Martinez Renewables

Safety Culture Maturity Assessment

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Glossary of Terms

- **ACC:** American Chemistry Council.
- **ANOVA:** Analysis of Variance. A statistical test used to analyze the differences between group means in a sample.
- **CAPA:** Corrective and Preventive Action. A systematic process to identify and address issues, both existing and potential, to prevent their recurrence.
- **CBT:** Computer-Based Training.
- **Coasting:** A level of safety culture maturity where entities are making minimal effort to develop safety strategies and processes, simply going through the motions.
- **Commanding:** A level of safety culture maturity where continual improvement is ingrained in the organization's DNA, and safe production is a matter of course.
- **Commencing:** A level of safety culture maturity where safety processes are rudimentary, ad-hoc, and chaotic.
- **Committing:** A level of safety culture maturity where an organization is actively striving to achieve its safety culture mission and goals, going beyond minimal compliance.
- **Complying:** A level of safety culture maturity where the organization's goal is to meet the minimum requirements to satisfy regulators, auditors, customers, and stakeholders.
- **Criterion-Related Validity:** A type of validity that assesses how well a measure predicts an outcome; in this report, it refers to how well the safety culture assessment relates to actual safety performance (personal injury and process safety incidents).
- **Cronbach's Alpha:** A measure of internal consistency or reliability, indicating how closely related a set of items are as a group; in the report, it helps check if questions were answered in a consistent way, which means the assessment is reliable.
- **Descriptive Norms:** The safety-related actions and behaviors that people regularly take, showing how the company encourages and supports safe behaviors.
- **ESS:** Environment, Safety, and Security.
- **F:** F-statistic. A number from a statistical test (called ANOVA) that determines if there's a real difference between the average results of two or more groups, or if the differences are just due to random chance.
- **Forced-choice:** Survey-style assessment method where participants must choose one option from a set, even if none seem perfect. There may not be a "right" answer; it's about preference, attitude, or perception.
- **Group mean:** The average value of a group of numbers. It helps to compare the overall performance of one group to another.
- **Hierarchy of Risk Control:** The order of preference for methods to control risks, typically from most to least effective: Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, and Personal Protective Equipment (PPE).
- **HESS:** Health, Environment, Safety, and Security.
- **Human Factors:** The cognitive, physical, and organizational aspects that affect human interactions within a system.
- **Injunctive Norms:** The formal safety guidelines that direct what ought to be done to control risks.
- **ISO 14001:** An international standard for environmental management systems (EMS). It provides a framework for organizations to establish, implement, maintain, and improve an EMS to reduce their environmental impact; "ISO 14001:2015 – Environmental Management Systems – Requirements with guidance for use"
- **JJSV:** Joint Job Site Visit.
- **Just Culture:** A positive atmosphere with regards to errors and mistakes, where employees feel comfortable reporting safety issues without fear of blame, punishment, or criticism.
- **Lessons Learned:** Situations where critical safety information is extracted from near-misses and/or adverse events, shared in a timely manner, and solutions are applied and enforced.
- **Management of Organizational Change:** A Systematic framework employed to manage organizational changes that could introduce new hazards or alter existing risks within their operations.
- **MOC:** Management of Change. A formal risk assessment process for managing changes in an organization to minimize risk(s).
- **MPC:** Marathon Petroleum Corporation.
- **MTZ:** Martinez Renewables.
- **Near-Miss:** An incident where no injury or damage occurred but had the potential to result in harm.
- **OCM:** Organizational Change Management. A structured program to manage the people side of change and mitigate potential negative impacts.

- **OEMS:** Operational Excellence Management System. Marathon's structured framework for managing its Health, Environment, Safety, and Security (HESS) responsibilities.
- **Pearson's r:** Pearson correlation coefficient. A number that shows how strongly two things are related and whether they move in the same or opposite direction. It goes from -1 to +1:
    - +1 indicates a perfect positive linear relationship (they increase together in a perfectly consistent way)
    - -1 indicates a perfect negative linear relationship (one increases while the other decreases in a perfectly consistent way)
    - 0 indicates no linear relationship (no clear pattern or connection between them)
- **PHA:** Process Hazard Analysis.
- **Predictive Analytics:** Statistical techniques used to identify the likelihood of future outcomes based on historical data; in this report, regression analyses are used for this purpose, to predict personal injury and process safety incidents.
- **Proactive Safety Management:** A forward-looking approach to safety that emphasizes hazard identification and prevention before incidents occur.
- **PSM:** Process Safety Management. A comprehensive, proactive approach regulated by OSHA to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals in workplaces.
- **Reactive Safety Management:** An approach where safety actions are primarily taken in response to incidents that have already occurred.
- **Regression Analysis:** A statistical method used to determine how different factors are connected; in this report, it's used to identify which safety culture domains are linked to higher or lower injury and incident rates.
- **Reliability:** The consistency of measurement achieved through assessment methods.
- **RFP:** Request for Proposal.
- **RF:** Renewable Fuels.
- **RLT:** Renewables Leadership Team.
- **RSP:** Refining Standard Practice.
- **Safety Culture:** The way we do safety around here; the shared values, beliefs, perceptions, and behaviors of an organization in relation to safety.
- **Scheffé Test:** After running an ANOVA test and finding a significant overall difference between group means, the Scheffé test is a follow-up procedure used to pinpoint which specific pairs of group means are significantly different from each other.
- **SIF:** Serious Injury and Fatality
- **Sig (Significance or p-value):** A number that highlights how likely it is that the results happened just by chance. A small number (usually less than 0.05) means there's strong evidence that the result is real and not random.
- **SMS:** Safety Management System.
- **SMART Goal:** Specific, Measurable, Achievable, Relevant, Time-bound. A framework for setting clear and achievable goals.
- **Social Norms:** The 'invisible' or unspoken beliefs, values, and attitudes about how safety should work within a company.
- **SPSS:** Statistical Package for the Social Sciences. A computer program used to organize and analyze numbers and data. It helps find patterns, test ideas, and understand results in surveys or research studies.
- **Stop Work Authority:** The authority granted to employees to halt work when they perceive a safety hazard.
- **Validity:** Validity of measurement refers to the extent to which a tool or method accurately measures what it's intended to measure. Valid measurements are reliable, meaning they produce consistent results, but they're only useful if they're also measuring the right thing.

Executive Summary

What was done

At the request of Contra Costa Health, an independent, third-party comprehensive Safety Culture Maturity Assessment was conducted at Martinez Renewables ("MTZ") during February and March 2025 by Motive Power/BSMS ("assessment team"). The primary objective of this assessment was to systematically identify both strengths and areas of opportunity requiring improvement within the facility's existing safety culture and management systems, with the aim of enhancing MTZ's overall safety performance going forward.

How it was done

Document Review

A comprehensive review of MTZ's existing safety-related documentation was conducted, encompassing approximately 40 document types, including processes, procedures, meeting minutes, incident reports and audits. All reviewed documents were accessible via a shared SharePoint site between the assessment team and MTZ staff.

Data Collection

A multi-faceted methodology was employed for data gathering to engage all 280 employees at MTZ to ensure a thorough and reliable collection of information. This included four on-site workshops; these facilitated the evaluation of ten key safety culture domains ("domains"), with participants providing both quantitative ratings, qualitative evidence, and improvement recommendations.

The Safety Culture Maturity Model described in this report is built on seven Safety Culture Root Cause Areas and three Core Business Processes, to establish the 10 domains that were assessed, including Strategy, Risk Assessment, and Corrective and Preventative Actions (CAPA).

Seven Safety Culture Root Cause Areas

- Productivity Before Safety
- Just Culture
- Safety Leadership
- Managerial Compliance
- Safety Communication
- Safety Competence
- Lessons Learned

Three Core Business Processes

- Strategy
- Risk Assessment
- CAPA

Supplemental data collection was obtained by observing on-site operational activities over a two-day period. Separately, 13 interview sessions, ranging across all leadership levels, were conducted with key personnel to gather additional qualitative insights, while an online survey, replicating the workshop content, was administered to expand participant engagement.

Participants rated the 10 key safety culture domains on a five-point maturity scale; questions for each domain within the workshop and survey assessment methods presented five forced-choice statements, reflecting the following scale: 1) Commencing (0-30%), 2) Coasting (31-60%), 3) Complying (61-80%), 4) Committing (81-90%) and, 5) Commanding (91-100%). Site observations and Interviews were rated against the same maturity scale by the assessment team. All methods obtained both quantitative and qualitative data.

Utilizing four data-collection methods ensured comprehensive data collection and expanded participation of site personnel in the assessment. In total, there were 191 engagements involving MTZ personnel, in which some attended workshops, participated in interviews and/or responded to the survey – representing 68% of the MTZ workforce. All collected data underwent statistical analysis to determine its reliability and dependability by the assessment method used, inclusive of the personal injury and process safety incidents used to establish the link between the assessment methods and actual safety performance.

Data Analysis & Assessment

Following the data collection phase, all quantitative data gathered from workshops, on-site observations, interviews, and surveys was entered into a specialized software called SPSS (Statistical Package for Social Sciences) for computation and analytical processing to compute a safety culture maturity rating score for each applicable domain, and for facilitating predictive analytics regarding which areas might be at risk if improvements aren't made.

To gain deeper insights into MTZ's safety culture, various statistical analyses were conducted. The assessment team

sought to determine whether the ratings were 1) 'shared and stable' (an important feature of organizational cultures), 2) the degree of variance between the four assessment methods, and 3) the significance of rating differences across departments and job roles.

The qualitative data collected (i.e., site observations, discussions, interviews, etc.) was aligned with the maturity domains which highlighted several key themes impacting the safety culture and maturity level at MTZ. The assessment team referenced both required and optional guidance documents to highlight to Martinez Renewables current gaps in existing safety programs, uncover additional hazard areas, and assess emerging risks through a structured, proactive framework—while also reinforcing leadership accountability and promoting active worker participation as essential components of a strong safety culture.

Quality control measures confirmed that the assessment results were both reliable and valid. Additionally, the assessment results correlated with MTZ's historical personnel injury and process safety data from the previous two years. This means the assessment consistently measured what it intended to measure, accurately reflected MTZ's safety culture, and aligned with observed safety performance, thus providing a strong foundation for the conclusions and recommendations presented.

What the assessment revealed

Safety Culture Maturity Model Score

The assessment placed MTZ's safety culture maturity at 65%, categorized as "Complying." This score falls within the 40th percentile when compared to our worldwide benchmark dataset (including the US), specifically six major Oil & Gas companies (82nd percentile) and 19 petrochemical refineries (75th percentile). While MTZ's rating is at the lower end of the "Complying" stage, the organization remains within the same overall maturity category as its industry peers.

Key Safety Culture Domain Focus Areas

Through predictive analytics of MTZ's safety culture assessment data and past personal injury records, the assessment team identified employee ratings in the following key safety culture domains as significant predictors of future personal injury incidents:

- Productivity Before Safety
- Just Culture
- Safety Leadership

Similarly, ratings for the following were found to be predictive of MTZ's process safety incident history:

- Productivity Before Safety
- Risk Assessment
- Safety Leadership

While other key safety culture domains present opportunities for improvement, a prioritized focus on the above identified predictive factors is strongly recommended for optimal impact (e.g., a focused approach is better than trying to do everything all at once). Focusing on the identified areas helps improve the work environment in ways that support safer employee behavior. Based on the assessment results and employee feedback, some high-level solutions are offered for MTZ to consider as it works to strengthen its safety culture.

Summary of Findings

Participant commentary revealed a divergence between managerial and operational perspectives, deficiencies in communication flow, and identified training gaps. Concerns were related to resource allocation, employee morale, and the effectiveness of Safety Leadership. Consistent with the quantitative data, commentary also pointed to a lack of consistency in hazard identification processes, risk assessment methodologies, and continuous improvement endeavors.

Despite the presence of existing safety programs, progress is seemingly constrained by shortcomings in proactive safety management and communication strategies. MTZ currently meets baseline requirements but lacks a robust system for proactive corrective and preventive actions. In sum, the commentary suggests that MTZ's safety culture is predominantly reactive, presenting significant areas of opportunity in leadership engagement, communication, and resource management.

To enhance MTZ's safety management system and address identified weaknesses, it is important to strategically review its existing Operational Excellence Management System (OEMS). This review should specifically consider areas where gaps exist, such as:

- Lone worker policies to ensure employee safety during isolated work.
- Worker participation and consultation processes to improve feedback mechanisms and address concerns about retaliation.
- Hazard identification and risk assessment practices to address inconsistencies and reactive approaches observed in the current system.

These areas show potential discrepancies when compared to recognized safety management principles and contribute to existing vulnerabilities. Addressing these gaps within OEMS, with clear responsibilities and timelines, is recommended to further strengthen MTZ's safety culture and prevent incidents.

To facilitate safety culture enhancement, the assessment team developed nine key recommendations representing critical safety culture enhancement areas for MTZ. Each recommendation includes a prioritized and detailed set of 'Action Items' designed to address the identified gaps and promote a more robust safety culture. These recommendations prioritize key areas such as safety leadership, risk assessment, and communication, providing MTZ with actionable strategies for continuous improvement.

1. Introduction to Safety Culture

1.1 Report Format

This report is structured to provide a comprehensive evaluation of the safety culture maturity at MTZ, aligning with Contra Costa Health RFP #2403-785 requirements. The report includes the following sections:

- **Introduction:** Provides the report format, objectives of the assessment, and background information on safety culture.
- **Scope and Approach:** Details the methods used to conduct the assessment, including data collection and analysis techniques.
- **Evaluation of Findings:** Presents the results of the assessment, including an analysis of Safety Management Systems, Human Factors, and Safety Culture.
- **Recommendations:** Offers specific and actionable recommendations for improving safety culture maturity at Martinez Renewables.
- **Conclusions:** Summarizes the key findings and their implications.
- **Appendix:** Contains supporting information, including the scope of work, comments from MTZ personnel, and additional condensed qualitative and quantitative data.

This structure is designed to present a clear, organized, and understandable evaluation of the safety culture at MTZ, facilitating informed decision-making and improvement efforts.

1.2 Objectives

The primary objective of this assessment, as outlined in the RFP, was to systematically identify both strengths and areas of opportunity requiring improvement within Martinez Renewables' (MTZ) existing safety culture and management systems, with the overarching goal of enhancing overall safety performance at the facility. This assessment specifically aims to evaluate the effectiveness of current management practices and safety culture, focusing on key elements detailed in the RFP's scope of work.

1.3 Background

The concept of safety culture, often used to describe the organizational ethos wherein "safe production is understood to be, and is accepted as, the number one priority", is operationally defined as "the way we do safety around here." It is widely acknowledged that an organization's safety performance is intrinsically linked to its established safety culture. A robust culture of safety comprises shared values, beliefs, perceptions, and behaviors related to safety, and empirical research and practical experience demonstrate that an organization’s safety culture can significantly influence its safety outcomes.

Organizations with a robust and effective safety culture typically exhibit a lower frequency and severity of adverse incidents. Despite the implementation of well-established safety management systems, documented procedures, and qualified safety resources, many organizations continue to experience catastrophic incidents. Numerous public inquiries into major safety catastrophes have consistently highlighted the absence of a positive safety culture as a critical contributing factor.

Figure 1 illustrates the reciprocal Safety Culture model[i]. It shows three connected components vital for safety: **Psychological (Hearts & Minds)** – people’s beliefs about safety; **Behavioral (Daily Actions)** – what people do regarding safety; and **Situational (Safety Guidelines)** – the organization’s formal safety rules. These three primary interactive components – psychological, behavioral, and situational – align with the underlying factors that cause industrial accidents[ii] and are key to understanding a strong ‘culture of safety’.

Daily actions and safety guidelines are visible and significantly influence safety performance (around 80%), while the invisible psychological aspect (how people feel) makes up the remaining 20%. This model emphasizes the strong impact of observable actions and clear guidelines on achieving a safe work environment, supported by people’s underlying commitment to safety[iii].

