

***COS-3-08 Guidance for
Verifying Existing Barriers***

November 11, 9:00am



Good Morning everyone. I'm Julia FitzGerald with the Center for Offshore Safety, and I'd like to welcome you all to this COS Webinar introducing COS-THREE-OH-EIGHT *Guidance for Verifying Existing Barriers*.

During today's webinar, which is being recorded and will be posted on the COS website, we request that you keep your audio on mute, silence your ringer, keep your cameras turned off, and do not interrupt during the presentation. We've set aside time at the end for questions. Throughout the presentation, please send your questions through the chat box. Any questions we do not sufficiently address during the webinar, we will look to supplement in post-webinar materials.

Contact information will be shared at the end of this presentation.

If you are using a phone for your audio, please do not place us on hold, as you might subject the rest of us to what is undoubtedly delightful background music.



The Center for Offshore Safety is part of the American Petroleum Institute and as such, we are governed by API's policies and procedures, one of which is the Antitrust Guidelines. To remain in compliance with these guidelines, today we will not discuss pricing or vendors in any way that could negatively impact their business. We don't anticipate this happening, but if you feel like we have veered into those territories, please bring it to our attention via the chat box and we will get back on track.

Special Thanks to the Webinar Contributors

Today's presenters:

- **Russ Holmes, COS**
- **Tricia Grant, Hess**
- **Tim Pieplow, ExxonMobil**
- **Laurie Knape, Avetta**



3 – Julia FitzGerald

Thank you to the members of the COS Verifying Existing Barriers Work Group, part of our Process Safety Subcommittee, for their hard work in preparing this new guidance document and today's webinar. Today's speakers have knowledge and many years of experience working in and supporting the offshore industry. In order of presentation, our speakers today are:

- Russell Holmes, Senior Director of the Center for Offshore Safety
- Tricia Grant, Process Safety Senior Advisor for Hess Corporation, and Chair of the COS Process Safety Subcommittee,
- Tim Pieplow, Operations Integrity Supervisor for Wells at ExxonMobil, and Chair of the guidance document work group, and
- Laurie Knape, HSE Professional for Regulatory and Industrial Relations for Avetta

Before handing things over to Russ Holmes, as I'm sure all of you know, we normally start all our COS meetings with some sort of safety moment. And since we have developed a range of COS Safety Shares that are available for free download from the COS website, covering topics related to Dropped Objects, Mechanical Lifting, and Process Safety, we thought it appropriate to discuss one today.

BLINDS IN RELIEF HEADER RESULT IN TANK DAMAGE



What happened?

A production technician was conducting walk downs on a subsea chemical injection system and observed two spectacle blinds installed on the relief headers that tie into the top of the chemical tanks. Upon discovering that there was pressure on the two tanks, the production team slowly relieved the pressure. The tanks have visible bulging and deformation as viewed from the top.

What went wrong?

The subsea injection system was installed by a third party working on behalf of a partner operated subsea well tie-back to another operator's host asset. The onshore mechanical commissioning lead did not act on an email from the Project Implementation Manager with instructions to add skilllets to a commissioning work pack. The email included a blind list and marked up Piping and Instrument Diagrams showing the skilllets.

Once installed, the skilllets were not recorded into the project database.

2018013

4 – Julia FitzGerald

The library of Safety Shares includes several with a Process Safety focus, including this one from 2018 titled “Blinds in Relief Header Result in Tank Damage”. We thought this particular share might be a good one for today’s webinar because it includes an offshore worker discovering damage while in the process of walking-the-line to verify barriers. And what he discovers is that someone else had signed-off on equipment being removed without verifying the work had been done.

So, what happened?

A production technician was conducting walk downs on a subsea chemical injection system when he observed two SPECTACLE blinds installed on the relief headers tying into the top of the chemical tanks. Upon further investigation, it was discovered there was pressure on the two tanks with the tanks visibly bulging and deformed when viewed from the top. The production team proceeded to slowly relieved the pressure.

What went wrong?

