

## PROCESS SAFETY COMPETENCY MAPPING OF FRONT-LINER IN PT. IPC TO ENHANCE COMPETITIVE ADVANTAGE AS A WORLD CLASS COMPANY

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### Abstract

Process Safety is a competitive advantage that CherCo is willing to invest. PT Indonesia Petroleum Company (PT IPC) as a subsidiary is facing challenging business situations. It is important to stay competitive by keeping operations safe and reliable. Based on observation and findings from Leadership Site Visit Validation & Verification (LSV V&V), its test score is under expectation. Frontliner has been chosen because they are the highest risk holders to perform day to day operations in facility. This research will observe front liner if they already had and implemented standard process safety competency in handling and/or supporting routine operations, and to measure the current actual level of process safety competency.

Competency mapping will be baseline to measure the current level of competency of process safety, and assess the readiness of our competency level as competitive advantage in CherCo world class company. By knowing the gaps, strategy to increase competency level of frontliners in facility can be developed. Literature review mapping is used to determine the model of process safety core elements which will be used as the basis elements in developing a questionnaire to map competency level. This research refers to models from Center for Chemical Process Safety (CCPS) and IChemE Safety Center (ICS), compared with internal Process Safety focus elements in OEMS. The intersection of these literature review mapping process is resulting 9 Process Safety Core Elements, which next is translated into questionnaire statements based on Knowledge – Skills – Attitude (KSA) competency characteristic.

Based on the assessment, it can be concluded that Operations already had very good to excellent competency levels in some PS elements, however, some room of improvement exists on several area of PS elements to improve the competency level of frontliners.

**Keywords:** Process Safety, Competency Mapping, Frontliner, Operator, Awareness, Competitive Advantage.

### 1. Introduction

CherCo is one of the world's leading integrated energy company. CherCo explores for, produces, and transports crude oil and natural gas, refines, markets, and distributes transportation fuels and lubricants; manufactures and sells petrochemicals and additives; develops and deploys technologies that enhance business value in every aspect of a company's operations. CherCo operates oil exploration and production in partnership with the Indonesian National Government.

Among oil & gas industries, Process Safety is considered as competitive advantage that CherCo is willing to invest. The challenge is to go from good to great in implementation and awareness of Process Safety. Within internal CherCo, Process Safety is defined as a focus area under Operational Excellence that is essential in preventing serious incidents. The system to manage process safety in the facility is complex, and it takes competence people

with knowledge, skills, and attitude working together to make company's vision in actualize safe and incident free operations to be possible.

PT IPC is facing challenging business conditions and the declining of oil price have great impact to company sustainability and capability in conducting day to day business. One aspect to stay competitive and having effective and efficient business is by keep the operations to be safe and reliable. This is aligned with CherCo Corporation priorities regarding zero accident and fatality. PT IPC needs to find out how to manage and improve process safety competency to manage business and operational sustainability to be safe, competitive, effective, and efficient in challenging situations.

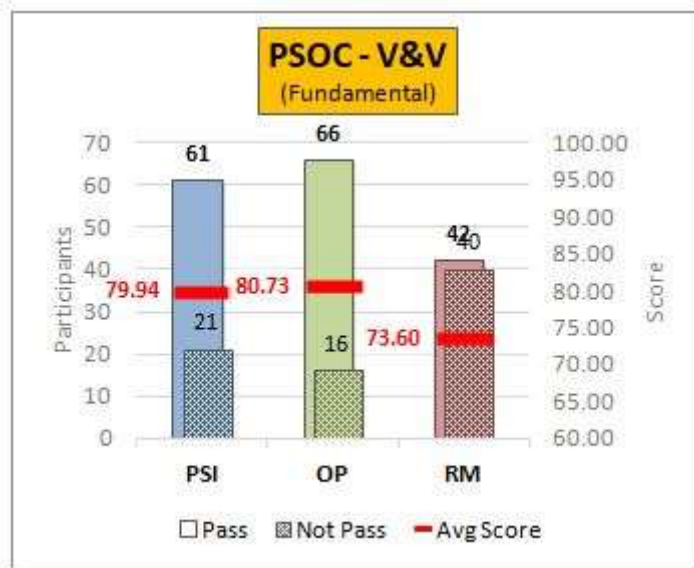


Figure 1.1. Test Result of V&V Participants

Based on observations and findings from Leadership Site Visit Validation & Verification (LSV V&V) test score is under expectation, researcher then has curiosity towards process safety competency of employees in PT IPC, especially for Operations frontliners, as the highest risk holders to perform day to day operations in facility. This research will observe a front liner if they already had implemented standard process safety competency in handling and/or supporting routine operations, and to measure the current actual level of process safety competency.

