PSM COMPETENCY MANAGEMENT GUIDELINE

EGPC-PSM-GL-016

PSM GUIDELINES

Acknowledgments

This publication has been produced as a result of the comprehensive efforts carried out by the PSM Technical Subcommittee on behalf of the Egypt PSM Steering Committee, formed per the Memorandum of Understanding signed between the Ministry of Petroleum and Mineral Resources and Methanex Egypt in February 2020 overseeing the design and implementation of a detailed PSM program to promote and enhance PSM culture for Ministry of Petroleum and Mineral Resources (MOP) and its affiliated COMPANIES following industry best practice, international codes and standards. The Egyptian Process Safety Management Steering Committee comprises MOP, EGPC, ECHEM, EGAS, GANOPE, and Methanex Egypt representatives.

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It should be noted that the above has not been directly involved in developing this document, nor does he necessarily fully endorse its content.
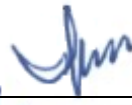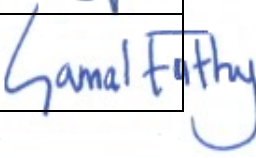

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Table of Contents

1. Introduction

Many incidents happen because necessary process safety knowledge or competence is not available at the right time in the right place. Process safety management (PSM) competency management ensures that the correct actions are taken to prevent the incident or reduce its severity. This guideline provides a comprehensive methodology to manage the PSM competency within the COMPANY to ensure that each working group has the right competencies for each PSM task. This guideline also provides a framework for PSM competency assessment and training. Besides, the guideline describes the requirement for personnel transitions (organizational changes) and recruitment. Finally, PSM competency monitoring and auditing requirements are discussed briefly to ensure that PSM competency management remains effective throughout the project life cycle from feasibility to decommissioning.

2. Purpose

The purpose of this document is to provide minimum requirements and guidelines for developing, sustaining, and enhancing PSM competency in COMPANIES and ENTITIES. The main product of competency management is understanding and using knowledge to make better decisions when faced with an abnormal situation. Ensuring process safety competency is one of the requirements of the PSM Program Standard (EGPC-PSM-ST-003).

3. Scope

This guideline covers all process safety competency management requirements in the oil, gas, and petrochemicals industry. It applies to the Egyptian General Petroleum Corporation (EGPC) and the Holding Companies, including the Egyptian Natural Gas Holding Company (EGAS), the Egyptian Petrochemicals Holding Company (ECHEM), and the South Valley Petroleum Holding Company (GANOPE), covering all their operational subsidiaries, state-owned companies, affiliates, and joint ventures. ENTITIES, COMPANIES, and contractors should ensure that all requirements listed herein are fully understood, implemented, complied with, and always monitored, including existing facilities and future projects.

4. Definitions

COMPANY: Refers to any operating company, subsidiary, affiliated, or joint venture company that belongs to an ENTITY.

ENTITIES: Refers to the Egyptian General Petroleum Corporation (EGPC) and Oil and Gas Holding Companies, including the Egyptian Natural Gas Holding Company (EGAS), the Egyptian Petrochemicasl Holding Company (ECHEM), and the South Valley Petroleum Holding Company (GANOPE).

5. Abbreviations

ECHEM   Egyptian Petrochemicals Holding COMPANY

EGAS   Egyptian Natural Gas Holding COMPANY

EGPC   Egyptian General Petroleum Corporation

ERP   Emergency Response Plan

ERT   Emergency Response Team

GANOPE   The South Valley Petroleum Holding COMPANY

MOC   Management of Change

PSM   Process Safety Management

PSSR   Pre-Startup Safety Review

PTW   Permit to Work

RCA   Root Cause Analysis

SCE   Safety Critical Element

SME   Subject Matter Expert

For other definitions and abbreviations, refer to the PSM Glossary of Definitions and Abbreviations Guideline (EGPC-PSM-GL-011).

6. Methodology

6.1 Organizational Roles Groups

Division roles are categorized into groups typical for the oil, gas, and petrochemicals industry with a single definition for easy matching competency levels, as illustrated in Annex A. However, each COMPANY should calibrate the job grouping to match the COMPANY's organizational structure.

6.2 Competency Definitions

The proposed competency levels are:

1. **Awareness:**

   - Be generally aware of this topic and associated terms.

   - May not know the answer but knows where to get more information.

2. **Basic / Knowledge:**

   - Has general working knowledge of the topic.

- Has basic training necessary to carry out general tasks.

- Independent contributor.

- Integrates work with other disciplines.

3. **Skill:**

- Advanced experience in the skill.

- Applies creative solutions to complex problems.

- Can execute most tasks within the topic with minimal or no direction.

- Has the experience levels to complete assigned tasks.

4. **Mastery/Expert:**

- Advanced experience in a particular skill.

- Applies creative solutions to complex problems.

- Has specialized training or certification, which may be required for certain tasks.

- Defines and drives critical business opportunities and needs.

- Represents the organization internally and externally on critical issues.

- Sets standards within the organization.

- Recognized as a subject matter expert (SME) with extensive knowledge and skills.

Notes:

- The requirements for each competency level assume that the requirements for the lower levels are met.

