Introducing behavioural markers of non-technical skills in oil and gas operations

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Contents

Foreword

IOGP Report 501 (April 2014) and Report 502 (December 2014) set out guidelines for developing and implementing Crew Resource Management (CRM) training for oil and gas workers involved in well operations. Crew Resource Management is also what is known as a non-technical skill (NTS). The concept of behavioural markers was introduced in these reports.

Non-technical skills have long been recognized across the oil and gas industry as being important to the ability to work safely, effectively and efficiently. This recognition now extends to the role that these skills play in supporting and enhancing technical competence, and of the consequences to safety and reliability that can arise when those skills are not present or break down.

This new report builds on the guidance developed by the IOGP's Human Factors Subcommittee and the Wells Expert Committee Competency & Training Subcommittee for the implementation of the concepts of Crew Resource Management and the development of non-technical skills in well operations. It expands the scope and application of non-technical skills beyond well operations to, potentially, all areas of oil and gas operations.

While most of the emphasis to-date has been on the use of crew resource management and non-technical skills in a training context, this report describes how non-technical skills behavioural markers can be used in many other ways.

It is critical to raise awareness across the industry of the impact that the competencies of Situation awareness, Decision making, Communication, Teamwork and Leadership.

Scope

This report describes in detail what behavioural markers are and how behavioural markers can be used in oil and gas applications.

Behavioural markers can be used to:

- support the development of non-technical skills (NTS)
- make judgments about the extent to which any individual possesses and applies the relevant non-technical skills, whether in an operational or a training environment
- ensure that personnel possess and effectively use a range of non-technical skills.

This report documents good and poor behaviours for five of the non-technical skills identified in Report 501: Situation awareness, Decision making, Communication, Teamwork and Leadership.

It provides examples of a basic list of behaviours which can be used to define behavioural markers specific to an activity, threat and context (Appendix B).

1. Introduction

1.1 What are behavioural markers?

The term **behavioural markers** refers to a prescribed set of behaviours indicative of some aspect of performance within a work environment. Behavioural markers describe observable, non-technical behaviours.

Behavioural marker systems are based around two distinct types of non-technical skills:

- a set of **cognitive skills** involving acquiring and interpreting information supporting development and maintenance of good situation awareness, risk assessment and decision making
- a set of **social skills** directed towards interacting with colleagues and making collective decisions.

1.2 Use within other industries

To date, behavioural marker systems have been developed for use in aviation, air traffic management, health care and for both commercial and military shipping.

Within those industries, behavioural markers are used for Crew Resource Management training purposes and also to assess how non-technical skills are incorporated in day to day operations.

For example, the focus of Crew Resource Management training and assessment in aviation is on the **identification** of specific threats during specific flight segments, **planning and management** of threat avoidance, as well as the **management of errors** that may be introduced by the crew during those flight segments.

1.3 Specific threats in oil and gas operations

Oil and gas operations can present markedly different and less predictable physical circumstances than many other industries. However, the threats that exist during different operational phases and various types of oil and gas activities make similar specific demands on non-technical skills.

Like the aviation industry, behavioural markers for oil and gas operations could be defined for specific threats linked to special work situations during which non-technical skills are essential to safe operations.

Examples of common operational situations that have the potential for human factors to introduce threats as well as posing high reliance on human performance to plan and manage the avoidance of threats and to manage errors include:

- shift/crew handover
- planning/carrying out critical/non-routine operations (e.g. shutdown activities)
- responding to unexpected events
- emergency response and crisis management
- Job Safety Assessments/Toolbox talks
- Simultaneous Operations (SIMOPS)
- responding to Management of Change
- application of unexperienced practice and technology.

These represent a wide variety of different types of threat scenarios. Each can require very different approaches to training and assessment even though the behavioural markers used in each threat scenario, and the ways they are to be assessed, might be very similar.

2.   Effective behavioural markers

2.1   Criteria for effective behavioural markers

Generally accepted criteria for effective behavioural markers include:

- They must be observable.
- They must clearly contribute to superior task performance within a work environment.
- They must be described in a way that is specific to the operational demands of the activity being performed.
- They must not describe attitude or personality traits.

