Advancing Safety in the Oil and Gas Industry: Statement on Safety Culture (2021)

Acknowledgement

This statement on safety culture was developed in collaboration with the Canada-Nova Scotia Offshore Petroleum Board and the Canada-Newfoundland and Labrador Offshore Petroleum Board.

Attestation

La présente déclaration sur la culture de sécurité a été rédigée de concert avec l'Office Canada – Nouvelle-Écosse des hydrocarbures extracôtiers et l'Office Canada – Terre-Neuve-et-Labrador des hydrocarbures extracôtiers.

Contents

1. 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 incident 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 are engaged in better understanding 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 encompasses the safety of workers and members of the public, operational/process safety facility or asset 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[1] 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 comparative study[2] of several major industrial accidents[3] 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 against serious incidents.

Similar findings have been echoed in several other investigation reports. The Michigan oil pipeline rupture and the Gulf of Mexico blowout investigation reports noted that (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 continue to promote and advance safety culture in concert with the effective implementation of management systems. In 2013, a special meeting of North American oil and gas regulators was convened to discuss improving safety and

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1 High hazard industries include those in which an operational failure and/or incident could cause serious consequences to multiple people or the environment (e.g.: aviation, nuclear power, oil and gas exploration, production, refining, and transmission, chemical processing)

2 Det Norske Veritas. (2011). Major Hazard Incidents: Arctic Offshore Drilling Review. http://www.dnvusa.com/Binaries/NEB%20Report%20April%208_tcm153-455725.pdf

3 The term "accident" is used in this document when referencing a published study, research, model or theory that also employs that term. Otherwise, "incident" is used throughout to describe an occurrence that resulted in or could have resulted in harm to people, the environment, or other losses and damage.

environmental protection outcomes by leveraging safety culture. This meeting included representatives from the Canada Energy Regulator (CER), previously the National Energy Board, the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB), the United States' Bureau of Safety and Environmental Enforcement (BSEE), and the United States' Pipeline and Hazardous Materials Safety Administration (PHMSA). Attendees discussed each agency's 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 CER , CNSOPB, 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. After public consultation, the Statement on Safety Culture was publicly released in 2014. As several years have passed since its initial release, the three regulators reaffirm their commitment to promoting and advancing safety culture in order to improve outcomes related to environmental protection and safety of people (i.e. workers and members of the public). The *Statement on Safety Culture (2021)* expresses the regulators' expectations of companies they regulate[4] to build and sustain a positive safety culture while continually scrutinizing their respective organizations for potential cultural threats.

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 (behaviours) of people in an organization, and these behaviours ultimately drive safety outcomes and performance. Safety culture is an organizational construct and so the framework is aimed at regulated companies who are ultimately responsible for managing all risks associated with their operations and activities. **The term "safety", in this context, is synonymous with the prevention of harm (to people and the environment).**

A strong safety culture is one in which:

- Leaders demonstrate that the prevention of harm is their overriding value and priority;
- Everyone is aware of known hazards while remaining vigilant to new threats;
- Everyone feels empowered and recognized for making safe decisions to prevent harm;
- Everyone feels encouraged to report all hazards, including instances where they have committed an error and introduced a threat themselves;

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4 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 CNSOPB under the Canada-Nova Scotia Petroleum Resources Accord Implementation Act or the Canada Energy Regulator, 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 and occupational health and safety regime. 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.

- Everyone, including the most junior employee, would not hesitate to take action in response to a concern without fear of disciplinary action or reprisal;
- Everyone works safely and takes actions to protect the environment (i.e. they make the right decisions and take actions to prevent harm) regardless of whether or not someone is watching; and
- The organization is continually learning from its own and others' experiences with the goal of advancing safety and environmental protection outcomes

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 hazards and risk(s) in advance of an incident.

MAJOR ACCIDENTS IN HIGH HAZARD INDUSTRIES AND THE ROLE OF SAFETY CULTURE[5]

In high hazard industries, 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. In the offshore environment, they may also include collisions and sinking. These accidents 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.

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.
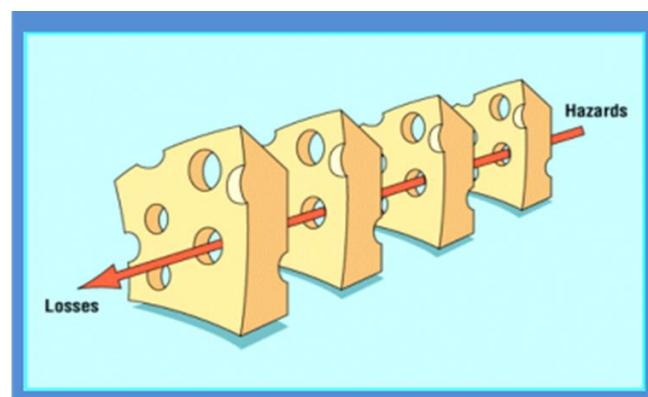
Figure 1 Accident Trajectory

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

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5 Reason, J. (1997). Managing the risks of organizational accidents. Burlington, VT: Ashgate Publishing Company.

safety culture is the one element that influences the quality of all protective layers in the safety system.