- Contractors who can impact process safety are expected to have appropriate competencies in process safety management based on their roles and the risk associated with their scope of work. These contractors include but are not limited to, operators, mechanics, and other hourly personnel.

- All full-time operations and maintenance contractors responsible for the plant's full operation and maintenance shall follow the COMPANY PSM competency matrix with applicable job grouping.

6.3 Competency Topics

There are 22 PSM competency topics requiring a specific level of competency. These topics relate to PSM elements, technical safety/ safety in design, and human factors, as illustrated in Table 1.

Table 1. PSM competency topics.

RBPS Pillars	Competency Topics
Commitment to Process Safety	Process Safety Culture
	Compliance with Standards
	Process Safety Competency
	Workforce Involvement
	Stakeholder Outreach
Understanding Hazards and Risks	Process Knowledge Management
	Hazard Identification and Risk Analysis
Manage Risk	Operating Procedures
	Safe Work Practices
	Asset Integrity and Reliability
	Contractor Management
	Training and Performance Assurance
	Management of Change
	Operational Readiness
	Conduct of Operations
	Emergency Management
Learn from Experience	Incident Investigation
	Measurements and Metrics
	Auditing
	Management Review and Continuous Improvement
N/A	Technical safety /Safety in design
N/A	Human factors

6.4   The PSM Competency Matrix

The PSM competency matrix is a useful tool for mapping staff PSM competencies. The PSM competency matrix is shown in Annex B and is available in spreadsheet format on the PSM Egypt website (www.psmegypt.com).

Notes:

- Competency-topic custodians included in the PSM competency matrix are provided as guidance per industry practice. The COMPANIES may assign different custodians for each topic to match the COMPANY organizational structure.

- The target competencies levels for the roles are generally in line with industry practice and should be followed. In case COMPANIES decide to change the custodians for some competency topics, the target competency levels may be changed for these competency topics.

- The PSM competency matrix is not intended to replace each working group's specific job competency requirements.

6.5 PSM Competency Assessment

The requirement for maintaining PSM competency expectations for each PSM competency topic should be included in the job description of all staff for appropriate monitoring and assessment. COMPANIES should plan to conduct gap assessments for existing role competencies against the PSM competency matrix at planned intervals to ensure maintaining the COMPANY's PSM competency profile, preferably once every two years for different proficiency Levels.

The assessment system's technical contents, including training material and questions, should be prepared by the COMPANY's PSM subject matter expert (PSM SME) in coordination with the human resources (HR) division. If applicable, it would be more effective in the matter of cost and effort to develop an online assessment method instead of a paper-based assessment method. The Skill and Mastery/Expert proficiency levels assessment should be conducted via face-to-face interviews by PSM SME, PSM competency topic custodian, and HR. In special cases where an expert for a specific competency topic is unavailable within the COMPANY, an external consultant expert in this area should be outsourced to conduct the PSM competency assessment in the presence of the PSM SME, PSM competency topic custodian, and HR. The HR division should coordinate, compile, and record all PSM competency assessment results. It is required that the PSM competency be part of the annual performance review. The PSM competency requirements must be assessed for any new role as part of the recruitment process for new employees.

6.6 Training

The training approach in this guideline has been structured around a three-part approach for learning and development, illustrated in Table 2. After the PSM competency gap assessment has been completed to verify the gap between actual proficiency level and target proficiency level as required by the PSM competency matrix, the training department should coordinate with PSM SME and respective division managers to prepare plan and budget for the improvement actions which explore the best possible options to fill the competency gap between the target and actual competency levels.

The learning through education (training courses) could be performed in-house via classroom or as electronic training courses prepared by the company PSM SME and training department in coordination with competence topic custodian and ENTITIES. This training could be conducted through an external party if capabilities and resources are available. For Skill and Mastery/ Expert levels, the learning is performed by a specialized consultant as per the approved training plan with applicable certification.

Table 2. Learning and development activities.

Learning and Development Approach	Typical Development Activities
Self-education, study, and guided reading.	- Expanding your knowledge by reading the required topics. - Learning through new experiences – Shadowing experienced personnel.
Learning through others – On-job -Training (OJT).	- Structured mentoring and coaching. - Receiving feedback.
Learning through education - Training course.	- Formal training and education. - Professional certification and accreditation.

6.7 Plan Personnel Transitions/Organizational Changes

A succession planning program for technical personnel should be implemented to prepare qualified internal candidates with the required PSM competency in case of any transition. The succession plan should include a formal requirement for PSM competency assessment and appropriate PSM training to fulfill the new job competency expectations to maintain the organization's competency and critical knowledge through transitions and enhance process safety competency over time.

6.8 Recruitment of Personnel

The recruitment process must ensure the selection of people from outside the COMPANY for all positions linked to PSM with the necessary PSM competencies, skills, aptitudes, and characteristics that will allow them to achieve competence given the available help and training. The process must allow the examination of education, existing skills, experience, and knowledge to identify suitable candidates.

6.9 Monitoring and Audit

For continuous improvement, an annual audit for process safety competency should be conducted as per PSM Program Standard (EGPC-PSM-ST-003) audit element.

7. References

[1] European Process Safety Centre (EPSC) , "Process Safety Competence: How to Set up a Process Safety Competence Management System," 2013.

