Ingenium

Safe Choice

Operationalizing Human Performance Science in Decision-Making

Abstract

An approach for enhancing safety performance in Energy Industry field applications by integrating decision-making science will be presented. Results – both qualitative and quantitative – will demonstrate step change potential in safety performance in pursuit of plateau breakthrough to zero high severity incidents. Safe Choice empowers and enables safe decision-making at all levels of an organization by providing new knowledge and techniques, and linking these to current behavioral based safety practices.

Emerging understanding about brain and social science, as it relates to Energy Industry safety, is provided in practical discussion centered around decision-making. Workforce members are entrusted and empowered with new knowledge, personal decision-making style survey results, and an appreciative inquiry discussion that integrates brain science concepts in a simple effective way to their existing, familiar work processes and tools for managing safety and risk in their operating, drilling, and construction field sites. Following Safe Choice, individuals have a greater understanding of their own human performance and decision-making. Focusing on individual learning and awareness is the differentiator.

The program was first developed for the ExxonMobil Hebron Project integration, hook-up and commissioning construction site in Newfoundland and Labrador, Canada during 2015-2016. Together, with other transformational safety leadership initiatives, Safe Choice contributed to best-in-class safety performance. Safe Choice was then further developed and adapted for application within operating field sites during 2017. With further success, the program is now being implemented globally with an agile, user-centered design philosophy and approach.

The small group approach to training includes each worker receiving an individual decision-making style report and creates an atmosphere of appreciative inquiry, trust and openness. Developing leadership supporting strategies that foster a continuation of this atmosphere once back in the field (and outside of the classroom) has proven effective, with use of the new language and concepts evident in regular daily meetings such as toolbox talks, shift handover and safety meetings, as well as being used between workers during conversations in the field. Many locations where Safe Choice has been implemented have excellent safety performance, and will show both qualitative and quantitative measures of success achieved.

Energy Industry Leaders, Operations, Drilling, Construction and Safety Professionals will gain new knowledge on successful next-step integration of decision-making science into safety programs for protecting their workforce. This will expand and extend earlier insights from panel discussions at SPE HSSE Meetings in New Orleans (April 2017) and Abu Dhabi (April 2018). This paper includes results of the program so far.

1.0 Introduction

For many years, the energy industry has understood both the moral and business imperatives for providing effective Safety Management Systems to keep employees, contractors, the communities in which they operate and the environment safe. Standards of design, personal protective equipment, safety management systems, work management standards, behavioral-based safety programs, leadership accountability and workforce engagement have all been the subject of many industry conference papers and safety references. Indeed, whole conferences aimed at 'getting this right' are in place. This focus is well justified. According to the latest International Oil and Gas Producers (IOGP) data, 50 people lost their lives working in upstream energy in 2016, and the number is likely larger when non-IOGP member companies are considered. There is no higher priority for our industry.

ExxonMobil is constantly pursuing our vision, 'Nobody Gets Hurt,' and like many organizations, we are pursuing next step performance breakthrough to eliminate fatalities and higher consequence injuries and outcomes. As part of this journey, we continue to focus on eliminating all hurts, including lower severity hurts, toward achieving our 'Nobody Gets Hurt' vision.

ExxonMobil has focused efforts in areas such as Operations Integrity Management Systems (OIMS), process safety, transformational leadership and safety culture. We are also focused on human factors and how these impact the effectiveness of our systems and processes.

Considerable study and discussion of human factors have led to a number of innovations in our safety approach. In recent years, we have represented our incidents based on the level of hurt, as well as the level of potential hurt, as a way of high-grading our efforts to eliminate fatalities and high consequence, life altering injuries. A deep-dive study of our upstream high potential events in 2015 found that decisions made in the moment impacted some portion of our incidents, though many had resulted from prior decisions made sometimes days, months, or even years earlier. From this analysis, we identified some higher priority areas of focus for our safety management systems, and most importantly identified a need for enhancing decision-making knowledge and awareness as a step towards conscious, safer decision-making. We determined that understanding the human factors behind decision-making was critical for us to unlock the breakthrough in performance that we are seeking.

In the same timeframe, at our ExxonMobil Canada Energy project for building and installing the Hebron Platform, we were exploring a decision-making safety program with Ingenium Training and Consulting (Ingenium) called Safe Choice. Hebron is a world-class offshore producing and drilling platform that was constructed in Newfoundland, Canada. Some of the facilities were constructed in other parts of the world and were brought to Newfoundland for Integration, Hook-Up and Commissioning (IHUC) at the Bull Arm site close to St. John's. Following successful co-development and application of a fit-for-purpose Safe Choice program for the Hebron Project's IHUC workscope, we identified an opportunity for Safe Choice to be further adapted and expanded across our upstream organization.

Safe Choice is the next phase in ExxonMobil's safety journey. It is important to note that Safe Choice does not and cannot stand alone as a safety program. Rather, it is the 'next step' in improving human performance and reliability in our operations; it works in concert with existing safety management programs and provides new knowledge and techniques to our workforce members about their individual decision-making processes and how the existing suite of safety tools and processes can be best leveraged for enhanced, safer decision-making.

Safe Choice seeks to take academic knowledge and information about decision-making and brain science, and operationalize these concepts in ways that resonate and make sense at the workface. Our aim has been to empower individuals with new knowledge and techniques that allow them to be aware of their own individual decision style and thinking patterns to ultimately help them be more consciously aware to make safer decisions. The focus on individual learning, personalized investment, personal growth, self-awareness and workface input have been the differentiators when compared with other programs.

Workforce members are empowered with new knowledge and insight, survey results on their individual decision-making styles, and an appreciative inquiry discussion. This approach integrates brain science concepts with their existing, familiar work processes and safety and risk management tools used in operating, drilling, and construction field sites.

2.0 Background and History

For more than a decade, ExxonMobil has internally discussed the concepts of human factors with our leadership and workforce through our fundamentals of safety training. Those efforts have highlighted that the success of operations depends on human performance. All the safeguards that focus on design, equipment, processes and systems are only as good as the humans who use them. What more could be done to improve the reliability of our people? We designed better equipment with human interface in mind, provided training to improve knowledge, skill and competency, and developed and required the use of procedures to ensure repeatable and consistent results. However, events do not always go according to plan. Faced with challenges, people improvise, adapt and find ways to make things work. This is why our people are our greatest assets. No system or procedure, no matter how good, can predict all possible changes and outcomes. While we hire, train, develop and empower our people with skills and processes for managing change according to risk, as humans we can still fail to recognize the influences that lead to negative outcomes. Recent efforts have focused on the factors that influence individual risk tolerance, with more emphasis on helping people identify what those factors are, but less on how and why those influences work. The concept of risk tolerance hasn't always resonated with all workforce groups. However, framing risk tolerance as individual decisions and choices has made more sense for a broader group of people across our organization. And so, our focus has shifted to providing a better understanding of the influences and impacts of choice.

This emphasis on personal choice connects well with a model we have been using to reach the hearts and minds of field workers, front line leaders, business unit leaders and all the way through to senior leaders of the company as part of our ExxonMobil Fundamentals of Safety Program. This model is known as the SPIES model and is shown in Figure 1. The SPIES model helps explain the shifts along an individual's safety journey from being about compliance and taking care of 'Self,' being 'Political' to satisfy my boss's needs, through 'Intellectual,' 'Emotional' and ultimately 'Spiritual' shifts.

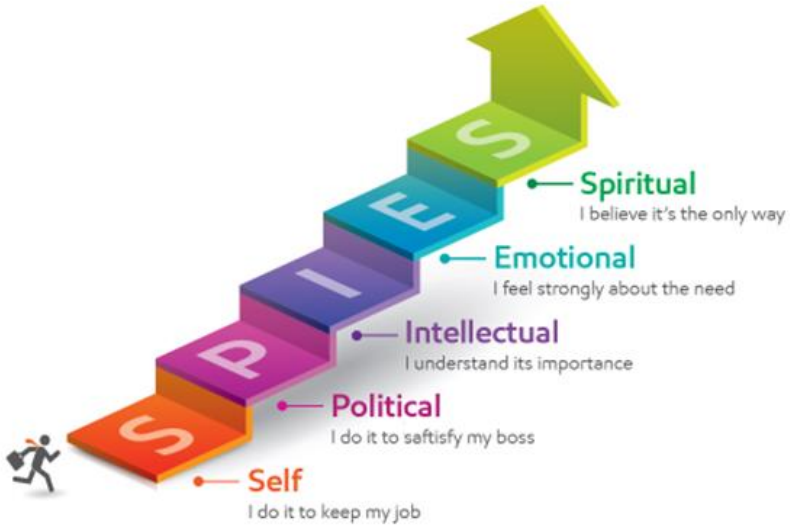

Figure 1: ExxonMobil's Fundamentals of Safety SPIES model

3.0 Safe Choice Components

The Safe Choice program at ExxonMobil is a co-developed product that brings Ingenium's expertise in decision-making science and leadership together with expertise from ExxonMobil's Center of Expertise (COE) in Human Factors. Further, the operating expertise of ExxonMobil and our Contractor Partners at our various business units around the globe is integrated with the program to make it fit for local purpose and culture. While it could be argued that the individual components of the program are not new, what is differentiating is the unique integration of concepts, with the workforce as the target group. Also, the program is designed to be flexible to meet business units 'where they are at' on their safety journey. The program has core principles that are present in all locations, but each location is given a significant degree of freedom to adapt for local needs. The program components are described in more detail below as follows:

- 3.1 Decision-making science
- 3.2 Human performance principles and concepts
- 3.3 The co-development approach, and
- 3.4 An overall summary of the program and its core principles

Section 4 covers the implementation blueprint process that enables each business unit to adapt and further the co-development process for their local needs while maintaining the core principles.

