Introduction to KIPIC Process Safety Management

Process Safety Management Team
Technical Service Group

KIPIC
البترولية المتكاملة

Content

Introduction

PSM Definition

Process Safety is a disciplined framework to prevent Catastrophic Releases of Chemicals or Major Incident Hazards by applying good design philosophies, engineering and operating practices.

PSM Vision

“Perfect Process Safety”
We are committed to world-class operational performance with a goal of no harm to people, stakeholders, assets, reputation, and the environment in which we operate.

PSM History

A process safety standard developed in the USA as the basis of major hazard regulation. Process Safety Management was developed through discussion between the US Regulators, EPA and OSHA, and industry following several major process accidents resulting in large scale loss of life and damage to property.

Some Significant Process Safety Incidents and Regulatory Response in Last 50 Years.

Feyzin, France
LPG BLEVE, killed 18
- First LPG prescriptive regulations

1966

1974

Flixborough, UK
Explosion and fire, 27 Killed, over 100 injured
- The Health and Safety at Work Act (HASAWA)1974

Seveso, Italy
Dioxin release, 2,000 Poisoned, environmental contamination, mass evacuation
- Seveso Directive 1982

1976

1984

Bhopal, India
Toxic gas release,>4,000 Killed, >20,000 injured, 200,000 evacuated
- CAER Program 1985
- Seveso Directive I 1987
- Emergency Planning and community right to know 1986

1988

Piper Alpha North Sea, UK
Explosion, 165 Killed, loss of the platform
- Safety case regulations 1992

1989

Pasadena TX, USA
Explosion, 23 killed
- US OSHA 1910-119 Process Safety Management 1992
- EPA Risk Management Program 1999

1998

Longford, Australia
Explosion and fire, 2 killed, gas cut for 19 days
- Major Hazard Facilities Regulations (2004)

2001

Toulouse, France
Explosion and fire, 30 killed, 2,000 injured, 600 homes destroyed
- Seveso Directive update

2005

Texas City, USA
Explosion, 15 killed, 180 injured
- Baker Panel Report
- API RP 754 Process safety indicators
- API RP 753 on Occupied buildings and vents

2010

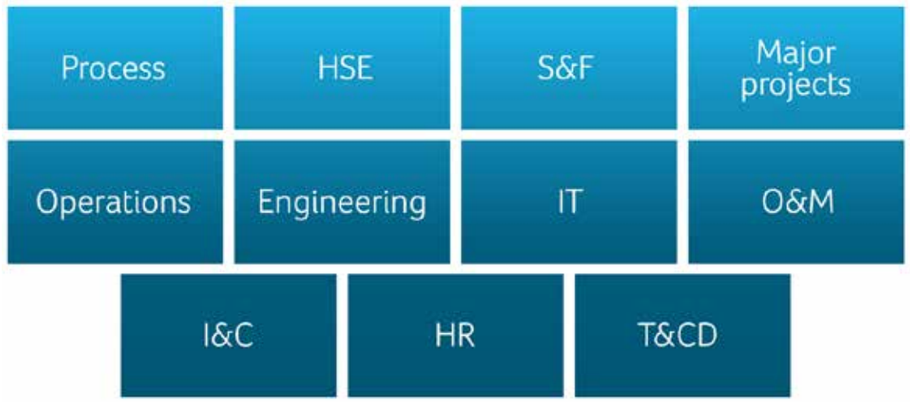
Macondo, USA
Explosion, 11 killed, loss of the platform
- API revised /produced 100 Standards
- Safety case regime

«PSM standards/ regulations development is a continuous process based on recent incidents and recommendations»