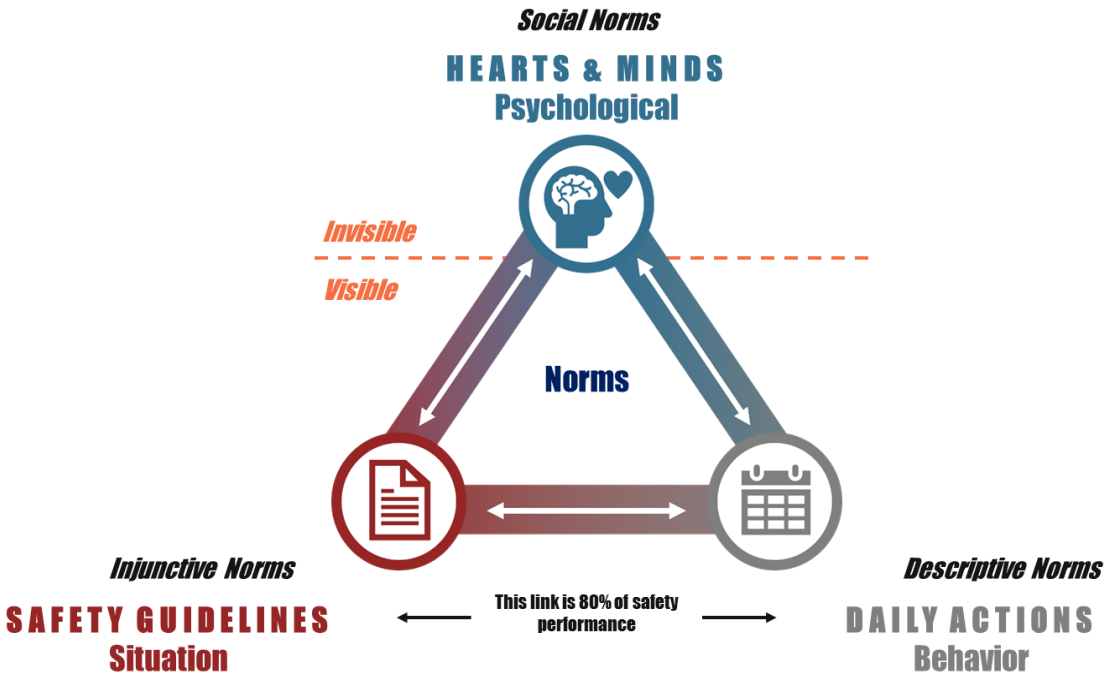

Figure 1: Reciprocal Safety Culture Model

Each of these three (3) components play a distinct role.

1. Social Norms: Hearts and Minds (Psychological) refer to the 'invisible' or unspoken social norms and expectations within a company, essentially what people believe about how safety should work.
2. Descriptive Norms: Daily Actions (Behavioral) are the safety-related actions people regularly take, showing how the company encourages and supports safe behaviors.
3. Injunctive Norms: Safety Guidelines (Situational) are the formal safety guidelines that direct what ought to be done to control risks.

When these three types of norms work together to prioritize safe production, the company's safety culture becomes more effective. To further clarify, Table 1 summarizes the relationship between the norm types, its corresponding component and a refinery specific example:

Table 1: Safety culture norms with refinery examples

Norm Type	Component	Description	Refinery Example	Relevance to Safety Culture
Social Norms	Psychological	Beliefs, values, and attitudes about safety	"Safety is a priority, even if it slows down production."	Sets the overall tone
Descriptive Norms	Behavioral	Observed safety behaviors	"Engineers consistently double-check calculations before start-up."	Influences everyday practices
Injunctive Norms	Situational	Formal safety guidelines	"The refinery has a robust permit-to-work system."	Provides the framework

Figure 2 below, illustrates how an organization develops its safety culture improvement plan ("Strategy") by considering outside influences like regulations, public/customer feedback, and employee/contractor input. This plan then drives two key operational processes: Risk Assessment (identifying potential hazards) and CAPA (Corrective and Preventative Actions to address risks and prevent future issues). Within these processes, the diagram highlights seven Safety Culture Root Cause Areas (i.e., key safety culture domains; not to be confused with a root cause analysis incident investigation) that significantly shape the company's safety culture, categorized under three types of norms:

- **Social Norms**: These represent the underlying beliefs about safety, such as the perceived balance between getting work done quickly versus safely ("Productivity v. Safety") and the fairness of the company's response to incidents ("Just Culture")[iv].
- **Descriptive Norms**: These reflect everyday safety-related behaviors, including how leaders demonstrate their commitment to safety ("Safety Leadership") and the extent to which managers adhere to safety rules ("Managerial Compliance").
- **Injunctive Norms:** These are the formal aspects of safety, including how safety information is shared ("Safety Communications"), ensuring employees have the necessary skills ("Safety Competence"), and the process for learning from past events ("Lessons Learned").

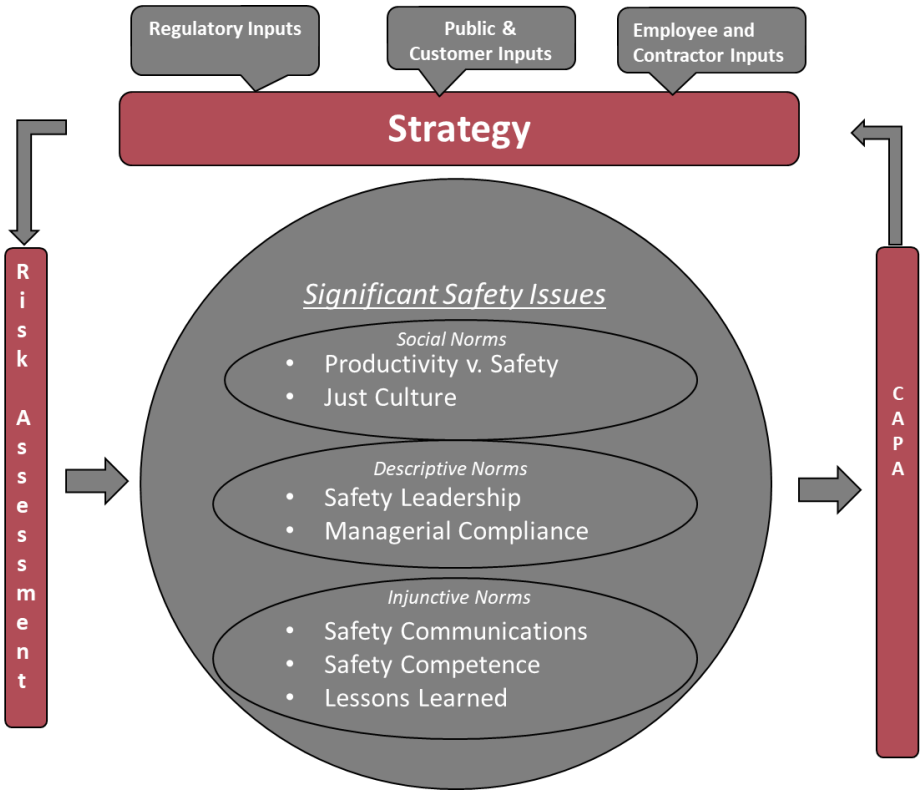

Figure 2: Continual Improvement Cycle to enhance your culture of safety

The diagram emphasizes that these seven Safety Culture Root Cause Areas, operating within the Risk Assessment and CAPA framework, are central to the overall safety culture improvement strategy, which is also informed by external standards and best practices. This acknowledges that a refinery's safety culture is not isolated but is influenced by its external environment.

Important Operational Features of a Culture of Safety

Academic research, public inquiries into industrial catastrophes, and loss of containment studies have consistently identified seven Safety Culture Root Cause Areas discussed above across these three key cultural norms: **Social**, **Descriptive**, and **Injunctive**. These elements require focused attention to prevent adverse events.

Social Norms

Productivity Before Safety relates to the relative priority of productivity and safety, particularly when safety is viewed as a cost, not an investment. Ideally, organizations would adopt the philosophy that '*safe production*' is the number one priority, aligning all their processes, resources, and actions accordingly[v].

Just Culture refers to a positive atmosphere with regards to errors and mistakes. Where it is poor, serious problems are often concealed because employees fear blame, punishment, or criticism from managers and colleagues.

Descriptive Norms

Safety Leadership refers to when management and the corporate culture consistently promote the identification of risks and opportunities for improvement. Without such leadership, poor safety decisions are often made due to factors such as leaders not fully understanding their safety responsibilities, lacking the authority to address safety issues, or not being well-versed in the safety management system relevant to their role[vi].

Managerial Compliance refers to routine Managerial Compliance to standards, rules, and procedures[vii], Managerial non-compliance has led to everyday routine operations and maintenance triggering around 80% of the world's process safety disasters. This indicates that cultural improvement initiatives should primarily focus on management and their compliance to rules, procedures, and standards; although it is recognized there can also be non-compliance amongst the workforce and contractors.

Injunctive Norms

Safety Communications are key and are primarily concerned with preventing problems of '*miscommunication*'; where critical safety information is not being relayed to decision-makers and/or the message has been diluted as it reaches its targeted recipients. Poor communication has been shown to be a major contributor in many workplace fatalities[viii]. The principle for addressing such issues is to recognize that "*a communication not received, is not a communication at all*". This means organizations need to concern themselves with the challenge of ensuring there are sufficient two-way communication and feedback channels to ensure any message is received, understood, and acted upon.

Safety Competence is defined as "*the ability of an individual and/or organization to do a job properly*". Competency failures are highlighted in many inquiries into industrial catastrophes where there were false expectations that direct hires and contractors were highly trained and competent. Competence is multidimensional and includes [a] *Cognitive Competence*: the ability to learn facts and principles; [b] *Functional Competence*: the ability to make decisions, plan work, do the work, and solve problems; and [c] *Enabling Competence*: the ability to lead, communicate, interact with others, and work in a team. Competent people are highly educated in their domains (e.g., refining), understand any background theory, possess practical experience of applying that theory in a wide range of situations, and can problem solve and articulate any requirements to others[ix].

Lessons Learned refers to situations where critical safety information is extracted from near-misses and/or adverse events; where the lessons are shared in a timely manner; and solutions applied and enforced. To be termed a *lesson*, it must be [a] an issue that had a significant impact on everyday operations; [b] valid (i.e., factually and technically correct); [c] applicable in that it identified a specific process, decision, or failure; and [d] must resolve the issue[x]. To be termed a *lesson learned*, there must be an *observable and measurable* change in the behavior(s) associated with the lesson that improves performance in some predefined way.

The connection between social, descriptive, and injunctive norms and various safety outcomes has been confirmed through safety culture research [ii].

2. Scope and Approach

This Safety Culture Maturity Assessment was conducted to fulfill the requirements outlined in Contra Costa Health RFP #2403-785. The assessment's scope included a comprehensive evaluation of MTZ's safety culture and management systems, encompassing human factors, safety program elements, and organizational practices, as defined by the RFP.

To evaluate the safety maturity of MTZ's existing safety culture, a comprehensive assessment was conducted at the refinery from February-March 2025.

2.1 Sample

The total workforce at MTZ is comprised of 280 employees. To achieve a statistically robust sample size for the assessment, a target of 162 responses was set. In total, a sample of 191 was achieved across four data collection methods. The assessment included participation from various levels of the organization, including senior and middle management, supervisory staff, and associate-level employees, to ensure a holistic evaluation of MTZ's safety culture.

2.2 Methodology

The assessment employed a multi-faceted methodology for data collection. This included a review of safety-related documentation, on-site activities, and an online survey. The document review involved a comprehensive analysis of approximately 40 document types, including processes, procedures, meeting minutes, incident reports and audits. On-site activities included workshops, site observations, and interviews. Four on-site workshops were conducted with job-function specific groups engaging in discussions and providing ratings for statements related to each of the key safety culture domains. Direct site observations allowed for in-situ discussions, and a total of 30 total interviews with site personnel were conducted to clarify issues identified during the workshops. An online survey, mirroring the workshop content, was administered to expand participant engagement.

2.3 Rating Scale

At the workshops, participants indicated their choice via forced choice response by marking a box next to each of their chosen statements on the recording sheet. These worksheets had a text box for each key safety domain topic, where they could point the assessment team to evidence to support their ratings. Additional space was provided for participants to indicate where improvements could be made.

The Safety Culture Maturity rating scale in this assessment was structured as follows:

- *Commencing* refers to 'beginning something'. In other words, this level of an entity's Safety Culture maturity reflects that current safety processes are rudimentary, ad-hoc and chaotic. They lack structure, with safety success largely depending upon the knowledge, skills, and abilities of those doing the work at the 'coal face'. This level reflects aggregate ratings between **0 - 30%.**
- *Coasting* refers to 'putting very little effort into something'. This level of maturity reflects where entities are making minimal effort to develop the necessary safety strategies and processes and are just going through the motions, in the belief they can deal with whatever they confront. There is no clear direction or systematic attempt, to improve safety. This level reflects aggregate ratings between **31 - 60%.**
- *Complying* is defined as 'meeting the minimum standards'. This level of maturity indicates the goal of an organization is to just meet the minimum requirements which satisfy the regulators, auditors, customers, and stakeholders to protect people, assets, and the environment. This level reflects aggregate ratings between **61 - 80%.**
- *Committing* is defined as 'putting a lot of effort into something'. This level of maturity reflects where an organization has pledged itself to going beyond minimal compliance in safety and is actively striving to achieve its Safety Culture mission and goals to greatly reduce the potential for harm in the workplace and the community. This level reflects aggregate ratings between **81 - 90%.**
- *Commanding* refers to an organization being 'in a commanding position'. This level of maturity reflects that continual Safety Culture improvement is in the entities' DNA at all levels. All work is conducted with safe production being a matter of course, with horizon scanning for potential safety issues a routine part of everyday activities. This level reflects aggregate ratings between **91 - 100%.**

2.4 Data Processing

Following the completion of each workshop, all documentation was transcribed and collated by the assessment team.

Participants were requested to provide evidentiary support for their assigned ratings and to offer suggestions for future improvements. This data was subsequently categorized according to the established safety culture maturity assessment topics.

Interview responses were similarly categorized; based on the safety culture maturity rating scale, each response was assigned a maturity score, determined by its alignment with the defined criteria within the safety maturity assessment tool. These quantitative scores were then entered into SPSS (Statistical Package for the Social Sciences), which is a software program the assessment team used to analyze data collected from the surveys and interviews to identify patterns and trends, for statistical analysis.

The qualitative data gathered from the workshops, site observations, interviews, and the online survey was utilized to provide contextual understanding and interpretation of the quantitative ratings. See Appendix 1 for the analysis on how the safety culture maturity rating was determined across multiple domains.

3. Evaluation of Findings

Data Quality
After data was captured and processed, various statistical analyses were conducted. These analyses aimed to identify any significant differences in maturity ratings based on factors such as workshop participation, departmental affiliation, employment category, work location (e.g., on-site or remote), and reported injury history within the past two years.

The analytical approach included the application of one-way analyses of variance ("ANOVAs") to test for significant differences in ratings. The results of these ANOVAs were subsequently subjected to tests to determine the statistical significance of any observed differences, and ensure any differences were not mistaken. Additionally, regression analyses were performed to conduct predictive analytics.

Following this data quality analysis, the consistency and validity of the measurement methods were evaluated.

Consistency of Measurement
Reliability, in the context of this assessment, refers to the consistency of measurement achieved through the assessment methods, such as the Safety Culture Maturity Assessment workshops, site observations and discussions, face-to-face interviews, and the supplemental online survey. The assessment team determined there was a high degree of consistency among the responses obtained. The detailed breakdown of reliability across each assessment method is available within Appendix 1.

Validity of Measurement
The reliability of a measure is also analyzed to see how well the assessment relates to actual performance. MTZ provided the assessment team with their personal injury and process safety records for the past two years. To prepare these records for statistical analysis, the assessment team made a frequency count by month and standardized the data (see Appendix 2 for reference). This analysis provided confidence that any correlation between the incident data and the safety culture maturity ratings are likely to be meaningful.

MTZ's overall safety culture maturity score (an average score for all the assessment methods combined) was correlated with MTZs personal injury and process safety incident records. This helped the assessment team determine how well the assessment ratings reflect real-world safety outcomes. The detailed breakdown of the assessment teams findings are available within Appendices 1 and 2.

This analysis demonstrated the reliability and validity of the data collected through various assessment methods. While some nuances exist between individual methods, the overall assessment provides a sound basis for evaluating MTZ's safety culture.

The following sections will present the findings of the evaluation, organized according to the three key areas outlined in the RFP: **Safety Management Systems**, **Human Factors**, and **Safety Culture**. Each section will detail the evaluation findings, incorporating the insights gained from the data analysis to provide a comprehensive understanding of the refinery's current state and areas for potential improvement.