3.1 Decision-making science

As management science developed throughout twentieth century so too did decision-making science, with an early focus of researchers on management and leadership styles of decision-making (Taylor, 1947, Tanenbaum and Schmidt, 1958, Adorno et al, 1950 and Rokeach, 1960).

As research progressed to examine decision-making and types of decisions (Simon, 1960, Harvey et al, 1961 and Schroder et al, 1967) they built upon earlier research including Jung's psychological types, human information processing and problem solving. Jung's psychological types (1921) were the

inspiration for advances in understanding decision-making, forming the basis for Myers-Briggs personality types introduced in 1943, and further developed by Kilman and Mitroff (1976), who applied Myers-Briggs personality types to decision-making styles.

Fascination with decision-making grew in the second half of the last century, with many of the concepts and models utilized in organizations and academia evolving during this time. To analyze the state-of-the-art research in the field and seek to understand its future direction, Rowe and Boulgarides (1983) adopted a taxonomy approach, categorizing decision style models (Figure 2). Their taxonomy categorized the different models based on decision certainty versus decision process and highlights the interest being taken in understanding decision-making within the context of leadership.

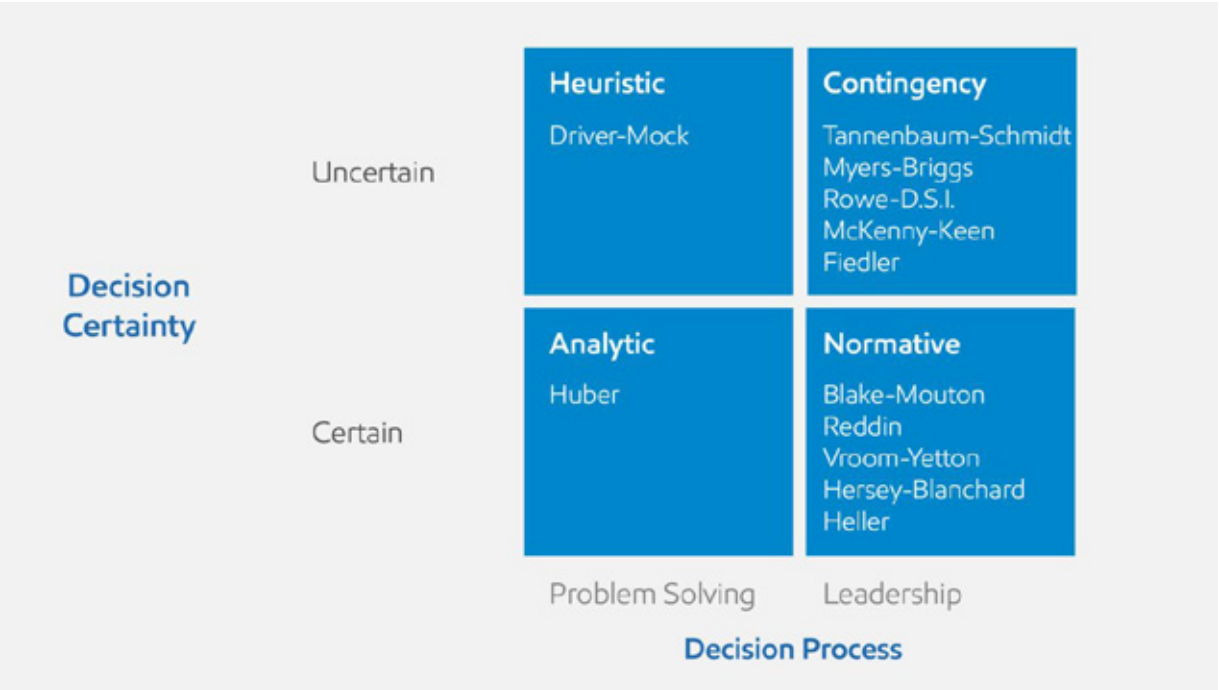

Figure 2: Categorization of decision-style models (adapted from Rowe and Boulgarides, 1983)

Rowe and Boulgarides further refined their thinking considering advances in cognitive psychology, which focused on perception, information processing, problem solving, memory, creativity, integration of cues, dogmatic fixations and operant response, or how behavior is impacted by consequences. The study of left and right hemispheres of the brain was an important area of study (Mann, 1982, Lundberg and Bigelow, 1982, Springer and Deutsch, 1981), leading to the realization of the importance of cognitive complexity in examining decision-making styles.

The Decision-Making Style Inventory was subsequently developed and propagated by Rowe and Boulgarides (1994). It is an internationally validated and reliable twenty-item Likert assessment questionnaire that identifies an individual's decision-making style preference. It has been widely used in different countries and cultures (e.g. Podrug 2011, Kasprzhak et al 2015, and Truoung et al, 2017). It has also been tested in exploring the impact of gender on decision-making (Boulgarides, 1984, Daewoo, 1996).

A decision-making style preference reflects the combination of how an individual perceives and comprehends stimuli and the general manner in which he or she chooses to respond to such information. The Decision-Making Style Inventory from Rowe and Boulgarides (1994) has been adapted by Ingenium Training & Consulting as an online portal questionnaire which generates a personalized report, as

portrayed in the *StyleUs* model—shown in Figure 3 — to test for decision-making styles in the area of safety and safe choices for leaders and workers throughout the upstream energy industry. The model is based on the idea that styles vary along two different dimensions, namely: Value Orientation: reflects the extent to which an individual focuses their attention on either task and technical concerns versus people and social concerns, when making decisions, represented as the horizontal axis. Tolerance for Ambiguity: reflects the extent to which an individual has a high need for structure or control in his or her life, represented as the vertical axis.

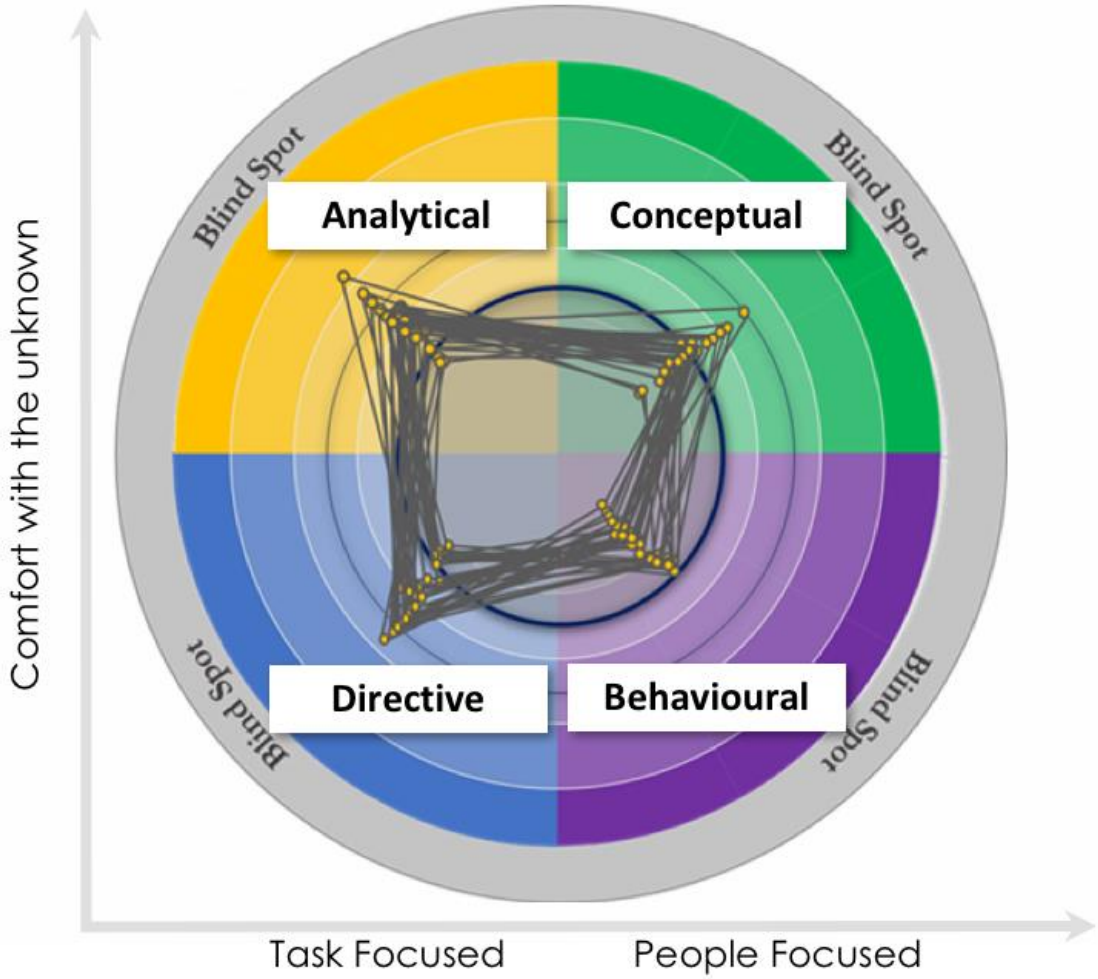

Figure 3: Adapted decision-making style quadrants (several individual spider plot survey results are shown)

When these dimensions of value orientation and tolerance for ambiguity are combined, they frame four distinct styles of decision-making; Directive, Analytical, Conceptual and Behavioral, all of which represent different areas of risk and opportunity when it comes to making safe choices in industrial work areas.