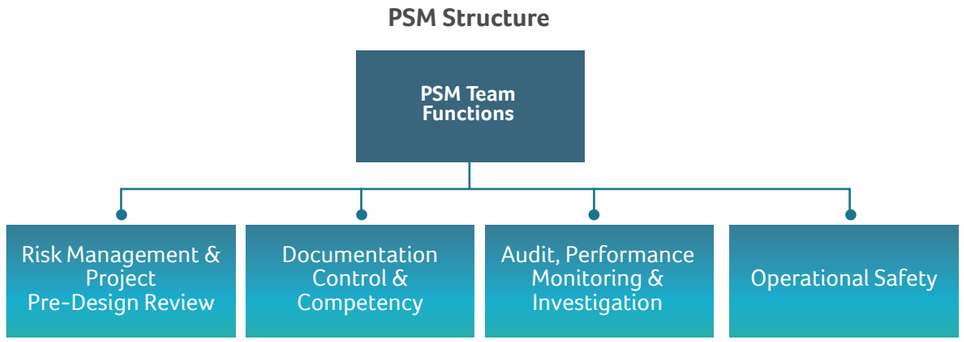
PSM Framework

Figure 1: PSM Framework

Major Stakeholders



PSM in KIPIC



PSM Team functions

- Establish, update, and maintain PSM policies, manuals, and Standards/procedures.
- Establish Companywide PSM strategies, plans, goals & targets.
- Support Operations to develop specific procedures for PSSR, start-up, shutdown, emergency operation, override and alarm Management.
- Support in reviewing process safety impacts at key stages of new projects.
- Conduct PSM system audits and self-assessments.
- Develop, monitor and report (with all relevant groups) PSM Key Performance Indicators (KPIs).
- Promote, communicate, and raise awareness of PSM across the Company and external stakeholders.
- Prepare the necessary training programs to develop PSM competencies.
- Perform process hazard & risk assessments.
- Coordinate to identify Safety Critical Equipment (SCE) and protective systems.
- Review project's related design documentations to ensure compliance with PSM standards.
- Perform all process safety event and incident investigations and track action items.
- Coordinate MOCs including conducting process risk assessments associated with MOC.
- Support & follow up the implementation of integrity management programs and insurance recommendations.

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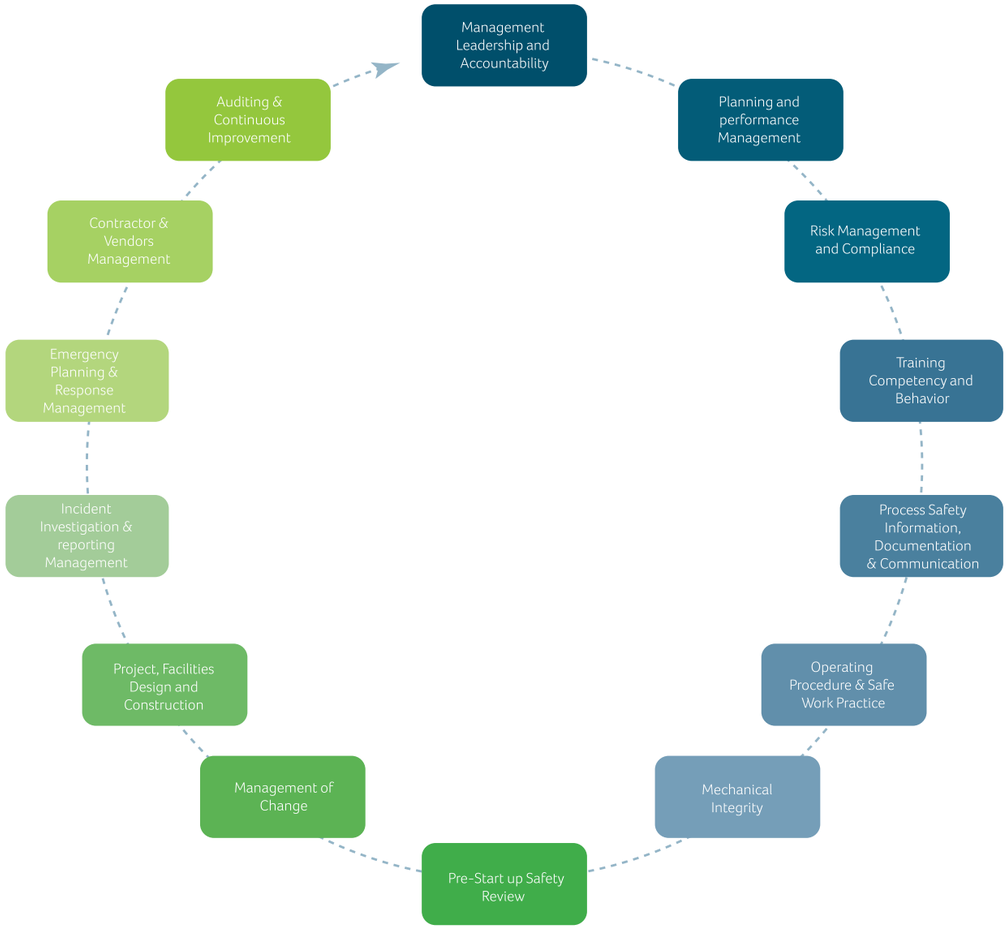
PSM Elements

