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Skills and Knowledge Management System Guideline

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Table of Contents

	<u>Pages</u>
1.0 Purpose.....	4
2.0 Scope.....	4
3.0 Definitions.....	4
4.0 SKMS Element - Commitment and Objectives.....	5
5.0 SKMS Element - Overview and Scope.....	5
6.0 SKMS Element – Accountability and Responsibility.....	5
7.0 SKMS Element – Roles/Tasks Definition.....	5
7.1 Roles/Tasks Considerations.....	5
7.2 Skills and Knowledge Considerations.....	6
7.3 Prioritization.....	7
8.0 SKMS Element - Assessment and Remediation.....	7
8.1 Assessment Considerations.....	8
8.2 Remediation.....	9
9.0 SKMS Element - Auditing and Quality Assurance.....	9
10.0 SKMS Element - Records and Documentation.....	10

COS Skills and Knowledge Management System Guideline

1.0 Purpose

This Center for Offshore Safety (COS) publication is a guideline to help the U.S. Offshore Oil and Gas Industry understand, develop and implement an effective Skills and Knowledge Management System (SKMS) based on company-specific needs. It is not the purpose of this document to provide prescriptive processes, practices, or procedures related to a SKMS.

2.0 Scope

The scope of this publication is the U.S. Offshore Oil and Gas Industry, including operators and contractors. Bridging documents may be used to align SKMS requirements where applicable.

An effective SKMS should have the following elements:

- Commitment and Objectives
- Overview and Scope
- Accountability and Responsibility
- Roles and/or Tasks
- Assessment and Remediation
- Auditing and Quality Assurance
- Records and Documentation

3.0 Definitions

3.1 Assessment

A comprehensive, objective, and systematic evaluation of the minimum knowledge and skills necessary to perform a role and/or task.

3.2 Assessor

A qualified person designated to perform an assessment.

3.3 Barrier

A constraint on a hazard that reduces the probability of an incident or its consequences.

3.4 Facility

All types of structures permanently or temporarily attached to the seabed of the U.S. outer continental shelf (e.g., mobile offshore drilling units (MODUs); floating production systems; floating production, storage and offloading facilities; tension-leg platforms; and spars) that are used for exploration, development, and production activities for oil, gas, and sulphur. This term includes pipelines regulated by the Department of Interior.

3.5 Remediation

The process of correcting gaps identified in a skills and knowledge assessment.

3.6 Role

Individual functions identified in a company's SKMS.

3.7 Skills and Knowledge Management System (SKMS)

A systematic process that serves to control, in a logical and integrated manner, a cycle of activities to establish, assess, and develop the skills and knowledge of identified individuals for successful performance of work.

3.8 Task

Specified work undertaken by the workforce which is part of an activity identified in a company's SKMS.

3.9 Verification

The documented means of establishing the accuracy and validity of assessments.

4.0 SKMS Element - Commitment and Objectives

This element includes statements of the intention and purpose of the SKMS and provides a clear description of its goals and objectives. It should include management's commitment to the SKMS and any other general information about the system.

5.0 SKMS Element - Overview and Scope

This element provides a brief description of the SKMS, and its implementation and management processes.

This element should summarize how the:

- SKMS is applied within a company
- SKMS is integrated with the company's other systems (if applicable)
- Company administers the SKMS
- Roles and/or tasks are identified and assigned
- Skills and knowledge are determined and delivered for each role and/or task
- Skills and knowledge are assessed (and remediated, if needed)
- Records and documentation are managed
- Performance of the SKMS is measured to enable continuous improvement

6.0 SKMS Element – Accountability and Responsibility

This element lists the positions at all levels within the company that are accountable for managing, executing and assuring the SKMS, with corresponding lists of general responsibilities and levels of authority.

7.0 SKMS Element – Roles/Tasks Definition

Each company should define which roles/tasks are included in the SKMS, including the associated skills and knowledge requirements. This element includes the company's definition processes and a list of the identified roles/tasks and associated skills and knowledge.

The definition process can be divided into the following basic steps:

- Define the roles/tasks for inclusion within the SKMS
- Determine the required skills and knowledge for defined roles/tasks
- Define the methods (e.g. education, training, experience, certifications, etc.) needed to acquire the required skills and knowledge
- Document the results from the steps listed above

7.1 Roles/Tasks Considerations

The definition process for roles/tasks should be based on company-specific factors. The factors listed below represent examples of criteria that a company may consider when defining roles/tasks for inclusion into the SKMS.