Directive – Individuals who have directive style have low tolerance for ambiguity and are orientated toward task and technical concerns when making decisions. They are efficient, logical, practical and

systematic in their approach to solving problems. Individuals with this style are action orientated and decisive and like to focus on facts. However, in their pursuit of speed and results these individuals tend to be autocratic, exercise power and control, and focus on the short-run.

Analytical – this style has a much higher tolerance for ambiguity and is characterized by the tendency to overanalyze a situation. Individuals with this style like to consider more information and alternatives that do directives. Analytic individuals are careful decision makers who take longer to make decisions but who also respond well to new or uncertain situations. They can often be autocratic.

Conceptual – individuals with a conceptual style have a high tolerance for ambiguity and tend to focus on the people or social aspects of a work situation. They take a broad perspective to problem solving and like to consider many options and future possibilities; they rely on intuition and discussion with others to acquire information. Downsides to this style are that it can foster an idealistic and indecisive approach to decision-making.

Behavioral – this is the most people orientated of the four styles. Individuals with this style work well with others and enjoy social interactions in which opinions are openly exchanged. Behavioral types are supportive, receptive to suggestions, show warmth, and prefer verbal to written information. This style can lead to a wishy-washy approach to decision-making as individuals have a hard time saying no to others and try to avoid conflict.

Martinsons and Davison (2006) contend that two significant influences on decision-making are values and cognitive perception. Both affect how an individual interprets and responds to stimuli and conditions. For example, urgent and comprehensive responses are more likely when situations are perceived as threats rather than opportunities.

Values are integral to thoughts and actions. They influence the evaluation of problems (e.g., is it serious? is it solvable?), as well as potential solutions (e.g., is it worth trying? was it successful?). Values also influence the processes used to make choices; the development of interpersonal relationships; the boundaries of and limits for ethical behavior; and the responses to external pressures (Rowe and Boulgarides, 1983, 1994). Different nationalities have different values, as Hofstede (1980) assessed in his seminal studies on work-related values of IBM employees in over sixty countries, where he found significant variations. National background and culture explained about half of the overall difference. This was far more than the proportions explained by professional role, age or gender.

Cognitive perception is another major influence on decision-making, as the management of information inevitably involves judgment biases. These biases lead to varying frames of reference and subjective interpretations of situations, which in turn determine our responses to specific situations (Morley et al, 2004). Individuals make a variety of systematic mistakes when making decisions. These mistakes are generally associated with a host of biases that occur when we use judgmental heuristics; which represent rules of thumb or shortcuts that individuals use to reduce information-processing demands (Kreitner and Kinicki, 2012).

In 2005, the National Science Foundation published an article regarding research about human thoughts per day, all potential precursors to choices. The survey concluded that the average person has as many as 12,000 to 50,000 thoughts per day, depending on how 'deep' a thinker one is. Other estimates run as high as 60,000 per day; and for those of who meditate, this higher level of daily thoughts is unlikely to be a surprise. Meditators are familiar with the 'monkey mind' phenomenon in which the mind is observed as an out-of-control thought generator. The Laboratory of Neuro Imaging at the University of Southern California research concluded that the average human being can have ‘up to’ a total of 70,000 thoughts per day.

Based on these data resources, it is reasonable to deduce that for an average human being, something between 20,000 to 50,000 daily thoughts takes place. This range is used as a starting reference point for 'our decision-making capacity' as part of the Safe Choice program.

Translating those thoughts into choices, many different types of decisions provide the structure of an individual's daily life. There are life decisions, such as those to get married, make a major purchase, have children, go to college, move city, etc. Then there are major decisions that may not be life altering, but do affect the outcome of an individual's day, such as the decision to get out of bed in the morning, to go to work or school, eat, etc. Then there are decisions that are so minor that an individual may not always be consciously aware that he or she is making them. Every single day people make decisions on what clothes to wear or what to have for breakfast.

The average adult makes an estimated 2,000 to 3,000 decisions a day (Sollisch, 2016). This figure may seem high; however, researchers at Cornell University suggest that we make 227 decisions every day about food alone (Wansink and Sobal, 2007), and we make an astounding 140 decisions per minute while driving. Looking at decision-making in an occupational context, teachers make 1,500 educational decisions each day, averaging four decisions a minute. That does not include decisions that go into curriculum, grading, feedback and revision of planned instruction.

When it comes to safety in the workplace, lack of attention to relevant risk events is one of the main factors in incidents, and distraction is frequently used to refer to this lack of attention or to attending to something irrelevant. The result of distraction is an impaired capacity to process relevant information (Rumar, 1990) because of perceptual inefficiency and/or inadequate response selection.

Attention is necessary for conscious perception (Mack and Rock, 1998), but engaging in events unrelated to the task in hand could also directly affect decision processes, producing incorrect or late response selection. Phenomena such as the psychological refractory period (Johnston et al, 2001) indicate that a difficulty to perform two tasks simultaneously arises when both tasks require a central process of evaluation and response generation; that is, the attentional interference occurs at central processing levels.

On project and operating facilities, onshore and offshore throughout the energy industry, workers can make up to 600 injury potential decisions every day at work. As previously discussed, we make 140 decisions per minute while driving, if you make the right decision 99 percent of the time, the 1 percent you make the wrong decision you will make 84 mistakes per hour. That equates to 672 mistakes in an eight-hour work-day. These statistics highlight the importance of being aware of your environment and your decision-making style.

Being conscious of your decision-making style and the biases inherent within it provides a solid foundation from which to make decisions relating to safety when used in conjunction with robust safety tools and processes. Decision-making styles and heuristics are essentially 'hard wired' into each of our approaches to decision-making with the associated issues that this creates. These are multiple biases, each capable of anchoring an individual's style into a quadrant of one of the four decision-making styles. This could be a good thing, or potentially harmful, depending on the context and situation. The relevance of understanding decision-making styles and biases is that it highlights the imperfections of human decision-making processes, which becomes particularly important when risk is a factor and there is a need to make safe choices.

3.2 Human Performance Principles and Concepts

Human factors in Safety Engineering is a broad topic. According to the UK Health and Safety Executive's 'Reducing error and influencing behaviour,' (2nd edition, also referred to as HSG48, 1999), "Human factors refer to environmental, organisational and job factors, and human and individual characteristics, which influence behaviour at work in a way which can affect health and safety."

In recent years, a growing portion of the energy industry safety conversation has been in the area of human and individual characteristics and how to understand behavior, psychology and neuroscience in

ways that can help influence greater human performance and reliability to lead to safer outcomes both at the workplace and outside of the workplace. With the advent of greater and more accessible brain imaging technologies, there has been a surge of neuroscience research and discussion and there is much literature available on this topic. For at least the past two decades, ExxonMobil's global operations have included behavioral-based safety science as a core part of the Safety Management Program as an integral expectation from ExxonMobil's Corporate Operations Integrity Management System (OIMS). This has included systems of practice that define leadership behaviors, set out expectations for safe behaviors from all workers, processes and practices for risk identification, notification and mitigation, as well as robust processes for measuring, managing and continuously improving these systems. The journey has taken ExxonMobil from a design standards and systems compliance focus, through behavioral, leadership and cultural focus areas to achieve world class safety standards and continued improved performance over the past thirty years as exhibited in Figure 4.

Figure 4: ExxonMobil's safety journey

ExxonMobil has been working on the next step in performance breakthrough and we believe this lies in the area of greater understanding of human performance. Integral to greater understanding is figuring out how to take academic science and knowledge and operationalize it in a way that creates impactful change at the workface.

The Human Performance Principles that underlie ExxonMobil's approach are listed below and underpin the change journey for the next step safety performance breakthrough that we are pursuing:

1. People make mistakes.
2. Mistakes often result from well-meaning behaviors intended to get the job done.
3. Underlying conditions often contribute to error-prone situations.
4. Understanding 'how' and 'why' mistakes occur can help us prevent them.
5. We can predict, and then prevent or manage most error-prone situations.
6. A leader's response to mistakes directly impacts the culture of both learning and accountability.
7. Managers, supervisors and team members work together to create an engaged, collaborative team.

There are several fronts of attack for 'operationalizing' these principles including, leadership training, leadership behaviors, incident investigation practices, organizational learning capability, work front behaviors, culture and worker engagement. Safe Choice includes concepts that directly target worker

engagement and work front behaviors in decision-making. Safe Choice includes learning and self-awareness training of the following concepts also described pictorially in Figure 5, below.

