common.
7. Degraded safety conditions exist.
8. Maintenance backlogs exist.
9. Quality of documentation is poor (inconsistent, inaccurate, out-of-date, inaccessible, etc.).
10. Employees receive the minimum, inadequate or poor quality training.
11. Little or no training is provided on system safety, risk and error management strategies.
12. Change management process and procedures are ineffective or absent.
13. Equipment needed to perform work safely is often unavailable.
14. Equipment provided for work is not fit for purpose and/or not serviceable.
15. Warning or alarm systems are not fit for purpose.
16. Proactive maintenance of assets is overdue.
17. Extended time lapse exists between reports of safety concerns and their resolution.

⁹ This is invariably an organization wide dilemma!

¹⁰ It is one thing to cut corners (including those that affect health and safety) when resources are available, but if the resources are not reasonably available – then what?

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Cultural Defense #1: Committed Safety Leadership

Safety is an organizational value demonstrated by a genuine leadership commitment and expressed by providing adequate resources, systems, and rewards to serve this end. Senior leaders recognize that commercial goals and safety can come into conflict and take measures to identify and resolve such conflicts in a transparent and effective manner. The strategic business importance of safety is reflected in the company's strategy, business plans and processes.

Committed Safety Leadership Attributes:

- Direct participation of leaders in the safety system
- Leader inquiry and understanding of threats
- Leaders taking action to address hazards and deficiencies in the system
- Leaders valuing safety efforts and expertise

Descriptors:

1. The management system specifies an accountable officer (AO) with authority and control for human and financial resources.
2. The management system specifies direct reporting lines between key safety personnel and the AO.
3. Leaders attend safety training and participate in safety reviews.
4. Timely action is taken to mitigate hazards even when it is costly to do so.
5. Safety positions are accorded equal status, authority, and salary to other operational assignments.
6. Leaders are willing to stand up for safety even when production is impacted.
7. Safety is considered at high-level meetings on a regular basis (not only after an incident).

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Cultural Defense #2: Vigilance

Vigilance refers to organizational preoccupation with failure and the willingness and ability to draw the right conclusions from **all** available ~~safety~~ information. The organization implements appropriate changes to address the lessons learned. It includes the continual collection and analysis of relevant data in order to identify hazards (human, technical, organizational and environmental factors) and manage related risk. The organization actively disseminates safety information in order to improve overall awareness and understanding of risks to safety. People are encouraged and willing to report safety concerns (unsafe conditions, errors, near-misses, incidents) without fear of blame or punishment. Employees trust that the information they submit will be acted upon to support increased awareness, understanding, and management of threats to safety. Errors and unsafe acts will not be punished when these events are unintended; however, it is clear that those who act recklessly or take deliberate and unjustifiable risks will still be subject to disciplinary action.

Vigilance Attributes:

- Knowing what is going on, through a proactive surveillance process
- Understanding safety information through analysis and interpretation
- Everyone proactively reporting errors, near-misses, and incidents
- Sharing information and interpretation to create collective understanding of current status of safety and anticipated future challenges

Descriptors:

1. Sophisticated information systems are used to collect and analyze data from a range of sources (e.g., incidents, hazard reports, inspections, audits, and reviews).
2. Safety performance indicators are tracked, trended, evaluated and acted upon.
3. Safety information and performance data is communicated upwards and across the organization without distortion.
4. Prospective analysis is conducted to identify future threats.
5. Staff from a wide variety of departments and levels attends meetings relating to safety.
6. A questioning attitude prevails at all levels of the organization.
7. Leaders seek to identify and understand active failures and latent conditions that lead to accidents.
8. Hazards and risks are explicitly captured, reviewed regularly, and updated.
9. Reactive and proactive safety performance is tracked over time.
10. Safety data gathering includes third parties, such as contractors.
11. Safety risks and related controls are communicated throughout the organization and beyond (contractors, other companies).
12. Staff have non-technical knowledge and skills related to human factors, team performance and error management techniques.
13. Policies are in place to encourage everyone to raise safety-related issues.