7.1.1 Description of Work

The specific nature and conditions of the work activities should be considered when describing the roles/tasks. The following are examples of different criteria that may be considered:

- Job description and title (e.g. cementer, crane operator, OIM, etc.)
- Task description (e.g. documentation of a work stoppage restart, a formation integrity test, etc.)
- Location of work (e.g. offshore, onshore, etc.)
- Type of facility (e.g. platforms, floating production systems, MODUs, etc.)
- Types of operations applicable (e.g. drilling, production operations, work over, etc.)
- Types of equipment used (e.g. cement unit, crane, etc.)

7.1.2 Hazards / Risk Assessments

Hazards and risk assessments are important tools to identify the key barriers in preventing and/or mitigating incidents. Barriers identified from these assessments may require activities to check and maintain their strength, reliability and efficacy, as well as the roles/tasks responsible for such activities. Examples of hazard and risk assessments include:

- Process Hazard Analyses (PHAs)
- Software-generated charts or diagrams
- Hazard identification
- Risk assessments conducted during a company's Management of Change process

7.1.3 Regulatory Requirements

Roles/tasks specifically referenced in regulatory requirements should be considered for inclusion into the SKMS. Examples include:

- Person-in-Charge (as defined by USCG)
- Ultimate Work Authority (as defined by BSEE)
- Conducting BOP tests
- Safety valve testing

7.1.4 External and Internal Requirements

If a company chooses to follow additional requirements (beyond those defined by regulation), these requirements should be considered when defining the role/tasks to be included in the SKMS. Examples of such requirements include:

- External requirements issued by industry associations
- Customer conditions and specifications
- Internal company policies and standards

7.1.5 Lessons Learned

Lessons learned should be reviewed to identify if additional roles/tasks should be included in the SKMS. These lessons can come from a variety of sources, both inside and outside the company, and may include:

- Incidents
- Audits
- Industry alerts and bulletins
- Previous performance history

7.2 Skills and Knowledge Considerations

Each company should define the processes used to determine the skills and knowledge requirements for the roles/tasks included in the SKMS. The factors listed below represent examples of criteria that a company may consider when determining the required skills and knowledge. Please note that requirements may vary from company to company, as each company uses its own processes and structure to determine the skills and knowledge required for a specific role and/or task.

7.2.1 Description of Role/Task

The specific nature and conditions of the work activities should be considered when determining the required skills and knowledge for the included roles/tasks. The following are examples of different criteria that may be considered:

- Role/task specific responsibilities (e.g. supervision, operation, monitoring, etc.)
- General responsibilities (e.g. stop work authority, emergency response, etc.)
- Location of work (e.g. offshore, onshore, etc.)

- Types of operations applicable (e.g. drilling, production operations, work over, etc.)
- Types of equipment used (e.g. cement unit, crane, etc.)

7.2.2 Hazards / Risk Assessments

Hazards and risk assessments are important tools to identify the key barriers in preventing and/or mitigating incidents. The identified barriers may require specific skills and knowledge to ensure their strength, reliability, and efficacy. Examples of how hazard and risk assessments may be used to identify skills and knowledge requirements include:

- Identifying specific activities required to maintain a barrier (e.g. operator rounds, testing, etc.)
- Identifying operating conditions that require specific skills and knowledge (e.g. respiratory hazards, weather, etc.)
- Identifying atypical operational conditions that require specialized training (e.g. emergency management, abnormal conditions, etc.)

7.2.3 Regulatory Requirements

Regulatory requirements that are associated with the defined role or task may specify the skills and knowledge of a person responsible for that role or task.

7.2.4 External and Internal Requirements

External and internal requirements that are associated with the defined role or task may specify the skills and knowledge of a person responsible for that role or task.

7.2.5 Lessons Learned

Lessons learned should be reviewed to identify if additional skills and knowledge requirements should be included in the SKMS. These lessons can come from a variety of sources, both inside and outside the company, and may include:

- Incidents
- Audits
- Industry alerts and bulletins
- Previous performance history

7.3 Prioritization of Roles/Tasks

Prioritization of roles/tasks into critical/non-critical categories is a recognized good practice associated with a risk-based approach towards incident prevention and/or mitigation. Critical is a term used to classify activities, facilities, processes, equipment, and, in this case, roles and tasks, that may be vital to the strength and reliability of the barriers that prevent or mitigate major incidents. Critical roles and tasks may be specific to physical barriers (e.g. instrumentation, valves, etc.), or may be responsible for the elements that support the barriers (e.g. management of change, operating procedures, etc.). For roles and tasks classified as critical, the associated skills and knowledge requirements may also be categorized as critical, which may influence the frequency of the assessments and verifications.

8.0 SKMS Element - Assessment and Remediation

This element describes the methods and/or processes used to evaluate, and if necessary remediate, the skills and knowledge of individuals to assure successful performance of their roles and/or tasks according to company requirements.

Skills and knowledge assessment results should allow for informed decisions regarding what level of supervision and managerial control is required for a given role and/or task, as well as what level of remediation is required (if applicable).