The PSM elements are integrated within KIPIC Management System through implementation of the expectations related to the distinct yet connected fourteen elements aimed at efficient management of process safety.

The elements represent an interrelated set of principles associated with the safe management of facilities, processes, people, production, and emergency preparedness. Each element contains PSM expectations which define what KIPIC needs to get right so it may meet the intent of the element.



1- Management Leadership and Accountability:

Assurance of the integrity of an organization's operation requires visible leadership commitment and accountability at all levels of the organization. Achieving the high levels of Process Safety requires the commitment of the whole employees. Therefore, Management must establish process safety performance targets and provide structure and resources to achieve targets as well as align, involve, and empower the whole employees in the identification and management of process safety hazards.

2- Planning and performance Management:

Control of operations depends upon having competent people in position. Management shall ensure that existing and new personnel have the required competencies and are fit to work.

3- Risk Management and Compliance:

This element is a fundamental requirement of the PSM system. Management shall assure that a comprehensive Hazard and Risk Management process systematically identifies, assesses, and properly manages the risks posed by KIPIC's operations and activities. This process shall also identify and properly manage the risk reduction measures derived from the risk assessment process.

4- Training Competency and Behavior:

Ensure that our employees are equipped with the appropriate process safety related skills and knowledge to perform their duties effectively without harm to either themselves or others to protect the environment, our business assets and the community. Their competence will be regularly updated and assessed.

5- Process Safety Information, Documentation and Communication:

It is crucial that each facility/asset/activity has fully updated process safety information, documentation and communication, which are essential to identify and assess process risks. Management shall assure that the process safety information, documentation and communication required to support safe operation are updated and are available at all time for all authorized personnel.

6- Operating Procedure & Safe Work Practice:

Operation of facilities within established parameters and according to legislation is an essential aspect of Process Safety Management. This shall ensure that the operating manuals and procedures required to support operations are identified, available, accurate, up to date, understood and used.

7- Mechanical Integrity:

Asset integrity management system support the continuing safe operations. The program is founded on risk assessment to understand and prioritize exposures to ensure no degradations to PSM safeguards. An asset integrity program addressing maintenance and inspection verifies ongoing integrity. Maintaining the integrity of plant and equipment is an essential requirement for Process Safety Management. The Company Management shall ensure that the necessary inspection and maintenance requirements are identified and carried out to reduce the likelihood of a significant incident as a result of failure of plant or equipment.

8- Pre-Start up Safety Review:

Pre-start up Safety Review (PSSR) is a process to confirm that PSM elements have been addressed and adapted satisfactorily for new and modified equipment through an appropriate review to ensure safe startup of facility.

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9- Management of Change:

Changes to a process are thoroughly evaluated to fully assess their impact on employee safety and health, the environment and the community and to determine needed changes to operating procedures and related process safety information. Ensure proposed changes (Technology – Subtle –Personnel) at KIPIC are defined, authorized, risk assessed, documented and proper controls are put in place prior to the change being implemented.

10- Project, Facilities Design and Construction:

New facilities design and modifications to the existing facilities, shall be developed with aim to manage risk at the source by inherent safe design, to consider best available technology and practices, to manage integrity and to prevent long term degradation for the planned lifecycle of the facility. PSM Procedures will be part of all future EPC/PMC contract in line with PSM Policy based on the need and the nature of these contracts.