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14. High reporting levels are viewed as a positive cultural signal.
15. Processes are in place to ensure visibility of risk produced by a single decision/action and aggregate risk that results from multiple decisions/actions that collectively exceed safety margins.
16. High quality and timely feedback is provided to staff following receipt of a report/concern.
17. Employees are clear that they will be treated fairly if they are involved in a near-miss or incident.
18. Disciplinary policies are based on an agreed distinction between acceptable and unacceptable behavior.
19. Safety mistakes, errors, lapses are treated as an opportunity to learn rather than find fault or blame.
20. Incident investigation aims to identify the failed system defenses and improve them.
21. Incidents are thoroughly reviewed at top-level meetings.
22. Lessons learned are implemented as global reforms rather than local repairs and communicated effectively to employees.
23. Lessons are learned from incidents that occur across the industry and in other high hazard industries.
24. Lessons learned from internal data collection are shared with others across the industry.
25. Leadership seeks to exceed the minimum established regulatory expectations with regards to safety.
26. Leadership takes ownership and responsibility for safety standards and performance and does not rely on regulatory interventions to manage the organization's operational risk.

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Cultural Defense #3: Empowerment and Accountability

Management benefits from the expertise of frontline workers in order to achieve better solutions to meet safety challenges. Employees feel that they can stop any activity when they notice a potential hazard in order to report it even when it may have an impact on production or costs. Accountabilities and responsibilities for safety are clearly established and documented at all levels of the organization. Ownership for safety outcomes is present at all levels and functional areas of the organization.

Empowerment and Accountability Attributes:

- Employee participation in safety management activities
- Organization-wide safety ownership and communication
- Willingness to do what is right in regards to safety
- Breaking down of organizational silos

Descriptors:

1. Employees participate in setting safety standards and rules.
2. Employees participate in the investigation of accidents and near-misses.
3. A person's safety performance is considered when hiring, retention, and promotion decisions are being made.
4. Contractor safety performance is given same weight as other criteria in procurement activities.
5. Positive labour relations exist.
6. Employees (regardless of position) express concern if safety procedures are not being followed.
7. Performance management systems include a wide range of safety criteria.
8. Employees are held accountable and rewarded for a demonstrated commitment to safety.
9. Non-operational staff recognizes their business decisions may impact safety.
10. Employees communicate with other departments to understand safety implications of decisions.

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Cultural Defense #4: Resiliency

Resiliency is the capability to respond effectively to changing demands in order to manage potential or emerging risk. There are organizational mechanisms in place to manage complex activities, and to constantly meet the fluctuating demands of a high hazard industry. There is a reluctance to simplify problems and situations in order to arrive at a solution. The organization allows decisions to be made by frontline employees and allows authority to migrate to the employees with the most expertise, regardless of their level in the company. The organization is committed to developing capabilities to detect, contain, and rebound from errors that may occur.

Resiliency Attributes:

- Recognizing the introduction of new or changing threats in the operating environment
- Ensuring employees (at all levels) have adequate knowledge and skill related to error management
- The organization having the capacity, diversity and redundancy to manage risk
- The organization responding to unanticipated or changing conditions in a timely and effective manner

Descriptors:

1. Adequate financial and human resources to manage risk and perform operational activities safely.
2. Authority to make decisions lies with the most qualified employees.
3. Robust change management practices include safety considerations.
4. Timely corrective and preventive actions are taken when deficiencies and hazards are detected.
5. Cross-functional and interdisciplinary teamwork is present in safety reviews and analyses.
6. Contingencies are in place to fill vacated roles with competent staff.
7. There is an ongoing monitoring of the operation and its environment for changing conditions and related risks.

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Conclusion

The NEB, C-NSOPB, and C-NLOPB put safety and environmental protection at the forefront of their responsibilities in protecting Canadians. The Boards achieve this by taking a leadership role to improve awareness and drive fundamental change when and where it is needed. Safety culture is an emerging discipline in the oil and gas sector that requires greater understanding and consideration. The draft safety culture definition and framework is intended to promote learning and shared understanding of safety culture. It also articulates the expectation that companies regulated by the Boards should build and maintain a positive safety culture while remaining vigilant to potential cultural threats.

The Boards will continue to work with the PHMSA and BSEE while consulting with others as part of their ongoing safety culture regulatory collaboration.