## 2. Methodology of Research

### 2.1. Conceptual Framework

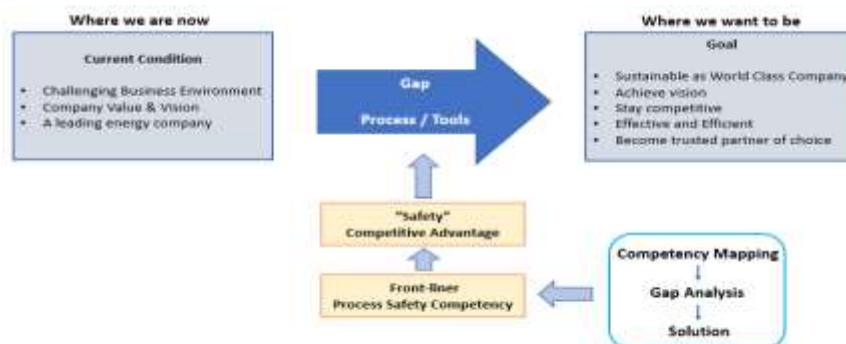


Figure 1. Conceptual Framework

## 2.2. Theoretical Framework

### Competency Theory and Concept

Hogg (1993) defined competency as ‘competencies are the characteristics of a manager that lead to the demonstration of skills and abilities, which result in effective performance within an occupational area.

Dubois (1998) defined that competencies are those characteristics – knowledge, skills, mindsets, thought patterns, and the like – that, when used either singularly or in various combinations, result in successful performance.

Spencer and Spencer (1993) also defined competency as an underlying characteristic of an individual that is casually related to criterion-referenced effective and/or superior performance in job situation.

According to Spencer & Spencer, there are five types of competency characteristics:

1. Motives – The things a person consistently thinks about or wants and that which causes action. Motives ‘drive, direct, or select’ behaviour towards certain actions or goals away from others.
2. Traits – Physical characteristics and consistent responses to situations or information.
3. Self-concept – A person’s attitudes, value, or self-image
4. Knowledge – Information a person has in specific content areas
5. Skill – The ability to perform a certain physical or mental task

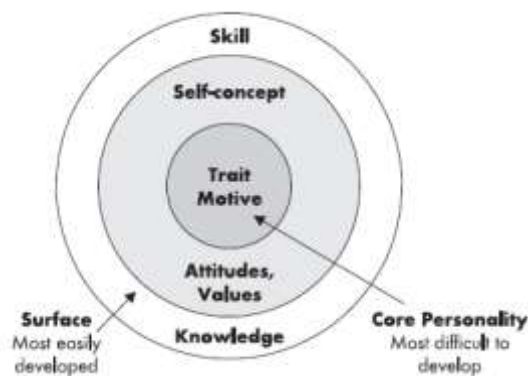


Figure 2: Circle Competency Model of Spencer & Spencer

‘Competency mapping’ is a process of identifying key competencies for a company or institution and the jobs and function within it. Competency mapping is used to identify key attributes (knowledge, skills, and behaviour) that are required to effectively perform job classification or any identified process.

Competency model is a set of competencies that include the key behaviours required for excellent performance in a particular role (Chouhan & Srivastava, 2014).

### Process Safety Theory & Model

Process safety is about managing the integrity of operating systems by applying inherently safer design principles, engineering, and disciplined operating practices. It deals with prevention and mitigation of incidents that have the potential for a loss of control of a hazardous material or energy. (CCPS, 2007)

The process safety competency element involves increasing the body of knowledge and, when applicable, pushing newly acquired knowledge out to appropriate parts of the organization, sometimes independently of any request (CCPS, 2007, p.7).