2. 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[6]:

1. The organization has a goal of maximum safety (i.e. prevention of harm to people and the environment).

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.

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 the tolerance of inadequate systems and resources. These cultural threats are not simply the absence of positive

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

safety culture dimensions but unique and separate dimensions that increase the risk of an organizational accident occurring.

A study by Fleming and Scott (2012) used Reason's framework to review 17 major petrochemical accidents that occurred between 1980 and 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); and
- Work pressure (identified four times)[7].

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 may impair safety and environmental protection performance.

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[8].

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

DEVELOPING THE REGULATORS' 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. Companies may choose to use a framework that is best suited to their organizational needs.

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7 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

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

As this 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 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 incident. For this reason, the CER, C-NLOPB, and CNSOPB framework includes both positive and negative cultural dimensions, attributes, and descriptors.

SAFETY CULTURE DEFINITION AND FRAMEWORK

The CER, C-NLOPB, and CNSOPB endorse the following safety culture definition:

> *Safety culture means "the attitudes, values, norms and beliefs, which a particular group of people shares with respect to risk and safety"[9][of people and the environment].*

The regulators' safety culture framework is comprised of eight cultural dimensions. There are four negative dimensions identified 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 hand, there are four positive dimensions identified 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)	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 framework can be articulated by considering the work of the dimensions in the context of James Reason's "Swiss Cheese" model. In Figure 2, we see the negative dimensions acting as cultural threats that breach or degrade the protective layers within the safety system.

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9 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.
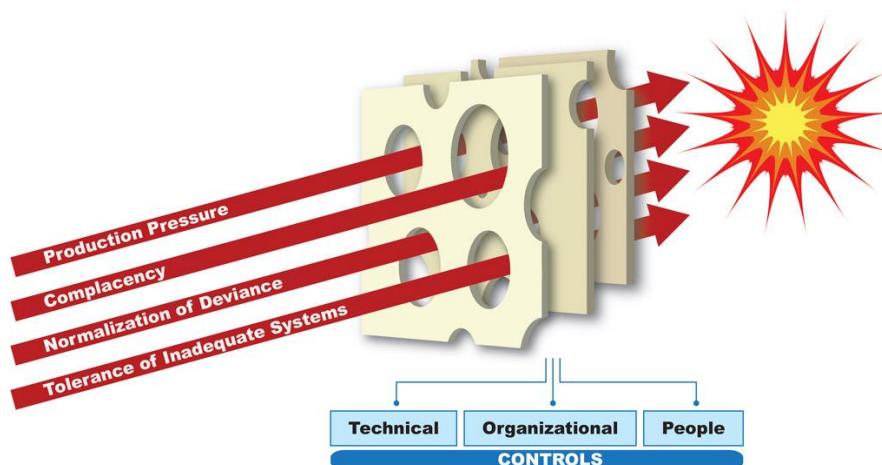
Figure 2 Safety Culture Model: Negative Cultural Threats Breaching Safety System

Conversely, in Figure 3, we see the positive safety culture dimensions acting as an overarching defense, which acts to deflect the cultural threats and reduce the risk that latent conditions or active failures will impair the safety system.
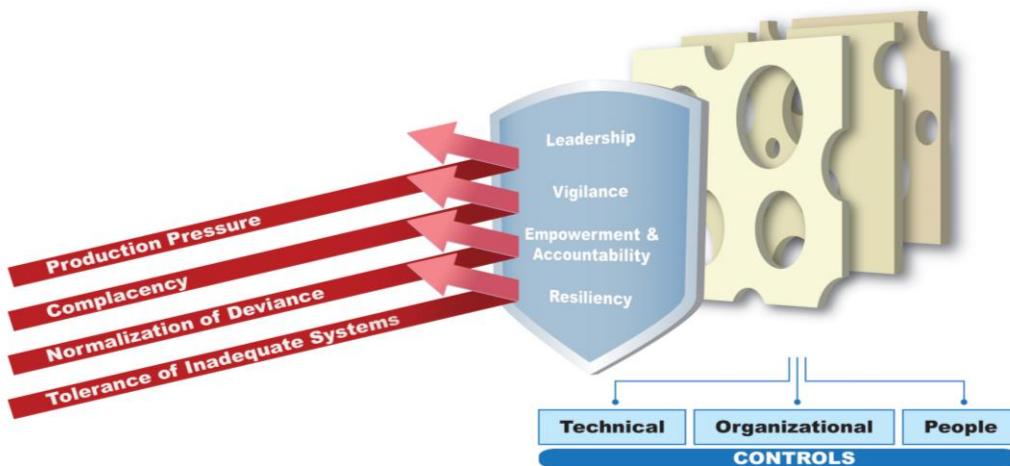
Figure 3 Safety Culture Model: Positive Cultural Defenses Deflecting the Threats