The subsea injection system in question was installed by a third-party working on behalf of a partner-operated subsea well tie-back to another operator's host asset.

It was learned that the onshore mechanical commissioning lead had received, but did not act on, an email from the Project Implementation Manager with instructions to add skilllets to a commissioning work pack. The email included a blind list and marked up P&ID showing the skilllets.

However, once installed, the skillets were not recorded into the project database.

BLINDS IN RELIEF HEADER RESULT IN TANK DAMAGE



Why did it happen?

The commissioning subject matter expert signed off a check sheet indicating the skillets had been removed but did not verify in the field that the work was completed.

What areas were identified for improvement?

Operator of the host asset will formally define the organizational structure including the level of oversight to manage third party contractors of partner operator-led projects.

Fabrication and commissioning team interfaces between an operator of a host asset and a partner operator of a subsea tie-back well should be managed to ensure the safe execution of projects and operations. This is inclusive of thorough and complete commissioning as there was a sign off that the skillets were removed but this was not verified in the field.

2018013

5 – Julia FitzGerald



Why did this happen?

The commissioning subject matter expert signed off on a check sheet indicating the skillets had been removed but did not verify (there's that word again) in the field that the work was completed.

What areas were identified for improvement as a result of this incident?

Moving forward, the operator of the host asset will formally define the organizational structure including the level of oversight to manage third party contractors of partner operator-led projects.

Fabrication and commissioning team interfaces between the operator of a host asset and a partner-operator of a subsea tie-back well, should be managed to ensure the safe execution of projects and operations. This is inclusive of thorough and complete commissioning as there was a sign off that the skillets were removed, but this had not been verified in the field.

This is just one of the many Safety Shares available for free download from the COS website. We encourage you to download them and share them with your teams.

With that, to kick us off, please welcome Russ Holmes, the Senior Director of COS. Russ?

COS Overview

The Center for Offshore Safety is designed to promote the highest level of safety for offshore drilling, completions, and operations through leadership and effective management systems addressing communication, teamwork, and independent third-party auditing and certification.

COS will achieve operational excellence by:

- Enhancing and continually improving industry's safety and environmental performance.
- Improving public confidence and trust in the oil and gas industry.
- Increasing public awareness of industry's safety and environmental performance.
- Fostering collaboration between industry, the government, and other stakeholders to develop and share good practices and learnings.



6 – Russ Holmes

Thank you, Julia. Good morning, everyone, and may I take a moment this Veterans Day to recognize all those with us who have served our nation. Thank you. And welcome everyone joining us to hear about the new COS guidance document, COS-THREE-OH-EIGHT Guidance on Verifying Existing Barriers. Before we dive into the details, I'd like to provide a little bit of background about the Center for Offshore Safety.

COS was established 10 years ago and to this day demonstrates the industry's commitment to advancing a culture of safety in offshore operations. Our collective efforts can be broken down into four main pillars, listed on this slide, to promote systems that drive offshore safety progress; analyze offshore safety data to identify opportunities for improvement; and facilitate development and sharing of good practices that advance safety and environmental protection.

Related to these pillars, COS also serves as the Accreditation Body, recognized by the Bureau of Safety and Environmental Enforcement, to accredit third party SEMS audit service providers.

The work for today's document was developed under the Good Practices pillar, consisting of a group of industry experts that collaborated to address an area where more guidance was clearly needed – as evidenced by the Safety Share Julia just reviewed.



7 – Russ Holmes

Last week COS hosted a webinar to promote the set of Process Safety Fundamentals developed by the International Association of Oil and Gas Producers, or IOGP. For those joining us today who did not attend last week’s webinar, a recording will be posted to the COS website in the near future. If you’d like to be notified when it’s posted and available for viewing, please contact Julia FitzGerald.

The webinar last week went in depth into each of the ten Process Safety Fundamentals.

4 – SUSTAIN BARRIERS



We discuss the purpose of hardware and human barriers at our location.

We evaluate how our tasks could impact process safety barriers.

We speak up when barriers don't feel adequate.