## 2.3. Analysis of Business Situation

### Process Safety as Elements in OEMS

The top priority for CherCo is to prevent serious incident and fatality. CherCo actively identify hazards, ensure that safeguards were installed correctly and worked as functioned to eliminate risk and mitigate of operational risk.

OEMS was applied by CherCo as part of the managing process safety incidents, for example: fire, explosion, and accidental release in the facility. CherCo also apply OEMS to manage process safety to prevent serious incidents, such as explosions, fires and accidental releases or loss of containment.

Process safety is one focus element in OEMS, covered under Process Safety, Reliability, and Integrity (PSR&I) element, as comprehensive program to prevent significant incidents.

#### CCPS - Risk Based Process Safety Elements

Center for Chemical Process Safety (CCPS) has developed next generation and improved versions of process safety management framework, called Risk Based Process Safety (RBPS). RBPS has purpose to help organizations design and implement more effective process safety management system. According to Center for Chemical Process Safety (CCPS) – Guidelines for Risk Based Process Safety (RBPS) 2007, Process Safety Competency Matrix (PSCM) should be developed using 4 pillars and 20 elements of process safety.

<b>Process Safety Accident Prevention Pillars and Focal Points</b>	<b>RBPS Elements</b>
<b><i>Commit to Process Safety</i></b>	
<ul style="list-style-type: none"> <li>• Ensure management cares and provides adequate resources and proper environment.</li> <li>• Ensure employees care.</li> <li>• Demonstrate commitment to stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>• Process Safety Culture</li> <li>• Compliance with Standards</li> <li>• Process Safety Competency</li> <li>• Workforce Involvement</li> <li>• Stakeholder Outreach</li> </ul>
<b><i>Understand Hazards and Risk</i></b>	
<ul style="list-style-type: none"> <li>• Know what you operate.</li> <li>• Identify means to reduce or eliminate hazards.</li> <li>• Identify means to reduce risk.</li> <li>• Understand residual risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Process Knowledge Management</li> <li>• Hazard Identification and Risk Analysis</li> </ul>
<b><i>Manage Risk</i></b>	
<ul style="list-style-type: none"> <li>• Know how to operate processes.</li> <li>• Know how to maintain processes.</li> <li>• Control changes to processes.</li> <li>• Prepare for, respond to, and manage incidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Operating Procedures</li> <li>• Safe Work Practices</li> <li>• Asset Integrity and Reliability</li> <li>• Contractor Management</li> <li>• Training and Performance Assurance</li> <li>• Management of Change</li> <li>• Operational Readiness</li> <li>• Conduct of Operations</li> <li>• Emergency Management</li> </ul>
<b><i>Learn from Experience</i></b>	
<ul style="list-style-type: none"> <li>• Monitor and act on internal sources of information.</li> <li>• Monitor external sources of information.</li> </ul>	<ul style="list-style-type: none"> <li>• Incident Investigation</li> <li>• Measurement and Metrics</li> <li>• Auditing</li> <li>• Management Review and Continuous Improvement</li> </ul>

Figure 3: Process Safety Accident Prevention Principles and Associated RBPS Elements

#### ICHEME Safety Centre (ICS) Process Safety Guidance

ICHEME Safety Centre (ICS) is an industry-funded and led organisation, focused on improving process safety through sharing information and learning. Process safety competency was identified as an initial area of work for ICS.

ICS provides an example of a process safety competency model. Each organisation should determine the specific requirements for implementation. It can be used to support implementation of process safety competency criteria within a Competency Management System (CMS), under ISC Process Safety Guidance (2018, p.8-9).

This is a guidance document that can be used to inform an organisation of the recommended process safety competences for each role, so that it can be incorporated into their existing competence framework.