A. Personal decision-making styles
B. Bias in decision-making
C. Fast and slow thinking modes of mental processing
D. Presence in-the-moment for decision-making, or 'Present Motivation'

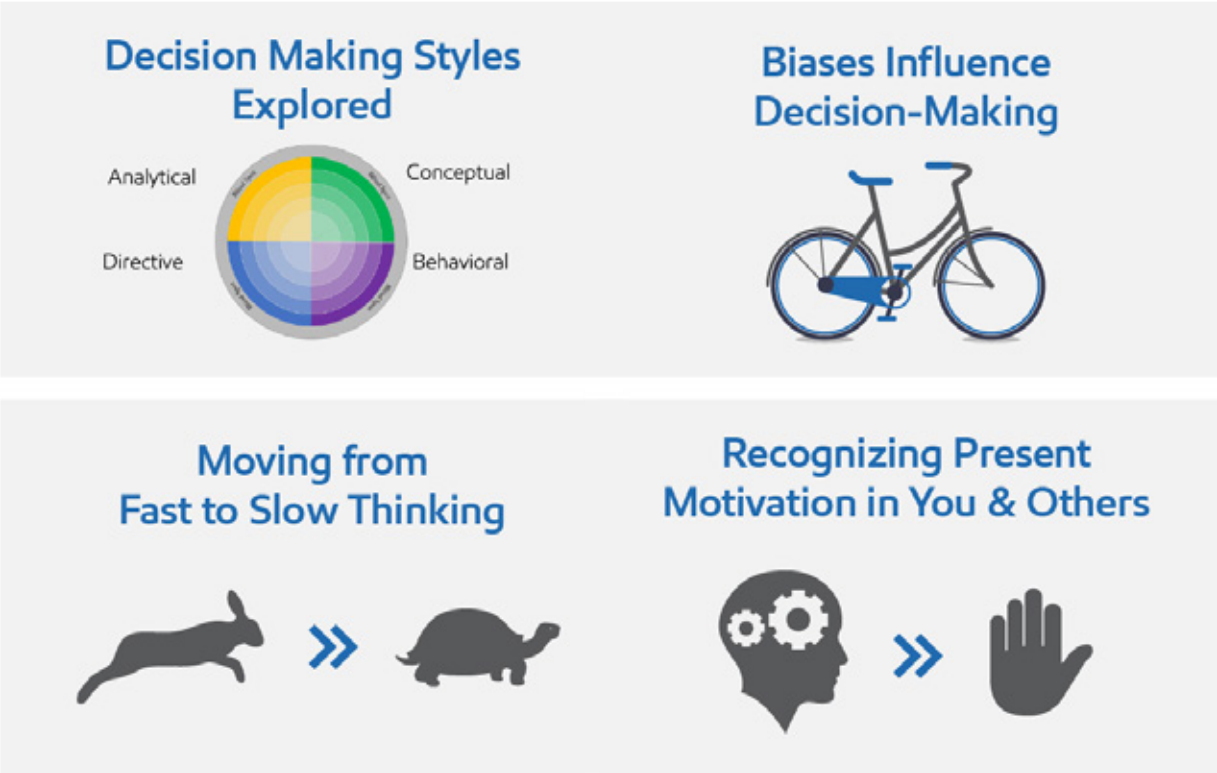

Figure 5: Safe Choice concepts

In Section 3.1, Decision-making Science, the *StyleUs* decision-making survey is described in detail. This is used in the program as a key enabler for starting conversation with the workforce participants of the training class reflecting on their own personal decision-making styles. It is important to acknowledge that psychometric tests need to be thoughtfully used with any target audience. In the case of *StyleUs*, as an integral part of Safe Choice, the survey results provide participants with an opportunity to learn about their own personal decision-making style and that others in their work group may have a different style. For many participants this is an eye-opening, first opportunity for personal learning of this nature and is an illuminating and fun experience. The *StyleUs* results are put into context with emphasis that there is no right or wrong result.

Workforce participants are also introduced to the concept of bias as part of the normal human response for managing the thousands of stimuli we are exposed to at every moment of the day, together with our brain's amazing ability to pattern match and discard unnecessary information so we can function and achieve the feats of daily human life.

Bias is discussed in a way that provides openness for different ways of thinking and a greater understanding of 'human' response that can at times lead to mistakes, faulty analysis, or a tendency to seek efficiency that results in potentially risky short cuts. The possibility for unsafe decisions and the root

cause of how error happens, as the pattern matching or filtering processes of our brains takes over, is described and explored in an open, appreciative environment. The 'a-ha moment' that comes to many participants is exciting, as people shift from feeling 'blamed' or 'bad' for their behaviors, to empowered and engaged through understanding their own biases. This is bolstered by the fact that management is supporting a program that discusses these concepts with candid transparency as solutions are sought together.

"Fast thinking" and "slow thinking" (Kahneman's 2011 *Thinking, Fast and Slow*) are the terms used to describe the complex, mental processing going on in the human brain in a simple and effective way. Kahneman posits that the human brain consists of two systems often in conflict with each other, System 1 in which decisions are taken quickly, effortlessly and intuitively (fast thinking), and System 2 in which there is deliberation and analysis which takes more time (slow thinking). He espouses the need for people to "recognize situations in which mistakes are likely and try harder to avoid significant mistakes when stakes are high" while observing that "because thinking slow takes work, we are prone to think fast, the path of least resistance." Again, this explanation of 'how and 'why' provides empowerment and shifts workers from a feeling 'bad' mindset to one of greater engagement.

Encouraging workers to 'stop and think' and use their 'head before hands' are key enablers in improving workplace safety. Safe Choice seeks to provide workers with the 'why' behind their typical safety tools such as Last Minute Risk Assessment, Stop and Think cards, or Stepback 5 x 5 cards, all of which have been used for a long time as interrupters to assist in moving from fast to slow thinking. Providing the brain processing science, in simple terms, provides workers with a context and a 'why' for using these tools resulting in these tools being applied even more effectively than prior to this knowledge being imparted.

In his book, *Start With Why: How Great Leaders Inspire Everyone to Take Action*, Simon Sinek explains the core of human motivation being around purpose and connection, and that with a sense of understanding of how our work connects to our purpose, our motivation grows and our decisions and actions can result in great human achievement. The people that make up our field workforce groups are not always given such a comprehensive opportunity to understand the 'why' behind their safety tools. Explanation of the tools and the underlying behavioral science promotes self-awareness and personal growth.

The last human performance concept included in Safe Choice is one of presence, we use the term 'Present Motivation'. Simply put, present motivation means being present in the moment and motivated by the moment. Common catchphrases include, 'head in the game' and 'in the zone.' Absence of present motivation could be due to distraction, fatigue or lack of current awareness. In discussion of human performance we enlighten participants in Safe Choice of the tens of thousands of thoughts humans have each and every day and the ease with which our minds can wander from our task to other aspects of our lives including everyday things such as what to eat for lunch, days-off activities, to perhaps more concerning items such as financial stress, relationship concerns or fatigue. All of these impact present motivation and result in greater chance of fast thinking mode and/or error. Safe Choice discusses the need for present motivation, particularly for higher risk activities that can lead to higher consequence outcomes such as those differentiated in ExxonMobil's Life Saving Actions programs.

3.3 Co-Development Approach

The ExxonMobil Safe Choice Journey has had three distinct stages so far:

I. Initial Application at Hebron Project Integration, Hook-up and Commissioning (2015-2016)
II. Operating Unit adaptation and pilots (1H 2017)
III. Implementation across Upstream Assets (2H 2017+)

In each of these stages, a co-development approach between Ingenium and the local ExxonMobil business unit teams, including key contract partners at those locations, has been a foundation to the success of the implementation process.

A partnering approach is not in itself revolutionary, and indeed there are other examples within ExxonMobil and other operators' businesses of co-development with a vendor of this nature. However, this approach has been a key success factor for Safe Choice and warrants some discussion as part of the Safe Choice story. Two areas of note for the Safe Choice development were the blending of human performance concepts and expertise, as well as the deliberate inclusion of our contractor partners in local developments, with representation from each specific business units' front line workforce (both employees and contractors) as part of the local co-development process.

For the Hebron Project's IHUC scope, this included activity over several months with ExxonMobil human factors and personnel safety experts coming together with representatives from the project team from ExxonMobil and our contract partners. As mentioned earlier, The Hebron Platform structure was constructed at Bull Arm in Newfoundland, Eastern Canada, with all components including the topside facilities and purpose-built drilling rig integrated and commissioned at Bull Arm. The Hebron platform was then towed offshore Canada to its drilling and production location. We made several iterations on training content before conducting a field ''Alpha Test'' to gain feedback from workforce members, and to include their contributions to the content development. Following this first ''Alpha Test'' of 20 workforce participants, we re-worked and tightened up some of the content ahead of a ''Beta Test'' for a further approximately 120 workforce members across six separate training sessions each with 20 participants. The feedback gained from this process was invaluable in both further refining and elevating content, and also in gaining positive feedback from the workforce members that the training content complemented existing safety program tools and processes. Participants agreed that their new knowledge of the human decision-making process and the techniques that were introduced, allowed them to better understand their own individual decision-making process and how this could enhance successful application of the existing safety tools during work in the field. In early 2016, as the IHUC workscope got underway, approximately 900 additional people were trained in Safe Choice as an integral part of safety orientation and onboarding training for the project site.

The Hebron project safety performance was world class. A safety strategy and plan that included transformational leadership behaviors, a safety culture focus and industry leading workforce engagement activities contributed to the success along with the Safe Choice program. The positive workforce response to Safe Choice was evident in the field to any visitor at site, and was a strong signal for senior leaders in ExxonMobil Upstream to further pilot the process within additional operating businesses.