We perform our roles in maintaining barrier health and alert supervision to our concerns.

We use an approval process for operations with degraded barriers.



8 – Russ Holmes

One of the fundamentals presented was SUSTAIN BARRIERS. You can see here the IOGP language that accompanies this fundamental:

- We discuss the purpose of hardware and human barriers at our location.
- We evaluate how our tasks could impact process safety barriers.
- We speak up when barriers don't feel adequate.
- We perform our roles in maintaining barrier health and alert supervision to our concerns.
- We use an approval process for operations with degraded barriers.

So, how is this fundamental applied?

- By knowing what the Process Safety barriers are at the location.
- By understanding how a task might affect these barriers.
- Ensuring that systematic barrier management processes are in place and that necessary resources are allocated to test and maintain barriers.
- And Implementing approved risk reduction measures for degraded or failed barriers and restoring barrier functionality as soon as practical.

The COS document being discussed today – COS-THREE-OH-EIGHT Guidance for Verifying Existing Barriers – is a deep dive into this specific fundamental.



- Introduction and Scope
- Purpose and Application
- Approach
- Barrier Ownership

9 – Russ Holmes



To present the first portion of the new document, please welcome the Chair of the COS Process Safety Subcommittee, Tricia Grant from Hess. Tricia?

INTRODUCTION/SCOPE

This document focuses on the activity of verifying that existing barriers that are intended for major incident prevention and mitigation have integrity and are or will be effective.


VERIFYING

EFFECTIVE

INTEGRITY

For the purpose of this document: Barriers are a subset of Risk Controls with specific characteristics:

- Capable – can fully prevent the unintended event or effectively mitigate the specified undesired consequence(s)
- Independent – can function independent of the initiating event and the design or operation of any other Barriers
- Verifiable - evidence exists that the barrier is real, present, and will function as intended



10 – Tricia Grant

Thank you, Russ. And please let me second Russ’s recommendation that, if you weren’t able to attend last week’s webinar on the Process Safety Fundamentals, you visit the COS website to watch the recording once it’s been posted.

As many of you likely know, oftentimes the biggest challenge in developing a new guidance document can be reaching an agreement on the definition of key words. There are countless documents in our industry and others that define words such as “barrier,” “risk control,” “safeguards,” etc.

For this document – and trust me, there was a lot of debate that went into reaching this consensus - “A Risk Control is the actions, equipment, or administrative measures to be established, implemented, or maintained to eliminate, reduce, or mitigate the risk. Safeguard is another term used by industry and is generally interchangeable with Risk Control. Barriers are a subset of Risk Controls with specific characteristics:

- They are Capable – meaning they can fully prevent the unintended event or effectively mitigate the specified undesired consequence(s)
- They are Independent – meaning they can function independent of the initiating event and the design or operation of any other Barriers
- And they are Verifiable - evidence exists that the barrier is real, present, and will function as intended”

And, although this document focuses on verifying whether existing barriers that are intended for major incident prevention and mitigation have integrity and/or will be effective, the elements of this guidance can be applied to all barriers.

APPROACH

Barrier Verification Aspects

API RP 75, 4th Ed Elements

- Barrier Information → • SEMS Information
- Barrier Ownership → • Leadership and SEMS Interface Management
- Barrier Inspections and Testing → • Procedures and Asset Design & Integrity
- Certain Mitigative Barriers → • Emergency Preparedness & Response
- Barrier Verification → • Evaluation & Improvement and Knowledge & Skills
- Compromised, Defective or Degraded Barriers → • Risk Assessment and Risk Controls



11 – Tricia Grant

This document is aligned with the 4th Edition of API Recommended Practice 75, Safety and Environmental Management System for Offshore Operations and Assets, published in 2019, and is intended to support companies as they implement, maintain, and improve their SEMS.

Shown here is a partial list of the topics in the document and how they link to SEMS elements.

This document assumes that a company has defined and identified its barriers according to their SEMS and that there will be some variability between companies in the number and type of barriers. With those assumptions, the document is intended to help companies systematically and reliably verify the integrity and effectiveness of those existing barriers.