Behavioural markers do not need to be defined nor measured in all situations: their relevance will depend on the context and the nature of the operation at the time, as well as the roles and responsibilities of the individuals being observed.

Significant technical expertise in the activities being observed is beneficial as it provides context to determine what is and is not relevant in any specific operational situation.

Observers must possess a strong command of non-technical skills, behavioural markers, both positive and negative.

2.2   Specific aspects related to behavioural markers in oil and gas operations

One of the most important lessons from existing approaches in other industries to developing behavioural marker systems is that the skills and the behaviours need to be as specific as possible to the responsibilities of the individual roles.

Based on the task analysis, specific behavioural markers can be identified for that specific role, critical to performing those tasks.

In the case of the application of non-technical skills to oil and gas operations: because of the wide range of roles, responsibilities and tasks being performed in a crew, multiple behavioural markers must be defined. No single set of markers can apply to every role.

IOGP Reports 501 and 502 recognize the need for personnel to have an understanding of factors that can have an impact on human behaviour (such as stress, fatigue, poor health and environmental factors). Those factors cannot always be observed on the spot and are considered as areas of knowledge that need to be taught. They are therefore outside the scope of the behavioural markers defined in this report.

2.3   Limitations of behavioural markers

Use of the non-technical skills and associated behavioural markers can provide insight and suggest areas for improvement. Due to the current state of maturity of the application of behavioural markers, these markers should not be considered as a means of formally assessing competence in the performance of non-technical skills.

What is most important is the organization's commitment to identifying the required skills and the behavioural marker systems that will be used to assess them. This must include thorough and consistent definitions, including clear, meaningful language. Additionally, this includes high quality training to teach the observers how to use whatever system is adopted.

2.4   Potential uses in oil and gas operations

To date, efforts around non-technical skills in the oil and gas industry have been focused around training: the contents of a non-technical skills training syllabus; how training should be delivered; who should be trained; the competence of trainers, and so on.

Behavioural markers have the potential to be of value well beyond the training environment. By providing a common language for communicating information about the importance of the skills, how to assess them, and recognizing when non-technical skills have broken down, behavioural markers offer the potential for a much wider set of uses.

A key learning from other industries is that the material used in training – and in the way training is evaluated – needs to be grounded and informed by the organization or industry's experience of what goes well and what goes wrong. Making use of the suggested behavioural markers offers the potential to create the evidence that can be fed forward to improve future non-technical skills training.

Behavioural markers can also have a key role in the investigation process, learning and feedback that is central to the continuous improvement of Operating Management Systems.

Training is one way in which behavioural markers can be used to improve non-technical skills in the workplace.

Four other applications of behavioural marker systems for oil and gas operations include:

1) to raise general awareness of the nature and importance of non-technical skills to safe operations

2) to engage the workforce

3) to train operations (including Emergency Response/Crisis Management training)

4) to learn from incidents.

3. Potential benefits from behavioural marker usage

Re-enforcing the importance of non-technical skills to safe operations: Behavioural markers are relevant for those involved in critical activities and critical decision making – from the most junior individuals to the top executives. Each person will reflect on the way their behaviour can affect others, prompting them to seek alignment with other 'good practice' behaviours.

NTS assessment: Activities of interest can be wide ranging, from planning or carrying out a planned operation, performing an emergency exercise, conducting a risk assessment or carrying out a crew or shift-handover. Observers may capture and record behavioural marker observations regarding how well the crew performed the non-technical skills needed using the results for discussion with the crew so they might recognize the need to work towards improvement.

Incident Learnings: Incident reports may provide examples of where ineffective inter-personal behaviours at all levels formed part of the context that led to an incident. Incident reviews should include a review of behavioural markers, in order to highlight ineffective behaviours cited as having contributed to incidents.

Enhance Operational training: Behavioural markers can be adapted for use in operational training by enhancing the technical training with the one or more non-technical skill components. For example, a training designer can design exercises to making trainees aware of the need to maintain awareness of the big picture (avoiding the risks of 'tunnel vision') and the risks of confirmation bias (assuming information or data that is inconsistent with their beliefs, expectations, or hopes is in some way flawed or otherwise not accurate or relevant).