3.1 Safety Management Systems

Martinez Renewables is developing a structured framework for managing its Health, Environment, Safety, and Security (HESS) responsibilities through an Operational Excellence Management System (OEMS). It's important to understand the evolution of MTZ's management systems to appreciate the current context. Previously, Marathon, the parent company, utilized the Responsible Care 14001 management system. This system, developed by the American Chemistry Council (ACC), was significant because it went beyond the scope of the ISO 14001 environmental management standard to include a more comprehensive approach encompassing all aspects of HESS.

In 2021, following Marathon's decision to discontinue its membership with the ACC, the company transitioned to an Operational Excellence Management System (OEMS). MTZ Renewables is currently in the process of building out its specific version of OEMS, with a company-wide rollout scheduled throughout 2025.

Given this transition period, coupled with ongoing organizational changes, MTZ should be hyper-aware of potential risks as it develops its OEMS, and the development of a Significant Risk Table to reflect this critical awareness. This table will

serve as a tool to prioritize MTZ's annual safety goals, focusing on the risk/consequence profiles that pose the greatest potential for harm. The development of this Significant Risk Table is a key component of MTZ's broader Strategic Plan, falling under the initiative to establish "Safe Stable Operations." This strategic alignment demonstrates an intent to integrate safety considerations into the company's long-term objectives.

While MTZ is developing a system aimed at proactive risk management (OEMS with the Significant Risk Table), the assessment revealed several vulnerable areas where the *implementation* and *effectiveness* of existing SMS elements would benefit from additional attention.

- **Data Integration and Analysis:** Currently, the independent data files for Personal Injury and Process Safety Management (PSM) incidents present some challenges to efficient and integrated analysis. Notably, correlating PSM incident responsibilities with Area Team information within the Personal Injury dataset has required significant manual effort by ESS staff. This indicates a need for improved data management within the SMS to facilitate comprehensive safety analysis.

- **System Awareness and Utilization:** Interview data revealed inconsistencies in personnel's awareness and understanding of various SMS components. For instance, some personnel were unaware of how safety communication was circulated (e.g., via the Monthly Sequential), and there were varying levels of familiarity with systems like Intelex. This suggests a need to improve communication and training related to the SMS to ensure that all employees understand its elements, when to utilize each, and their roles in its implementation.

- **Feedback and Improvement Mechanisms:** While systems exist for reporting incidents (e.g., Intelex, Eagle Eye), the assessment highlighted concerns about the effectiveness of feedback loops and action item tracking. Some participants expressed uncertainty about how their safety concerns are addressed and a lack of visibility on the status of corrective actions. Furthermore, there was a perception that some recommendations were closed out prior to meeting their true intent by the employees who submitted their concern. This indicates a need to strengthen processes for tracking, communicating, and verifying the completion and effectiveness of corrective and preventive actions.

- **Integration and Consistency:** Observations and interviews revealed inconsistencies in how safety practices and procedures are applied across different departments and teams. For example, there were differing perceptions on the effectiveness of risk assessments; these are a fundamental bedrock of industrial safety.

3.2 Human Factors

The evaluation of human factors is a critical component of this assessment, as explicitly required by the Contra Costa Health RFP #2403-785, which calls for an evaluation of the human factors and systems concerning the management practices and safety culture at the refinery.

While the assessment addresses various key safety culture domains, each of these domains is fundamentally influenced by human factors. Human factors encompass the cognitive, physical, and organizational aspects that affect human interactions within a system. In this context, it involves understanding how personnel's capabilities, limitations, and behaviors interact with safety management systems and practices at MTZ.

This section delves into specific human factor domains that significantly impact their effectiveness. These key safety culture domains include Managerial Compliance and Safety Competency, both representing a critical interface between organizational systems and human performance.

3.2.1 Managerial Compliance

Managerial Non-Compliance to established rules and procedures has been a contributing factor in numerous major process safety disasters worldwide, spanning several decades. It is worth noting that staffing constraints are impacting Managerial Compliance at MTZ. For instance, feedback indicated that while the parent Marathon Petroleum Corporation (MPC) Refining Standard Practices (RSPs) exceed legislative requirements, MTZ faces procedural gaps and resource limitations, including staffing and time, which hinder its ability to meet these standards.

Additional commentary suggested a reactive operational approach, rather than a proactive strategic one, and cited instances of procedural deviations during critical operations, such as furnace start-ups. These comments explain the

lower ratings assigned to Managerial Compliance and, more importantly, highlight critical process safety issues that demand immediate attention from MTZ.

3.2.2 Safety Competency

Training serves as a foundational element in developing safety proficiency, providing individuals with the procedural knowledge and specific skills necessary for the safe execution of their work functions. However, practical experience also plays an important role in knowledge acquisition and the development of safe work behaviors, accounting for approximately 28% of the knowledge required for effective job performance[xi,xii] . Competence, therefore, is a composite of knowledge, comprehension, and practical skill. Critically, achieving adequate competence levels extends beyond mere participation in training sessions, requiring on-the-job experience and practical application to solidify understanding and skill development.

Safety Competency gaps are evident at MTZ, as indicated by both the maturity ratings and participant feedback regarding the quality of safety training.

The prevalent reliance on computer-based training (CBT) for certain aspects, coupled with perceived deficiencies in trainer effectiveness, has been highlighted as a concern. Participants noted that while classroom and CBT sessions offer learning opportunities, they do not guarantee competency. Job roles and responsibilities, while defined, are not perceived to accurately reflect all required duties. While MTZ has undertaken extensive operator re-training and re-qualification efforts post-incident, and utilizes CBTs for regulatory compliance and remote learning, the importance of robust hands-on training was consistently emphasized during the assessment. Notably, the expected job shadowing component did not surface in discussions with personnel or during site observations.

The current training approach, heavily reliant on textbook materials, coursework, drawings, and a four-day co-working period (followed by four nights) conducted individually, appears to lack a consistently applied and adequately emphasized job shadowing element, according to assessment feedback. This perceived deficiency directly impacts competency, as operations personnel perceive the training as rushed and inadequate. Additionally, employees reported frequent assignments to roles misaligned with their existing skills and qualifications.

Consequently, while training programs are in place, the methods used to ensure training quality and facilitate the practical application of acquired knowledge remain unclear. This perceived lack of sufficient practical application hinders the development of necessary skills and ultimately affects overall competency.

3.3 Safety Culture

Maturity Level

MTZ's overall safety culture rating was determined to be **65 percent**, placing the organization at the **40th percentile** within our worldwide benchmark dataset (including the US) as shown in Figure 3 below. This dataset encompasses safety culture ratings across a diverse range of industries, including six upstream Oil & Gas majors (82nd percentile) and 19 petrochemical refineries (75th percentile). MTZ's rating corresponds to the '**Complying**' stage on the maturity ladder. While MTZ is demonstrating progress, additional effort is needed to align its safety culture maturity with that of its higher-performing industry peers. The following sections provide insights into the maturity ratings by several different attributes.

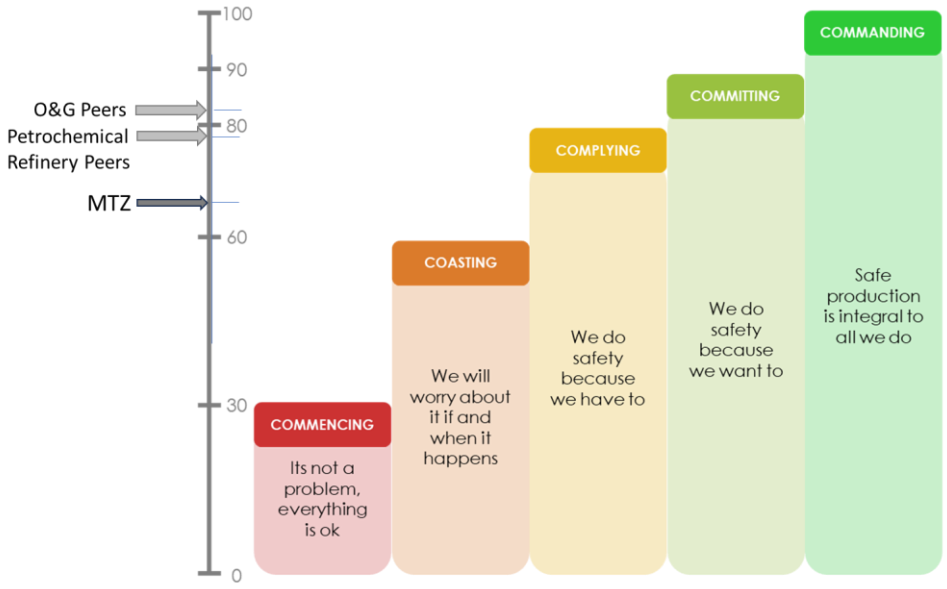

Figure 3: MTZs Safety Culture Maturity rating and peer group ratings

3.3.1 Mean average maturity ratings by data collection method

The maturity ratings were analyzed based on the data collection methods employed with a summary in Figure 4 below. The analysis revealed that MTZ's safety culture is generally stable and shared across the organization, which is a fundamental characteristic of an effective safety culture. See Appendix 1 for specific data analysis conducted.

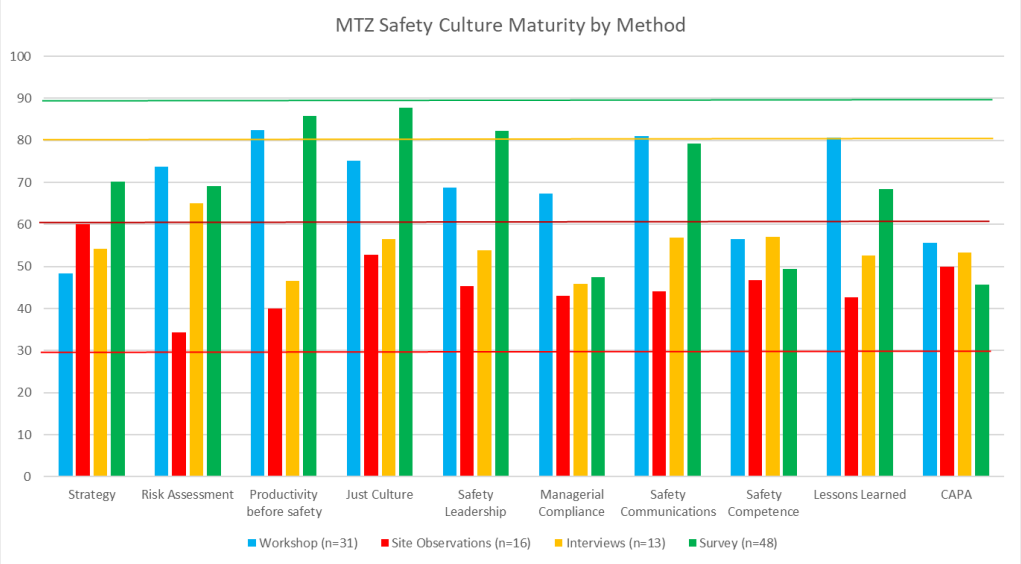

Figure 4. MTZ Safety Culture Maturity by Method

3.3.2 Demographic Analyses

The maturity ratings were further analyzed by the demographic data collected, which included department, job role, remote working status, and injury/near-miss reporting. Due to the limited number of participants indicating remote work (one individual), this category was excluded from the comparative analysis. Detailed individual rating tables for each assessed topic, categorized by demographic data, are available in Appendix 1.

3.3.2.1 Mean average maturity ratings by Department

Statistical analysis revealed no significant differences in ratings across the various departments. However, it was observed that Engineering, Operations and Technical Services tended to report lower ratings, falling within the 'Coasting' maturity range, while other departments generally rated within the 'Complying' range. See Appendix 1 for additional details related

to Figure 5 below.

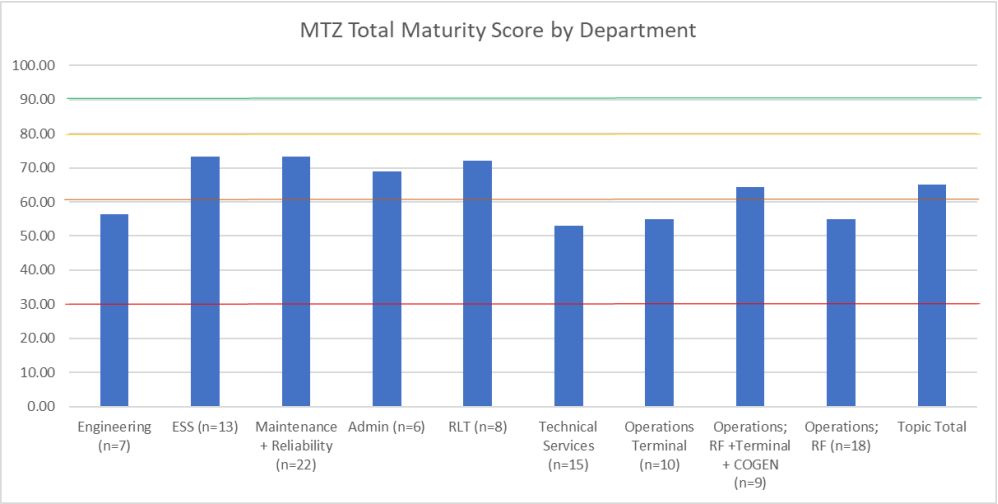

Figure 5. MTZ Total Maturity Score by Department

3.3.2.2 Mean average maturity ratings by Job Role

An analysis of the data categorized by job role revealed a statistically significant difference ($p<.05$) in the perception of MTZ's safety culture between Operators and Technicians, and others, falling within the 'Coasting' range while other departments generally rated within the 'Complying' range. In other words, this shows that the difference between groups is statistically meaningful, with less than a 5% chance that the result happened by random chance. See Appendix 1 for additional data related to his analysis.

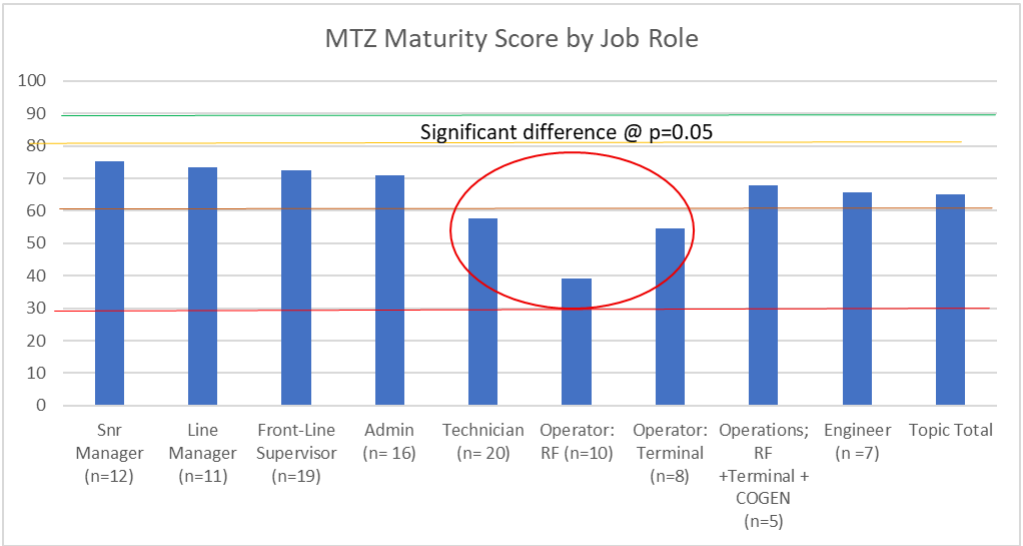

Figure 6. MTZ Maturity Score by Job Role

This finding, as shown in Figure 6, aligns with qualitative feedback received from various personnel on-site and may explain the observed lower rate of survey completion among a significant portion of operators, despite multiple invitations. It is important to acknowledge that this lower survey participation may be attributed to a combination of factors, including both internal dynamics within MTZ and potential external influences such as initial survey timeout issues.

Regardless of the specific contributing factors, this warrants further investigation to understand the relative impact of each and to identify effective strategies for improving participation in future assessments. Exploring avenues such as engaging union facilitators external to MTZ from USW Local 5 may offer a greater sense of trust and facilitate more open communication with MTZ operators, potentially leading to improved participation.