Elements	Topic
Culture	Safety leadership commitment, responsibility and workplace culture
Knowledge & competence	Process safety concepts
	Hazard identification and risk assessment
	Hazard awareness specific to the operation
Engineering & design	Safety in design
	Asset integrity
	Codes and standards
	Management of change
Human factors	Human factors
Systems & procedures	Systems, manuals and drawings
	Process and operational status monitoring and handover
	Contractor and supplier selection and management
	Safe systems of work
	Project delivery
	Management of major emergencies and emergency preparedness
	Incident reporting and investigation
Assurance	Legislation and regulations
	Audit, assurance, management review and intervention

Figure 4: PS Competency Elements and Topics based on ICS - PSG

### 3. Method of Data Collection and Analysis

The methodologies used for this research are both quantitative and qualitative methods to get more comprehensive and in-depth understanding of phenomenon on this research. There are two major approaches to gathering information about a situation, person, problem, or phenomenon. Based upon these broad approaches to information gathering, data can be categorized as primary data and secondary data. Information gathered using This research will use both methods of data collection and information gathering.

To collect data, researchers will use a survey method. The survey is a questionnaire form which features questions related to the research subject. A questionnaire survey is chosen because it is less expensive, and it offers greater anonymity. Another reason is because the respondents are scattered over a wide geographical area (from RB, MN, DR and DM).

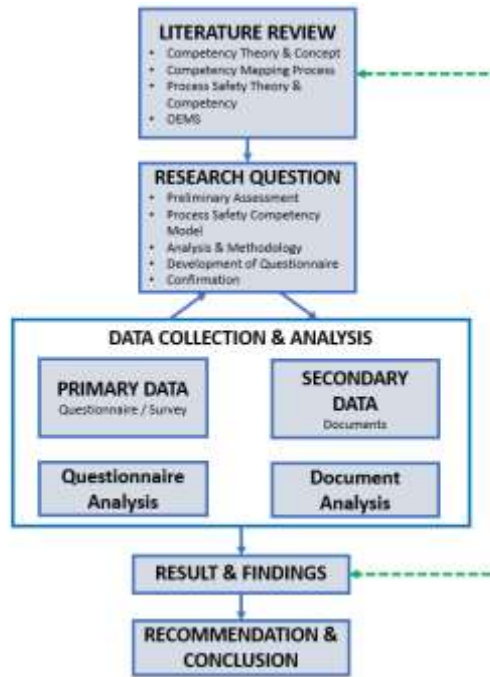


Figure 5: Research Methodology Flow

### 3.1. Questionnaire Design

A Questionnaire was developed to evaluate and measure process safety competencies of front liners. It is important for researchers to attempt to establish the quality of result. Questionnaires must be both valid and reliable. In this case, the questionnaire must pass both validity test and reliability test.

Literature review is a systematic method for identifying, evaluating and interpreting the work of researchers, scholars and practitioners in a chosen field (Fink, 1998). This research will use mapping literature review by comparing model from CCPS-RBPS, ICS-PSC, and OEMS as company standard. Table below explain how Process Safety Elements from RBPS are mapped into ICS-PSG competency topics, and finally OEMS PSR&I elements.

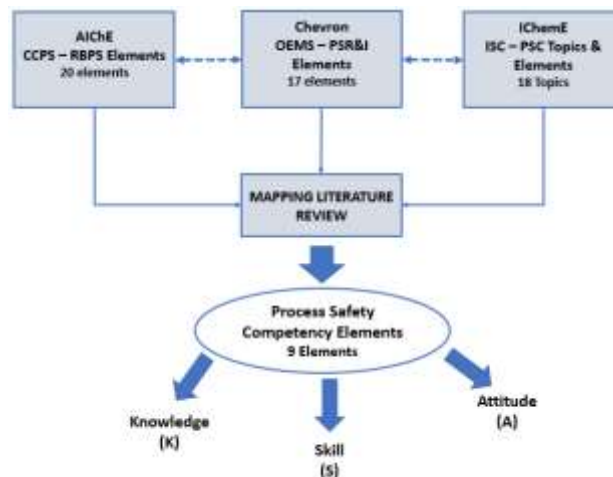


Figure 6. Mapping Literature Review

The intersection from Process Safety Elements under OEMS with Process Safety Elements under RBPS and ICS is as shown on table below:

Table 1: Mapping Literature Review

No	Elements	RBPS	OEMS	ICS	Intersection
1	Process Safety Culture	v	v	v	v
2	Compliance with Standards	v	v	v	v
3	Process Safety Competency	v	v	v	v
4	Workforce Involvement	v			
5	Stakeholder Outreach	v			
6	Process Knowledge Management	v	v	v	v
7	Hazard Identification and Risk Assessment	v	v	v	v
8	Operating Procedures	v	v	v	v
9	Safe Work Practices	v	v	v	v
10	Asset Integrity	v	v	v	v
	Reliability	v	v	v	v
11	Contractor Management	v	v	v	v
12	Training and Performance Assurance	v			
13	Management of Change	v	v	v	v
14	Operational Readiness	v	v		
15	Conduct of Operations	v	v		
16	Emergency Management	v	v	v	v
17	Incident Investigation & Reporting	v	v	v	v
18	Measurement and Metrics	v			
19	Auditing	v		v	
20	Management Review and Continuous Improvement	v		v	
21	Safety in Design		v	v	
22	Legislation and regulations			v	
23	Project Delivery			v	
24	Human Factors			v	
25	Well Control		v		
26	Well Reliability & Integrity		v		
27	Maintenance		v		

After conduct Literature Review Mapping, we got 9 elements to assess and measure Process Safety Competency for frontliners in PT IPC. Some of them are not included because they have already managed under a different team as they're part of OSHA/HES or has already combined to simplify the process in internal PT IPC. The 9 elements of Process Safety Competency Assessment are as shown in the table below:

Table 2: PS Competency Core Elements

No	PS Competency Core Elements
1	Process Safety General Competency and Culture (PSC&C)
2	Technical Codes & Standard (TC&S)
3	Process Safety Information (PSI)
4	Hazard Identification & Risk Management (H&RM)
5	Operating Procedures (OP)
6	Asset Integrity and Reliability (AI&R)
7	Management of Change (MOC)
8	Emergency Management (EM)
9	Incident Investigation Reporting (IIR)

In order to assess and map the competency level, these 9 core elements need to be translated into questionnaire statements (or questions) based on Knowledge – Skill – Attitude (KSA) competency characteristic by Spencer & Spencer.

### 3.2. Questionnaire Development

Data is gathered through paper-based survey since period 8 – 19 July 2019. Respondents of this survey are full-time employees in PT IPC in Rumbai, Minas, Duri, and Dumai, from Operations Department. The Questionnaire was spread through email to correspondents in PT IPC. Each correspondent received an email and submitted only once. Total listed questions in the questionnaire for this research is 88 questions. These questions are divided into several parts:

1. General Information
2. Competency Assessment (KSA Model Spencer & Spencer)

Total statements for this assessment is 30 statements which represent Knowledge assessment from 9 core elements of process safety, 31 statements represent Skills, and the last 27 statements represents Attitude. The purpose of this research is to assess the gap of current competency level of front liners and Operations Support engineers in PT IPC. To quantify the response of the population of sample, questionnaire use 6-points likert scale from 1 to 6 for each criteria of answer.

## 4. Results and Discussion

### Respondent Profile

In the questionnaire collection period, 57 samples from 612 employees under Operations from different level (role) working on shift-based) were successfully collected from questionnaire being spread. The correspondents consist of operators in RB, MN, DR, and DM.

### Validity Test

Validity is the ability of an instrument to measure what it is designed to measure. Based on the simulation using SPSS, the result of validity test shows 3 invalid statements from 88 questions, because of R count < R table. There will be only 85 valid statements that will be used for further research and reliability test.

### Reliability Test

Reliability is the ability of a research instrument to provide a similar result when used repeatedly under similar conditions. By using SPSS method, the questionnaire shows the value of Cronbach's alpha is varying from 0.7 to more than 0.8 This means the questions in



the questionnaire have good/excellent reliability to measure the process safety competency in PT IPC.

### Questionnaire Scoring and Result

Based on the normalization of score explained above, all PS elements showing various result from 66.7 as the lowest score in TC&S element and 86.3 as the highest score in EM element.