Consideration may also be given to linking other existing processes (e.g. auditing, incident analysis, behavioral-based safety, etc.) to the assessment process as a supplemental means of evaluating the skills and knowledge of an individual.

The assessment process can be divided into the following basic steps:

- Plan the assessment
- Conduct the assessment
- Provide feedback
- Record findings
- Plan and Execute remediation (if applicable)

8.1 Assessment Considerations

The assessment process should be based on factors that are specific to a company's work activities. Management support is key to a successful and effective assessment process. The factors listed below represent examples of criteria that a company may consider when developing an assessment process.

8.1.1 Assessment Methodology

Assessments should aim to acquire performance-based evidence that an individual can successfully perform a role and/or task. The following are examples of different assessment methodologies:

- Certification Review
- Drill and/or Simulation
- Experience Review
- Observation
- Performance, Records, or Work Product Review
- Training Review
- Witness Testimony
- Written, Oral, or Practical Examination

A company may consider the following when selecting assessment methods:

- Location: for many roles and/or tasks, a field-based assessment may provide a better opportunity to perform a realistic assessment.
- Consistency: assessments should be structured such that different assessors would be likely to generate similar results for a given assessment.
- Risk: the assessment methodology and the level of evidence collected should be commensurate to the criticality of the assessed role and/or task.

8.1.2 Assessor Criteria

Qualified assessors are an important component of an effective assessment process. The SKMS should have a process for determining assessor qualifications. Assessors may be dedicated to the assessment process or may perform this function as part of their primary job function (e.g. supervisor, trainer, etc.). To assure the consistency of assessments, a company may consider developing a protocol for assessors that includes assessment guidance. The following criteria should be considered in identifying assessors:

- Qualifications
- Experience
- Skills and knowledge
- Objectivity
- Credibility
- Training

8.1.3 Feedback Process

Feedback is an important tool to reinforce desired skills and knowledge. The individual being assessed should receive prompt, accurate, and constructive feedback from the assessor.

8.1.4 Frequency

Assessment frequencies should be established according to criteria defined by the company. One of the more commonly accepted methods for setting assessment frequency utilizes a risk-based approach, with higher risk tasks being assessed more frequently than those deemed lower risk. In addition, a company's SKMS should consider the following when establishing assessment frequencies:

- New hires
- Assignment to new roles and/or tasks
- Re-assessments following remediation of gaps
- Non-routine, infrequent, and emergency situations

8.1.5 Managing Assessment Results

The assessment process determines if the evaluated individual has the required skills and knowledge for the specific role and/or task. Individuals that do not meet the requirements should be subject to remediation per the company's SKMS.

8.2 Remediation

A company should have a documented process that address gaps determined during an assessment. Gaps may be the result of deficiencies at the individual and/or management system levels. An evaluation should be made to identify the level at which gaps are present so that appropriate corrective actions can be taken.

8.2.1 Individual Gaps

If an individual is found to have a skills and/or knowledge gap, remedial action should be considered. Upon completion of the remedial actions, the company should reassess the individual. Examples of remedial actions include:

- Re-training
- Simulations
- Mentoring

8.2.2 Management System Gaps

Where the assessor finds management system gaps, the company should take remedial action in a timely manner. Examples of remedial actions include:

- Revising the SKMS to address unintended omissions in training
- Assuring that the roles and/or tasks have been properly identified
- Ensuring that company supervision levels are appropriate for a given role and/or task
- Updating equipment and/or procedures

9.0 SKMS Element - Auditing and Quality Assurance

This element describes the verification and quality assurance processes used to assure that a company's SKMS is suitable, adequate, and effective. It should include the process to validate the SKMS, and may also include the following methods:

- Auditing and/or reviewing the SKMS
- Reviewing records related to worker skills and knowledge
- Reviewing records prior to starting work
- On-site verifications

This element should also define the processes used to validate that the assessors have effectively and consistently applied the assessment process, and that the assessment records are valid, accurate, and complete. Verification should be performed by a designated verifier who is:

- Qualified per a company's SKMS
- Not the same individual who performed the assessment being verified

If a company uses contractors to fulfil roles and/or tasks included in its SKMS, it should periodically assure that the SKMS of its contractors is suitable, adequate, and effective. This assurance may be performed as part a company's existing contractor management system, and may include the above listed methods.

10.0 SKMS Element 7 - Records and Documentation

This element describes the process for managing the SKMS records and documentation, which may include:

- Procedures and/or processes for implementing, maintaining, and managing the SKMS
- Documents and forms necessary for providing verification of these policies and procedures
- Training and Assessment records
- Audit and Quality Assurance reports

The company's documentation control process should also address the following:

- Location of records
- Format of records
- Retention requirements