3.3.2.3 Mean average maturity ratings by injury reporting

The assessment data was analyzed to compare the safety culture ratings of participants who had reported an injury or near-miss with those who had not. Typically, individuals who have experienced an incident or injury tend to provide more negative safety culture ratings. However, this pattern was not detected at MTZ. In fact, the injury reporting group generally provided slightly more positive ratings, though these differences did not reach statistical significance.

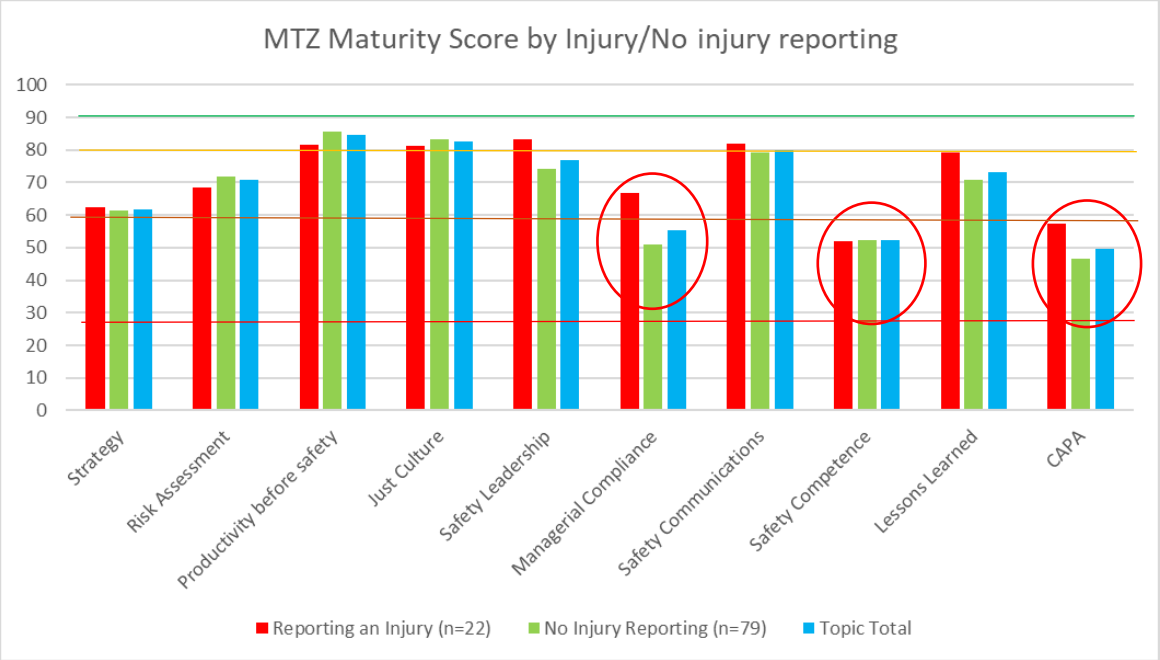

Figure 7. MTZ Maturity Score by Injury/No Injury reporting

As per Figure 7, Managerial Compliance, Safety Competence and Corrective & Preventive actions were rated at the 'Coasting' maturity level. See Appendix 1 for additional data analysis.

3.3.3 Predictive Analytics (Personal Injury)

The assessment team analyzed the different measurements of MTZ's safety culture, using multiple regression analysis, to see if any safety culture components were related to the number of injuries and incidents that occurred.

Using a statistical method, a value was calculated (i.e., adjusted R-squared) that indicates how well the overall safety culture method predicts the frequency of personal injuries. A higher value means that these safety culture components have a stronger connection to how often injuries happen.

For the specific numbers of incidents that occurred between 2023 and 2025, please refer to Appendix 2.

The multiple regression analysis identified **'Productivity Before Safety,' 'Just Culture'**, and **'Safety Leadership'** as significant predictors of MTZ's personal injury experience. This finding underscores the importance of prioritizing 'safe production' through effective resource allocation and strategic planning, as well as the need to enhance MTZ's Safety Leadership practices. See Appendix 1 for additional details.

Productivity Before Safety

The multiple regression analysis revealed that addressing the *Productivity Before Safety* topic would significantly enhance MTZ's overall safety culture maturity. This highlights the critical need to prioritize and adequately resource safety initiatives to ensure safe production.

Assessment ratings indicated a general acknowledgment of safety's importance, although production demands were perceived to sometimes take precedence. Notably, a divergence in ratings was observed between operators and the management structure, with operators consistently providing more negative ratings regarding both safety prioritization and resource allocation. Similarly, Technical Services, Operations, and ESS departments exhibited more negative views on

safety priority and resourcing compared to other departments, with Administration and the Refinery Leadership team (RLT) demonstrating the most positive outlook, indicating a potential polarizing disconnect within the organization.

Commentary indicated instances where operators initiated operational shutdowns due to perceived safety risks, at times diverging from managerial instructions to maintain production. While the exercise of stop-work authority in these situations is positive and should be encouraged at all levels, it may point to potential differences in risk perception or communication between management and operations, particularly when production demands could be seen by operators as conflicting with safety. Further review would be beneficial to understand the frequency and organizational awareness of these occurrences.

Just Culture

The multiple regression analysis for site-observation/discussion data also identified *Just Culture* as a significant factor influencing MTZ's safety culture. While employees generally expressed a degree of comfort in challenging leadership on safety matters, concerns regarding job security when reporting safety issues were also evident. This latter finding may partially explain the observed decline in employee personal injury reporting since April 2024 as shown in Appendix 2.

Significant disparities in 'Just Culture' ratings were observed across departments and job roles. Administrative functions and Refinery Fuels (RF) personnel provided notably lower ratings compared to other departments, while the RLT assigned the highest rating (see Appendix 1 for detailed rating tables). Similarly, line management exhibited more positive ratings than operators, technicians, and administrative staff.

Commentary indicated instances of perceived retaliation against operators and concerns among ESS employees about communicating with supervisors. RF personnel also expressed apprehension about reporting unit knowledge gaps due to inadequate training. These findings suggest the presence of a 'fear culture', which has been strongly correlated with a range of injuries, from minor first-aid incidents to serious injuries and fatalities (SIFs).

Safety Leadership

Predictive analytics, based on data from face-to-face interviews, identified 'Safety Leadership' as a significant factor influencing MTZ's safety culture. While leadership was generally perceived as frequently assessing the safety implications of operational decisions and demonstrating a reasonable understanding of their Safety Management System (SMS) responsibilities, concerns were raised regarding their willingness to act decisively to rectify safety issues. Notably, non-managerial staff reported a lack of accountability for leaders' own safety performance and that of their teams.

Commentary highlighted instances where supervisors were perceived to be engaging in unsafe work practices, contributing to a perceived absence of accountability for poor decision-making. The practice of framing such incidents as 'teaching moments,' attributed to staffing constraints that preclude employee termination, was also noted.

3.3.4 Predictive Analytics (Process Safety Incidents)

A multiple regression analysis was also performed to identify safety culture topics associated with MTZ's process safety incidents. This analysis determined that **'Productivity Before Safety'**, **'Risk Assessment'**, and **'Safety Leadership'** are predictive factors for MTZ's process safety incident history. See Appendix 2 for additional details. As 'Productivity Before Safety' and 'Safety Leadership' have been previously addressed, the subsequent discussion will focus on the implications of 'Risk Assessment' findings.

Risk Assessment

Risk Assessment is a fundamental component of maintaining safe work environments, as recognized within Cal/OSHA 5189 Process Safety Management for Acutely Hazardous Materials, CCR Title 19, Division 5, Chapter 2 California Accidental Release Prevention (CalARP) Regulations and County ISO (County Ordinance Code Chapter 450-8). Predictive analytics indicated that a focused effort on enhancing *Risk Assessment* practices would significantly improve MTZ's overall safety culture maturity and contribute to a reduction in Process Safety Management (PSM) incidents.

Notably, Risk Assessment ratings differed between operations and technical services, and other departments and job roles.

MTZ generally demonstrates a commitment to formal risk assessment, with a system in place for both non-critical and critical tasks. There is active support and involvement in risk reduction across organizational levels, and personnel report being consulted about the strengths and weaknesses of this system. These elements indicate a positive foundation for

managing risk within the organization.

However, there are areas needing attention to strengthen risk assessment practices. Operators and technicians indicated the presence of a more informal risk assessment approach alongside recent efforts to formalize the system for critical tasks. They also cited inconsistencies in management support for the risk assessment system and its processes. Commentary suggests that risk assessments are often conducted reactively, following problem identification, rather than proactively to prevent issues.

4. Recommendations

Based on the findings of the Safety Culture Maturity Assessment, the following detailed recommendations are provided to Martinez Renewables to enhance their current safety culture. These recommendations are informed by both the assessment findings and the valuable input received from participants.

Recommendations are prioritized based on their potential impact on reducing personal injury and process safety incidents and the feasibility of implementation. The timeframes provided are intended as guidelines, and MTZ should adjust them based on their specific circumstances and resources.

1. Prioritizing Safety and Resource Allocation (High-Priority)

To effectively prioritize safety and ensure adequate resources, Martinez Renewables should ensure the planned comprehensive review of staffing levels across all departments should focus on areas identified as understaffed, such as Operations, RF Operators, and the control room. This review should include a thorough analysis of workload and staffing requirements to determine optimal staffing levels and a phased plan to address any shortages, considering both the number of personnel and their experience levels. Strategies to improve employee retention, such as competitive compensation and career development opportunities, should be implemented to reduce turnover and its associated disruptions. Cross-training personnel to provide coverage during staff shortages and reduce reliance on overtime should also be considered.

Furthermore, safety initiatives must be adequately funded and supported, ensuring that all site personnel have the necessary resources, equipment, and time to effectively implement safety programs and address identified hazards. It is critical to reinforce the importance of safe-production by developing and communicating a clear policy that explicitly prioritizes safe-production. Metrics should be established to track both safety and production performance (e.g., monitoring the frequency of stop-work authority use and where) ensuring that safe-production is given equal weight in performance evaluations, and employees who prioritize safety and identify potential hazards should be recognized and rewarded.

Participant Input: Survey participants emphasized the need to “improve staffing” and “hire more staff (operators and maintenance personnel).” They also called for valuing “time off all and provide assistance for workload” and to “support workforce as possible with able/sufficient resources to do it well.” These comments strongly support the recommendation for a comprehensive review of staffing and resource allocation.

Action Items (Prioritization and Timeframe):

- Establish a clear and regular process for departments to request and prioritize safety initiatives for funding. This process should include maintaining and periodically reviewing a distinct safety priority request list to inform budget allocation decisions: *High, Immediate*
- Develop and communicate a safe-production policy by creating a written document outlining the prioritization of safety and tracking its distribution and related communication sessions: *High, Short-term*
- Ensure planned comprehensive staffing review focuses on Operations, RF Operators, and the control room, and generate a report that identifies understaffed areas and recommends solutions based on workload analysis: *High, Short-term*
- Establish at least three measurable safety metrics at each department level and integrate them into the performance evaluation process, tracking these metrics regularly and documenting the updated evaluation process for implementation in the next review cycle: *Medium, Short-term*
- Develop and communicate initial employee retention strategies, including compensation analysis and defined career development opportunities, and track impact on employee turnover after 6 months: *Medium, Medium-term*

2. Fostering a Just Culture (High Priority)

To foster a more robust Just Culture, Martinez Renewables should build upon its existing anonymous reporting system by implementing additional measures to ensure its effectiveness. While the anonymous system provides a channel for reporting safety concerns and near-misses, it should be complemented by a clear and well-communicated policy on non-retaliation for reporting safety issues, with training provided to all employees to reinforce this policy. A transparent process for promptly investigating reported concerns and providing feedback to the reporter, even if anonymously, is essential to build trust and encourage continued use of the system. Establishing clear accountability measures for safety performance at all levels will further emphasize the importance of safety and encourage a culture

where employees feel valued and heard.

Participant Input: While employees generally expressed a degree of comfort in challenging leadership on safety matters, concerns regarding job security when reporting safety issues were also evident. Commentary indicated instances of perceived retaliation against operators and concerns among ESS employees about communicating with supervisors. These findings suggest the presence of a 'fear culture', which has been strongly correlated with a range of injuries, from minor first-aid incidents to serious injuries and fatalities (SIFs).

Action Items (Prioritization and Timeframe):

- Develop and communicate a clear non-retaliation policy by creating a written document explicitly prohibiting retaliation against employees who report safety issues and outlining the consequences of such actions. This policy should be communicated through various channels, including mandatory training for all employees, with completion tracked to ensure understanding and adherence.: *High, Short-term*
- Implement a transparent investigation and feedback process for reported safety concerns by establishing a documented procedure for promptly investigating all reported issues, regardless of the reporting method. This process should include a mechanism for providing feedback to the reporter, even anonymously (where possible without compromising confidentiality), on the status and outcome of the investigation, with timelines for each stage clearly defined and monitored: *Medium, Short-term*
- Establish clear safety performance accountability measures at all levels by defining specific safety responsibilities and expectations for individuals and teams across the organization: *Medium, Short-term*

3. Improving Communication (High Priority)

To enhance communication, Martinez Renewables should develop a comprehensive communication plan. This plan should outline clear channels for distinct types of safety information, utilizing a variety of communication methods to ensure effective dissemination and accessibility. This should include improving communication within existing structures such as the Joint Health & Safety Meetings and ensuring that safety information reaches all levels of the organization, from management to hourly work groups.

The plan should also specify how changes made from incident investigations and the reasoning behind ESS decisions will be communicated. A system for documenting and tracking safety communications should be established to ensure that information is received, understood, and acted upon. Feedback mechanisms should be improved to ensure that employee concerns, regardless of reporting channel, are heard, addressed in a timely manner, and contribute to organizational learning and improvement. Crucially, providing safety leadership training to all supervisors and managers will equip them to model safe behaviors, reinforce safety expectations, and actively promote open two-way communication.

Action item management should be improved by developing a system for tracking action items from identification to completion, assigning clear responsibilities and deadlines to avoid confusion on who is responsible, next steps to resolve, and timelines.

Participant Input: Numerous participants highlighted communication as a key area for improvement. Suggestions included: “Joint Health & Safety Meeting Communication,” “Communicate Formal Strategic Safety Culture to all levels,” “Improve communication for process, safety, health, etc., top down,” “Improve the communication to hourly work group on the changes made from incident investigations,” and “Communicate the reason for decisions…especially when decisions are made for ESS reasons.” There were also calls for “Better two-way street communication”.

Action Items (Prioritization and Timeframe):

- Develop a comprehensive safety communication plan, specifying channels and methods to reach all employee levels for various information, and track communication dissemination back to employees as appropriate: *High, Medium-term*
- Provide safety leadership training focused on communication skills to all supervisors and managers, evaluating its impact on team communication and safety engagement: *High, Medium-term*
- Develop and implement an action item tracking system with clear responsibilities, deadlines, and effectiveness monitoring: *High, Medium-term*

4. Enhancing Safety Leadership (Medium Priority)

To enhance safety leadership effectiveness, Martinez Renewables should implement initiatives to strengthen leadership's commitment to safety and improve accountability. This includes ensuring that leaders consistently demonstrate their commitment to safety by actively participating in safety activities, modeling safe behaviors, and prioritizing safety in decision-making. Given the strong correlation observed between safety leadership effectiveness and overall safety performance at MTZ, as evidenced by its significant influence on personal injury and process safety management data, a comprehensive approach to enhancing leadership practices is warranted. To achieve this, MTZ should consider implementing the following best practices:

- Develop a Safety Leadership matrix that specifies expected leadership behaviors in terms of “demonstrate safety leadership, communicate about safety, prioritize safe production, encouraging employee engagement, making safety personal, and follow-up with employees concerns” and “leaders’ knowledge of SMS, responsibilities, accountabilities, and authority to fix things.”
- Increasing the transparency of leaders' safety considerations in decision-making processes (e.g., reviewing safety decisions with safety committees).
- Ensuring consistency between leaders' verbal and behavioral safety practices.
- Mandating formal safety leadership training for all individuals in leadership positions.
- Promoting leaders as safety role models who can effectively communicate safety culture objectives to subordinates.
- Eliminating ambiguity surrounding Permitting and Management of Change (MOC) requirements.