Table 3: Questionnaire Scoring for 9 PS Elements and KSA

No	Element	K			S			A		
		#	Score	Norm	#	Score	Norm	#	Score	Norm
1	PSC&C	4	5.18	83.5	2	5.15	83.0	3	5.03	80.6
2	TC&S	1	4.44	68.9	1	4.33	66.7	4	4.87	77.4
3	PSI	2	5.02	80.4	5	5.04	80.9	2	5.21	84.3
4	H&RM	6	5.11	82.3	4	4.82	76.4	4	5.09	81.9
5	OP	3	5.05	81.0	6	4.76	75.2	4	4.92	78.4
6	AI&R	3	4.73	74.7	3	4.87	77.4	2	5.09	81.9
7	MOC	3	5.13	82.6	4	5.18	83.6	2	5.16	83.1
8	EM	5	5.31	86.3	3	5.17	83.4	2	5.23	84.6
9	IIR	3	5.21	84.2	3	4.74	74.8	4	5.03	80.6

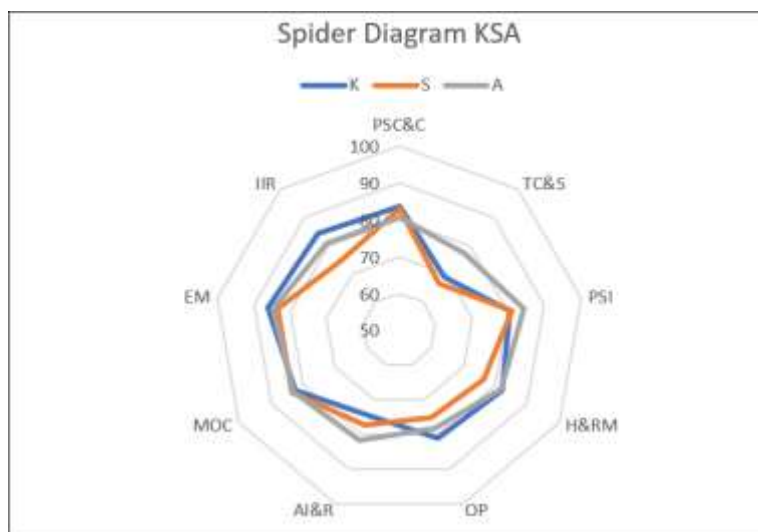


Figure 7: Spider Diagram KSA of 9 PS Elements

From the table and spider diagram, researchers want to focus at the element which has score lower than 80. PS elements with score below 80 are considered to be elements which need improvement, as already discussed with process safety expert in the company. Based on the spider diagram and table above, the PS elements with score below 80 is shown under elements:

- Knowledge (K): TC&S and AI&R
- Skill (S) : TC&S, H&RM, OP, AI&R, and II&R
- Attitude (A) : TC&S and OP

The diagram and table show lowest average score and widest gap on skill (S) area at 5 PS elements. From a short interview with Group Leader of Operations and process safety expert mentioned that this phenomenon is showing that Operator need improvement on implementing their knowledge to real action. Most operators have already had the knowledge, but need consistency and chance on applying and implement their knowledge.

## 5. Competency Mapping and Gap Analysis

### Process Safety General Competency & Culture (PSC&C)

Process safety general competency and culture in an organization is closely related to attitudes and behaviours which will be integrated to organization value system to support the goal of safer process operations. The process safety competency level of Operator has already good enough, but still have gap for room of improvement.

Operator's knowledge and skill related to process safety culture and general competency is high, but the attitude related to feedback and their willingness to share best practice and motivation to upgrade PS competency is still low. To improve the attitude element of PSC&C is by engaging leadership to spread good PS Culture and encouraging their members to upgrade their PS competency by involve in forum, sharing session, training, activity, and assignment.

Table 4: Score of KSA for PSC&C of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.18	83.52	EXCELLENT
Skills	5.15	82.96	VERY GOOD
Attitude	5.03	80.62	VERY GOOD

### Technical Codes & Standard (TC&S)

The score of knowledge is the lowest. From interview with some Operators, they confirmed difficulties to identify a code or standard which is suitable with a situation or project. From the Operator's perspective, it was a scope of engineering to understand which standard being used and Operator has no right to interfere.