Enhance Role-specific training: Role-specific training refers to situations where the purpose of the training is to ensure an individual has the necessary knowledge and skills – both technical and non-technical – to perform in a specific operational role.

Activity or operation specific training: Behavioural markers provide a starting point for conducting activity or operation-specific non-technical skills training, using task analysis as the basis for identifying a customized set of markers reflecting the non-technical skills and behaviours that are key to the activity or operation being trained.

Appendix A

Summary of non-technical competencies and elements identified in Report 502, *Guidelines for implementing Well Operations Crew Resource Management Training*

WOCRM NTS competencies	WOCRM elements/behaviours
Situation awareness	Actively seeks relevant information [a]
	Attends to all relevant information sources [b]
	Works to understand information [c]
	Projects and anticipates future states [c]
	Maintains awareness of the big picture (avoids 'tunnel vision') [b]
	Maintains awareness and respect of risk [b]
	Recognizes mismatches between own situation awareness and that held by others [a]
Decision making	Recognizes situations where a decision is needed [a]
	Understands their own role and the contribution of others to decision making
	Assesses risks associated with options [b]
	Contributes to consideration of options [b]
	Communicates options [b]
	Implements decisions [b]
Communication	Recognizes the importance of good communication with team members [b]
	Conveys information at the right time clearly and succinctly [a]
	Listens effectively and seeks clarification [a]
	Pays attention to verbal and non-verbal indicators that information has been received and understood [b]
	Avoids pre-judging or jumping to conclusions [a]
Teamwork	Collaborates with other team members [a]
	Supports team members [a]
	Resolves conflict and creates trust [a]
Leadership	Coordinates team activities [d]
	Provides feedback, motivates and supports [a]
	Sets and communicates clear expectations [a]
	Adopts suitable leadership styles and practices [a]
	Manages time effectively and copes with pressure [c]

[a] Original as contained in IOGP Report 502 (may be changed to active voice).

[b] Added in development of IOGP Report 503 – not in IOGP Report 502.

[c] Reworded from IOGP Report 502 to align with NOTSS (Non-Technical Skills for Surgeons) and/or NOTECHS (non-technical skills for crew members in the aviation industry).

[d] Repositioned from IOGP Report 502.

Appendix B

Examples of behavioural markers

Situation awareness

Situation awareness: Developing and maintaining a dynamic awareness of the situation and the risks present during an operation, based on gathering information from multiple sources from the task environment, understanding what the information means and using it to think ahead about what may happen next.

Elements/Behaviours	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Actively seeks relevant information	Regularly checks key sources of information including alarms and other prompts.	Does not go to the effort to locate or confirm important information that is not readily available.
	Makes use of all available information sources – instruments, colleagues and others – to check the status of the operation or assumptions about the state of the world or the operation.	No prompt intervention at the activation of the alarm or inability in interpreting signals or other parameters to prevent a problem.
	Shows concern and takes action if important information is not available when it is needed.	
	Asks for regular updates from colleagues who may have relevant information.	
	Be proactive in addressing missing relevant information.	
Attends to all relevant information sources	Makes time to attend to anyone who offers potentially relevant information.	Does not give sufficient attention to information from unexpected sources or from more junior team members.
	Treats anyone offering potentially relevant information with respect.	Accepts information sources without validating them.
	Knows the key indicators of risk and success and regularly monitors them.	
	Promptly reacts to critical information risen from other people or the system.	

Note: Roberts, Flin and Cleland [3] report recent research involving interviews and observation to investigate the cognitive components required for offshore drillers to maintain situation awareness. Their results provide many examples of the kind of activities drillers engage in to develop and maintain good situation awareness.