11- Incident Investigation and Reporting Management:

All PSM related incidents are reported and investigated down to root causes. Incident's analysis, recommendations and lessons learned are developed and shared with all concerned to prevent recurrence.

12- Emergency Planning and Response Management:

Effective emergency preparedness and response, Business Continuity and recovery plans are in place to manage potential safety, environmental and other emergencies. These plans identify organization, personnel, training, equipment, and drill requirements.

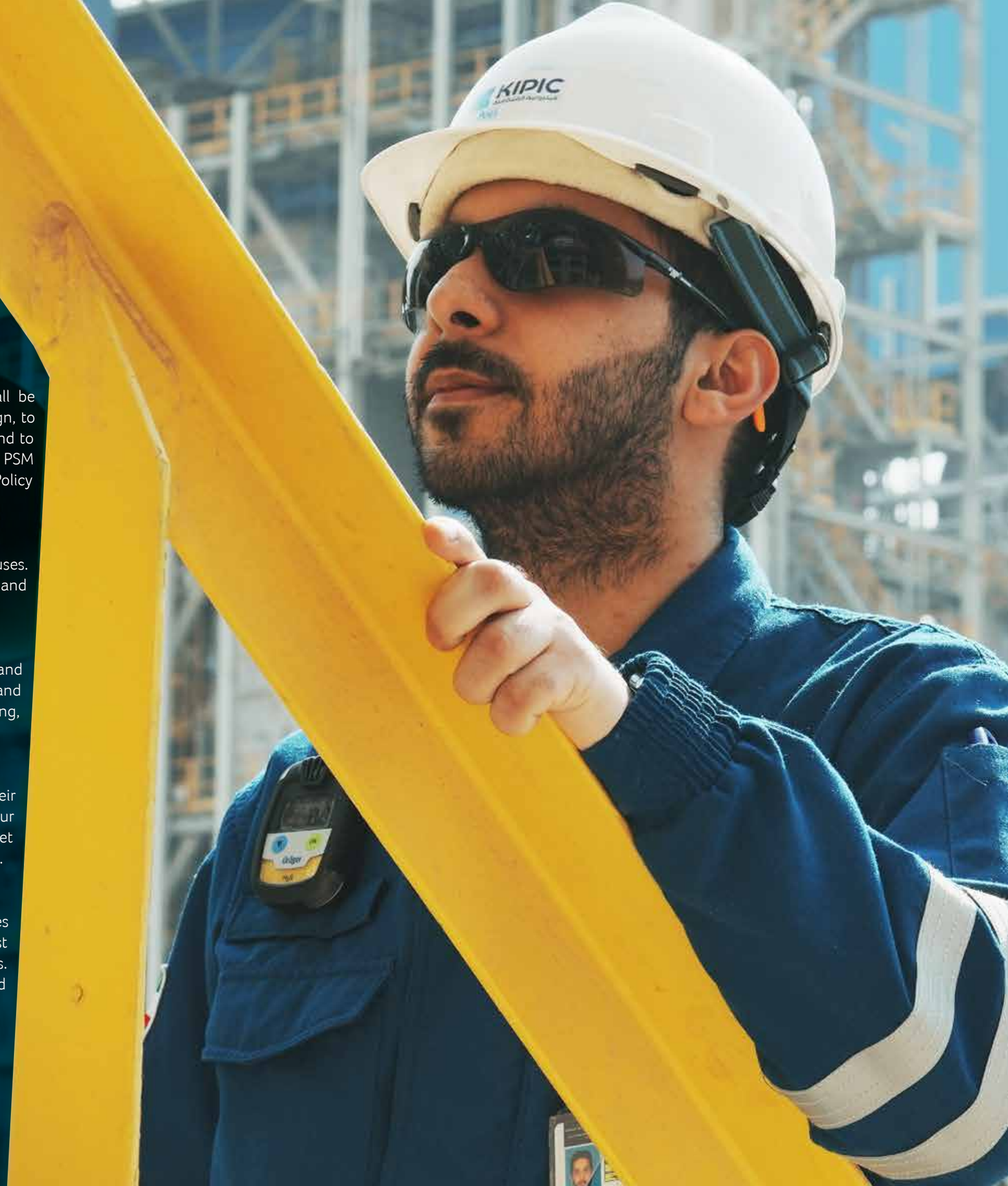
13-Contractor and Vendors Management

Contractors and vendors are key to our business performance. Their capabilities and performance will be monitored and assessed against our PSM expectations. Our procurement system ensures materials meet set standards and that critical PSM equipment and supplies are available.