[2] Institution of Chemical Engineers (IChemE) , "Process Safety Competency: Supplementary guide – how to build and develop process safety competence," 2020.

[3] Egyptian General Petroleum Corporation (EGPC), "PSM Program Standard (EGPC-PSM-ST-003)," 2021.

[4] Center for Chemical Process Safety (CCPS), Guidelines for Defining Process Safety Competency Requirements, Wiely, 2015.

8. List of Annexes

- **Annex A -** Organization Job Groups.
- **Annex B -** EGPC PSM Competency Matrix.
- **Annex C -** PSM Competency Definitions.

Annex A - Organization Job Groups

Division/Department	Job Group
Management	**CEO** = Chief Executive Officer, Managing Director & Vice President
Plant Manager	**PL** = Plant Manager/ Fields Manager
Operation	**Manager** = Division manager & Deputy manager, **TL** =Area manager/Shift manager, supervisor & Team leader, **PO** = Panel operator /Senior panel operator, **FO =** Field operator/Senior field operator
Maintenance	**Manager**=Division manager & Department manager, **TL**= Team leader, Lead engineer, **Eng** = Senior Engineer, Engineer & Senior field staff, Field Staff
Inspection	**Manager**=Division manager & Department manager, **TL**=Team leader, Lead engineer, **Eng** = Senior engineer, engineer
Engineering/Technical	**Manager**=Division manager & Department manager, **TL**=Team leader, Lead engineer, **Eng =** Senior engineer, engineer
Process Safety Management (PSM)	**SME** = Subject Matter Expert, **TL** = PSM Team leader, **Engineer** = PSM engineer
HSE	**Manager**=Division manager & Department manager, **TL**=Team leader, Lead engineer, **Eng =** Senior engineer, engineer
Quality management	**Manager**=Division manager & Department manager, **TL**=Team leader, Lead engineer, **Eng =** Senior engineer, engineer
Public Relations (PR)	**Manager**=Division manager & Department manager, T**L** = Team leader
Supply Chain (SC)	**Manager**=Division manager & Department manager, T**L** = Team leader
Human Resources	**Manager**=Division manager & Department manager, T**L** = Team leader
Training	Training team
Projects	**Manager**=Division manager & Department manager, **TL =** Team leader
None-Technical (NTS)	Security, Marketing, Sales, Finance & trading, and other nontechnical staff
Note	Job grouping is a typical job grouping for oil, gas, and petrochemicals companies provided as guidance, and each COMPANY is required to calibrate the job grouping to match the COMPANY's organization

Annex B - EGPC PSM Competency Matrix

EGPC PSM Competency Matrix table showing Typical Proficiency Levels (1 = Awareness; 2 = Basic / Knowledge; 3 = Skill; 4 = Mastery / Expert) across roles (Operations, Maintenance, Inspection, Engineering - Technical, PSM, HSE, Quality, Public Relations, Training, HR, Supply Chain, Projects, None Technical Staff, Plant Manager, Management) for competency topics organized by pillars (I. Commit to Process Safety, II. Understand Hazards and Risks, III. Manage Risk, IV. Learn From Experience).

Note: EGPC PSM Competency Matrix is available in spreadsheet format on the PSM Egypt website (www.psmegypt.com).

Annex C - PSM Competency Definitions

1. Process Safety Culture

Awareness	Basic / Knowledge	Skill	Mastery/Expert
- Aware of process safety concepts. - Aware of the differences and interface between process safety, personal safety, and their Hazards. - Aware of and participates in the company process safety programs. - Awareness of how to report safety incidents and the importance of accurate reporting.	- Knowledge of how to apply process safety concepts to daily work activities. - Knowledge of how the progress towards the process safety goals and objectives is measured. - Knowledge of how to participate in process safety-related conversations and suggests improvements. - Familiar with sharing learnings related to process safety, including how incidents from other industries may be used to improve the processes at this facility.	- Skilled with resources required to implement process safety elements. - Skilled in mentoring others in process safety. - Skilled in communicating process safety concepts with target audiences and stakeholders. - Skilled in sending clear and consistent messages about the importance of process safety. - Skilled in communicating process safety issues and programming to the leadership/management team and gaining support. - Skilled with the adequate selection process of competent PSM SMEs to properly implement PSM within the company and lead process safety culture change journey. - Skilled in communicating process safety concepts with target audiences and stakeholders.	- Expert in designing and delivering process safety training sessions for various levels within the company. - Expert in linking learnings from past events to process safety framework. - Extensive experience in how process safety goals and objectives and progress towards them are communicated throughout the facility. - Expert in designing and implementing cultural change programs. - Expert in designing and implementing improvement plans. - Expert in ensuring the leadership team is aware and committed to providing adequate financial resources, staffing, and supervision to ensure an effective safety culture to support process safety.