Works to understand information	Challenges key assumptions that could impact on safety and regularly checks to confirm they are still reasonable.	Does not evaluate the reliability of information which has potential to create an unsafe condition.
	Challenges assessment of risk and the state of the world.	Makes statements, asks questions or makes suggestions that indicate lack of awareness of what is happening, that they have not understood the significance of information, or have ignored the views of others.
	Shows unease or concern and checks if important data or information are not consistent with what was expected.	
	Prioritize actions, taking into account critical signals, avoiding information flooding.	

Elements/Behaviours	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Projects and anticipates future states	Makes others aware of their thinking about the effect of current decisions and actions on possible future events. Considers recent trends and conditions and possible projections to the future.	Is not properly prepared before starting a critical activity – has not allowed sufficient time to check risks and key information sources. Does not plan ahead – e.g. does not look for information until the time it is needed and does not consider future impact on others. Allows problems to develop before starting to respond to them. Dismisses information that could indicate undesirable future events.
Avoids 'tunnel vision'	Regularly takes steps to check the 'big picture' for information or signs of developing or changing risks in the working environment. Avoids becoming overly focused on the task at hand. Reflects and asks others for their opinion of ambiguous or unexpected events or indicators. Asks colleagues to alert them if they become overly focused on one activity or option.	Finds reasons not to act on information that is not as expected, could interfere with planned progress, or that would involve additional effort. Fails to consider the implications of new information or a change in operating conditions for coming activities.
Maintains awareness and respect of risk	Steps back and checks the situation or conditions have not changed significantly with the passage of time. If something unexpected happens, steps back and re-assesses the planned activity in consultation with colleagues. Checks the work environment to ensure it is as it should be before beginning a critical activity. Plans to make allowance for interruptions or unexpected events. Identifies and is ready to propose alternate options if events do not go as planned.	Gives undue prominence to expectations based on experience or expectations, rather than information or opinions at the time. Shows a willingness to disbelieve data or information that conflicts with what is expected. Shows a willingness to quickly accept data or information that backs up pre-conceptions. Does not consider potential problems, and gives others no insight into what is expected or what to do if the situation changes. Acts in ways that knowingly goes beyond their competence or experience.
Recognizes mismatches between own SA and that held by others.	Responds to signs that other team members have a different understanding of the current state of the operation than they do. Responds to signs that other team members are not aware of the state of critical equipment. Responds to signs that other team members have a different assessment of the key risks than their own. Responds to signs that other team members have a different assessment of team goals and priorities than their own. Interrelates different kind and different sources of information.	Does not react, or reacts negatively, if other team members say or do things that suggest they have a different assessment of the situation, equipment or risks than they do. Does not make others aware of difficulties until after things have gone wrong. Does not speak up to let others know if they become aware of information or events that are not as expected. Assumes, without volunteering information or checking, that others who need to know are aware of the same risks as they are that could affect the safety of an operation.

Decision making

Decision making: The ability to reach a judgment or choose an appropriate option to meet the needs of an assessed or anticipated situation.

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Recognizes situations where a decision is needed	Intervenes rather than continues with a plan where there are indications that risks have changed or the plan is not working. Clearly identifies what the issue is that needs a decision.	Carries on with current activities until told to change despite being aware of indications that the plan is not working.
Understands their own role and the contribution of others to decision making	Actively contributes own knowledge and experience to consideration of options. Shows willingness to concede to more junior staff where they have technical expertise, knowledge or experience relevant to the problem. Shows willingness to intervene or challenge more senior colleagues if they believe they have more accurate information or possess the necessary knowledge or experience on the issue. Where decisions could involve non-standard activities, seeks approval from relevant technical authority.	Makes decisions without ensuring team members who need to know are properly consulted or informed. Is unwilling to consult or agree with more junior staff even if they are better placed to advise. Gives undue prominence to opinions or advice of friends or senior staff even if they do not have the necessary experience or background. Shows a lack of willingness to ask for or accept advice or support.
Assess risks associated with options	Seeks up to-date information about potential risks from those best placed to provide it. Invites others who may have relevant knowledge or experience to contribute to the assessment of risks. Relies on lessons learned and recognizes past similar situations. Well defines both the weakness and the opportunities related to all the options and is able to objectively balance them for ranking purposes.	Relies on information or risk assessments that may be out of date or not relevant to the options. Makes quick decisions based on meeting operational needs, without adequately considering risks or drawing on input from those with the necessary expertise or experience. Is unwilling to delay operations to properly assess risks associated with critical decisions. Willing to make decisions without consideration of the risks involved.
Contributes to consideration of options	Understands what is expected in standards and procedures. Actively contributes experience and knowledge where it is relevant to identifying options. Shows courage to challenge and voice their disagreement with what they believe are unsafe decisions even if they are popular. Respects the opinion of experts but is comfortable asking questions.	Does not contribute own information, knowledge or experience when it is relevant. Is easily swayed and willing to agree with a decision they believe is unsafe without voicing their concerns. Ends discussion of options or possible consequences of decisions before everyone who wants to contribute has a chance to do so. Is unwilling to concede to the opinion of others.