Public Comment Period

Each Board will release this discussion paper and invite public comment on the draft safety culture definition and framework. Comments and questions may be submitted to the NEB until 30 January 2014 using the following methods:

Email:

safetyculture@neb-one.gc.ca

Mail:

Safety Culture Consultation
Attention: Claudine Bradley
National Energy Board
444 Seventh Avenue SW
Calgary, Alberta
T2P 0X8

Fax:

403-292-5503 or 1-877-288-8803 (toll free)

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Appendix A-1: Comparison of Safety Culture Frameworks

IAEA	JAMES	HIGH RELIABILITY ORGANIZATIONS	BSEE	PHMSA	NEB/ CNLOPB/ CNSOPB
Leadership for safety is clear			Leadership Safety Values and Actions	Leadership is clearly committed to safety	Committed Safety Leadership Production Pressure
Safety is learning driven	Learning	Preoccupation with failure	Continuous Learning	Organization practices continuous learning	Vigilance
Safety is a clearly recognized value		Preoccupation with failure	Leadership Safety Values and Actions	Decisions demonstrate safety is prioritized over competing demands	Committed Safety Leadership Production Pressure
	Informed Reporting Complacency Normalization of deviance	Reluctance to simplify interpretations Sensitivity to operations	Problem Identification and Resolution	Reporting systems and accountability are clearly defined	Vigilance Complacency Normalization of deviance
	Informed Just Complacency Normalization of deviance	Preoccupation with failure	Environment for Raising Concerns Inquiring Attitude	There is a safety conscious work environment	Vigilance Complacency Normalization of deviance

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IAEA	JAMES	HIGH RELIABILITY ORGANIZATIONS	BSEE	PHMSA	NEB/ CNLOPB/ CNSOPB
Accountability for safety is clear	Just	Deference to expertise	Personal Accountability	Employees feel personally responsible for safety	Empowerment and Accountability Vigilance
	Informed	Deference to expertise	Effective Safety Communication	Open and effective communication across the organization	Vigilance
	Just	Deference to expertise	Respectful Work Environment	Mutual trust is fostered between employees and the organization	Vigilance
	Just	Preoccupation with failure	Environment for raising concerns without fear of retaliation, intimidation, harassment, or discrimination	Organization is fair and consistent in responding to safety concerns	Vigilance
Safety is integrated into all activities	Informed Flexible Tolerance of Inadequate Systems and Resources	Commitment to resilience	Work Processes	Training and resources are available to support safety	Vigilance Resiliency Tolerance of Inadequate Systems and Resources Production Pressure

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Endnotes

[1] Det Norske Veritas. (2011). *Major Hazard Incidents: Arctic Offshore Drilling Review*.

[2] In Canada, frontier and offshore oil and gas activities are regulated, depending on location, by three independent regulators under mirrored regulatory frameworks - the C-NLOPB under the *Canada-Newfoundland Atlantic Accord Implementation Act*, the C-NSOPB under the *Canada-Nova Scotia Petroleum Resources Accord Implementation Act* or the National Energy Board, on frontier lands and offshore areas not otherwise regulated under these joint federal-provincial accords, under the *Canada Oil and Gas Operations Act* (COGOA) . The Accord Acts reflect the technical provisions of COGOA. As a result, all of the ensuing regulations promulgated under these Acts have essentially the same technical basis. This makes regulation of the oil and gas industry, in all areas of the frontier and offshore, technically consistent and similar from region to region.

[3] Reason, J. (1997). *Managing the risks of organizational accidents*. Burlington, VT: Ashgate Publishing Company.

[4] Reason, J. (1998). *Achieving a safe culture: theory and practice*. *Work and Stress*, vol. 12, no. 3, pp. 292-306.

[5] Fleming, M. & Scott, N. (2012) *Cultural disasters: Learning from yesterday to be safe tomorrow*. *Oil and Gas Facilities*, Vol. 1, No. 3 (June). Society of Petroleum Engineers. Houston, Texas

[6] Weick, K. & Sutcliffe, K. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty*. San Francisco, CA: Jossey Bass.

[7] Mearns, K., Flin, R., Gordon, R. & Fleming, M. (1998). *Measuring safety culture in the offshore oil industry*. *Work and Stress*, 12(3), 238-254. "Safety" includes safety of workers and the public, process safety, operational safety, facility integrity, security and environmental protection.