Leaders should be provided with training to enhance their understanding of their Safety Management System (SMS) responsibilities and equip them with the skills to effectively address safety issues. Accountability mechanisms should be established to ensure that leaders are held responsible for their own safety performance and the safety performance of their teams. This includes addressing instances of supervisors engaging in unsafe work practices and ensuring that poor decision-making has appropriate consequences. MTZ should move beyond framing safety lapses as mere "teaching moments" and implement systems that drive genuine accountability.

Participant Input: While leadership was generally perceived as frequently assessing the safety implications of operational decisions and demonstrating a reasonable understanding of their Safety Management System (SMS) responsibilities, concerns were raised regarding their willingness to act decisively to rectify safety issues. Notably, non-managerial staff reported a lack of accountability for leaders' own safety performance and that of their teams. Commentary highlighted instances of supervisors engaging in unsafe work practices without any perceived consequence, and a perceived absence of accountability for poor decision-making. The practice of framing such incidents as 'teaching moments,' attributed to staffing constraints that preclude employee termination, was also noted.

Action Items (Prioritization and Timeframe):

- Establish clear accountability mechanisms for leaders' safety performance and address instances of unsafe behaviors by defining consequences for unsafe actions and ensuring consistent application: *High, Short-term*
- Provide leadership training focused on SMS responsibilities, safety accountability, and effective safety practices, incorporating the best practices listed above: *High, Medium-term*
- Review and revise policies to ensure that safety lapses are addressed with appropriate and consistently applied consequences, while reinforcing that disciplinary actions cannot be publicized due to Company Policy: *Medium, Short-term*
- Develop and implement a system for leaders to actively participate in safety activities and consistently model safe behaviors for their teams: *Medium, Medium-term*

5. Enhancing Risk Assessment Practices (Medium Priority)

To enhance risk assessment practices, Martinez Renewables should cultivate a proactive and comprehensive approach to risk management, ensuring that risk assessment is integrated into all levels of the organization and applied consistently across all activities. This involves strengthening the existing risk assessment framework and addressing specific areas where improvements were identified during the assessment. Crucially, MTZ should ensure all personnel report obvious safety risks directly to management for immediate attention.

A clearly defined and consistently applied risk assessment procedure should be established, encompassing all aspects of operations, including routine tasks, non-routine activities, and emergency situations. This procedure should

emphasize proactive hazard identification and evaluation using an approved risk evaluation matrix *before* work begins, rather than reacting to problems after they occur. To facilitate this, MTZ should ensure that risk assessments are conducted by qualified and demonstrably competent personnel, involve input from relevant stakeholders (ensuring consistent involvement even during periods without incidents), and utilize standardized tools such as a risk matrix.

Training on the risk assessment process, including the use of any tools and documentation requirements, should be provided to all personnel, with refresher training conducted periodically to maintain competency. Adherence to the Management of Change (MOC) process across all departments is crucial and should be reinforced through training and audits to ensure that changes are thoroughly assessed for potential risks; many MOCs that surround a particular process/piece of the plant / equipment should be assessed in their entirety, as well as individually, to avoid a build-up of potential PSM problems that might not have been acknowledged prior. To effectively control identified risks, MTZ should ensure that the hierarchy of risk control is consistently applied, and that personnel understand its principles (e.g., Avoid – Do something different entirely; Substitute – Change process or substances; Isolate – Barriers; Reduce – As Low as Reasonably Practicable; Protect – PPE). Risk control measures should prioritize higher-level controls (e.g., elimination or substitution) whenever feasible, reducing reliance on less effective measures such as PPE.

Collaboration between line management and employees is essential to ensure consistent implementation of identified risk control measures. Furthermore, MTZ should establish operational-level monitoring of risk controls and utilize a risk register for regular management reviews to prevent uncontrolled risks. Effective risk communication is vital. Stakeholders should be trained to follow a defined risk appraisal process, and all process or task changes must be clearly defined, documented, and communicated to line management, employees, and relevant contractors. By implementing these enhanced risk assessment practices, Martinez Renewables can significantly strengthen its safety culture and reduce the likelihood of incidents.

Participant Input: One participant specifically mentioned “Mapping for PHAs – what people are supposed to do and look for.” Another suggested to “Review processes for all jobs…Supervisor should be assessing job and try to improve the process versus just sending people & expecting feedback.”

Action Items (Prioritization and Timeframe):

- Define "critical" and "non-critical" tasks and communicate these definitions to all personnel: *High, Short-term*
- Establish a clearly defined risk assessment procedure encompassing all operations and emphasizing proactive hazard identification: *High, Short-term*
- Ensure risk assessments are conducted by qualified personnel by establishing competency requirements and verifying personnel qualifications: *High, Medium-term*
- Ensure consistent application of risk control hierarchy by providing training and monitoring its implementation in risk assessments: *High, Medium-term*
- Provide comprehensive risk assessment training to all personnel, including tools and documentation, the risk appraisal process and adherence to MOC with periodic refresher training: *Medium, Medium-term*
- Implement a robust system for risk analysis, incorporating incident history to inform risk likelihood and severity: *Medium, Medium-term*

6. Enhancing Training Effectiveness and Safety Competency (Medium Priority)

To enhance training effectiveness and competency, Martinez Renewables should adopt a multifaceted approach that addresses both the methods and content of training, as well as the assessment and ongoing management of employee competency. Training methods should be improved by strategically reducing reliance on computer-based training (CBT) and increasing the use of hands-on, practical training, including job shadowing programs, to better facilitate the transfer of knowledge and skills. This shift should be accompanied by a thorough evaluation and improvement of trainer effectiveness, incorporating feedback mechanisms and observational assessments to ensure high-quality instruction.

Training content should be meticulously reviewed to ensure its direct relevance to specific job roles and responsibilities, aligning training with the actual demands of each position. Furthermore, MTZ should address identified competency gaps by developing and implementing a comprehensive competency assessment program that

includes practical evaluations, going beyond traditional classroom-based assessments. This program should be integrated with a system to track and manage employee competency, facilitating the identification of individuals needing refresher training or further development. To support this, job roles and responsibilities should be clearly defined and accurately reflect required duties.

Finally, onboarding processes should be enhanced to provide comprehensive safety training for all new hires, ensuring clear communication of safety expectations and procedures, and emphasizing the importance of Stop Work Authority from the outset of employment.

Participant Input: There were numerous calls for improved training, such as "Improve Training," "Trainers to teach operators…Send Trainers to train or hire – Real Trainers," "Better operator training, more real life applicable," and "Operator Qualification Approval to be signed by OPS, not management." One participant suggested to "Implement quizzes randomly from CBTs to ensure people are learning & retaining."

Action Items (Prioritization and Timeframe):

- Review training content for job relevance to ensure alignment with specific roles and responsibilities: *High, Short-term*
- Strategically build upon CBT with an increase of hands-on training, including job shadowing programs, to improve knowledge and skill transfer to ensure adequate real-life experience is integrated into operator qualification: *High, Medium-term*
- Develop and implement a competency assessment program that includes practical evaluations, a system for tracking employee competency, and refresher training as appropriate: *High, Medium-term*
- Clearly define job roles and responsibilities to accurately reflect required duties and support competency assessment: *Medium, Short-term*
- Enhance onboarding processes to provide comprehensive safety training for all new hires, to include specific safety and health hazards, emergency operations including shutdown, safe work practices applicable to the employee's job tasks and Stop Work Authority: *Medium, Short-term*
- Evaluate and improve trainer effectiveness throughout feedback mechanisms and observational assessments to ensure high-quality instruction: *Medium, Medium-term*

7. Aligning Practices with County ISO and OEMS (Medium Priority)

The findings from site observations and interviews, representing qualitative data gathered during the assessment, were used to generate the safety practices that should be considered for implementation from County ISO. This alignment plan should specifically consider the need for a robust lone worker policy, addressing the concerns raised by MTZ employees regarding the safety of performing tasks in isolation.

County ISO (County Ordinance Code Chapter 450-8) highlights other areas including Worker Participation and Hazard ID & Risk assessment.

Participant Input: The assessment team observed that MTZ has numerous lone workers. To further strengthen its safety management system, MTZ should consider adopting a formal lone worker policy as well as other relevant elements of County ISO as per Table 2 below.

Action Items (Prioritization and Timeframe):

- Identify gaps in lone worker policies, worker participation and consultation processes, and hazard identification and risk assessment practices when compared to recognized safety management principles: *High, Short-term*
- Develop a plan to address the identified gaps within OEMS, clearly outlining responsibilities and timelines for implementing improvements in lone worker safety, worker participation mechanisms, and proactive risk assessment practices: *High, Medium-term*
- Assign clear responsibility for overseeing the integration of improvements related to lone worker policies, worker participation, and risk assessment within OEMS to a designated team or individual: *Medium, Short-term*
- Establish a monitoring process with defined metrics to track the implementation and effectiveness of the improvements made to lone worker safety, worker participation, and risk assessment practices within OEMS: *Medium, Ongoing*

Table 2: Comparison of Safety Practices with County ISO (County Ordinance Code Chapter 450-8)

Safety Practice	County ISO (County Ordinance Code Chapter 450-8)	Rationale
Worker Participation & Consultation	* Requires employee consultation and participation in various prevention programs and human factor evaluations * Requires feedback and retaliation questions to be included within human factor evaluations * Requires assessment of communications to be included within human factor evaluations although does not require leadership to have communications training [450-8.016(a)(3), 450-8.016(a)(4), 450-8.016(b)]	Improves communication flow, addresses concerns about feedback and retaliation
Hazard ID & Risk Assessment	* Requires hazard identification and risk assessment evaluations through implementation of select prevention programs * Requires these evaluations to be conducted by qualified personnel [450-8.016(b), 450-8.016(c), 450-8.016(d), 450-8.016(h), 450-8.016(i), 450-8.016(j)]	Addresses inconsistencies and *reactive* approaches observed in the current system. Prevention programs include Process Hazard Analysis, Inherently Safer System Analysis, Layer or Protection Analysis, Management of Organizational Change, Human Factors (includes latent conditions evaluations), Incident Investigations, and Safety Culture Assessments

8. Incorporating Pre-Meeting Safety Discussions (Low Priority)

To foster a more proactive safety mindset, Martinez Renewables should establish a culture of proactive pre-meeting safety discussions. While safety is currently addressed in some meeting contexts, implementing a consistent practice of brief, proactive safety discussions at the start of all meetings – including those at the operational, leadership, and management levels, both in-person and virtual – can further enhance safety awareness. This initiative should be guided by standardized templates or checklists to help ensure consistency. These proactive pre-meeting discussions should cover key topics such as:

- General Safety Areas
  - Fire safety, including the location of fire alarms and emergency exits, procedures for contacting the fire department/911, evacuation routes, muster point procedures, and assigned headcount duties.
  - Procedures for uncontrolled release or shelter-in-place.
  - Earthquake safety procedures.
  - Weather-related protocols
  - Active shooter response protocols.
  - Health emergency procedures, including the location of first aid kits and AEDs, and designated personnel to assist.
- In-Field Considerations (as applicable):
  - The dangers inherent in the energy sources that will be in work area (Electrical, Hydraulic, Pneumatic, Chemical, etc)
  - Identifying and assessing risks upon arrival at a worksite
  - Identifying situations at work-sites that cause Human Error (Human Error Traps)
  - Completing permits-to-work

To facilitate effective implementation, MTZ should begin with a pilot program in select departments or meeting types. Training should be provided to all employees on the purpose and process of these proactive safety discussions. Visual aids, such as whiteboard placards for physical meeting rooms and dedicated slides for virtual meetings, should be developed to support these discussions. The process should be regularly evaluated and refined based on feedback and effectiveness.

Participant Input: N/A; This recommendation is primarily drawn from best practice and expert knowledge but aligns with the need for accountability and follow-through implied in participant comments.

Action Items (Prioritization and Timeframe):

- Develop standardized pre-meeting safety discussion templates/checklists covering both office meeting room and in-field safety topics: *Medium, Short-term*
- Conduct a pilot program of pre-meeting safety discussions in select departments/meeting types to assess feasibility and gather initial feedback: *Medium, Short-term*
- Provide training on the purpose and process of pre-meeting safety discussions to all employees: *Medium, Medium-term*
- Establish a process for regular evaluation and refinement of the pre-meeting safety discussion program, incorporating feedback and effectiveness data: Medium, Ongoing
- Develop visual aids to support pre-meeting safety discussions: Low, Short-term

9. Improving Data Integration and Analysis (Low Priority)

To enhance the efficiency of safety data analysis and promote a more proactive safety management approach, it is recommended that MTZ implement an "Area Team" column within the Intelex PSM data reports.

This enhancement would establish a direct correspondence between Personal Injury and PSM datasets, currently maintained as independent files, and enable MTZ to more readily identify co-occurrences of incidents across specific site locations and determine the responsible teams. This improved data integration would support more effective trend analysis and facilitate the implementation of targeted interventions to prevent future incidents.

Furthermore, considering the decrease in employee personal injury incidents from 20 in 2023 to 10 in 2024/25, and acknowledging that factors such as changes in work density or turnaround schedules may influence these numbers and the uneven distribution in 2024, ESS should implement a system to routinely track work density and exposure hours alongside incident data. Calculating and analyzing incident rates based on this data will provide a more accurate understanding of safety performance trends.

To further validate past correlations, ESS should also attempt to retrospectively incorporate any available work density and turnaround schedule data for 2024 into their analysis. Consistently analyzing incident data in this comprehensive manner, including the integration of work density and exposure hours, is crucial for effective, proactive safety management.

Participant Input: While no single participant explicitly mentioned “Intelex” or “data integration,” several comments reflect a desire for improved systems and processes. For instance, one participant called for: “Consolidate Systems for Procedures…Go Plant for PC & RF are different & have been for a long time,” “More understanding from all groups on processes of change and necessary stops in work for evaluation.”

Action Items (Prioritization and Timeframe):

- Insert "Area Team" column in Intelex PSM data reports to enable direct correlation with personal injury data and identify incident co-occurrences by location and team: *High, Short-term*
- Retrospectively incorporate available work density and turnaround schedule data for 2024 into their incident analysis to validate past correlations: *Medium, Short-term*
- Implement a system to routinely track work density and exposure hours alongside incident data to calculate and analyze more accurate safety performance trends: *Medium, Medium-term*

5. Conclusions

The Safety Culture Maturity Assessment of Martinez Renewables revealed an overall maturity rating of 65 percent, positioning the organization in the 'Complying' stage. This rating places MTZ below industry benchmarks, with Oil & Gas peers at 82% and Petrochemical Refining peers at 79%. While the assessment results demonstrated reliability and validity, the data consistently indicates a disparity in safety culture ratings between employees and management. Notably, site observations, discussions, and interviews tended to yield more negative assessments compared to survey responses.

Statistical analysis showed minimal significant variation in safety culture maturity ratings across departments and employment categories, suggesting a generally shared and stable safety culture within the organization. However, key areas, specifically 'Productivity Before Safety', 'Just Culture', and 'Safety Leadership', were identified as significant predictors of personal injury incidents. Similarly, 'Productivity Before Safety', 'Risk Assessment', and 'Safety Leadership' are predictive of process safety incidents. These findings underscore the need for targeted interventions to address these critical areas.

While acknowledging that other safety culture topics present opportunities for improvement, the report emphasizes the importance of prioritizing key predictive factors to optimize safety culture enhancement. The recommendations provided offer MTZ actionable strategies to prioritize safety, foster a Just Culture, enhance Risk Assessment practices, improve communication, strengthen leadership, and enhance training and competency. Successfully implementing these recommendations will significantly improve MTZ's safety culture maturity and drive sustainable safety performance.

Appendix 1 - Safety Culture Maturity Topics and Assessment Scores

Additional statistical analysis insights from Section 3.0 Evaluation of Findings to include the individual Maturity Assessment Scores can be found below with the corresponding section numbers referenced.

Reference for 3.0 Consistency of Measurement

Reliability shows how consistent and dependable the results are and is scored on a scale ranging from 0 to 1. If a measurement method is not reliable the results will not be valid. The generally accepted minimum reliability score is 0.70, with 0.90 representing the recommended upper limit. As seen in Table 3, the reliability scores (measured using Cronbach's Alpha) ranged from 0.75 to 0.92 across all assessment methods, meaning the responses were consistently reliable.