2. Compliance with Standards

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware that process safety standards and company/ industry reference documents exist. • Able to access the applicable standards.	• Knowledge of which process safety standards apply to the facility.	• Skilled in monitoring changes to applicable standards. • Skilled in adapting practices as needed to comply with any process safety standards. • Understands how to assimilate relevant company/industry reference documents into work efforts. • Skilled in the legal requirements for compliance with applicable standards. • Skilled with company/industry reference documents affecting process safety across multiple disciplines as appropriate, e.g., instrumentation & electrical, mechanical, civil/ structural, etc. • Skilled in enforcing compliance with codes and standards.	• Expert in implementing systems to ensure compliance with codes and standards. • Expert in reporting and documentation requirements for applicable standards. • Practiced in contributing expertise throughout the company and industry in the specialization. • Extensive experience in leveraging the knowledge and acting as a contributing member of Industry bodies, e.g., API, ASME, CCPS PIP, ISO, etc., especially in developing industry reference documents that fulfill the company's needs. • Practiced serving as the technical authority in the field of expertise. • Expert in designing systems to ensure compliance with codes and standards.

3. Process Safety Competency

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware that process safety competency guidelines/procedures and matrix exist.	• Knowledge of access to process safety competency guidelines/ procedures and matrix. • Understand main process safety skills.	• Skilled in process safety core skills and how to improve them. • Fully knowledgeable of the process safety training courses required for process safety. • Skilled in participating in developing process safety competency matrix with minimum supervision. • Skilled in reviewing and assessing process safety competency matrix. • Skilled in proactively sharing process safety information with potentially affected facilities and key personnel.	• Expert in recommending training courses for different levels of personnel in process safety. • Expert in performing process safety competency assessments for different levels of employees in the company. • Extensive experience in developing and evaluating process safety competency matrix and procedures. • Expert in managing personnel transitions to ensure PSM competencies are maintained. • Expert in establishing and maintaining a system for collecting, organizing, and sharing process safety information and associated PSM policies and procedures.

4. Workforce Involvement

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Awareness of the workforce involvement element is part of the 20 PSM program elements. • Aware of how to access the workforce involvement guideline.	• Ability to be an active participant in any assigned process safety team. • Able to communicate with others the importance of workforce involvement. • Knowledge in engagement with plant personnel concerning process safety.	• Skilled in communicating with management about the improvement in workforce involvement. • Skilled in leading formal and informal activities that enhance workforce involvement.	• Expert in participating in developing and implementing company procedures concerning workforce involvement. • Extensive experience in developing company guidelines/procedures concerning workforce involvement. • Expert in enforcing company procedures concerning workforce involvement.

5. Stakeholder Outreach

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Awareness of stakeholder outreach is part of 20 PSM program elements. • Aware of the importance of stakeholder outreach.	• Familiar with company procedures and regulatory requirements for communications with external stakeholders. • Knowledge of the concept's areas of the company stakeholder outreach procedures.	• Skilled in implementing company procedures and regulatory requirements for communications with external stakeholders. • Skilled in supporting and participating in stakeholder outreach planned events. • Skilled in implementing emergency response communication plans for episodic events. • Skilled in leading and driving company procedures and regulatory requirements for communications with external stakeholders. • Has appropriate interactions with stakeholders. • Skilled in enforcing stakeholder outreach procedures.	• Expert in reviewing and recommending improvements for the company procedures and regulatory requirements for communications with external stakeholders. • Extensive experience in developing and enforcing company stakeholder outreach procedures. • Practiced auditing the process of stakeholder outreach procedures and recommended improvement to the leadership team. • Practiced in enforcing stakeholder outreach procedures. • Expert in developing an emergency response communication plan for episodic events. • Expert in providing appropriate interactions with stakeholders.

6. Process Knowledge Management

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Able to locate appropriate process documents. • Aware of how to access documentation for relevant processes and chemicals. • Aware of how to interpret piping and instrumentation diagrams (P&ID), cause and effect charts and process flow diagrams.	• Understand how the document the control system works and how to make suggestions for improvement. • Knowledge of company policies and procedures. This includes developing the drawings with correct details, managing documentation updates, and adhering to privacy requirements.	• Skilled in organizing process safety information to be up-to-date and accessible to affected personnel. • Skilled in using the process safety information in an emergency situations. • Skilled in defining what process safety documentation is required. • Skilled in using process safety information to explain actual process performance issues.	• Expert in assigning resources required to gather and update process safety information. • Expert in specialized resources that may be needed to develop process safety information and how to obtain such resources. • Expert in defining the authorization process. • Expert in defining document management system and its use in training.

7. Hazard Identification and Risk Analysis

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of basic hazard identification processes and company risk matrix and where they are used. • Aware of where to locate risk registers. • Aware of the safe systems of work tools – PTW, isolation, safe work method statements. • Aware of the terms hazard, cause, consequence, control, risk, and as low as reasonably practicable (ALARP). • Aware of the hierarchy of Controls.	• Knowledge of hazard identification and risk analysis methods and requirements. • Understand how process safety hazards are controlled, what those controls are, and how effective they are. • Understands the terms loss of primary containment (LOPC), hazard identification (HAZID), hazard and operability study (HAZOP), and layers of protection (LOPA). • Able to implement safe systems of work, including PTW, isolation procedures, and safe work method statements, into everyday work activities.	• Understand the scope of each HIRA type. • Skilled with the information required to perform HIRA properly. • Skilled in leading /participating in risk assessment processes such as hazard identification (HAZID), hazard and operability study (HAZOP), and layers of protection (LOPA). • Skilled in appropriate methodologies used for each type of HIRA. • Understanding of when to use different methodologies. This may include certifications. • Skilled in how to manage recommendations arising from HIRAs.	• Expert in mentoring others in conducting risk assessments. • Expert in identifying who needs to be involved in developing hazard identification processes. • Extensive experience with the sensitivity of HIRA results in input information and experience with making appropriate assumptions if input information is unavailable. • Subject matter expert for HIRA and risk control. • Expert in identifying where a safe work system needs to be developed. • Expert in engaging with the leadership team to provide resources for identification and assessment. • Mastery of consequence modeling concepts and details. • Expert in developing risk criteria. • Expert in developing control strategies – e.g., from inherently safer design to emergency response.