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Communicates options	Takes time to ensure everyone involved is aware of the options being considered.	Makes decisions without advising others of the possible alternate options.
		Responds aggressively or is unresponsive if their decisions are challenged.
Implements decisions	Implements decisions quickly and positively once adequate consideration has been made.	Is unwilling to commit to a decision – finds reasons to delay or put a decision off.
	Shows courage to implement what they believe is the right decision even if it is unpopular.	Does not take responsibility if events show a decision they took was poor. Finds excuses or blames others rather than being willing to learn from their mistakes.
	Takes responsibility for their decisions even if hindsight suggests they were not good. Is willing to learn from their mistakes.	Indecisive – easily influenced by the opinions of others.
	Demonstrates to have a clear understanding of the whole task and subtasks to be performed to implement the decision.	

Communication

Communication: The exchange (transmission and reception) of information, ideas and beliefs by verbal and non-verbal methods.

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Recognizes the importance of good communication with team members	Takes steps to share information with others without being prompted. Keeps others informed of key progress or significant changes. Provides timely and appropriate feedback. Focuses on problem solving while reporting unsafe conditions, rather than blaming other people.	Does not consider whether others may need to know about information or events. Does not speak up if they are having difficulties. Does not volunteer that they have information or knowledge that could affect the safety of a decision or request. Only communicates information that supports what they believe or want to achieve. Does not raise concerns over the safety of themselves or others. Does not take communication seriously: prefers to get on with their own job in isolation rather than communicating with team members. Does not listen to the opinion of others. Does not allow people to contribute.
Conveys information at the right time, clearly and succinctly	Uses appropriate format for conveying important information. Recognizes when information is needed and ensures it is delivered at the right time. Communicates clearly and succinctly, taking account of the environment and potential distractions. Makes time and prepares to communicate important information properly.	Is unprepared: does not think ahead and anticipate the need to share information with others. Conveys information in a way that is not consistent with its content or importance. Does not provide information when needed – puts team members under pressure by delaying passing on information.
Listens effectively and seeks clarification	Gives the source of a communication appropriate time and attention and shows good body language in listening to face-to-face communication. Acknowledges receipt of important information. Asks questions and seeks clarification where necessary.	Makes frequent interruptions or is willing to be distracted in a way that disrupts communication. Shows no acknowledgement that communications have been received and understood.
Pays attention to verbal and non-verbal indicators that information has been received and understood	Ensures those they wish to communicate with are engaged and paying attention. Adapts communication when body language and other indicators show that a recipient is not able to attend to information.	Is unresponsive or dismissive if team members ask questions or seek clarification. Acts defensively or aggressively when questioned.
Avoids pre-judging or jumping to conclusions	Waits until the deliverer has completed the message before judging the relevance. Shows respect and attends to the source until the information has been delivered. Avoids to be biased by preconceived ideas.	Makes judgments about the value or relevance of information before the message is complete. Makes judgments about the value or relevance of information based only on the source.

Teamwork

Teamwork: The ability to work effectively and interdependently in groups of two or more to achieve a shared goal.