Table 3: Reliability coefficients for the assessment methods

Method	Cronbach's Alpha	F	Sig
Overall - Individual Items	.92	7.51	<.01
Overall – Aggregate topics	.83	8.49	<.01
Workshops – Individual Items	.88	2.91	<.01
Workshops - Aggregated Topics	.77	3.00	<.01
Site Observations / Discussions	.82	4.52	<.01
Face to Face Interviews	.76	3.6	<.01
Survey – Individual Items	.92	5.76	<.01
Survey - Aggregated Topics	.84	8.07	<.01

Reference for 3.0 Validity of Measurement

As highlighted in Section 3.0 Evaluation of Findings, the reliability of a measure is also closely associated with its criterion validity, which essentially means how well the assessment relates to actual performance. MTZ provided the assessment team with their personal injury and process safety records for the past two years. To prepare these records for statistical analysis, the assessment team made a frequency count by month and standardized the data (see Appendix 2 for reference).

When the assessment team tested the reliability of MTZ's incident data, Cronbach's Alpha returned 0.77 [F=87.13, Sig p =<.001]. This result provided confidence that any correlation between the incident data and the safety culture maturity ratings are likely to be meaningful.

MTZ's overall safety culture maturity score (an average score for all the assessment methods combined) was correlated with MTZs personal injury and process safety incident records. This helped the team determine how well the assessment ratings reflect real-world safety outcomes.

As shown in Table 4, the assessment team found a statistically significant negative link (lower safety culture scores were linked to higher rates of injuries and safety incidents) between the total maturity score and both personal injuries (r=-0.23; p<.02, actual=0.018) and process safety incidents (r= -0.22; p<.02, actual=0.019). This supports the assessment results are valid and meaningful, as both correlations are in the right direction.

However, the strength of these correlations, as reflected in the 'r' values, does not meet the minimum recommendation set by the U.S. Department of Labor (r=0.35) and academic research (r=0.45). Therefore, the team subsequently looked at the results for each assessment separately.

Table 4 presents the validity coefficients for each individual assessment method. Notably, the workshop and site observation/discussion ratings demonstrated much stronger correlations with MTZ's personal injury and process safety incidents, exceeding the recommended validity coefficient thresholds. In contrast, the interview and online survey responses did not exhibit significant correlations. This discrepancy suggests that these methods may have yielded overly

optimistic perceptions and ratings of MTZ's actual safety culture, potentially skewing the results towards a more positive outlook than warranted by the incident data.

Table 4: Criterion-related validity coefficients for the assessment methods

Criterion	Method	Pearson's r =	Sig
Personal Injury incidents	Total Aggregate Score (All Methods)	-0.23	<.02
	Workshops	-0.57	<.01
	Site Observations / Discussions	-0.67	<.01
	Face to Face Interviews	-0.18	n.s.
	Online Survey	.11	n.s.
Process Safety incidents	Total Aggregate Score (All Methods)	-0.22	<.02
	Workshops	-0.59	<.01
	Site Observations / Discussions -	-0.52	<.05
	Face to Face Interviews	-0.15	n.s.

Reference for 3.3.1 Mean average maturity ratings by data collection method

The maturity ratings were analyzed based on the data collection methods employed as per Maturity Ratings X Assessment Method in Table 5 below. Post-hoc Scheffé tests revealed no statistically significant differences between the ratings obtained from the various methods, with one exception: 'Lessons Learned.'

Specifically, on-site observations/discussions and face-to-face interviews yielded lower (more negative) ratings for 'Lessons Learned' compared to the workshop and survey ratings ($p<.05$). Aside from this discrepancy, the assessment indicates that MTZ's safety culture is generally stable and shared across the organization, which are fundamental characteristics of effective organizational safety cultures.

Table 5: Maturity Ratings X Assessment Method

	Workshop (n=31)	Site observation (n=16)	Interview (n=13)	Online Survey (n=48)	Scheffe Test Statistical Sig.	
Strategy	48.39	60.00	54.17	70.21	0.52	n.s.
Risk Assessment	73.76	34.28	65.00	69.17	0.07	n.s.
Profit before safety	82.42	40.00	46.66	85.83	0.57	n.s.
Just Culture	75.16	52.78	56.52	87.83	0.37	n.s.
Safety Leadership	68.71	45.28	53.85	82.34	0.09	n.s.
Managerial Compliance	67.42	42.96	45.82	47.43	0.43	n.s.
Safety Communications	80.97	44.16	56.92	79.17	0.22	n.s.
Safety Competence	56.45	46.68	57.02	49.38	0.93	n.s.
Lessons Learned	80.73	42.60	52.69	68.44	0.05	sig.
Corrective & Preventive Actions (CAPA)	55.70	50.00	53.34	45.63	0.96	n.s.

Ratings: Commencing=0-30; Coasting=31-60; Complying=61-80; Committing=81-90; Commanding=91-100

As seen in Figure 8 below, while other methods have similar looking variances as 'Lessons Learned' in the bar chart, the Scheffe Test Statistical Significance of 0.05 for 'Lessons Learned' is the only discrepancy noted.

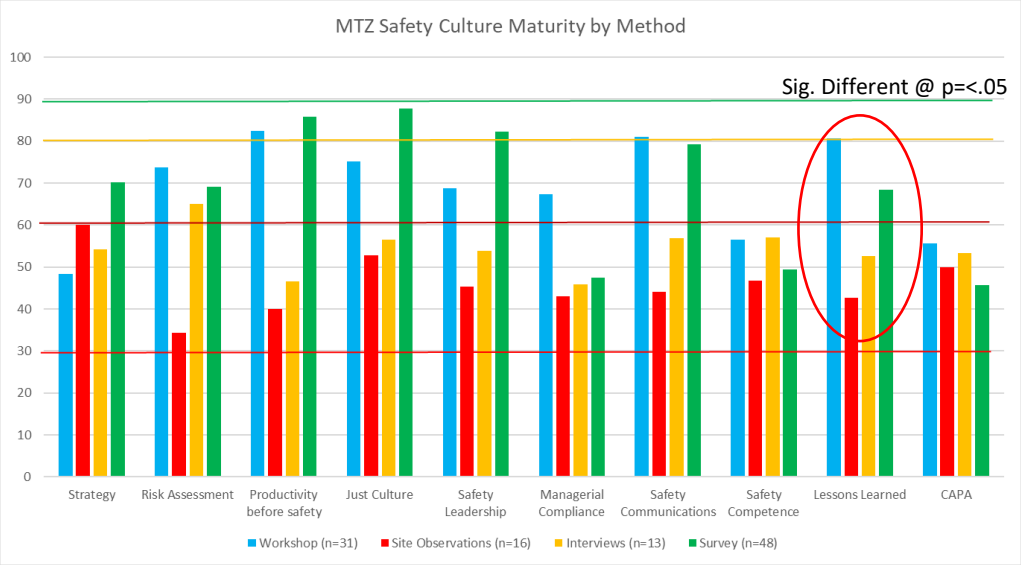

Figure 8. MTZ Safety Culture Maturity by Method with Statistical Sig.

Reference for 3.3.2.1 Mean average maturity ratings by Department

Statistical analysis revealed no significant differences in ratings across the various departments. However, it was observed that Operations and Technical Services tended to report lower ratings, falling within the 'Coasting' maturity range, while other departments generally rated within the 'Complying' range as per Table 6 below.

Table 6: Maturity Ratings X Department

	Engineering (n=7)	ESS (n=13)	Maintenance + Reliability (n=22)	Admin (n=6)	RLT (n=8)	Technical Services (n=15)	Operations Terminal (n=10)	Operations; RF +Terminal + COGEN (n=9)	Operations; RF (n=18)
Strategy	27.20	79.60	75.20	80.80	68.80	31.60	49.60	78.40	52.60
Risk Assessment	82.80	84.60	79.00	86.40	74.60	49.40	32.00	46.60	54.80
Productivity before safety	82.80	78.80	71.80	85.20	67.60	73.40	69.60	80.00	65.00
Just Culture	82.20	83.00	85.80	43.40	78.20	82.00	61.60	83.80	60.20
Safety Leadership	47.86	83.08	75.91	69.58	77.50	66.11	63.25	81.39	55.28
Managerial Compliance	47.83	53.85	66.76	58.91	71.38	42.10	33.67	51.49	43.89
Safety Communications	63.57	77.88	78.25	77.50	73.13	72.00	69.00	71.94	61.67
Safety Competence	38.10	53.69	65.02	66.17	62.63	19.56	62.67	33.52	60.74
Lessons Learned	55.37	78.65	74.52	85.83	72.16	51.15	63.75	68.06	55.28
CAPA	37.14	58.46	60.76	36.12	75.00	42.00	45.00	47.78	40.37
Ratings: Commencing=0-30; Coasting = 31-60; Complying = 61-80; Committing = 81-90; Commanding = 91-100									

Reference for 3.3.2.2 Mean average maturity ratings by Job Role

An analysis of the data categorized by job role revealed a statistically significant difference (p<.05) in the perception of MTZ's safety culture between Operators and Technicians, as shown in Table 7. In other words, this shows that the difference between groups is statistically meaningful, with less than a 5% chance that the result happened by random chance.

Table 7: Maturity Ratings X Job Role

	Snr Manager (n=12)	Line Manager (n=11)	Front-Line Supervisor (n=19)	Admin (n= 16)	Technician (n= 20)	Operator: RF (n=10)	Operator: Terminal (n=8)	Operations; RF +Terminal + COGEN (n=5)	Engineer (n =7)
Strategy	71.25	79.09	73.42	77.45	44.75	33.50	42.50	73.00	34.29
Risk Assessment	78.33	74.62	73.86	85.31	42.21	32.33	40.42	73.33	87.62
Productivity before safety	72.50	76.82	82.11	78.54	69.50	51.00	63.13	73.00	88.57
Just Culture	80.83	85.18	78.00	70.31	80.27	45.00	65.00	79.00	90.83
Safety Leadership	80.83	81.14	72.63	79.22	66.55	42.75	58.13	81.50	44.58
Managerial Compliance	73.54	69.36	63.86	52.93	37.37	33.67	29.58	72.68	37.14
Safety Communications	74.51	77.05	80.92	76.56	72.25	50.50	60.31	70.00	67.14
Safety Competence	69.26	31.24	60.77	78.35	33.50	43.00	60.83	57.00	21.90
Lessons Learned	75.38	79.28	75.66	80.78	50.88	35.25	65.94	63.00	62.14
CAPA	77.22	79.09	64.56	31.25	37.83	25.33	59.17	36.00	31.90
Ratings: Commencing=0-30; Coasting = 31-60; Complying = 61-80; Committing = 81-90; Commanding = 91-100									

Reference for 3.3.2.3 Mean average maturity ratings by injury reporting

The assessment data was analyzed to compare the safety culture ratings of participants who had reported an injury or near-miss with those who had not as seen in Table 8. Typically, individuals who have experienced an incident or injury tend to provide more negative safety culture ratings. However, this pattern was not detected at MTZ. In fact, the injury reporting group generally provided slightly more positive ratings, though these differences did not reach statistical significance.

Table 8: Maturity Ratings X Injury Reporting

	Reporting an Injury (n=22)	No Injury Reporting (n=79)
Strategy	62.27	61.40
Risk Assessment	68.48	71.93
Productivity before safety	81.59	85.61
Just Culture	81.36	83.27
Safety Leadership	83.30	74.27
Managerial Compliance	66.82	50.82
Safety Communications	81.82	79.12
Safety Competence	51.82	52.28
Lessons Learned	79.32	70.92
CAPA	57.42	46.55

Ratings: Commencing=0-30; Coasting = 31-60; Complying = 61-80; Committing = 81-90; Commanding = 91-100

Appendix 2 - Standardized Incident Data

The following analysis compares the MTZ Incident Data reviewed by the assessment team to the quantitative scores from the various assessment methods.

Personal Injury

Figure 9 below reflects the number of personal injury reports from January 2023 to January 2025 for MTZ contractors and employees combined. The regression trendline shows the drop-off in reports (n = 193) from 2023 (n=174) to 2024/5 (n= 19) is statistically significant (R2 = 0.67, p=<.01).

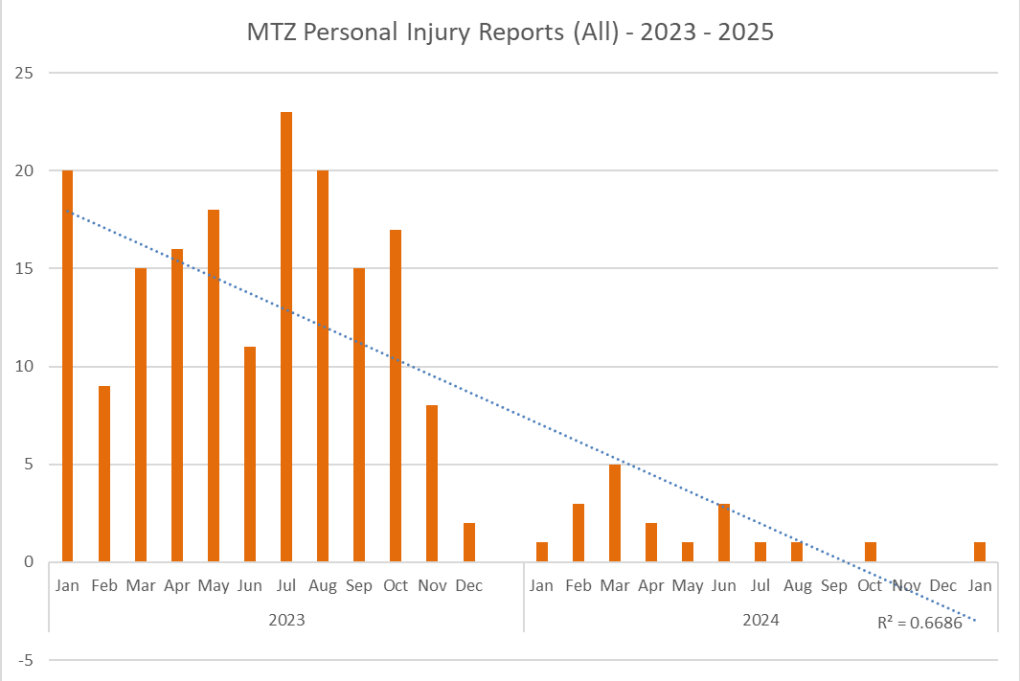

Figure 9. MTZ Personal Injury Reports

Figure 10 below represents exactly the same data as the Personal Injury report graph above in Figure 9, except it is standardized data to facilitate predictive analytics, making use of the assessment ratings and personal injury reports.

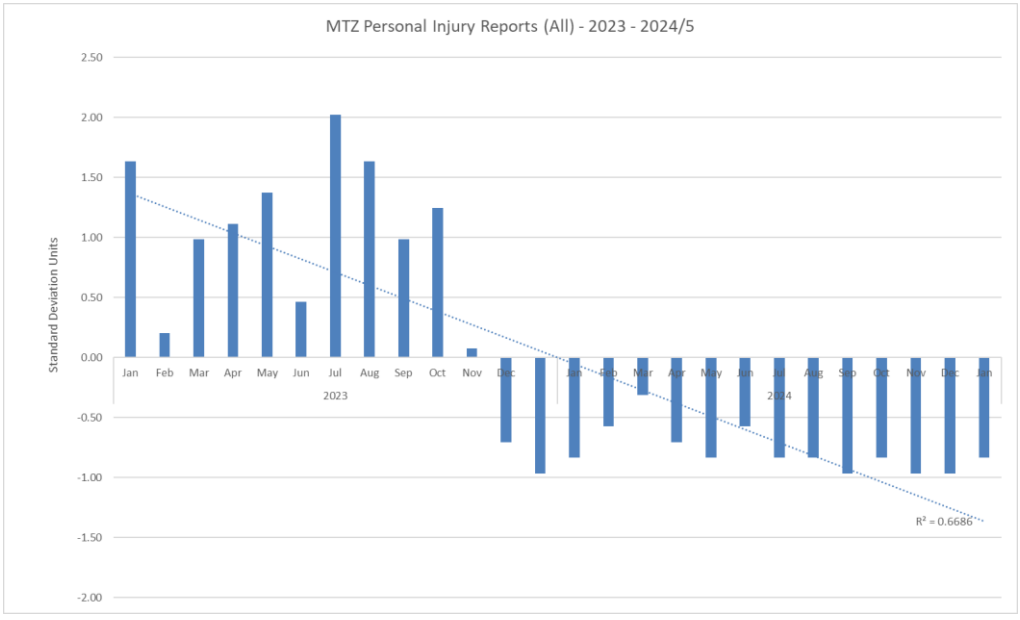

Figure 10. MTZ Personal Injury Reports - Standardized Data

Reference for Section 3.3.3 Predictive Analytics (Personal Injury)

The multiple regression analysis identified 'Productivity Before Safety,' 'Just Culture,' and 'Safety Leadership' as significant predictors of MTZ's personal injury experience. This finding underscores the importance of prioritizing 'safe production' through effective resource allocation and strategic planning, as well as the need to enhance MTZ's Safety Leadership practices. See Table 9 for specific analysis.