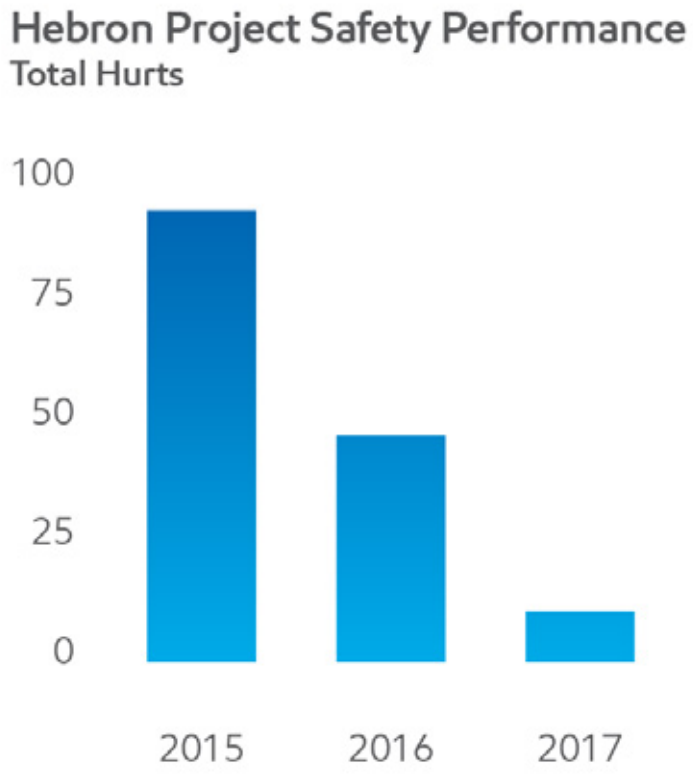

Figure 6: Hebron Integration, Hook-Up and Commissioning (IHUC) hurt results. Safe Choice, together with world-class safety leadership and workforce engagement resulted in a zero Loss Time Incident (LTI) record, and no life-altering injuries.

In the first half of 2017, we selected two operating business units to pilot an adaptation of the Safe Choice program – one was part of the operating portfolio in Esso Australia Pty. Ltd., and the other was in Northern Alberta, Canada, as part of our Imperial Oil Resources Ltd. portfolio.

Building on the knowledge gained and success of the Alpha and 'Beta Test' approach that gained crucial local insights from local workforce participants, as well as being able to drive local ownership and engagement, a similar co-development approach was taken. A small group from the ExxonMobil Central Safety, Security, Health and Environment (SSH&E) team together with Ingenium team members worked with local safety professionals, management and operations workforce members to replicate the Alpha and 'Beta Test' approach. A workshop to develop strategies for how to successfully implement the program was also undertaken. This is discussed in more detail in Section 4.0 Implementation Approach.

As in Eastern Canada (Hebron IHUC), the additional pilot programs were well received by workforce groups in both Australia and Western Canada. Shared pursuit of 'next step' performance breakthrough, early enthusiasm, and organizational momentum led to the Safe Choice 'Alpha Test' and Implementation Workshop being requested from a variety of additional business units across ExxonMobil's global operations.

During the second half of 2017 and so far in 2018, Safe Choice has been implemented in a variety of locations around the world including additional locations in the United States, Eastern and Western Canada, Russia and Malaysia. Many other locations are in early discussions for developing an implementation strategy with plans to bring local insight and co-development while retaining the core principles and concepts as central components in pursuit of a step change in safety performance.

Figure 7: ExxonMobil affiliates, subsidiaries and contractors trained in Safe Choice (June 2018)

3.4 Program Description

The Safe Choice program consists of a number of parts, all of which are customizable for the end business unit. The parts as shown below in Figure 8 include:

- One-day training class
- Field coaching program
- Sustainment through integration with existing safety management practices

Figure 8: Safe Choice program parts

The one-day training program consists of five main sections (Figure 9).

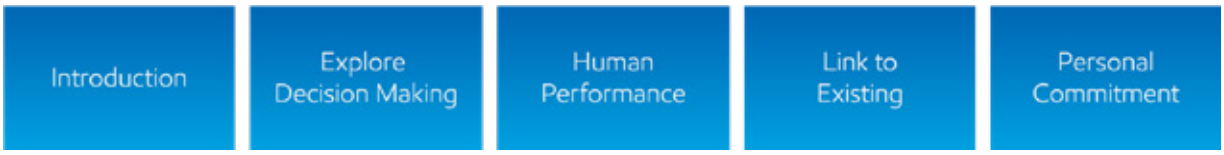

Figure 9: One-day training program has five distinct sections as shown

By design, individual business units have flexibility and autonomy on how to sequence and arrange these sections, as well as the amount of time spent on each section. The base ''Alpha Test'' training day spends about one to two hours on each of the sections for a total day of about 8 hours of classroom time. Typically, each business unit's local version of the one-day training class is arranged similar to this generic 'starting point' and takes six to eight hours. The introduction provides the participants with an overview of the day, and compels participants that this will not be an 'ordinary' or usual safety training day. Practical, experiential and tactile learning activities are introduced quickly to make the learning experience both enjoyable and impactful.

Considerable time is then spent exploring personal decision-making styles. Typically, participants will have completed their *StyleUs* questionnaires prior to coming to training. Once the individual reports are provided, and the concepts are covered, there is ample time built into the training day agenda for individuals to discuss their results with facilitators to ensure that the individual learning process is optimized. To enable this, classes are kept to a maximum size of 20 participants with at least two facilitators available for each class. This also fosters an atmosphere of appreciative inquiry, promoting an inside-out learning opportunity for participants. Storytelling and conversation from the whole group are featured throughout the day. For many of the attendees, this is the first time an investment has been made in their personal and professional development in this way. Past programs have tended to develop leaders and supervisors with self-awareness learning tools such as psychometric test reports, but for many workforce members, this is a first opportunity to participate in this type of learning. Careful attention is paid to ensuring not one particular style is seen as right or wrong, and the conversation promotes that the best decisions are made using all four of the decision-making styles as part of the decision-making process.

The human performance discussion and linkage to decision-making of bias, fast and slow thinking, and present motivation is then explained. Once again, an appreciative inquiry approach with interactive learning techniques such as individual and group exercises, use of work related, and often emotional, video testimonials and case studies, and participant sharing through personal story telling is employed.

The fourth and very important section of the day is linking the new concepts to the existing, familiar safety and work management tools used at the local business unit. An interactive approach using scenario-based and role playing methods reinforces how the new human performance and decision-making concepts can be applied to everyday tasks and conversations. Participants have the opportunity to practice using the language of the new concepts in true-to-life work scenarios through small group discussions. Participants are able to use existing tools and processes to step through identification, management and mitigation of risks and hazards, for improved and safer decision-making that can be translated to field situations.

Finally, participants have the opportunity to generate their personal action plans and commitments based on their individual learnings. They are able to draw on their training experience, the various exercises and scenario based role playing to develop their own focus areas and smart goals for achieving their personal transformation in safer decision-making. The commitment from the business unit leadership is for ongoing assistance and support outside of the classroom with field coaching and supervisory/leadership encouragement for integration of Safe Choice concepts with daily work management and safety practices.

Field coaching is an important aspect of embedding decision-making awareness in individuals and the cultural change in safety that results from the collective improvement in decision-making and enriched conversations. Human learning is a complex process, and in particular when learning how to break long held habits, our normal, human tendencies for pattern matching are working against us. Reinforcement of the new concepts once outside the classroom is therefore necessary for individual and ultimately, organizational change and improvement in decision-making to be achieved. The coaching aspect of the Safe Choice program has taken a variety of forms in different business units based on the nature of the work being done, the location and roster of work teams, and each business unit's preference given other related aspects of their existing safety management program. The starting point for each business unit's coaching program design is for each team member to have at least one touch point per month, for three months, with a coach. This is to provide for a one-on-one discussion of each individual's personal action plan, any refresh or discussion desired on the content of the training concepts, and a general conversation of wellbeing and empowerment in utilizing the existing safety tools and processes with the new safe choice mindset. Coaching resources typically emerge from the participant group at the training days and are made up of a blend of peer workforce coaches, local field safety advisors, front line leadership acting as coaches, which is already one natural part of their day to day role, as well as third party specialists.

Of course, with any program of this nature, long-term sustainability is an important aspect. All too often, initiatives are well intended and there is an initial burst of energy and excitement that may not be as long lasting as true sustainment requires. Sustainment activities become too hard, or forgotten in the fray of day-to-day business and the next 'new initiative' that is being implemented.

Safe Choice is not immune to these challenges and efforts are underway to assure sustainment needs are met. The philosophy is one of integration. Purposeful integration with existing safety management programs is paradoxically aimed at creating a constancy of purpose that is so needed in our safety and work management programs, together with an injection of new and fresh ideas in the decision-making and human performance concepts arena. We believe that by integrating Safe Choice into the current 'norms' of how safety 'gets done' in business units, that conversations will get richer, existing programs will become more effective, and culture will shift into slower and safer decision-making for workers and leaders. While it may be intuitive for an integrated approach to have more lasting value, it does not mean that it is easily done.

A global community of Safe Choice practitioners is growing within ExxonMobil and a great deal of sharing and leveraging of ideas is underway. While an intended consequence of the program, the significant unleashing of creativity and empowerment from our workforce members around the world has exceeded expectations. Although the program is tailored and therefore slightly different at each of the local applications, the consistent core principles allow for the global community sharing to be effective despite the differences, and practitioners gain a sense of belonging to something bigger than their own business unit. Along with a sense of connection to others outside their own business unit, community members gain a sense of pride as their own business unit ideas are adopted by others, and practitioners are also able to tap into a vast array of fresh ideas from others that can be adapted and adopted for their own organization. This empowerment has been achieved with simple techniques of connection such as periodic global teleconferences, employee communication applications such as Yammer and other central reference and 'news' websites.