Table 5: Score of KSA for TC&S of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.18	83.52	EXCELLENT
Skills	5.15	82.96	VERY GOOD
Attitude	5.03	80.62	VERY GOOD

### Process Safety Information (PSI)

Most Operators can find and access the PSI documents, know the importance of having the most updated PSI documents and report the inaccurate PSI as per procedure. The lowest point that may need to be improved is the PSI audit for operators. The questionnaire shows that not all of the operators have already contributed actively in PSI audit. This will need support from leadership and active engagement from PSM to operators to distribute PSI audit to operators evenly. Operators also need to be reminded and refresh regularly to keep support in conducting PSI V&V regularly and actively report inaccurate PSI as per procedure.

Table 6: Score of KSA for PSI of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.02	80.37	VERY GOOD
Skills	5.04	80.89	VERY GOOD
Attitude	5.21	84.26	EXCELLENT

### Hazard Identification & Risk Management (H&RM)

From the questionnaire, it is shown that not all operators have contributed actively on PHA revalidation and were able to identify the potential of hazard which impacted to process of safety incident. This skill element can be improved by conduct training for operators.

Table 7: Score of KSA for H&RM of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.11	82.28	VERY GOOD
Skills	4.82	76.39	VERY GOOD
Attitude	5.09	81.85	VERY GOOD

#### Operating Procedures (OP)

From the questionnaire, not all operators have actively contributed in OP Revalidation process. Operator skills to analyse procedure based on Human Performance, to identify inaccurate steps in OP and determine the high consequence activity which need procedure still need improvement. One way to improve these skills are by performing additional training.

Table 8. Score of KSA for OP of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.05	80.99	VERY GOOD
Skills	4.76	75.25	VERY GOOD
Attitude	4.92	78.43	VERY GOOD

#### Asset Integrity & Reliability (AI&R)

AI&R competency level of Operator is already good enough, but still have gap for room of improvement especially for knowledge and skill element. To improve knowledge of operator, sharing program related to AI&R and Non-conformance process (NCR) process must be done. PSM need to leverage skill element for example by training and sharing to make sure Operators understand the interpretation of inspection test and incident scenario related to AI&R.

Table 9. Score of KSA for AI&R of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	4.73	74.69	VERY GOOD
Skills	4.87	77.41	VERY GOOD
Attitude	5.09	81.85	VERY GOOD

#### Management of Change (MOC)

The MOC competency level of Operator has already good enough, shown by high score for all KSA elements from questionnaire. However, regular refreshment training and observation (such as from audit) might be important to maintain Operators' competency level high.

Table 10. Score of KSA for MOC of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.13	82.59	VERY GOOD
Skills	5.18	83.61	EXCELLENT
Attitude	5.16	83.15	VERY GOOD

## Emergency Management (EM)

All KSA elements for EM is interpreted as “Excellent.” This means the EM competency level of Operator is already excellent. Emergency drill and update ERP were conducted frequently to maintain the competency level of Operator in managing emergency situation.

Table 11. Score of KSA for EM of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.31	86.30	EXCELLENT
Skills	5.17	83.43	EXCELLENT
Attitude	5.23	84.63	EXCELLENT

## Incident Investigation and Reporting (II&R)

The II&R competency level of the Operator is already good enough, but still has a gap for room of improvement, especially for Skills and Attitude elements. Operators need improvement in RCA participation and interpretation of why tree or 5 why. The intervention from Leadership team was also important to ensure that Operations understand the goal of incident investigation is not for “pointing finger” but what we can learn from the incident.

Table 12: Score of KSA for II&R of Operators in PT IPC

Elements	Average Score	Normalized	Interpretation
Knowledge	5.21	84.20	EXCELLENT
Skills	4.74	74.81	VERY GOOD
Attitude	5.03	80.65	VERY GOOD

The widest gaps in PS Competency of Operators or Frontliners are from Technical Codes & Standard (TC&S), followed by Asset Integrity & Reliability (AI&R), Operating Procedures (OP), and Hazard Identification & Risk Management (H&RM). These elements will be the focus of PSM Team to narrow the gap in short term strategy implementation. While in the long-term strategy, the focus is to maintain the PS Competency for all elements.