Table 9: Assessment Method Personal Injury Predictors

Assessment Method	Predictors	Adjusted R Square	F	Sig.	*n*
Workshop	Productivity before Safety	0.42	22.52	< .01	1,29
Site Observations / Discussions	Just Culture	0.44	12.8	< .01	1,14
Interviews	Safety leadership	0.55	15.68	< .01	1,11
Online Survey	Not Predictive	-	-	-	-

A statistically significant negative association was obtained for the total maturity score and personal injuries (r= -0.22; p=<.02). By assessment method, using multiple regression, the following are predictive of personal injury incidents;

1. Workshop: Productivity Before Safety (Adj. R^2=0.42; F(1,29)=22.52, p=<.01)
2. Site Observations: Just Culture (Adj. R^2=0.44; F(1,14)=12.8, p=<.01)
3. Interviews: Safety Leadership (Adj. R^2=0.55; F(1,11)=15.68, p=<.01)
4. Online Survey – Not Predictive

Contractor Personal Injury Analysis

The standardized data graph for contractor personal injury reports (n= 163) in Figure 11 below supports the notion the statistically significant decline (R^2 = 0.64, p=<.01) in injury reports could be related to contractors leaving the site.

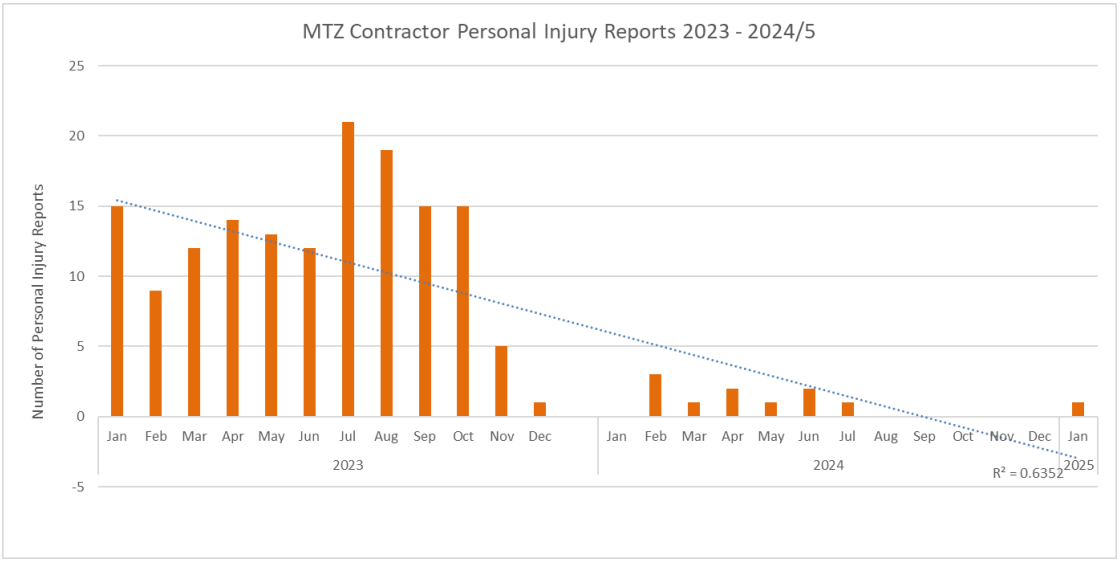

Figure 11. MTZ Contractor Personal Injury Reports - Standardized Data

The standardized data graph below in Figure 12 reflects exactly the same data in Figure 11, except it is standardized to make it easier to compare. The Zero on the X-Axis represents the monthly mean average of 6.23 monthly personal injury reports. The bars above and below Zero, represent the variation (standard deviation = 6.93) in the monthly report numbers.

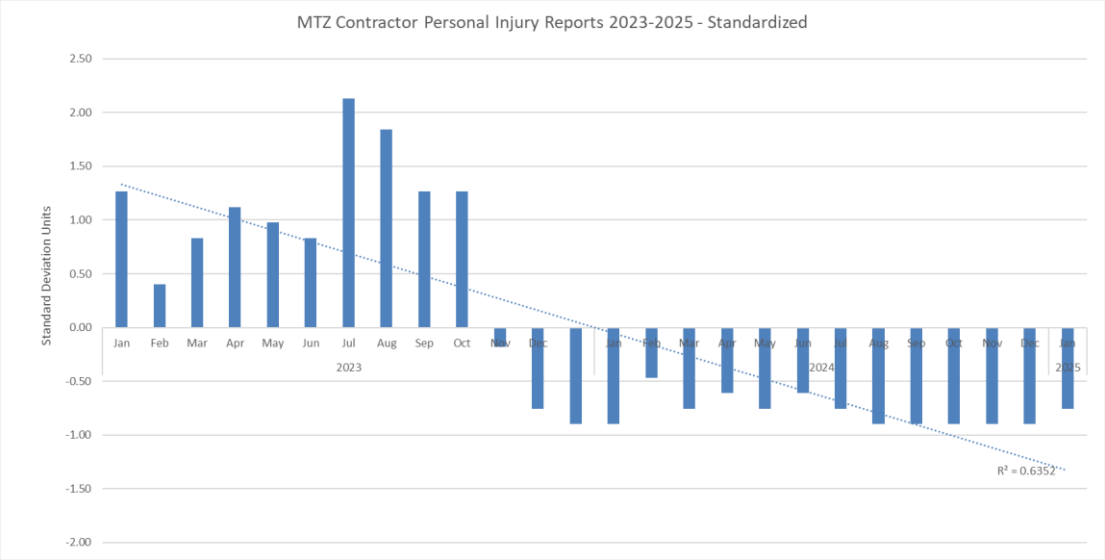

Figure 12. MTZ Contractor Personal Injury Reports - Standardized Data

Employee Personal Injury Status

The graph for MTZ Employee personal injury reports (n=30) in Figure 13 shows a non-significant regression trendline (R^2 = 0.08, n.s.) (indicating no statistical change) since January 2023 (n=20) through 2024 (n=10).

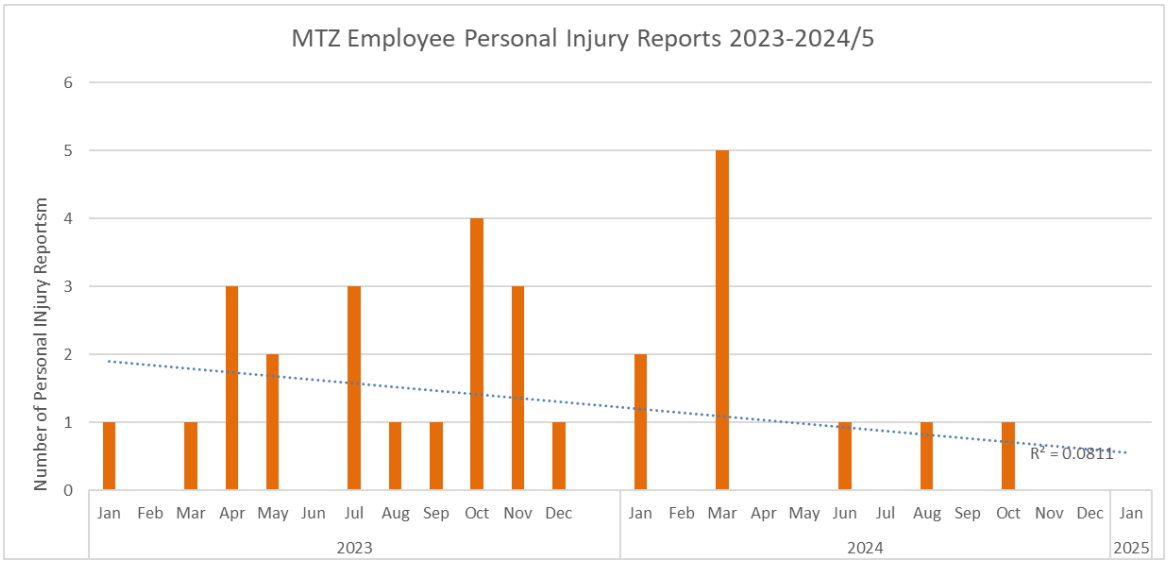

Figure 13. MTZ Employee Personal Injury Reports

However, the employee personal injury history does seem to show that employee reporting has also tailed off since April 2024 (n=3). It's unlikely that minor injuries and near-misses have completely stopped; a possible explanation could be that these incidents are being underreported for reasons that are not yet clear.

The standardized data graph below in Figure 14 reflects exactly the same data that is in Figure 13, except it is standardized. The Zero on the X-Axis represents the monthly mean average of 1.25 monthly personal injury reports. The bars above and below Zero, represent the variation (standard deviation = 1.39) in the monthly report numbers.

There were 20 employee personal injury incidents recorded in 2023, compared to 10 in 2024/25. The decline

may be attributed, in part, to activities associated with Phase 3, after ending Phase 2. However, the distribution of 2024 incidents, with seven occurring in the first quarter and only three in the subsequent 11 months, warrants further investigation.

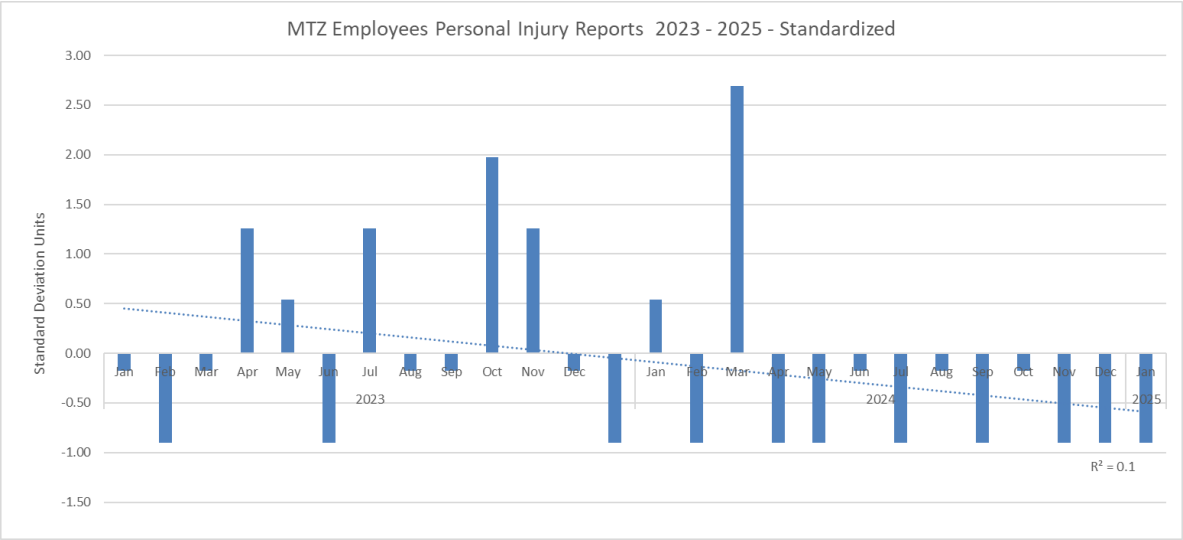

Figure 14. MTZ Employee Personal Injury Reports - Standardized Data

Process Safety Incidents

Figure 15 shows the number of Process Safety Incidents reported from January 2023 to February 2025. A regression trendline reveals there is a downward trend in the number of incidents (n=630) by month (average 24.23 reports per month), but the decrease is not statistically significant ($R^2 = 0.14$; n.s.).

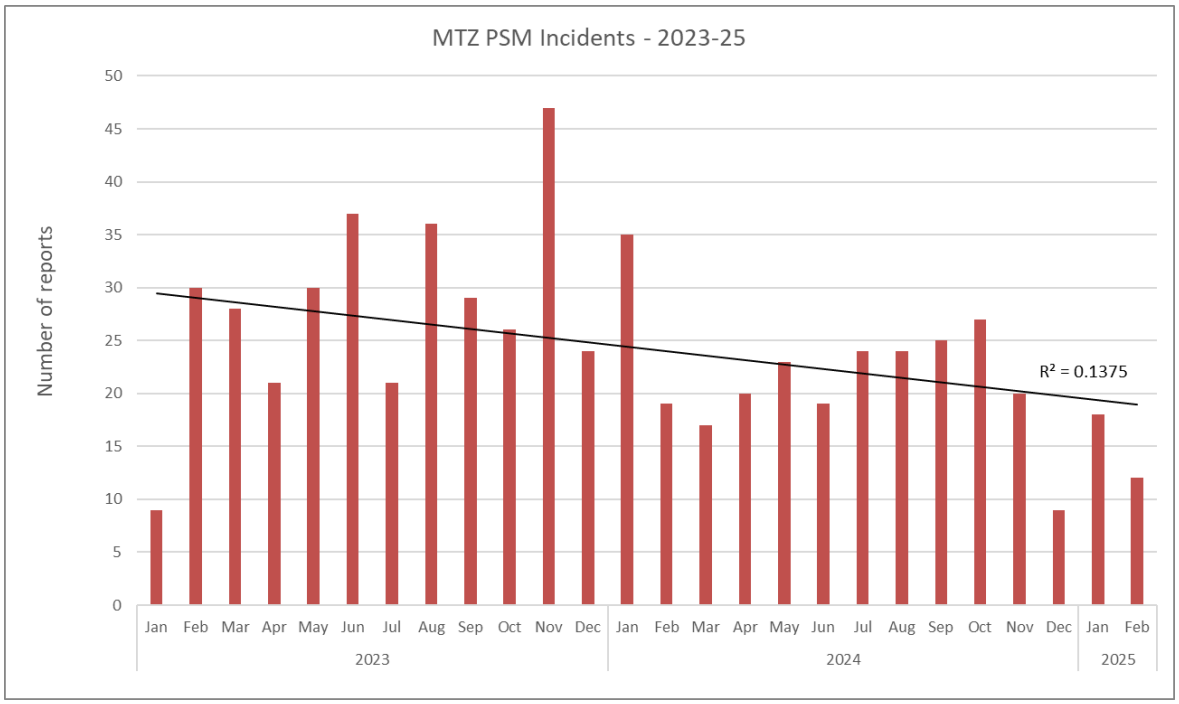

Figure 15. MTZ Process Safety Management Incidents

Figure 16 represents the same data as the PSM report number graph in Figure 15, except it is standardized data to facilitate predictive analytics. In the graph below, the Zero on the X-Axis represents the average reports per

month (24.23). The bars above and below Zero, represent the variation (standard deviation = 8.65) in the monthly report numbers.