4.0 Implementation Approach

Several features of the implementation approach for Safe Choice have proven to be key success factors in organizational uptake and local ownership and engagement with the program. The implementation approach has been somewhat unique for ExxonMobil with a mindset to 'learn as we go.' This section will describe the steps of the implementation approach as well as the key success factors.

There are a number of objectives for the Safe Choice implementation that underpin the implementation approach. These include workforce ownership and empowerment for their own safety program, strong leadership commitment and engagement, cultural transformation in behaviors, decision-making and learning, and ultimately, step change in performance with fatalities and high consequence events eliminated.

Critical success factors have been no new tools, no new Key Performance Indicators (KPIs), an implementation philosophy that says "don't let perfect get in the way of better," John McGrath, 2002, and an agile, "fail forward" approach, John C Maxwell, 2000. Taking a tailored approach for local adaptation of the program while remaining true to a consistent set of core principles, and meeting local teams 'where they are at' have also been success factors.

Historically, corporate-wide programs usually fit into one of two categories when it comes to the nature of their implementation. The first category is programs that are highly prescribed, with clear and standard expectations for implementation. These programs are usually strongly supported by a central team that visits with each business unit to provide guidance and training and on a schedule determined centrally. Local business units often have less input for timing and less opportunity for fit for local needs or exceptions. The second category consists of programs where a clear set of expectations at a high level are provided with references and resources for individual business units to implement these programs themselves in a customized fashion. There is usually more freedom for local adaptation and local decisions on timing for this second category of program, but with less ongoing support from central resources.

Safe Choice implementation has taken a pathway somewhere in the middle, with a small central team providing support for those business units willing and ready to take on Safe Choice to complement their existing safety programs. There is not a schedule or deadline dictated from the central organization. This is purposeful, as the transformational change we are embarking on with Safe Choice is not as simple as training individuals with new skills, but it is deeper and more entangled than that. A leadership team has to be ready to truly foster the change management process, and this readiness is considered a prerequisite. For a variety of reasons, the central organization cannot always know best for each of our business units, as to the right timing to take on this transformational change.

The first step in the implementation involves a local business unit leadership member getting in touch with the Central Safe Choice Team to express interest in taking on Safe Choice. There is a substantial amount of discussion at this early stage of the engagement to understand the current safety management performance for a specific business unit and their readiness for meeting the challenges of taking the 'next step' in their journey with Safe Choice. Individual business units need to be sure to understand the significant effort and resources needed for Safe Choice to be successful in achieving a step change in performance. While the program has significant flexibility, the core principles cannot be compromised or the effort becomes an incremental enhancement of the existing, and not the differentiation required for performance step change.

Once an individual business unit, or a project team, drill team or producing asset team is ready to implement Safe Choice, the next step is to plan a local ''Alpha Test'' and an implementation strategy and planning workshop.

Local business unit workforce and front line leaders are invited to the ''Alpha Test'' where the generic Safe Choice training is delivered followed by an in-depth feedback and co-development phase for the local version of Safe Choice. This includes making sure that case studies, video examples of the concepts,

and work site specific scenarios and safety program references made during the one-day training make sense for the local audience. This method ensures local nuances are covered ensuring that the concepts 'land' with participants. This also engenders engagement and ownership as the 'Alpha Test' participants are involved in the development process and truly become co-developers of the program.

A key discussion topic for the implementation strategy and planning workshop is establishing a connection for Safe Choice to the local business unit's safety journey. We have been referring to this as the Safe Choice 'anchor.' This concept ensures teams are thinking through how Safe Choice fits and integrates with existing programs and organizational messages, as well as how Safe Choice will resonate with the local workforce. Safe Choice journey anchors have ranged from a safety refresh coincident with a drilling or project phase start-up, to the 'next step' in maintaining ongoing excellence in performance.

The remainder of the implementation strategy and planning workshop covers topics such as training logistics and resourcing, coaching plans and resourcing, integration with existing safety management tools and processes, leadership behaviors, communication plans for internal and external stakeholders, qualitative ways for measuring success that make sense locally, timing and scheduling for getting started.

The workshop defines the beginning of the transition for an individual business unit to take ownership of their own Safe Choice program from the Central Team. There is of course ongoing support from the central team and several business units are taking advantage of Train the Trainers and Coach the Coaches workshops that are typically scheduled three to six months following the initial 'Alpha Test' and implementation workshop as part of the program kick-off.

This approach ensures core concepts and principles are maintained, local business units take ownership for their own Safe Choice program including integration into their existing safety management program, and that central support and resources are available as needed.

5.0 Early Results

As we all know, what gets measured gets managed. As Peter Drucker said, "If you can't measure it, you can't improve it."

Industry-wide safety performance is most often measured using lagging safety indicators, the most common metric being total recordable incident rate (TRIR) or frequency (TRIF). TRIR is typically quoted using USA Occupational Safety and Health (OSHA) reporting standards. The definitions and standard application for this metric have been in place over a long period of time making this one of the easiest metrics to use as a consistent comparator of performance across different companies, or across different projects or producing assets. Those close to safety management and this data will know well the shortcomings of placing too much value on this metric alone as a measure of safety performance. It has been said by many that the truest measure of safety is not the absence of incidents, but the presence of robust safeguards.

ExxonMobil has progressively moved to a hurt-based model for internal reporting and measuring of incidents. As described in SPE-163757-MS from 2013, the hurt-based approach makes sense when it comes to truly fostering a culture of care and engaging workers. In essence, the hurt-based approach takes into account severity of the 'hurt' of an individual injury, and importantly, an individual's recovery. Higher level hurts are those that result in loss of life or where after recovery from injury, an individual's life is altered. Of course, care for an injured party comes first, but it is often in the discussions that follow during incident investigations that intentions can become lost if the conversation focuses on OSHA recording rather than the hurt itself, the individual's recovery and steps to take to prevent recurrence. Conversations that focus on care, recovery and preventive actions, versus a heavy focus on the reporting requirements, tend to engender a different kind of response from field personnel and drive different kinds of care behaviors in workforce and leaders alike.

Over a long period of time, and with a large population of work hours, TRIR trends can be a useful indicator of performance. Figure 10 shows ExxonMobil's corporate TRIR performance since 2000.

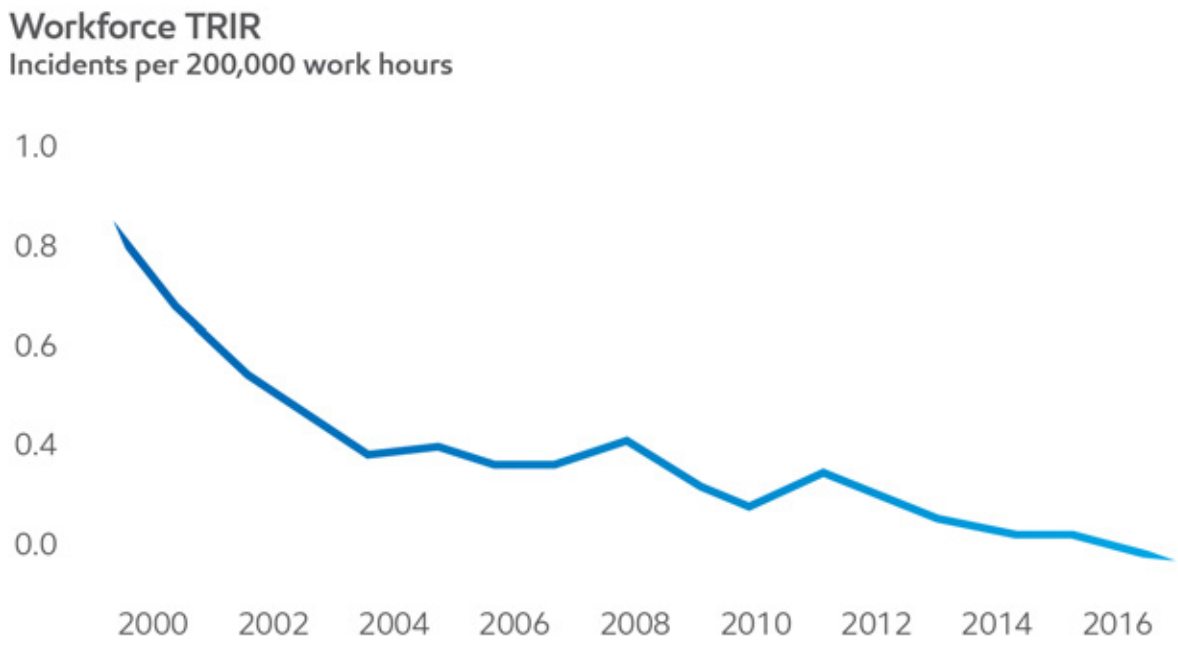

Figure 10: ExxonMobil TRIR for total workforce (employees + contractors)

There is much to be proud of in these results. Relentless focus on the fundamentals of safety, equipment standards and design, world-class work management and risk management processes as well as focus on effective leadership, culture and behaviors have all driven this performance. The plateau observed in recent years represents our next step challenge.