## 6. Business Solution Alternatives & Analysis

There are some proposed business solutions developed from the gap analysis in previous chapter to narrow the gap of process safety competency in PT IPC. The proposed solutions need to be discussed with Process Safety Advisors in collaboration with consumers and other related team in PT IPC to get their endorsement and feedback related to implementation plan of this solution.

1. Regular Leadership Engagement Validation & Verification (LE V&V)
  - Objective: Help leadership more effectively and actively engage frontliner to build and sustain a good PS culture
  - Focus: Assess and recognize PS anomalies on field, provide an useful advices, and engage Operators
2. Integrated PS Learning Library & Activity - Competency Tracker
  - Objective: Track the process safety (PS) activities integrated with competency level of each personnel
  - Focus: Simplify and integrate between activity, competency, and all PS material and knowledge
3. Computer-Based Test & Modules
  - Objective: measure and leverage Knowledge element of process safety
  - Focus: Provide self-learning CB test and module materials for Operators level

#### 4. Field Hands-on (Class) Training

- Objective: Ensure the transfer knowledge of process safety competency from process safety expert to narrow the gap of knowledge, especially for frontliners
- Focus: Operators demonstrate skills and given a study case to demonstrate their behaviour towards a certain situation related to process safety.

#### 5. Put in Scorecard

- Objective: Ensure commitment to increase PS awareness & competency from all workforce levels (incl. management)
- Focus: Set realistic and achievable statement, threshold, and frequency of scorecard based on competency level and current gap

#### 6. Wall of Fame and Award

- Objective: Appreciate and recognize an operator who promotes and shows consistency in PS implementation
- Focus: Encourage of Operator to influence others in cultivating good PS practices

#### 7. Process Safety Lookback & Sharing Session

- Objective: Share knowledge and best practice regarding process safety
- Focus: Learning from the incidents and sharing session to strengthen awareness

#### 8. Process Safety Agent of Influencer

- Objective: Influence the workforce (Operators) to actively implement process safety and bring process safety culture into the organization
- Focus: Influence process safety in a micro scale, to ensure full implementation of process safety program (from PSM) in a regular basis

Implementation plan for solutions will be separated into short-term strategy and long-term strategy align with the PS Elements. The short-term strategy is focusing on the critical process safety elements which has the widest gap and the most critical one to process safety, and its application and implementation plan to targeted participants. The long-term strategy is focusing the process safety element in a wider targeted workforce and to maintain the competency level of workforce.

Implementation of these programs is supposed to be continuous and sustainable since process safety is still playing the essential role to oil and gas industry. CherCo's big attention in managing process safety, has resulted a good corporate culture and awareness amongst the workforce, current process, and day to day operations, related to the importance of process safety to maintain safe and reliable operations. Furthermore, the best practice from PT IPC can be spread to other peer company.

### **Conclusions**

As Process Safety becomes strong competitive advantage that CherCo is willing to invest, it is important to understand that PT IPC already have strong focus towards process safety, especially for frontliner as the highest risk holders to perform day to day operations in facility. The challenge is to go from good to great in implementation and awareness of Process Safety.

Within internal CherCo, Process Safety is defined as a focus area under OE that are essential to preventing serious incidents. The system to manage process safety in the facility is complex, and it takes competence people with knowledge, skills, and attitude working together to make company's vision in actualize safe and incident free operations to be possible.

Competency mapping and assessment are important as a baseline to measure the current level of understanding, competency, and awareness of process safety, and assess the readiness of our competency level as competitive advantage in CherCo world class company. By knowing the gaps, we can develop the strategy to increase competency level of frontliners in our facility.

Based on the research and assessment of frontliners competency mapping above, it can be concluded that Operations as frontliner already had very good to excellent competency level in some PS elements, however, some room of improvement exists on several area of PS elements to improve the competency level of Frontliners.

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