PURPOSE and APPLICATION

...verifying existing barriers is one of many aspects of the overall life cycle of a barrier



12 – Tricia Grant

There are many stages to the life cycle of a piece of equipment, including barriers, as seen in the diagram here. Starting with design – and progressing through fabrication, installation, commission, and operation – there are multiple phases and tasks associated with each stage. And while all of these stages are important, this document focuses on the Verification portion.

The elements listed here under Verification are:

- Barrier ownership
- Barrier information and performance criteria
- Methodologies
- Frequency and schedule
- Personnel knowledge and skills, and
- Results, communication, and response

Let's take a closer look at Barrier Ownership.

BARRIER OWNERSHIP



13 – Tricia Grant

Each barrier should have a designated owner.

The owner should have the ability to actively monitor the barrier and the authority to take action to address any deficiencies, for example, a site supervisor.

The owner is responsible for:

- understanding the role of the barrier in preventing or mitigating a major incident,
- regularly monitoring the integrity and effectiveness of the barrier, and
- engaging line management to address any deficiencies.

The barrier owner is not necessarily the OIM, although the OIM does have Ultimate Work Authority for the facility.

The barrier owner – and/or delegate(s) – should verify that barrier integrity and effectiveness is consistent with the performance criteria specific for that barrier. This might include testing, routine surveillance or inspections, etc. We'll touch more on performance criteria in a little bit.

When personnel discover that a barrier does not meet the performance criteria, the barrier owner should be notified immediately. This discovery could be made by an employee, a partner, or a contractor, so it's important that all entities understand the need and mechanism to notify the barrier owner.



14 – Tricia Grant

- Barrier Information and Performance Criteria
- Barrier Verification Methodologies
- Barrier Verification Frequency and Schedule
- Knowledge and Skills of Verification Personnel



CENTER FOR OFFSHORE SAFETY

And now I'll hand it over to Tim Pieplow from ExxonMobil and let him take us through the next several elements. Tim?

BARRIER INFORMATION AND PERFORMANCE CRITERIA

AVAILABLE

ACCESSIBLE

For barriers that already exist, there should be information available to and accessible by personnel who have ownership and responsibility for the process of verifying that the barriers are effective or will be effective on demand.



What types of documentation?



15 – Tim Pieplow

Thank you, Tricia. And thanks to all of you who have joined us today.

As Tricia mentioned, there should be information available for each barrier and that information should be accessible by all personnel who have ownership and responsibility for verifying that those barriers are effective, or will be effective, on demand.

This information, including performance criteria, can come in many forms, not all of which will apply to every barrier.

BARRIER INFORMATION AND PERFORMANCE CRITERIA

- Role or function of barrier and relationship to other barriers
- How the barrier prevents a threat or mitigates a consequence
- The systems the barrier depends on to function
- How the barrier is operated and its operating limits
- How the barrier is maintained
- How to respond if the barrier is:
 - Compromised, defective or degraded
 - Placed out-of-service
 - Changed
 - Bypassed
- History of barrier – learnings from failures and management of barrier changes
- Interface agreements



16 – Tim Pieplow

Here we see examples of information for barriers – much of which is generated or obtained through elements of SEMS – that should be available and readily accessible to barrier owners and their delegates.

This information ranges from

- the role or function of a barrier and its relationship to other barriers
- how this particular barrier acts to prevent a threat or mitigate a consequence
- what other systems this barrier is dependent on
- the barrier’s operating limits – this, by the way is another of the IOGP Process Safety Fundamentals, “STAY WITHIN OPERATING LIMITS”

The information will also usually include

- how to maintain the barrier
- how to respond if the barrier is compromised, out-of-service, or bypassed
- the history of this barrier – any previous failings or changes?
- and, finally, any interface agreements that might impact the ownership or responsibility for this barrier.

As you’ll recall, this last one was one of the areas for improvement highlighted in the COS Safety Share that Julia presented earlier.