14- Auditing and Continuous Improvement

Regular review and audit of compliance with the PSM elements, guidelines and procedures are vital to ensure proper implementation of PSM first and then, that Process Safety performance meets the defined targets. Management must ensure that there are both routine review and independent audit of compliance with PSM expectations.

For more details on the PSM elements please refer to PSM Manual Ref No. KIPC/ZOR/TSG/PSM/0001.



Process Safety Culture

Definition of Process Safety Culture:

Process safety culture is defined as combination of group values and behaviors that determine the way process safety is managed.

So where do we start?

Improving KIPIC process safety culture, requires the following 5 steps:

- **Survey our employees to understand how well or how poorly we are doing on each element.**
- **Follow up with an on-site assessment to identify.**
- **Why employees believe the way they do about each element.**
- **Recommended programs or actions to close the gaps in each element.**
- **Conduct a Leadership Workshop to present an overview of the elements and the results of the survey, the assessment, and the recommendation.s**
- **Implement the recommendations.**
- **Ongoing support with a focus on continuous improvement.**

Process Safety Culture (PSC) has been recognized as a contributing factor in many significant incidents that have occurred in the processing industries in recent years. PSC in any facility forms the foundation of the Process Safety Management System, regardless of what is written. The quality of demonstrated leadership directly affects the strength and quality of the PSC, and the quality and health of the process safety program itself. While the Manager of PSMS's clearly serve as Process Safety Leader, all Managers and Team Leaders in KIPIC that manage major process hazards should demonstrate process safety leadership and help set a strong and positive culture.

Achievements

Major Achievements

- Creating PSM Team Business Process.
- Development and implementing of PSM audit system (Plan, Protocols, Checklists, etc.)
- PSM Awareness Campaign sessions (Arabic & English) have been completed for more than 1200 KIPIC employees.
- Several PSM procedures have been issued for roll-out as per the gap analysis & the required procedure for the current stage of company projects.
- Training sessions on selective PSM topics (PHA, QRA and SIL) were conducted for KIPIC stakeholders.
- Development of PSM awareness programs for DCEOs and leadership.
- Development of Soft skills/PS Culture training material for newly joined UDs in the whole KIPIC.
- Launching of PSM webpage.
- PSM Got Operating Partner Membership with IChemE, All KIPIC employee have direct access to IChemE website through PSM Webpage in KIPIC Portal without the need to provide the username/password.
- Developing and implementing S-OJT Program for UDs.
- Liaise with Insurance and MP teams to support the insurance survey and Presenting PSM readiness.
- PSM team Participated in Refinery Commissioning Support
- Developed PSM KPIs Based on API RP 754 which will be useful for driving process safety performance improvement.

Young Talent Developments Program

- **Training Plan by PSM Team**
  Training program developed by PSM team that incorporates various methods to upgrade Newly Joined Engineers; Coaching, job shadowing, site visits, Job Rotation and tasks handling & assistance are include.
- **Structured - On Job Training (S-OJT)**
  Young talents are enrolled in PSM S-OJT program consisting of 7 modules. Young talents explored PSM 14 elements through reviewing case studies and increasing knowledge in selected PSM topic.
- **Job Shadowing**
  Attached with Lead PSM engineers, Young Talents observed various PSM activities in details, attended PSM meeting, learned teamwork, communications with other teams and soft skill.
- **Tasks Handling**
  Assisted in PSM tasks with the supervision of Lead PSM engineers.

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Path Forward

PSM Team's vision is to operate at a world-class level to achieve our goal of no harm to people, stakeholders, assets, reputation, and the environment, by adopting PSM system in line with KPC and international best practices.

Introducing Process Safety culture in KIPIC sites by enhancing awareness on typical hazardous operations Understanding the challenges in the sites and the good practices that help achieving KIPIC vision.