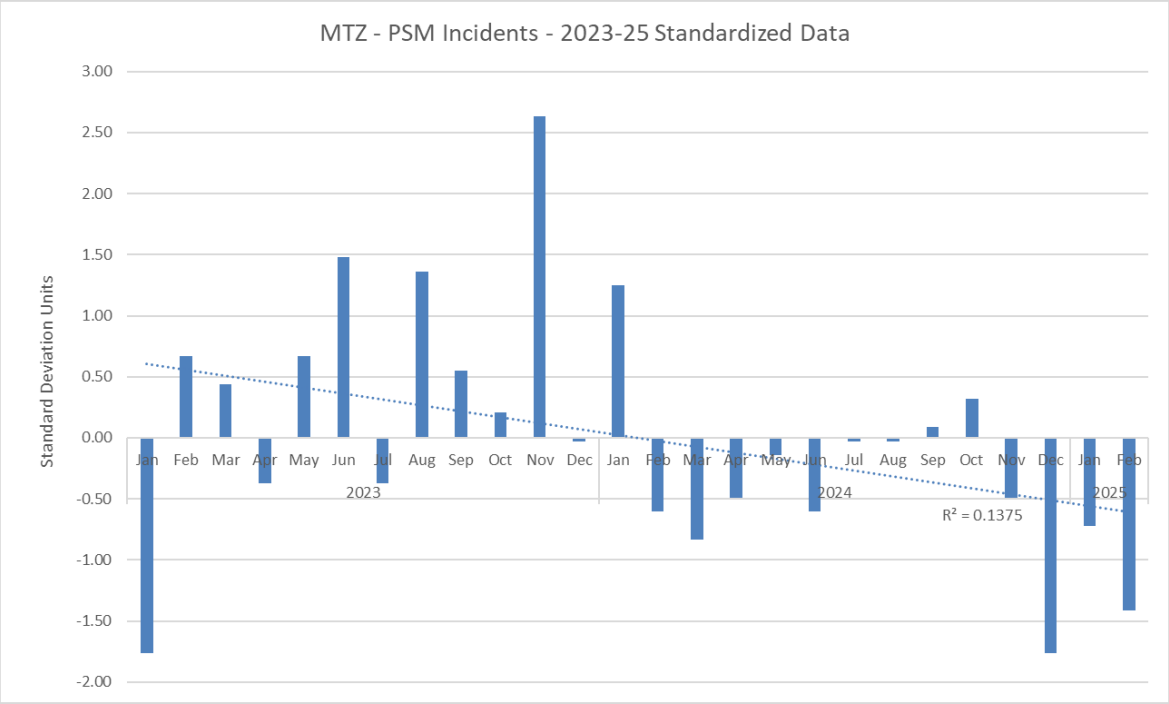

Figure 16. MTZ – PSM Incidents – 2023-2025 Standardized Data

This shows a drop-off in PSM incidents reported between 2023 and 2024 & 2025. This could be due to the problems being fixed and the plant becoming inherently safer, or incident reporting is tailing off in similar fashion to personal injuries, or it reflects a mixture of both. The regression trendline again shows the drop-off does not reflect a statistically significant change, albeit the trend is in the right direction.

Reference for Section 3.3.4 Predictive Analytics (Process Safety Incidents)

The multiple regression analysis identified 'Productivity Before Safety,' 'Risk Assessment,' and 'Safety Leadership' as significant predictors of MTZ's Process Safety experience. See Table 10 for specific analysis.

Table 10: Assessment Method Process Safety Predictors

Assessment Method	Predictors	Adjusted R Square	F	Sig.	*n*
Workshop	Productivity Before Safety	0.31	14.16	< .01	1,29
Site Observations / Discussions	Risk Assessment	0.30	7.42	< .02	1,14
Interviews	Safety Leadership	0.67	25.82	< .01	1,11
Online Survey	Not Predictive	-	-	-	-

A statistically significant negative association was obtained for the total safety culture maturity rating and process safety incidents (r=-0.22; p=<.02).

By assessment method, using multiple regression, the following are predictive of process safety incidents

1. Workshop: Productivity Before Safety (Adj. R^2=0.31; F(1,29)=14.16, p=<.01)
2. Site Observations: Risk Assessment (Adj. R^2=0.30; F(1,14)=7.42, p=<.02)
3. Interviews: Safety Leadership (Adj. R^2=0.67; F(1,11)=25.82, p=<.01)
4. Online Survey – Not Predictive

Appendix 3 – Participant Comments (Summarized)

As part of the safety culture assessment, participants were given the opportunity to provide open-ended feedback regarding MTZ's safety culture improvement opportunities. This appendix section has compiled and organized the valuable insights provided by MTZ employees.

In order to facilitate analysis and reporting, the raw responses have been grouped into thematic categories. While striving to maintain the authenticity of the feedback, some responses have been condensed to eliminate redundancy and improve clarity. The summaries and representative quotes presented below offer a comprehensive view of the employees' perspectives on safety culture at MTZ.

I. Communication

- **Summary**: A dominant theme is the need for improved communication across all levels and departments. This includes clarity in priorities, changes, incident findings, and general safety information. There's a desire for two-way communication, feedback mechanisms, and ensuring messages are tailored to different audiences.
- Condensed Responses:
    - "Align on priorities and communicate rankings".
    - "General safety communication…communication to everyone including all visitors".
    - "Joint Health & Safety Meeting Communication".
    - "Communicate Formal Strategic Safety Culture communicated to all levels of organization".
    - "Better two-way street communication".
    - "Opportunity → Communicate results and action plan from this survey - and communicate progress".
    - "We believe there is an opportunity to improve communication for process safety, health, etc. top down. A lot of the current communication stays within certain groups & is not cascaded down for all".
    - "Improve bottom-up communication…maybe focusing on internal / smaller meetings".
    - "The refinery could be helped if communications and training will be better".
    - "Improve the communication to hourly work group on the changes made from incident investigations".
    - "Communicate the reason for decisions…especially when decisions are made for ESS reasons".

II. Training

- **Summary**: Participants frequently mention the need for better and more relevant training. This includes ensuring trainers are qualified, training is practical, and new employees aren't overloaded with irrelevant training early on. There's also a suggestion for ongoing evaluation of training effectiveness.
- Condensed Responses:
    - "Improve training".
    - "Trainees to lead operators. Send trainers to train or hire real trainers".
    - "Avoid overloading new employees on un-important trainings in early employment to avoid lack of interest / disengagement from material".
    - "The refinery could be helped if communications and training will be better".
    - "Implement quizzes randomly for CBTs to ensure people are learning & retaining".
    - "Better operator training, more real life applicable".

III. Resources and Staffing

- **Summary**: A lack of resources and insufficient staffing are recurring concerns. This includes the need for more personnel (operators and maintenance), adequate support for workloads, and ensuring necessary equipment is available and functional.
- Condensed Responses:
    - "Support workforce as much as possible with able / sufficient resources to do it well".
    - "Additional support for operations workload and personnel demand".
    - "The site in general could use additional operators and maintenance personnel (extended shifts, training, project / MOC support, vac permit)".
    - "The refinery could be helped if communications and training will be better. The problem is also that we are working a lot of samples with not enough workforce".
    - "Hire more staff (operators and maintenance personnel)".
    - "More staffing".
    - "Department resources to support PHA backfill".
    - "Value time of all and provide assistance for workload".

IV. Accountability and Leadership

- **Summary**: Concerns exist about accountability, both for poor performance and for adhering to safety rules. Some participants feel that bad behavior isn't addressed and that some supervisors are unqualified. There's a call for management to prioritize safety over production.
- Condensed Responses:
    - "Jobs need to be assigned to have accountability".
    - "Lack of accountability for poor performance & for people who disregard safety rules / procedures. Bad behavior seems to be not addressed & sometimes rewarded".
    - "It is apparent that some supervisor / leadership personnel are un-qualified to be in a position to address poor performance / bad behavior individuals".
    - "Management putting safety first truly and not prioritizing production".
    - "Operator Qualification Approval to be signed by OPS not management".
    - "Head Operator need to be brought back".

V. Processes and Procedures

- **Summary**: Several comments focus on the need to review and improve existing processes and procedures. This includes addressing outdated documentation, ensuring consistency across different plant areas, and understanding the reasons behind current practices.
- Condensed Responses:
    - "Review processes for all jobs as the common answer when asked why we do it a certain way is 'that's how we have always done it'".
    - "P&ID's & Drawings are still out of date".
    - "Consolidate systems for procedures…GO…Plant…bc & RF are different & have been for a long time".
    - "More understanding from all groups on processes of change and necessary steps in work for evaluation".

VI. Specific Safety Concerns and Hazards

- **Summary**: Some responses highlight specific safety hazards or areas needing improvement, such as hazard communication, vehicle access, and the condition of safety resources.
- Condensed Responses:
    - "Hazard Communication - New stop signs have been installed in poor locations…Basically poor implementation".
    - "Several roads within RF area have been communicated with a computer-based learning module that the road access with a vehicle require a permit. Yet, in the field, there are no signs indicating that vehicle access requires a permit".
    - "On Solano there is no passing. Yet the yellow line painted is dashed…Pointing out the issue but the underlying problem is lack of proper communication which includes field implementation".

- "Safety resources (pg. 4) The truck does not have cover for sample pickup. The gas cylinders keep sending us with black sludge and it hasn't been fixed for a year. The bin for the bottle dumping is also hard to open and it needs a good amount of force".

VII. Additional Suggestions

- **Summary**: This category includes miscellaneous suggestions for improvement, such as team building, safety incentives, and personalized approaches.
- Condensed Responses:
  - "Should be more personalized".
  - "Develop team building program for hourly & salary workers".
  - "Increase safety incentivization programs".

VIII. Positive Feedback

- **Summary**: It's important to also acknowledge positive feedback, which can provide a balanced perspective.
- Condensed Responses:
  - "New Marathon. A few members on the RLT are great and dedicated and are here to help and change the culture. We can feel it. I hope its not too late".
  - "Marathon has a mature and robust wellness program. Martinez is hiring a full-time wellness coach that will sit onsite".

Appendix 4 – Statement of Work (Renewable Fuels Refinery Management Systems and Safety Evaluation RFP No 2403-785)

Section II: Scope of Work

A. Scope of Work:

The evaluation will be conducted at Marathon.

1. Evaluate the effectiveness of how the refinery's management systems and human factors are incorporated into site programs and practices. Also, evaluate the safety culture exhibited by personnel in operations, maintenance, management, contractors, and other staff.
Address the management systems in place for safety program elements including but not limited to: Mechanical Integrity, Operating Procedures, Training, Management of Change (including management of organizational change), Process Safety Information, Pre-Startup Safety Reviews, Incident Investigation, Hot Work, Contractors, Emergency Response Program, Compliance Audits, Employee Participation, and Process Hazard Analysis.
The review of the management systems is to include how Marathon follows up with action items from incident investigations (internal and external), audits (internal and external) and actions to address enforcement citations.
This evaluation should include, but not be limited by the list in Appendix A **"***Self-evaluation Questionnaire for Managers Considering Ways To Improve Human Performance*[1]*Policy Issues*", Appendix B *Contra Costa County's Safety Program Guidance Document Section B: Human Factors Program"*, Appendix C *Contra Costa County's Safety Program Guidance Document Section F: Safety Culture Assessments,* and the items listed below:

a) How is management intent, as expressed in internal policies, carried out at field level?

b) How are procedures and policies developed? What do personnel at Marathon do when work falls outside of the written procedures or policies?

c) How is bottom-up input provided for, and on what range of subject matter? How are disagreements resolved?

d) What systems are in place to assure that policies and/or procedures are followed? Do these include audits (scheduled and random)?

e) What accountability exists at each level of the organization? Who is accountable for what and to whom?

f) Is there stop work authority for all refinery personnel and if there is, does the line and support staff believe that there will be no repercussions if the policy is followed?

g) Does stop work thoroughly include stopping/shutting down a process, or just maintenance work?

h) Does the frequency in changing the refinery top management affect the overall safety culture of the refinery?

2. Public Participation – this evaluation will include public participation. The selected consultant will be required to report out on the final draft report at the Industrial Safety Ordinance (ISO)/ Community Warning System (CWS) Ad Hoc Committee and the final report at a Board of Supervisors meeting. At these meetings there will be an opportunity for public comment. There will be an opportunity for the contractor to listen to the Board of Supervisors and public's concerns and consider making changes in the report or doing additional onsite work to complete the evaluation. The contractor working with Contra Costa Health shall respond to all written comments and comments that are raised in the public meeting. The contractor should expect to attend and present reports at the following meetings:

[1] This a modified list from the Chemical Manufactures Association's (CMA) book titled A Manager's Guide to Reducing Human Errors Improving Human Performance in the Chemical Industry

a) As requested at the ISO/CWS Ad Hoc Meeting.

b) A public meeting of the Contra Costa County Board of Supervisors, to present the final report.

The contractor will prepare a plan for evaluation and will submit this plan to the Project Manager from Contra Costa Health for review. The plan shall include interviewing the representatives of the local employee union. Included in Appendix A are examples of items to be considered in this evaluation. The contractor should use this list to assist in the evaluation of Marathon's current programs for addressing management systems, safety practices, and the safety culture of Marathon.

Requirements:

The Management Systems and Safety Evaluation must be able to evaluate the refinery's human factors and systems concerning the management practices and safety culture at the refinery.

Appendix 5 – Summary of Qualitative Analysis - Interviews and Site Observations

Date	Activity/Participants	Key Issues Identified (Concise)	Overall Maturity Level	Relevant Recommendations
2/19/2025	Day 1 Site Observation/Job-Function Group #1	Training deficiencies, communication gaps, understaffing, management-operations disconnect, reactive approach	2 (Coasting)	1, 3, 7
2/19/2025	Day 1 Site Observation/5Gas Observation	Potential lack of risk awareness, disconnect between procedure and training	1 (Commencing)	5, 7
2/19/2025	Day 1 Site Observation/Employee Ad-Hoc Discussion	Understaffing, limited safety coverage, lack of proactive safety management	1 (Commencing)	1, 4
2/19/2025	Day 1 Site Observation/3HDO Location	Communication gaps, potential training overlaps	2 (Coasting)	3, 7
2/19/2025	Day 1 Site Observation/Employee Disc. & Joint-Committee Meeting Observation	Unresolved safety hazard, ineffective meetings, lack of accountability	2 (Coasting)	3, 8
2/19/2025	Day 1 Site Observation/Employee Interview #1	Incomplete implementation of safety processes, inconsistencies in application	3 (Complying)	4
2/19/2025	Day 1 Site Observation/Job-Function Group #2	Understaffing, communication issues, inadequate training	2 (Coasting)	1, 3, 7
2/20/2025	Day 2 Site Observation/Job-Function Group #3	High workload, potential reporting gaps	3 (Complying)	1
2/20/2025	Day 2 Site Observation/Job-Function Group #4	Communication and staffing concerns	2 (Coasting)	1, 3
2/20/2025	Day 2 Site Observation/Job-Function Group #5	Understaffing, potential work environment issues	2 (Coasting)	1, 6
2/20/2025	Day 2 Site Observation/Job-Function Group #6	Understaffing, potential equipment issues	3 (Complying)	1, 5
2/20/2025	Day 2 Site Observation/Job-Function Group #7	Integration and staffing concerns	4 (Committing)	1, 5
2/20/2025	Day 2 Site Observation/Job-Function Group #8	Communication and staffing concerns	3 (Complying)	1, 3
2/20/2025	Day 2 Site Observation/Employee Interview #9	Heavy workload	3 (Complying)	1

2/20/2025	Day 2 Site Observation/Employee Interview #2	Potential for misaligned priorities, communication gaps	4 (Committing)	1, 3
2/20/2025	Day 2 Site Observation/Employee Interview #3	Communication gaps, potential misalignment of concerns	4 (Committing)	3
2/24/2025	Interview #1	Lack of centralized safety culture plan, communication challenges	3 (Complying)	3
2/24/2025	Interview #2	Staffing challenges, experience/knowledge gaps	3 (Complying)	1, 7
2/25/2025	Interview #3	Inconsistencies in emergency response, communication challenges	3 (Complying)	3, 6
2/25/2025	Interview #4	Challenges in embedding a consistent safety culture, lack of formal CAPA system	3 (Complying)	4, 8, 10
2/25/2025	Interview #5	Need for more people, communication gaps	4 (Committing)	1, 3
2/25/2025	Interview #6	Communication gaps, competency concerns, staffing concerns	2 (Coasting)	1, 3, 7
2/25/2025	Interview #7	Need for streamlined communication, potential for production pressure to override safety	4 (Committing)	1, 3
2/25/2025	Interview #8	Communication disconnect, staffing and overwork concerns, impact of past incidents on morale	1 (Commencing)	1, 3
2/27/2025	Interview #9	Opportunities to improve communication and feedback loops	3 (Complying)	3
3/4/2025	Interview #10	Opportunities to improve feedback loops and consistency of emergency response procedures	4 (Committing)	3, 6
2/24/2025	Interview #11	Need for a more developed safety strategy, concerns about high-risk tolerance	3 (Complying)	1, 4
2/24/2025	Interview #12	Need for better documentation of peer-to-peer accountability and safety information	3 (Complying)	3
2/24/2025	Interview #13	Potential environmental influences on safety perceptions, discrepancy between feedback from this team and field operators	3 (Complying)	3

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