CULTURAL THREATS

Cultural Threat #1: Production Pressure

Production pressure occurs when there is an imbalance between production and the prevention of harm. This can occur when 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. 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 and environmental protection outcomes
- Leaders failing to see the impact of their actions in eroding safety (and environmental protection) as an organizational value

Descriptors

1. There are time and workload pressures because not enough time or resources are assigned to 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 prevention of harm 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.

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 limited data sets (e.g.: occupational injury rates) that leads to the erroneous belief that the organization is 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

Descriptors

1. 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, spill volumes) or not present at all.

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 rules and procedures.

6. The organization only seeks information to confirm its superiority.

7. The organization believes that it is "safe" because it complies with regulations and standards.

8. The organization discounts information that identifies a need to improve.

9. There is no interest in learning from other organizations or industries.

10. Those who raise concerns are viewed negatively.

11. Response to safety concerns focus on explaining away the concern rather than understanding and addressing it.

12. Investigation of incidents is superficial with a focus on the actions of individuals.

13. Investigations of incidents fail to uncover underlying root causes and deficiencies within the management system.

14. Failures are viewed as being caused by bad people rather than system inadequacy.

Cultural Threat #3: 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). Rules, procedures 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 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. Maintenance activities are not prioritized and executed as planned.

5. Processes and procedures are not routinely assessed for accuracy, completeness, or effectiveness.

Cultural Threat #4: 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 Attributes

- A pervasive belief that organizational success or survival is dependent upon making do with what is available
- A reactive stance towards safety and risk 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 risk management and the prevention of harm to people and the environment.

3. A single person is assigned responsibility for multiple positions/portfolios.

4. No competent backup personnel for critical safety, operational and emergency response functions exist.

5. Poor working conditions exist.

6. Operational workarounds are common.

7. Degraded safety and operating conditions exist.

8. Maintenance backlogs exist.

9. Quality of documentation is poor (inconsistent, inaccurate, unclear, out-of-date, inaccessible, etc.)

10. Employees receive inadequate or poor quality training with ineffective competency evaluation.

11. Little or no training is provided on system safety and risk management.

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.

CULTURAL DEFENSES

Cultural Defense #1: Committed Safety Leadership

Safety (i.e. prevention of harm to people and the environment) 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 system
- Leaders inquiry of 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[10] and the AO.

3. Leaders attend safety training and participate in safety system reviews.

4. Timely action is taken to mitigate hazards even when it is costly to do so.

5. Personnel with accountabilities related to the management of health, safety and/or the environment are accorded equal status, authority, and salary to other operational assignments.

6. Leaders are willing to stand up for safety and protection of the environment even when production is impacted.

7. Safety and protection of the environment is considered at high-level meetings on a regular basis (not only after an incident).

Cultural Defense #2: Vigilance

Vigilance refers to organizational preoccupation with failure and the willingness and ability to draw the right conclusions from all available 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. People are encouraged and willing to report safety concerns (unsafe conditions, hazards, 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 hazards. 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 hazards, errors, near-misses, and incidents
- Sharing information and interpretation to create collective understanding of current status of safety and anticipated future challenges

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10 Key safety personnel refer to people with responsibility for and/or knowledge of the health of the safety system. This would include those responsible for development and implementation of any part of the management system, and those who monitor, evaluate, and identify remedies for performance issues related to the entire safety system.

1. Sophisticated information systems are used to collect and analyze data from a range of internal sources (e.g.: incidents, hazard reports, maintenance system data, inspections, audits and reviews).

2. The organization seeks information from a wide range of sources (local responders, landowners, communities, regulators, etc.) to support hazard identification.

3. Safety performance indicators are tracked, trended, evaluated and acted upon.

4. Safety information and performance data is communicated upwards and across the organization without distortion.

5. Prospective analysis is conducted to identify future threats.

6. Staff from a wide variety of departments and levels attend meetings relating to safety.

7. Staff are aware of the connection between cause and effect as they track the consequences of their actions and decisions.

8. Teams avoid making decisions in isolation; instead they seek feedback about the impact of their actions from other parts of the organization.

9. A questioning attitude prevails at all levels of the organization.

10. Leaders seek to identify and understand active failures and latent conditions that lead to incidents.

11. Hazards and risks are explicitly captured, reviewed regularly, and updated.

12. Reactive and proactive safety performance is tracked over time.

13. Data gathering includes third parties, such as contractors and sub-contractors.

14. Hazards, risks and related controls are communicated throughout the organization and beyond (contractors, suppliers, providers of service, etc.).