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Collaborates with other team members	Pays attention to and anticipates the needs of team members.	Prefers to communicate with team members indirectly (e.g. by messages or via third parties).
	Provides timely support to team members without needing to be asked.	Proceeds with own activities at own pace without checking whether team members affected are ready and aware.
	Contributes information or takes action to assist with team activities without being prompted.	Dismisses information with no explanation or feedback.
	Pays attention to the condition and performance of team members.	
	Actively shares information needed by team members to meet their responsibilities.	
	Responds to requests or directions from team members in a timely manner.	
Supports team members	Checks that team members are ready before initiating a joint activity.	Needs to be asked to provide information another team member needs.
	Recognizes and offers support when team members are having difficulty.	Allows team members who are having difficulty to carry on unsupported despite having the time and ability to do so.
	Shows concern over the ability of team members to work safely.	Does not ensure other team members are informed of the status of their own activities when they need to be aware of or make use of them.
	Checks common understanding of the objectives of a task.	Allows team members to carry on with activities that could be unsafe, are unnecessary or are wrong without intervening.
Resolves conflict and creates trust	Identifies conflicts of interest with the potential to interfere with their or a team member's ability to support team tasks.	Takes action that interferes with the ability of other team members to perform their roles efficiently.
	Anticipates and acts to avoid or resolve potential situations of conflict.	Makes comments or takes actions that create situations of conflict with team members.
	Focuses on what is right, rather than who is right.	Criticizes other team members in public.
	Keeps calm in conflicts.	Creates situations where team members compete.
		Makes open accusations or complaints about other team members.
		Over-reacts in situations of interpersonal conflict, does not look for compromise.

Leadership

Leadership: The ability to successfully influence others to achieve a shared goal by providing guidance, direction, coordination and support.

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Coordinates team activities	Briefs team members and ensures objectives, risks and work plan are understood before beginning an activity or shift.	Does not set clear objectives for the short and medium term.
	Checks that team members know what is expected of them, and allows opportunity for questioning and clarification before assigning team members to carry out critical activities.	Does not make team aware of their intentions or what is expected of them.
	Makes sure team members are aware of objectives, the work plan, risk profile, or work conditions change.	Allows individuals to work with no awareness of other team activities.
	Delegates tasks effectively and ensures team members have the time to work safely.	Creates barriers or bottlenecks that impede team communication or cooperative working.
	Ensures team members are aware of their responsibilities, and that there are effective lines of communication.	
	Ensures team members are aware of activities elsewhere that may impact or represent risk to each other.	
	Sets achievable targets for the activities and allocates suitable resources and schedule.	
	Inspires the team to a shared and common vision.	
Provides feedback, motivates and supports	Use appropriate behaviour and language consistently with the needs, experience and seniority of team members.	Is disrespectful or hostile to colleagues verbally or through body-language.
	Establishes rapport and open dialogue.	Acts in ways that suggests colleagues are not valued or respected.
	Recognizes and gives credit for good work.	Allows under-performance to carry on unchallenged.
	Provides constructive feedback if an individual's behaviour or performance is below expectations and clearly explains what is expected.	
	Shares the final success with the whole team members.	
	Allows individuals empowerment.	
Sets and communicates clear expectations	Ensures all team members understand they must not deviate from procedures and normal work practices without leadership approval.	Fails to observe standards or procedures or acts in ways that are in conflict with expectations set for team members.
	Takes action that demonstrates they are prepared to miss production targets rather than compromise safety.	Is not prepared to step back and delay production when presented with a risk to safety.
	Intervenes if activities deviate from standards and plan.	Assumes team members have the same knowledge or understanding as they do.
	Positively supports actions that stop the job due to safety concerns.	