8. Operating Procedures

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware that operating procedures exist. • Aware of where to access operating procedures.	• Knowledgeable of operating procedures and how to follow them. • Able to follow operating procedures to operate the facility within a safe operating envelope.	• Skilled in regulatory requirements for information that must be contained in the operating procedures. • Skilled in how to audit operating procedures and operator actions to ensure accuracy. • Skilled with the resources required to develop and maintain operating procedures. • Skilled in assisting in developing operations training material. • Skilled in leading teams to audit operating procedures and operator actions to ensure accuracy.	• Practiced in training and mentoring new operators. • Expert in representing the operation division in the incident investigation related to the operation. • Expert with the resources required to develop and maintain operating procedures. • Expert in developing audit checklists for operating procedures audits. • Extensive experience in developing operations training materials. • Expert in effectively leading people in the operating division. • Expert in recommending to top management any area for improvement on operating procedures.

9. Safe Work Practices

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of safe work practice element. • Aware of company safe work practice procedures, e.g.., PTW, isolation, confined space entry. • Aware of how to access safe work practice procedures.	• Knowledge of hazards related to respective non-routine work and risk associated. • Knowledge of what action is required and who to contact if support or assistance is required to manage hazardous non-routine work. • Able to recommend prevention and mitigation measures to manage risk with supervision.	• Skilled in identifying hazards related to respective non-routine work and able to assess risk associated with supervision. • Skilled in training employees on how to implement safe work practices properly. • Skilled in leading risk assessment workshops to identify hazards, assess risk, and recommend prevention and mitigation measures to manage risk.	• Expert in developing and ensuring the implementation of safe work practice procedures. • Practiced in auditing safe work practice process. • Expert in communicating with top management to recommend improvement in safe work practices. • Expert in monitoring and managing simultaneous operations.

10. Asset Integrity

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware that SCE requires inspection and maintenance to ensure integrity. • Aware of which SCE form critical controls. • Able to support condition monitoring regimes. • Aware of safety-critical tasks and the likely effects if these tasks are not carried out.	• Familiar with what is considered critical process equipment. • Knowledge of the system selected to manage the asset integrity and reliability program. • Knowledge of the quality control system used for spare parts and new assets. • Able to track and report performance criteria and when assets are not meeting criteria. • Basic knowledge of how reliability and maintainability combine to predict availability. • Able to monitor the reliability of SCE. • The knowledge that SCE requires inspection and maintenance to ensure integrity. • Supports condition monitoring regimes. • Aware of safety-critical tasks and the likely effects should These are not carried out. • Able to interpret the barrier health model and take appropriate action accordingly.	• Skilled with which best practices apply to the critical equipment at the facility. • Skilled in developing how in-field performance is measured. • Understands/ can explain reliability, availability, and maintainability (RAM) study metrics. • Skilled in scheduling maintenance and inspection activities. • Skilled in conducting periodic reviews of asset performance and risk levels. • Skilled in promoting asset integrity. • Skilled in safety-critical tasks and the likely effects should these not be carried out. • Skilled in conducting periodic performance reviews of SCE. • Skilled in participating in developing barriers health model for SCE.	• Expert in interpreting maintenance and inspection data and deciding based on it, e.g., corrosion, fixed equipment, and rotating equipment. • Extensive experience in authorizing life extensions or changes to inspection programs. • Expert in identifying potential failure modes of critical elements. • Expert in undertaking regular auditing of the effectiveness of SCEs. • Expert in determining lead and lag indicators for the performance of SCEs. • Expert in developing the control strategy. • Expert in establishing the data collection and reporting system. • Expert in engaging senior management in the development and review of indicators. • Expert in designing formal management systems for performance standards. • Extensive experience in conducting a formal review of SCE and asset integrity processes. • Expert in leading teams in developing barrier health models for SCE.

11. Contractor Management

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of the process of contractor selection and management. • Aware of company policies and procedures to manage contractors.	• Knowledge of company policies and procedures to manage contractors. • Able to contribute to the contractor performance evaluation and onsite supervision. • Able to provide basic supervision to contractors. • Able to assist in reviews or assess contractor competencies.	• Skilled with how to approve, reject and remove contractors for work onsite. • Skilled in providing basic safety training to contractors working onsite. • Skilled in developing work scope information required to undertake and review work (scope of work, contract requirements, legislative requirements, competency of contractors). • Skilled in making evidence-based decisions regarding the process safety competency of the contractor and suitability for the project.	• Expert in managing contractors' meetings. • Expert in evaluating and verifying the adequacy of the management systems with the client's system requirements. • Expert in developing and ensuring the implementation of contractor management procedures. • Extensive experience in auditing contractors working onsite. • Expert in establishing contractor and supplier selection/processes/ criteria for process safety performance.