In SPE-168377 (2014), Jack Toellner shared lessons learned in field execution of project-specific, leading indicator programs at ExxonMobil to gain insights in the relentless pursuit of our 'Nobody Gets Hurt' vision. The value of the insights gained by collection and analysis of data must outweigh the cost of collecting that data and can be challenging for many organizations. To use an adage most often attributed to Einstein, but which actually may be from American author W. Bruce Cameron, "Not everything that can be counted counts, and not everything that counts can be counted."

When it comes to Safe Choice and our implementation philosophy for balancing the degree of change in our business units with maintaining a constancy of purpose of the existing and familiar processes, we have elected not to introduce any new KPIs to our business units.

This has been a welcome part of the program. With any new program, there is always the potential unintended consequence of unnecessarily burdening organizations with new data gathering and reporting requirements. Rather it is in local, insightful evaluation of leading indicators of engagement, safety conversations, ongoing discussions and depth of thinking in existing programs such as hazard recognition, behavioral observation and employee engagement programs that cultural shift change will be revealed. Some of these will be quantitative measures and others qualitative, showing up as observations we see and hear. By virtue of being transformational in nature, culture change is not easy to measure.

The discussion below shares some of the early indicators of success and opportunities for learning that have been observed so far in our Safe Choice journey.

As part of the implementation strategy and planning workshop process, the Central Team facilitates a discussion with the local business unit team on measuring success. In the absence of new KPI

requirements, the central team works with each local business unit to develop a first pass of qualitative measures that will indicate success. The ones that feature the most often are:

- Leaders are supporting and reinforcing Safe Choice.
- Safe Choice concepts and terminology are heard in daily meetings.
- Decision-making and human performance concepts are reflected in observation card program captured comments.
- Safe Choice conversations are taking place beyond specific coaching discussions.
- Step-change in quality of the application of existing safety tools with new Safe Choice knowledge now being applied.
- Workers feel that Safe Choice concepts are helping them be safer in their jobs.

We recently conducted a survey of four of our early Safe Choice groups against these measures, with the results shown in Figure 11.

Assets A-D Versus Qualitative Measure	A	B	C	D
Leaders are supporting and reinforcing Safe Choice	5	5	3	2
Safe Choice concepts and terminology used in daily meetings	5	5	2	2
Decision making and human performance concepts are reflected in Observation Card program captured comments	5	3	2	1
Safe Choice conversations are taking place beyond specific coaching discussions	4	4	3	2
Step-change in quality of application of existing Safety Tools with new Safe Choice knowledge now being applied	4	4	2	2
Workers feel that Safe Choice concepts are helping them be safer in their jobs	5	4	4	2

Score range 1 – 5 (where 1 is infrequently observed and 5 is consistently observed)
Figure 11: Post-Safe Choice implementation qualitative input from early adopters

Stepping back to understand this range of outcomes in our early adopters led us to examine aspects of the program that made intuitive sense for impacting these measures. We included i) the degree of uptake of the field coaching program, ii) the degree of integration with existing program processes, iii) the degree of the business unit senior leadership visible support and iv) the degree to which the field front line leaders were provided clear support and guidance for leading Safe Choice, among others. Figure 12 shows the correlation for i) the degree of uptake of the field coaching program for Assets A-D with their average score from the post implementation qualitative measures.

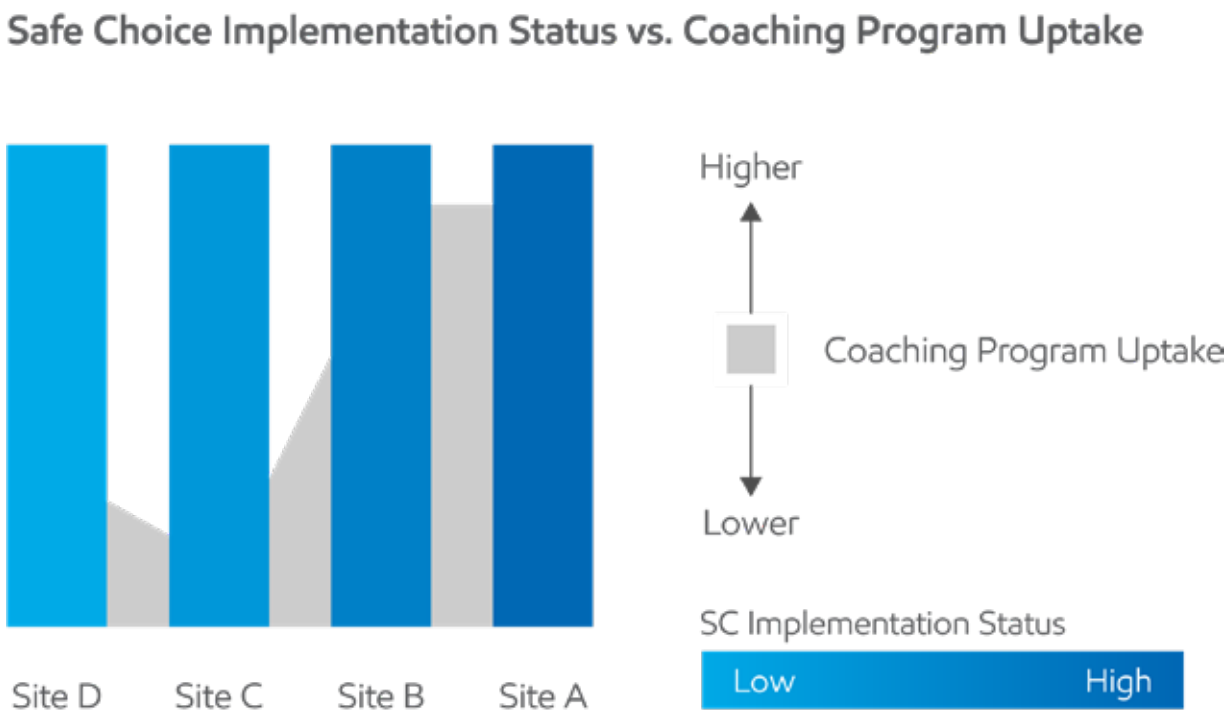

Figure 12: Qualitative measure scores with coaching program Uptake score comparison

This qualitative analysis approach has been extremely helpful for capturing lessons learned on our visits back to the business units several months after Safe Choice implementation. These visits have not been an audit nor an assessment, but rather an opportunity for learning and sharing of lessons for improvement.

Given our approach of not letting perfect get in the way of better, our willingness to learn and adapt has been an essential feature of the program. For the coaching example illustrated above, this analysis has allowed us to dig in a little deeper to examine the actions and decisions with the coaching program at individual sites to understand the features that have had a strong, positive impact and those that have not worked as well. In turn, this allows future implementations to take place with the knowledge from these lessons learned available at the outset. And for groups that need some additional assistance, these lessons learned are a starting point for program remediation where needed. We have analyzed opportunities at individual business unit teams in similar ways with other qualitative parameters.

The next example shows one business unit's approach for leading indicators through their observation program. The observation card was updated to include a section for Safe Choice observations, in addition to the existing sections which included Work Management Expectations, Housekeeping, Proper Use of Personnel Protective Equipment (PPE), to name a few. Early analysis of the observations on the new card demonstrates an uptake of the Safe Choice concepts in the field, and from that infers a change in the conversation of workforce members as decision-making behaviors are noticed and addressed. This data is shown in Figure 13 and also helps support other business units in their Safe Choice implementation strategy as they consider how to integrate Safe Choice with existing safety management processes.

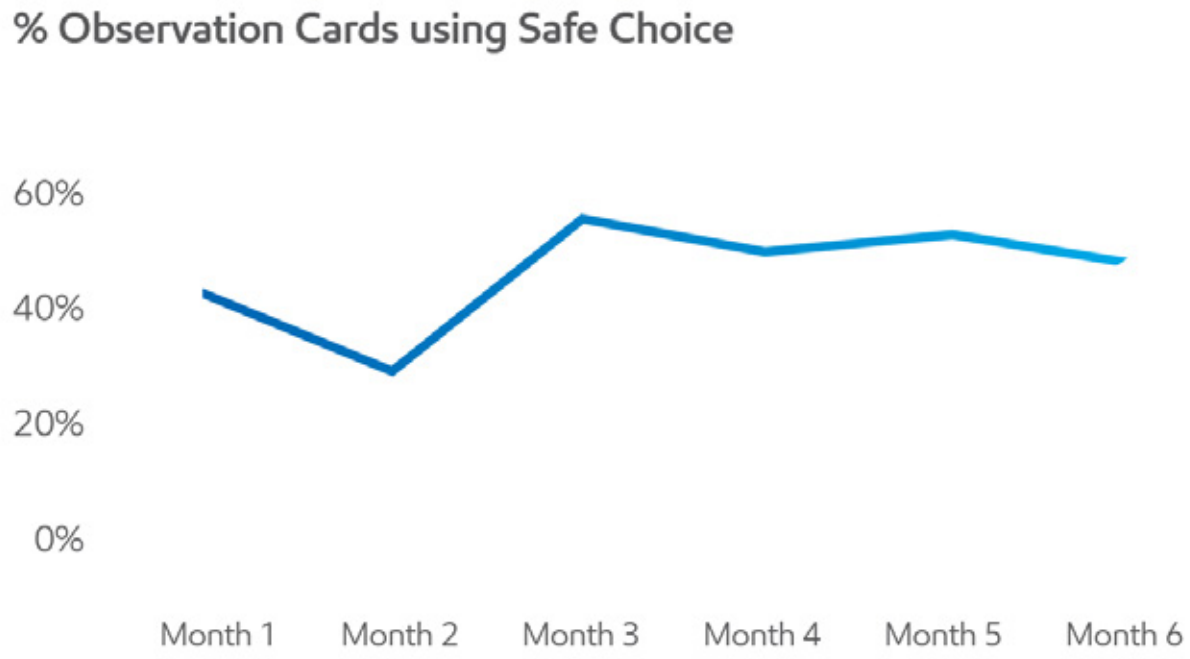

Figure 13: Leading indicator example: Percent of observation cards submitted with Safe Choice category selected

Further analysis of this data set shows which of the Safe Choice concepts are most frequently selected as part of the observation program. See Figure 14.