BARRIER INFORMATION AND PERFORMANCE CRITERIA

- Essential action or activity the barrier
 - Capacity
 - Effectiveness
- Availability of the barrier when needed
- Ability to function under relevant incident scenarios and loads
- Failure/acceptance criteria, including:
 - Corrosion allowance
 - Industry codes,
 - Company standards
 - Regulatory requirements



17 – Tim Pieplow

In addition to the examples listed on previous slide, one type of information of particular importance is the Performance Criteria for any given barrier.

Performance criteria should include:

- The essential action or activity the barrier is expected to perform along with details of expected capacity and effectiveness, such as operator expertise or “bubble-tight” valve closure
- Availability of the barrier when needed, such as expected reliability or survivability
- The barrier’s ability to function under relevant incident scenarios and loads, and
- The barrier’s failure or acceptance criteria, such as corrosion allowance, industry codes, company standards, and/or regulatory requirements

For hardware barriers, the performance criteria might include items such as:

- integrity status, for example, acceptable piping wall thickness,
- maintenance, including last scheduled Preventive Maintenance performed per schedule, and
- availability

For a human barrier, the performance criteria can include items such as

- training, for example, training on procedures completed on time,
- collective competency – assuring sufficient skills to maintain and operate the barrier is present on the facility,
- independent verification – having a supervisor present during a critical task, and
- Emergency Response drill completion – assuring drills have been executed on schedule and per plan.

BARRIER VERIFICATION METHODOLOGIES

RISK-BASED
APPROACH

Barrier verification can be achieved through a variety of methodologies...Each company should use a risk-based approach to determine the optimal method for verifying its existing barriers. Learnings over time may lead to adjustments to the approach.

Direct Observation



Preventive Maintenance,
Inspection and Testing



Monitoring



Audit Results



18 – Tim Pieplow

Once the barrier information and performance criteria are established, barrier verification can be performed.

Barrier verification can be achieved through a variety of methodologies, some of which are shown here. Each company should use a risk-based approach to determine the optimal method for verifying its existing barriers.

The first one listed here is direct human observation. An example of this would be an individual on rounds making a weekly check that a specific relief valve is in the open position and car sealed open, not simply relying on a P&ID to verify the valve is available.

Another verification method is preventative maintenance, inspection, and testing. Examples of this include firewater pump maintenance, blast wall structural inspection, and BOP pressure and function tests.

When these activities are performed on time and per procedure, it provides verification that hardware barriers have integrity and are expected to perform as intended.

Other barriers can be verified by monitoring, such as a fluid column that can be monitored during well intervention activity.

SEMS audits and other inspection results may also serve as a gauge of management system elements related to maintaining barriers.

BARRIER VERIFICATION FREQUENCY AND SCHEDULE

The frequency of verification will be specific to each particular barrier. These frequencies should be established by subject matter experts and approved by management, and consider OEM recommendations and industry standards, as applicable. Frequency schedules should also comply with applicable regulatory requirements.

SPECIFIC FOR EACH
BARRIER

ESTABLISHED BY SME
& APPROVED BY
MANAGEMENT

CONSIDER OEM RECS
AND INDUSTRY
STANDARDS

COMPLY WITH
APPLICABLE REGS

*Prior to barrier verification being deferred from the established schedule, the barrier owner should be informed to **determine if a risk assessment is needed** and whether the operation should continue with the deferral.*



19 – Tim Pieplow

Verification frequency will be specific to each barrier – hardware and human - and should be established by subject matter experts and approved by management. When determining frequency, a company should consider OEM recommendations and industry standards, and applicable regulatory requirements.

And, as mentioned earlier, these frequencies should be based on risk and may vary from pre-use, daily, weekly, monthly, yearly, or multi-year.

As we all know, it's not uncommon for work teams and facilities to face unforeseen challenges. When this happens, scheduled plans are routinely rationalized and adjusted, and work reprioritization often occurs.

When a site's schedule becomes challenged, it is normal to extend target dates for some planned activities.