12. Training and Performance Assurance

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of PSM training and performance assurance element. • Aware of company training and performance assurance procedures. • Aware of how to access training and performance assurance procedures.	• Knowledge of company training and performance assurance procedures. • Knowledge of the training requirements for operators, mechanics, and other personnel related to the PSM system. • Knowledge to provide required training to operators, mechanics, and other personnel related to the PSM system.	• Skilled with how to audit the training program to ensure effectiveness • Skilled in linking training requirements with respective PSM competencies, • Skilled in recommending training requirements in process safety. • Skilled in organizing relevant PSM training courses.	• Expert in the implementation of training and performance assurance. • Expert in reviewing and auditing training and performance assurance processes. • Expert in coordinating the company's PSM training matrix with the training department. • Expert in developing and approving technical safety training for different levels of personnel in the company. • Expert in monitoring PSM and technical safety training and ensuring that PSM competencies required are met.

13. Management of Change

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of the need to manage change. • Aware of what is covered by management of change procedure: policies, procedures, work methods, personnel, etc. • Able to recognize what a change is and initiate the process.	• Understands own role in change management. • Able to contribute to the implementation of change management. • Understands the change and can update information systems, e.g., drawings, manuals, procedures, etc.	• Skilled in reviewing and approving changes as appropriate. • Skilled in how to manage action items arising from a change. • Skilled in implementing change management procedures. • Recognizing the theory of implementing change; how changes will affect the risk equation. • Skilled in communicating changes as required. • Skilled in actively implementing change management procedures.	• Expert in authorizing a change in their area/ competency or is a reviewer on the change. • Expert in developing and ensuring implementation of management of change (MOC) procedures. • Subject matter expert across relevant cross-functional areas in the MOC process, including hazard identification and risk control, human factors, etc. • Expert in being actively involved in organizational changes and how they are managed.

14. Operational Readiness

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of the process and what can go wrong before start-up. • Aware of what is required to do before start-up.	• Knowledge of how operational readiness is implemented at the facility. • Knowledge to participate in operational readiness reviews (PSSR).	• Skilled in reviewing and approving start-ups as appropriate. • Skilled in how to manage action items arising from an operational readiness review (PSSR). • Skilled in implementing PSSR procedures. • Skilled in auditing the readiness review process (PSSR).	• Expert in developing PSSR procedures. • Practiced auditing the readiness review process (PSSR). • Expert in mentoring new operators. • Practiced supervising the management of existing interfaces. • Extensive experience in leading PSSR for a unit or plant start-up. • Expert in collaborating with third parties on PSSR recommendations.

15. Conduct of Operations

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware that safe operating envelopes exist. • Aware of the importance of following and implementing existing operating procedures. • Aware of the roles and responsibilities of the operation team. • Aware of the logs/reports prepared by the operation. • Aware of the process and what can go wrong. • Aware of what is required to keep the process under control. • Aware of what to do in an abnormal/emergency.	• Knowledge of the importance of having as-built updated P&IDs. • Knowledge of the risk associated with operating outside a safe operating envelope. • Able to Assist in preparing operation logs and reports. • Knowledge of maintaining the capability of safety interlock systems. • Able to maintain a shift log. • Able to track and report control performance criteria.	• Skilled in maintaining effective communication within the operating division and external division. • Skilled in effectively preparing operation logs and reports and conducting effective shift handover. • Skilled in ensuring competency for operation staff and recommends training to fill the gaps. • Skilled in ensuring that safe operating limits are followed. • Skilled in methodologies used to evaluate staffing levels. • Recognizes how to recover from an abnormal situation and manages start-ups and shutdowns. • Skilled in interpreting weakly signals, e.g., shift log details.	• Expert in confirming process capability and safe operating limits. • Expert in enforcing compliance with SIS bypass procedures. • Extensive experience in periodically auditing operations for compliance with policies, procedures, and standards. • Expert in ensuring adequate competency levels for all operation staff. • Expert in enforcing compliance with safe operating envelop. • Extensive experience in evaluating workers' fatigue/fitness for duty. • Expert in ensuring a safe and productive work environment. • Practiced in monitoring and managing simultaneous operations. • Expert in engaging senior management in the development and review of process indicators.

16. Emergency Management

Awareness	Basic / Knowledge	Skill	Mastery/Expert
- Aware of escape routes, muster points, and emergency evacuation procedures. - Aware of major incident scenarios and pre-plans. - Aware of how to initiate emergency response.	- Knowledge of specific roles assigned as part of the emergency response plan. - Able to play a role in emergency response as nominated. - Understands how to escalate emergency alarms, e.g., calling emergency services/ response. - Able to plan and undertake emergency exercises. - Knowledge or experience in updating emergency response plans based on learnings from drills.	- Skilled in addressing findings from emergency response drills. - Skilled in ensuring team members are aware of the emergency response plan and their roles and that of the emergency response team. - Skilled in deciding on response actions and directing people. - Skilled in monitoring the effectiveness of response activities. - Training and certification as an emergency response team (ERT) member and an incident commander. - Skilled in ensuring that all ERT teams have the proper training for each role. - Engage with external emergency services and third parties. - Skilled in ensuring appropriate staffing requirements for the emergency management team.	- Expert in developing emergency response plans based on major incident scenarios and results of consequence modeling. - Extensive experience in engaging with external emergency services and third parties. - Expert with planning, executing and critiquing emergency response drills. - Extensive experience ensuring that emergency response procedures are developed, updated, and well-implemented. - Practiced in ensuring that emergency response plans and drills are implemented. - Extensive experience in ensuring that emergency response equipment is well maintained.