Elements	Examples of behaviours reflecting good practice	Examples of behaviours reflecting poor practice
Adopts suitable leadership styles and practices	Uses an effective balance of consultation and direction. Is appropriately assertive for the situation. Creates effective working relationships. Ensures team members are aware of decisions and plans intended to manage risk. Emphasizes the seriousness of risks through appropriate use of words, body language, emphasis and behaviour. Gives team members an opportunity to express doubts or lack of awareness of risks or the reasons for decisions. Shows respect for cultural, gender and religious diversity. Ensures they are always available for team members who need their support. Checks that critical activities they are responsible for have been completed correctly. Conduct systematic and regular safety inspections. Takes command if the situation demands it. Lead by example, show commitment and positive attitude.	Expects team members to do what they are told without questioning or explanation. Shows lack of respect for knowledge, skills and experience available within the team. Shows lack of sensitivity to individuals need for personal and professional respect. Makes fun of sexual, cultural or religious differences. Gets tied up in meetings for long periods where they are not available to advise or support team members if needed. Relies on team members to tell them if tasks they are responsible for have been completed correctly. Intervenes in team performance and takes control when it is not necessary. Unwilling to respond or acknowledge requests or questions from team members: is unapproachable.
Manages time effectively and copes with pressure	Remains calm under pressure. Conveys a sense of urgency and serious intent without creating concern or panic. Demonstrates ease with responsibility and willingness to stand by and support decisions. Takes control and ownership in event of emergencies or abnormalities until a plan is in place. Recognizes when an individual or the team is over-loaded and takes action to re-prioritize objectives or re-assign resources accordingly.	Fails to prioritize or delegate tasks causing themselves to be become over- loaded and unable to provide effective leadership. 'Freezes' or is unable to communicate, make decisions or act under pressure. Sets unreasonable targets given the time and resources available.

Appendix C

Example NTS (non-technical skills) assessment record – skill-specific training

Non-technical skills: Situation Awareness / Decision Making			**Training objective**: Awareness of tunnel vision and confirmation bias		
Behaviours reflecting good practice	**Observations**	**Notes**	**Behaviours reflecting poor practice**	**Observations**	**Notes**
Regularly checks key sources of information including alarms and other prompts	✓✓✓	*Frequently checked with the control room for update. Ensured assistant regularly checked pressure data.*	Waits for the alarms as the prompt to intervene in an activity or to carry out checks	✓✓✓	*Didn't notice the developing problem with the mud system until the alarm went off.*
Makes time to attend to anyone who offers potentially relevant information	✓✓	*Took time to read the emails from the lab.*	Does not give sufficient attention to information from unexpected sources or from more junior team members	✓	*Declined to take the phone call from shore – asked them to call back at the end of the shift.*
Challenges assessments of risk and the state of the world			Does not evaluate the reliability of information which has potential to create an unsafe condition	✓	*Told John that the pressure gauge giving an unexpected high pressure was known to be faulty.*
Avoids becoming overly focused on the task at hand	✓	*Regularly stepped back and asked about what else was going on.*	Dismisses information that could indicate undesirable future events		
Reflects and asks others for their opinion of ambiguous or unexpected events or indicators	✓✓✓	*Showed concern about the trip of the generator and called a break to ask for other opinions.*	Gives undue prominence to expectations based on experience, rather than information or opinions at the time		
Responds to signs that other team members are not aware of the state of critical equipment	✓✓		Shows a willingness to disbelieve data or information that conflicts with what is expected	✓	
Result			**Assessment**		
Observations predominantly reflect good practice: few poor practices observed.			Individual demonstrated satisfactory performance of the skill.		
Observations balanced, or predominantly reflect poor practice.			Trainee did not demonstrate satisfactory performance of the skill. Further training would be beneficial to improve awareness of behaviours that can lead to loss of situation awareness.		
Observations predominantly reflect poor practice. Few good practices observed.			Trainee did not demonstrate satisfactory performance of the skill. Further training needed to improve awareness of behaviours that support good situation awareness, as well as behaviours that can lead to loss of situation awareness.		

References

[1]   IOGP Report 501. *Crew Resource Management for Well Operations teams*.
      London: April 2014.

[2]   IOGP Report 502. *Guidelines for implementing Well Operations Crew Resource
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[3]   Ruby Roberts, Rhona Flin, Jennifer Cleland. Staying in the Zone. Offshore Drillers'
      Situation Awareness. *Human Factors*. Vol. 57, 4: pp. 573–590. December 15, 2014.

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This report describes in detail what behavioural markers are and how behavioural markers can be used in oil and gas applications.