Given the importance of barriers in preventing or mitigating major incidents, however, site leadership should prioritize barrier verification activities.

Prior to barrier verification being deferred from the established schedule, the barrier owner should be informed to determine if a risk assessment is needed and whether the operation should continue with the deferral.

KNOWLEDGE AND SKILLS OF VERIFICATION PERSONNEL

Understands intent and function of barrier in overall barrier strategy

Be familiar with performance criteria of barriers



Company responsible for:

- determining knowledge and skills required
- identifying individuals and providing training
- assuring necessary level of knowledge and skills is maintained



20 – Tim Pieplow

Barrier verification should be performed by personnel with the appropriate knowledge and skills to be able to determine whether a barrier is meeting its performance criteria, or whether there are deficiencies. The verification personnel should understand:

- The purpose or basic intent of the barrier
- How the barrier is meant to function, and
- The role of the barrier in the overall barrier strategy.

For example, if the barrier to be verified is a relief valve, the verifier should have knowledge of how the valve works, what results occur when the valve is activated, and the consequences of valve failure. In addition, the verifier should be familiar with performance criteria associated with this specific valve.

At a higher level, the company is responsible for:

- Determining what knowledge and skills are required to carry out verification activities,
- Identifying and training the personnel who will carry out those verifications, and
- Assuring that the appropriate level of knowledge and skill is maintained over the life of that barrier.



- RESULTS OF BARRIER VERIFICATION
- COMMUNICATION OF BARRIER VERIFICATION RESULTS
- RESPONDING TO VERIFICATION RESULTS



21 – Tim Pieplow

To take us through the remaining elements, I'll hand it off to Laurie Knappe from Avetta. Laurie?

RESULTS OF BARRIER VERIFICATION

After the verification activity has occurred, the results should initiate follow-up communication and response.

Verification results typically indicate one of the following:

Barrier meets performance criteria



Barrier is compromised, defective or degraded



Barrier is out-of-service



Barrier is bypassed



22 – Laurie Knape

Thank you, Tim, and that you also Tricia and Russ. Happy to be here with you this morning.

Once verification activities have been completed, the results of those verifications should be documented and communicated to assure that any actions identified during the verification are carried out in a timely manner.

Barrier verifications will typically have one of four likely outcomes:

One – the barrier is determined to meet the performance criteria and no action is needed at that time.

Two – the barrier is determined to be compromised, defective or degraded and, while it may still be kept in service, corrective action should be taken to restore it to full function.

Three – it is determined that the barrier should be placed out-of-service while corrective actions are taken, or

Four – it is determined that the barrier is no longer viable and it should be bypassed altogether.

The verification outcome should be documented to enable communication to the barrier owner and any other appropriate personnel. This documentation is also used to track completion of identified action items.

If a barrier is determined to not meet its performance criteria, it should be risk-assessed to determine the level of risk this poses to the operation. The timing and urgency of communications regarding the verification results should be determined based on this risk-assessment.

COMMUNICATION OF BARRIER VERIFICATION RESULTS

Stop Work Authority should be applied for any instance where verification results present an imminent risk.

Verifications that meet performance criteria

Should be:

- communicated to barrier owner and management on a regular basis
- reviewed to provide insight to ongoing performance of SEMS as related to verifying effective barriers

*Verifications that **DO NOT** meet performance criteria*

Should be:

- promptly communicated to barrier owner and management to determine need for follow-up actions, and
- Assessed to determine urgency to carry-out corrective actions



23 – Laurie Knappe

As mentioned on the previous slide, the communication of verification results will vary depending on whether the barrier did or did not meet its performance criteria.

If a barrier **does** meet its performance criteria, that should be communicated to the barrier owner and management on a regular basis, and reviewed as part of management reviews of SEMS, as related to verifying effective barriers.

If a barrier **does not** meet its performance criteria, that should be **promptly** communicated to the barrier owner and management to determine follow-up actions, and, risk-assessed to determine the urgency for completing corrective actions.