17. Incident Investigation

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of the incident reporting requirements and knows how to report an incident. • Aware of why incidents are reported and investigated. • Aware of the purpose, process, and outcome of root cause failure analysis.	• Able to contribute to the incident investigation process. • Understands the importance of the preservation of the site and evidence. • Ensures that incidents are reported. • Understands what a process safety incident is. • Able to assist in inspecting and analyzing the failed equipment root cause. • Able to implement systems to encourage reporting.	• Skilled in undertaking immediate post-incident response. • Skilled in planning the investigation of the incident. • Skilled in leading basic investigations. • Skilled in analyzing and using root cause analysis (RCA) to improve system performance. • Skilled in identifying potential consequences of incidents. • Skilled in applying RCA methods to recommend and implement required modifications to equipment and procedures. • Skilled in communicating knowledge and the organization's values in incident prevention and recording where they occur.	• Certification in appropriate methodologies used to investigate incidents . • Extensive experience with how to properly interview personnel involved in or witnesses to incidents. • Practiced in leading major incident investigations. • Expert in analyzing incident statistics to predict trends. • Expert in ensuring learning from incident investigations across the organization/ project/ site to avoid the same or similar risk exposure. • Extensive experience in training and mentoring others to dismantle, inspect and perform RCA on equipment. • Expert in developing and ensuring the implementation of incident investigation procedures. • Expert in establishing staffing requirements for an incident investigation team. • Expert in engaging with legal counsel. • Expert in determining investigation methodologies. • Expert in defining the RCA methodologies. • Expert in recommending to the top management for the incident investigation process improvement.

18. Measurement and Metrics

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of "leading" and "lagging" indicators by which process safety performance is measured.	• Knowledge of recognizing and reporting common leading and lagging process safety indicators. • Knowledge of the typical KPI for measuring process safety performance at a particular site.	• Skilled in establishing and measuring leading and lagging process safety indicators. • Skilled in analyzing process safety performance, identifying the gaps/ shortcomings in process safety management systems, and recommending intervention plans. • Skilled in ensuring that leading and lagging process safety key performance indicators are developed and monitored.	• Expert in auditing implementation of process safety leading and lagging key performance indicators • Expert in using different leading and lagging process safety KPIs. • Expert in benchmarking company process safety KPIs with best industry practices and recommending improvement to top management.

19. Auditing

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware there is an assurance process. • Able to observe or contributes to assurance activities where required. • Aware of the function and purpose of compliance assurance as an integral part of good safety management arrangements. • Understand why there are assurance processes.	• Familiarity with PSM audits and knowledge of appropriately answering auditors' questions. • Understand the different tiers of assurance activities. • Able to participate in audits under the supervision of the lead auditor.	• Skilled with the requirements and information needed for auditing process safety programs. • Skilled of how to manage recommendations arising from audits. • Skilled in undertaking a lead role in assurance activities such as audits and management reviews. • Skilled in participating in the establishment of assurance plans.	• Expert in undertaking the role of a lead auditor. • Expert in conducting /developing protocols/checklists for various assurance activities. • Expert in establishing process safety audit team. • Expert in developing process safety audit team terms of reference, tools, and criteria. • Expert in scheduling audits based on risk. • Expert in designing the governance framework. • Expert in defining new policies and systems as dictated by audit findings.

20. Management Review and Continuous Improvement

Awareness	Basic / Knowledge	Skill	Mastery/Expert

• Aware of the importance of visible safety leadership.
• Aware of and participates in company safety programs.
• Able to demonstrate knowledge of workplace safety culture.
• Able to engage and own safety responsibilities and accountabilities.
• Able to report safety incidents and understands the importance of accurate reporting.
	• Knowledge of how to address recommendations from management reviews.
	• Understands the importance of visible safety leadership.
	• Understands the concept of process safety.
	• Able to participate in PSM-related conversations and suggests improvements.
	  - Able to communicate: Why process safety is important to the individual and the company.
	  - What behaviors is the individual expected to adopt consistently?
	• Able to ensure that their communication and behavior consistently communicate that safety is embedded as a personal core value.
		• Skilled in interpreting trends of process safety performance.
		• Skilled in applying laws, codes, and regulations about the safe process/facility design, construction, and operation.
		• Skilled in discussing causes and potential risks of behaviors and attitudes.
		• Skilled in holding regular in-field PSM conversations with front-line workers.
		• Skilled in identifying and privately discussing undesired behaviors and attitudes.
		• Skilled in implementing management reviews and audits.
		• Skilled in identifying at-risk behavior activators.
		• Skilled in sending clear and consistent messages about the importance of process safety.
			• Practiced in identifying and implementing process safety improvements.
			• Expert in regular in-field verification of controls and lessons learned from significant incidents.
			• Expert in documentation requirements for management review and continuous improvement.
			• Mastery in designing and implementing safety leadership programs.
			• Extensive experience in designing and implementing cultural change programs.
			• Expert in designing and implementing improvement plans.
			• Expert in developing cultural definitions and norms in an organization.
			• Expert in ensuring the leadership team is aware and committed to providing adequate financial resources, staffing levels, and supervision to support process safety.
			• Expert in monitoring PSM metrics to review the effectiveness of the leadership program (leadership time in-field, levels of supervision, behavioral-based interactions) and the link to adverse events.
			• Expert in motivating and inspiring others to achieve a particular goal or outcome by sending clear and consistent messages about the importance of process safety.