Figure 14: Frequency of Safe Choice category selected in observation cards

Analysis of this data shows that all of the Safe Choice concepts are being observed in the field, with the most prevalent being Personal Decision-making Styles and Focus on the Focus on the Task: "Head in the game." This data can be studied to understand workforce uptake of training, assessment of training

quality and focus areas needed, as well as level of engagement in the field after training, and sustainment of discussion in the field over time. Interestingly, the concept of Present Motivation, or Focus on the Task: "Head in the game," terminology adopted at this particular location, is clearly shown as a strong take-away by participants from the training. It is believed that the experience of learning the decision-making styles and human performance concepts means that workforce participants have internalized this catch phrase to a new level. It is encouraging that these concepts are being reported in the observation program.

Other examples of integration with existing safety program processes have included making Safe Choice a part of existing recognition programs. One business unit has a weekly recognition for high quality observations known as Catch of the Week and following the implementation of Safe Choice it was observed that a significant portion of the Catch of the Week submissions are Safe Choice related. Another business unit implemented a Safe Choice Story of the Month program to encourage Safe Choice conversations. It is still early in the journey for some of these programs, but we anticipate that continued focus on integration and sustainment will lead to a deepening of the concepts into the culture of everyday conversations at these business units.

Encouragement is also given to each business for innovation and creativity to further develop and enhance the Safe Choice concepts. Figure 15 shows an example of hard hat stickers that were created at one of the early business units and have been adapted and adopted by many teams around the world, each putting their own spin on the graphics. This localization of Safe Choice materials is a simple but effective way for fostering local ownership.

Figure 15: Safe Choice hard hat stickers depicting the *StyleUs* decision-making styles

A global Community of Practice for Safe Choice has been established utilizing ExxonMobil's internal Yammer platform. The level of membership and numbers of people sharing conversations across the business units that have implemented and are implementing Safe Choice is growing. The enthusiasm and level of engagement observed is encouraging and supports our strategy for enabling business units to be a part of the development of Safe Choice, both at the front end, as well as in the sustainment phase of

implementation. As Safe Choice implementation continues to be implemented across our organization, we anticipate greater engagement and sharing as this global community of practitioners expands even further.

While measuring success for Safe Choice may not seem traditional, there is great insight to be gained by viewing qualitative measures and leading indicators of engagement, field conversations and observation programs. Transformational, step-change improvements take time and it is not easy to measure change over short time periods. It is anticipated that over the long run, Safe Choice will contribute, along with other focus areas, in breaking through our performance plateau, and this will be reflected in TRIR and Hurt metrics.

6.0 Next Steps

In some ways we are still at the beginning of our Safe Choice journey at ExxonMobil, with many new lessons and adaptations in front of us. However, with more than 10,000 people already trained and using the concepts in their daily work across our global operations, we have experienced significant success and have learned lessons of great value. Local engagement, ingenuity in co-development and creativity in applying the new concepts has exceeded expectations, and we will continue to pursue effective ways to share lessons and stories across the enterprise through our global community of practice.

Our next focus areas include consolidating our formal lessons learned, known as our 'loopback' process; deeper study and strategy of successful sustainment practices; and further expansion with our major projects activities, as well as our downstream operations. We hope to share additional insights and lessons learned in the future as the Safe Choice program gains more run time and reaches even more national cultures around the globe.

7.0 Concluding Thoughts

This paper started out by citing the IOGP data on fatalities in our industry. While impressive breakthroughs have been made in our collective safety efforts and resulting performance, we cannot accept loss of life or injuries that alter people's lives, their family's lives and their livelihoods. Getting right what we already know how to do is critical, but so too is a willingness to acknowledge that we need to do something different. Working harder on the fundamentals is not necessarily yielding the results we seek to achieve. Instead, we need to continue to explore breakthrough opportunities. Learnings from high potential incident data analyses, together with the latest thinking in neuroscience, have led us to study decision-making in more depth. We believe operationalizing human performance concepts through Safe Choice will contribute significantly on our safety performance breakthrough journey.

8.0 List of References (A – Z)

Adorno, T. W., Frenkel-Brunswik, E., Levinson, D. and Sanford, N. (1950), *The Authoritarian Personality*, Free Press.

Boulgarides, J. D. (1984), 'A comparison of male and female business managers,' *Leadership and Organization Development Journal*, Vol. 5 No. 5.

Daewoo, P. (1996), 'Gender role, decision style and leadership style,' *Women in Management Review*, Vol. 11 No. 8.

Harvey, O. J., Hunt, D and Schroder, H. (1961), *Conceptual Systems and Personality Organization*, Wiley, New York.

Hofstede, G. (1980), *Cultures Consequences: International Differences in Work-related Values*, Newbury Park, CA, Sage Publications.

Jung, C. A. (1921), *Psychologische Typen*, Rascher Verlag, first published in German and translated into English, 1923.

Kahneman, D. (2011), *Thinking Fast and Slow*, Farrar, Straus & Giroux, New York.

Kasprzhak, A. G., Filinov, N. B., Bayburin, R. F., Isaeva, N. V. and Bysik, N. V. (2015), 'School principals as agents of reform of the Russian education system,' *Russian Education and Society*, Vol. 57 No. 11.

Kilman, R. H. and Mitroff, I. I. (1976), 'Quantitative versus qualitative analysis for management science,' *Interfaces*, Vol. 6 No. 2, February.

Kreitner, R. and Kinicki, A. (2012), *Organizational Behavior*, McGraw-Hill, Boston.

Lundberg, C. C. and Bigelow, J. (1982), 'Creativity training, hemispheric functioning and information processing,' *Academy of Management*, November.

Mack, A. and Rock, I. (1998), 'In-attentional Blindness: Perception without Attention,' *Visual Attention*, Vol. 8.

Mann, R. B. (1982), 'Relationship between Decision Styles of Corporate Planners and other Planning Executives,' PhD Thesis, University of Southern California.

Martinsons, M. and Davison, R. (2006), 'Strategic Decision-Making and Support Systems: Comparing American, Japanese and Chinese Management,' (Vol. 43, pages 284-300), City University of Hong Kong.

Maxwell, John C. (2000), *Failing Forward: Turning Mistakes into Stepping Stones for Success*, Thomas Nelson Inc.

McGrath, John (2002), *The Most Valuable Lessons I have Learned: Over 100 Success Concepts for Changing your Life*, Harper Collins (Australia) Pty Ltd.

Podrug, N. (2011), 'Influence of National Culture on Decision-Making Style,' *South East European Journal of Economics and Business*, Vol. 6 No. 1.

Rokeach, M. (1960), *The Open and Closed Mind*, Basic Books, New York.

Rowe, A. J. and Boulgarides, J. D. (1983), 'Decision styles – a perspective,' *Leadership and Organization Development Journal*, Vol. 4 No. 4.

Rowe, A.J. and Boulgarides, J.D. (1994), *Managerial Decision-Making*, Englewood Cliffs, NJ: Prentice-Hall.

Rumar, K. (1990), 'Drive Requirements and Road Traffic Informatics,' *Transportation*, Vol. 17 No. 3.

Schroder, H. M., Driver, M.J. and Streufert, S. (1967), *Human Information Processing*, Rinehart and Winston.

Simon, H. A. (1960), *The New Science of Management Decision*, Harper and Row, New York.

Sinek, Simon (2009), *Start With Why: How Great Leaders Inspire Everyone to Take Action*, Portfolio.

Smith, R.M. and Jones, M.L. (2013), 'A Hurt-based Approach to Safety,' SPE-163757-MS, Society of Petroleum Engineers

Sollisch (2016), 'The Cure for Decision Fatigue,' *Wall Street Journal*.

Springer, S. P. and Deutsch, G. (1981), *Left Brain, Right Brain*, W. H. Freeman and Co., San Francisco.

Tannenbaum, R. and Schmidt, W. H. (1958), 'How to choose a leadership pattern,' *Harvard Business Review*, March/ April.

Taylor, F. W. (1947), *The Principles of Scientific Management*, Harper and Row, New York.

Toellner, J. (2014), 'Lessons Learned in Executing Leading Safety Indicators,' SPE-168377, Society of Petroleum Engineers

Truoung, T. D., Hallinger, P. and Sanga, K. (2017), 'Confucian values and school leadership in Vietnam,' *Educational Management, Administration and Leadership*, Vol. 45 No. 1.

Wansink, B. and Sobal, J., (2007), 'Mindless eating: the 200 daily food decisions we overlook,' *Environment and Behavior*, Vol. 39 No. 1.

Web/Online References:

International Association of Oil and Gas Producers (www.iogp.org) – IOGP Safety Performance Indicators (2016), Fatal Incident Reports - https://www.iogp.org/bookstore/portfolio-item/safety-performance-indicators/