RESPONDING TO VERIFICATION RESULTS

*For verification results that **do not** meet performance criteria, the barrier owner should work with the appropriate technical, operations, and management representatives to determine action items to address any gaps.*

Action items should be assigned to a responsible person and then stewarded to closure, at which point the barrier will meet the performance criteria.



24 – Laurie Knape

For verification results that **do not meet** performance criteria, the barrier owner should work with the appropriate technical, operations, and management representatives to determine action items to address any gaps.

Action items should be assigned to a responsible person and then stewarded to closure.

As part of a robust SEMS, verification results should be evaluated for opportunities to improve applicable documents, processes, and programs, such as:

1. Risk management
2. Barrier strategy, and
3. Barrier design

EXAMPLES – HARDWARE AND HUMAN BARRIERS

Example case #1 (hardware barrier): Shutdown valve actuator failure

On a hypothetical offshore platform, SDV-123 is a boarding valve (first valve on) and is considered an existing barrier for the facility. In the case of a loss of containment on the platform, its function is to isolate the inventory of hydrocarbons feeding the process.

The maintenance supervisor on the platform has been assigned as the owner for SDV-123. He understands the importance of the valve and regularly monitors its status. The performance criteria for SDV-123 includes completing preventative maintenance and function testing according to the Company's SEMS. As the barrier owner, the maintenance supervisor checked the records to verify that the preventative maintenance for SDV-123 was completed on schedule and that the most recent test was successful. Because the maintenance supervisor has shared the documented performance criteria with the crew and reinforced the details through regular communications, they have been instructed to inform him of any circumstances when the performance criteria for SDV-123 is not being met. The maintenance supervisor periodically reviews the performance criteria with the crew to reinforce their understanding.

However, during a planned shutdown, the actuator for SDV-123 fails, rendering the valve unavailable to perform its function. The technician who identified the failure immediately notifies the maintenance supervisor since he is the barrier owner. The maintenance supervisor immediately confers with the OIM, and the OIM notifies the asset manager. Since the performance criteria for SDV-123 includes availability to function on demand, they decide to postpone start-up of the platform until the situation can be resolved. They promptly order a replacement actuator from shore and the OIM requests a risk assessment to help determine if there is an option to start up safely in the interim until the replacement actuator could be delivered and installed in a few days.

Following the risk assessment, the asset manager determines that the platform can safely be restarted with interim mitigations in place. Alternative barriers are provided by two functioning SDVs downstream of SDV-123, and the team confirms that the condition of the piping downstream of SDV-123 is adequate. Regular rounds/surveillance at the affected area are increased. Communication protocol between the relevant platform teams are upgraded and tested. The team also limits cargo off-loading to/from the platform to must-do items only until SDV-123 can be restored. Any critical lift requirement during this period will be escalated to the asset manager for approval. All other related barriers are evaluated and deemed to be acceptable.

The OIM widely communicates the status and plans to personnel on the platform.

The asset manager informs the asset leadership team of the situation and the decision to start up with interim mitigations until the actuator can be replaced.

Example case #2 (human barrier): Shutting in a well upon influx below BOP

On a hypothetical offshore drilling rig, certain actions taken by the Driller are considered to be a barrier to preventing a surface blowout. In the event of an influx below the BOP, the Driller must respond by shutting in the well to prevent uncontrolled hydrocarbon release to the rig floor. This action by the Driller is considered a human barrier.

The Company established the following performance criteria for the barrier of shutting in the well:

- Whenever flow is detected, the Driller is to self-initiate shut-in of the well without any further approval
- All personnel authorized to activate the system are included in the drills and trained to operate the well shut-in system.
- Well control drills are conducted to ensure that drilling personnel can shut-in the well in the shortest time possible. The drills are held at least weekly with each crew. The results of drills are assessed and recorded in the daily drilling reports.
- Detailed rig and well-specific shut-in procedures are developed and posted on the rig floor. This procedure is practiced during drills, so all crew members know their roles and responsibilities.