21. Technical Safety /Safety in Design

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of laws, codes, and regulations about the safe process/ facility design, construction, and operation. • Aware of the concepts of inherent safety, e.g., eliminate / substitute / attenuate / separate, and some examples of each. • Aware of the following process safety-related concepts for Safety in Design:- Inherently safer design (ISD)- Risk-based design- ALARP principle. • Aware of Safety case and its main contents. • Aware of HAC drawings. • Aware of site MAH's list.	• Knowledge of safety engineering design codes and standards applicable to the assigned engineering discipline. • Able to differentiate and identify the application of the different pressure relief devices. • Understand the application of inherent safety concepts and recognize ways inherently safer designs can be implemented. • Knowledge of passive and active fire protection systems • Knowledge of facility siting reviews. • Understand the difference between Zone 0, Zone 1, and Zone 2 in HAC drawings and respective requirements. • Basic knowledge of the quantitative risk assessment (QRA) report. • Knowledge of formal safety assessment requirements in the safety case. • Can read and interpret site MAH's Bowties. • Understand the difference between design and operations safety cases.	• Skilled in reviewing shutdown/ control logic for simple facilities. • Skilled in assisting with fire and explosion analysis to determine the consequence of pool and jet fires and the potential to escalate. • Skilled in designing the optimum fire/gas/ toxic detection systems. • Skilled in assisting in developing passive and active fire protection requirements for simple facilities. • Skilled in reviewing Hazardous area classification (HAC) drawings. • Skilled in recognizing how one design proposal may be inherently safer than another. • Skilled in participating in developing site MAH's Bowties. • Skilled in participating in developing design and operations safety cases. • Skilled in identifying Safety Critical Elements (SCE) and develops Performance Standards.	• Expert in developing applicable corporate process safety design standards, guidelines, and philosophies. • Expert in applying cost-effective instrumentation to achieve the necessary redundancy and independence of controls and safety systems. • Expert in facility siting review. • Expert in developing fire protection requirements for facilities. • Expert in reviewing and approving QRA assumption register and QRA reports. • Expert in applying SIL methodology to control measures to inform criticality and criteria. • Expert in leading multi-discipline teams in developing site MAH's Bowties. • Expert in participating in developing site MAH's Bowties. • Expert in leading internal or external teams to develop the site's operation safety case. • Recognized as the company's SME in technical safety. • Expert in managing external third-party service providers supplying complex process safety services (e.g., detailed explosion studies).

22. Human Factors

Awareness	Basic / Knowledge	Skill	Mastery/Expert
• Aware of what are the human factors . • Aware of how human factors influence human and safety performance. • Able to manage self-fatigue and at-risk behaviors. • Aware of how organizational factors shape safe behaviors and the effectiveness of safety system implementation.	• Able to identify and responds to observed at-risk behaviors in self and others. • Able to provide feedback on the poor job and equipment design and suggests improvements. • Understand the practical consideration of human error in process hazard assessment sufficiently to recognize where the human error should be considered. • Recognizes that human factors concern task requirements and their characteristics, the individual's competence, workplace culture, and the link to safety.	• Skilled in intervening when at-risk behaviors are observed. • Skilled in providing input into job design, considering human factors. • Skilled in solving poor job and equipment design and welcomes suggested improvements. • Skilled in analyzing factors/ circumstances where human error is critical for process safety. • Understand more in-depth human factor assessment techniques and consider dependency aspects. • Skilled in communicating human factors to the wider workplace. • Skilled in how human factors link to process safety, communicating how an individual's competence, skills, personality, attitude, and risk perception affect safety.	• Expert in providing input into job design, considering human factors. • Expert in testing, examining, and evaluating organizational factors by observation and targeted questioning. • Expert in ensuring plant and equipment designs and tasks account for human limitations and strengths. This includes matching the job to people's physical and mental strengths and limitations. • Expert in promoting how work patterns, workplace culture, resources, leadership communications, etc., significantly influence individual and group behavior. • Subject matter expert for human factors. • Expert in managing the impact of contractors in the workforce concerning safety. • Expert in tools and techniques for assessing human factors and ability to guide hazard assessment practitioners in their selection and use. • Extensive experience in developing effective organizations for safety improvement. • Expert in applying the experience pragmatically elsewhere.