15. Staff have knowledge and skills related to human and organizational factors, team performance and error management techniques

16. Policies are in place to encourage everyone to raise safety concerns.

17. The organization understands that a decrease in or lack of reporting does not mean that culture is strong or performance is improving.

18. Processes are in place to ensure visibility of: (a) risk produced by a single decision/action/condition and (b) aggregate risk that results from multiple decisions/actions/conditions that collectively exceed safety margins.

19. High quality and timely feedback is provided to staff following receipt of a report/concern.

20. Employees are clear that they will be treated fairly if they are involved in a near-miss or incident.

21. Disciplinary policies are based on an agreed distinction between acceptable and unacceptable behavior.

22. Mistakes, errors, and mental lapses are treated as an opportunity to learn rather than find fault or blame.

23. Incident investigation aims to identify the failed system defenses and improve them.

24. Incidents are thoroughly reviewed at top-level meetings.

25. Lessons learned are implemented as global reforms rather than local repairs and these lessons are communicated effectively to employees.

26. Lessons are learned from relevant incidents that occur across the industry and in other high hazard industries.

27. Lessons learned from internal data collection are shared with others across the industry.

28. Leadership seeks to exceed the minimum established regulatory expectations.

29. Leadership takes ownership and responsibility for (safety) standards and performance and does not rely on regulatory interventions to manage the organization's operational risk.

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 mitigate, eliminate, or report it even when that 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, participation 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 incidents, including 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 safety concerns (e.g.: if safety procedures are not being followed, if hazards or procedures are unknown for a particular task).

7. Performance management programs include a wide range of safety criteria.

8. Informal leaders are encouraged to promote safe decisions and practices in order to prevent harm.

9. Employees are held accountable and rewarded for a demonstrated commitment to safety and environmental protection.

10. Those with responsibility for representing employees (e.g.: health and safety committee members) are provided with adequate training, skills, and resources.

11. Non-operational staff recognize their business decisions may impact safety and environmental protection outcomes.

12. Employees communicate with other departments to understand safety implications of decisions prior to making them.

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. The organization promotes effective teambuilding and maintenance skills in support of operational excellence.

6. Cross-functional and interdisciplinary teamwork is present in safety reviews and analyses.

7. Contingencies are in place to fill vacated roles with competent staff.

8. There is an ongoing monitoring of the operation and its environment for changing conditions and related risks.

PATH FORWARD

The CER, C-NLOPB, and CNSOPB remain committed to promoting and advancing safety culture through engagement with industry members, Indigenous peoples, subject matter experts, and other interested parties. The agencies will continue to collaborate with members of the North American Regulators Working Group on Safety Culture. Specifically, this group will prioritize work related to:

1. regulatory staff competency development related to safety culture;

2. improved understanding of regulatory safety oversight culture and its impact on industry performance outcomes; and

3. outreach, sharing and learning across industry.

In concert with these actions, the CER, C-NLOPB, and CNSOPB will continue efforts to develop validated safety culture indicators that may be used by regulators within traditional compliance verification activities (i.e.: inspections, audits, incident investigations). These indicators would be designed to gather signals of industry best practices and potential hazards related to culture. Related lessons would be shared in order to improve awareness of culture's role in supporting or detracting from safety and environmental protection. In addition, individual company information may supplement other performance data collected by the regulators (e.g. incidents, non-compliances, management system deficiencies) in order to inform the regulators' risk based approach to compliance activity planning and oversight.

Finally, the agencies recognize the importance of industry ownership in developing, achieving, and sustaining a robust safety culture. For this reason, the CER, C-NLOPB, and CNSOPB call upon regulated entities to:

1. evaluate the maturity of their safety cultures;

2. integrate and embed safety culture considerations into activities and decision making; and

3. address potential cultural weaknesses while nurturing existing strengths.

CONCLUSION

The CER, CNSOPB, and C-NLOPB put safety and environmental protection at the forefront of their responsibilities. Safety culture remains a subject that requires greater understanding and consideration in the prevention of catastrophic incidents. The regulators' safety culture definition and framework is intended to promote learning and shared understanding of safety culture across the North American onshore and offshore oil and gas industry. Further, this *Statement on Safety Culture (2021)* articulates the expectation that companies regulated by these three agencies build and maintain a positive safety culture while remaining vigilant to potential cultural threats.

Appendix A: Comparison of Safety Culture Frameworks

IAEA	James Reason	High Reliability Organizations	BSEE	PHMSA	CER / 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
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

Statement on Safety Culture (2021)

IAEA	James Reason	High Reliability Organizations	BSEE	PHMSA	CER / CNLOPB / CNSOPB
	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