The Company has assigned the Wells Supervisor to be the barrier owner. As such, she regularly checks on the performance criteria to ensure that they are being met. She knows that if any of the performance criteria are not being met she needs to engage the asset leadership to determine if operations should continue, if a risk assessment should be performed, and/or if additional interim barriers should be established.

Some of the activities undertaken by the Wells Supervisor to confirm barrier status include

- checking drill records to verify that they are occurring weekly and that the appropriate drilling personnel are included in drills
- periodically walking the rig floor to verify that the shut-in procedures are clearly posted
- conversing with the drillers to verify that they understand their role as a human barrier for this scenario

Appendix:

- Sample list of hardware barriers
- Sample list of human barriers



That takes us through the main elements of this guidance document. There is also an Appendix that provides a few examples – one for a hardware barrier, one for a human barrier. We won't take the time here to go through these examples, instead you'll need to download the document to read them for yourselves.

With that, I turn it back to Russ.

COS-3-08

GUIDANCE FOR VERIFYING EXISTING BARRIERS

NOVEMBER 2021

SAFE PLACES & CERTIFICATES

RISK EVALUATION, ANALYSIS & REPORTING

GOOD PRACTICE DEVELOPMENT

SHARING KNOWLEDGE & EXPERIENCE

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API Recommended Practice 75

SEMS GOOD PRACTICES

The Center for Offshore Safety's commitment to learn and continually improve SEMS include resources related to leadership engagement, SEMS maturity self assessment, safety culture, and others. One of the most important roles COS plays is in the development of a strong safety culture based on six safety characteristics from the Bureau of Safety and Environmental Enforcement's Safety Culture Policy Statement: Leadership, Respect and Trust, Environment for Raising Concerns, Open Communication, Personal Accountability, and an Inquiring Attitude.

Verifying Existing Barriers

This document provides guidance to help companies verify their existing barriers have integrity and are or will be effective.

COS-3-08 Guidance on Verifying Existing Barriers

Crane Maintenance Tracker

This guidance provides companies engaged in offshore operations with a framework for the establishment, implementation, and maintenance of a Crane Maintenance Tracker (CMT) to manage and reduce risks associated with inspecting and maintaining offshore crane equipment.

COS-3-07 Guidance for the Development of an Effective Crane Maintenance Tracker (CMT)

Developing and Managing Procedures

This guidance will address operating procedures and safe work practices. Companies can use this document to implement a systematic procedure to involve the right personnel in operations, incorporate appropriate risk controls, and focus on end users of all stages.

COS-3-06 Guidance for Developing and Managing Procedures

CENTER FOR OFFSHORE SAFETY

26 – Russ Holmes

Thank you, Laurie, and thank you also Tricia and Tim.

As mentioned a few times this morning, a link to this new document, COS-THREE-OH-EIGHT Guidance on Verifying Existing Barriers has been posted. To download a free copy of the document, just visit the COS website, click on Guidelines & Reports and then again on SEMS Good Practices.

While on that page, be sure to check the full library of good practices and COS Safety Shares available.

And, with that, let's see if there are any questions that have been submitted via the chat box. Julia?

Questions?



Q & A



COS - Become a Member!

- Annual Membership Fee
 - API Members - \$0 additional annual fee to join COS
 - Non-API Members - \$5000 annual membership fee
- For Additional Information:
 - Russ Holmes – holmesr@centerforoffshoresafety.org
 - Julia FitzGerald – fitzgeraldj@centerforoffshoresafety.org

And we can't let you go this morning without a plug for membership in COS. The mission of COS, to continually improve offshore safety and safety management, is only possible by the active participation and contributions of companies engaged in our industry.

We're happy to announce some big changes to the cost of membership in COS. Starting this year, current API members pay zero additional membership fees to become members of COS. And for non-API members, the annual membership fee is now only \$5000, regardless of company type or size.

For additional information on becoming a member of COS please reach out to me or Julia FitzGerald. Our contact information is on the screen.

Thank you for joining us this morning. From all of us at COS and today's speakers, We hope you all have a wonderful day.