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Draft Final Report
Independent Incident Investigation/Root Cause Analysis
of the
Martinez Refining Company LLC
February 1, 2025 Loss of Process Containment and Fire
for

Contra Costa Health
Attn: Nicole Heath, Michael Dossey

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1. INTRODUCTION

On February 1, 2025, the Martinez Refining Company, LLC (MRC), which is part of the PBF family of refineries, experienced an incident in which hydrocarbon material was released and ignited, resulting in a fire. The fire was responded to by MRC and Mutual Aid fire crews and extinguished on February 4, 2025. Six workers were evaluated by medical personnel and released; none were hospitalized.

JEM Advisors was selected by Contra Costa Health (CCH) to conduct an independent Incident Investigation (II)/Root Cause Analysis (RCA) for this event. The objective is to identify the underlying causes, assess compliance with safety regulations, and develop recommendations to prevent recurrence. This independent investigation is focused on the root causes of the initial release of material from closed systems that lead to the resulting fire.

The JEM II/RCA was completed April 7-11, 2025. Because the content of this investigation report is technical in nature, a glossary of the technical terminology is included in Appendix 1.

Appendix 2 lists the JEM independent investigation team members with a brief summary of qualifications.

2. EXECUTIVE SUMMARY

At approximately 1:35PM on February 1, 2025, two contract workers began opening a flange to install isolation blind #816 to prepare for planned maintenance on one of the process units (Cat Feed Hydrotreater, CFH). The CFH had been shut down for maintenance on January 30, 2025.

The flange tagged as #816 was within two isolation valves which had been closed and locked to remain closed. A drain valve within this double isolation valve installation had been previously opened, rodded out to confirm no drain valve plugging, and witnessed to confirm there was no pressure or valve leakage (confirmation of “zero energy”). However, the flange on the outside of the isolation valve was mistakenly opened by the contract workers. When opening the flange, hydrocarbon material started to leak. The two workers evacuated the area after seeing the leak, and the hydrocarbon material ignited within a minute of the initial release, resulting in a large fire in the CFH and Cat Cracker Unit Gas Plant (CCUGP) units.

The investigation concluded that MRC procedures to positively identify work locations and to verify isolation and “zero energy” were not effective for the current Maintenance Contractor organizational capability, resulting in the workers opening a flange on the wrong side of the isolation valve, resulting in the loss of containment.

MRC cut out the double isolation valve assembly and sent it to a mechanical and metallurgical laboratory for testing. A summary of breakaway torque measurement data from that testing was provided to JEM by MRC indicated 4 bolts on the bottom of the incorrect flange (Flange #4 on Figure 1) and all bolts on the correct flange (Flange #3 on Figure 1) were loose. An additional summary of independent laboratory results was provided verbally by MRC to JEM in late May. Based on this

information, JEM concluded the four bottom stud bolts on the incorrect Flange #4 were loosened prior to the loss of containment and fire.¹ The loose stud bolts found on Flange #3 are believed to be loose due to the heat effects of the fire.

The investigation found the root cause is ***Operations Monitoring and Control of Work was inadequate for current Maintenance Contractor Organizational Capability***. Four contributing causes were identified as well. Recommendations are developed to address all causal factors and prevent recurrence of such incidents.

The investigation team reviewed the conclusions and recommendations with the MRC Leadership Team on April 11, 2025.

3. SCOPE OF INVESTIGATION

The scope of this independent investigation was limited to identifying the causal factors and root causes that led to the loss of containment and resulting fire. The investigation also addressed recommendations that would prevent the recurrence of similar potential events.

This investigation does not focus on issues regarding emergency response or community notification systems.

JEM used the Fishbone Diagram (also called Ishikawa Fishbone Diagram) methodology for this investigation and Root Cause Analysis. The Fishbone Diagram method starts with identification of broad categories of potential causes and allows for structuring data collection and targeting interview questions to examine and evaluate potential causes in these categories. Root causes and contributing causes are identified and validated and causes that are found to be not valid are eliminated. Finally, recommended actions which will reduce the likelihood of recurrence or prevent recurrence, are developed for valid root causes and contributing causes. These recommended actions are summarized in Appendix 3.

JEM reviewed the site of the incident to be familiar with the location and details of the initiating event and the extent of the resulting fire damage.

4. INCIDENT AND INVESTIGATION DETAILS

The incident started at approximately 1:35 p.m. on Saturday, February 1, 2025, when two contract workers were opening a flange to install an isolation plate blind in preparation for planned maintenance on one of the refinery's process units, the Cat Feed Hydrotreater (CFH), which had been shut down previously on January 30, 2025.

¹ A verbal summary of the metallurgical examination and testing results from an independent lab were provided by MRC to JEM Advisors in late May 2025. The updated information indicated that Flange #3 stud bolts were loosened by heat effects of the fire originating at Flange #4, and JEM has changed the report text to reflect this. Evidence of this heat effect include bolt elongation, thread deformation, reduced bolt metal hardness, and changes in grain size observed in microscopy analysis. JEM has not yet received the final written report from the metallurgical lab.

While opening the flange, hydrocarbon material started to leak. The two contract workers, upon observing the leak, evacuated the area, and within a minute the material caught fire, which spread within the immediate vicinity of the CFH.

MRC launched its incident investigation on February 1, 2025.

The California Department of Industrial Relations (Cal/OSHA) initiated its inspection on February 1, 2025.

The JEM Advisors initiated its independent investigation April 7, 2025, just days after finalizing the contract with CCH and after finalizing a Non-Disclosure Agreement with MRC to protect the company's confidential business information. The Martinez Refinery Leadership Team provided a conference room and dedicated two refinery leaders who arranged all interviews and provided all data requested by JEM for the investigation. The cooperation and openness in discussions by the Martinez Refinery leaders and employees interviewed demonstrates commitment to identifying causes of this incident and completing actions to prevent recurrence. The cooperation and open dialog is commended.

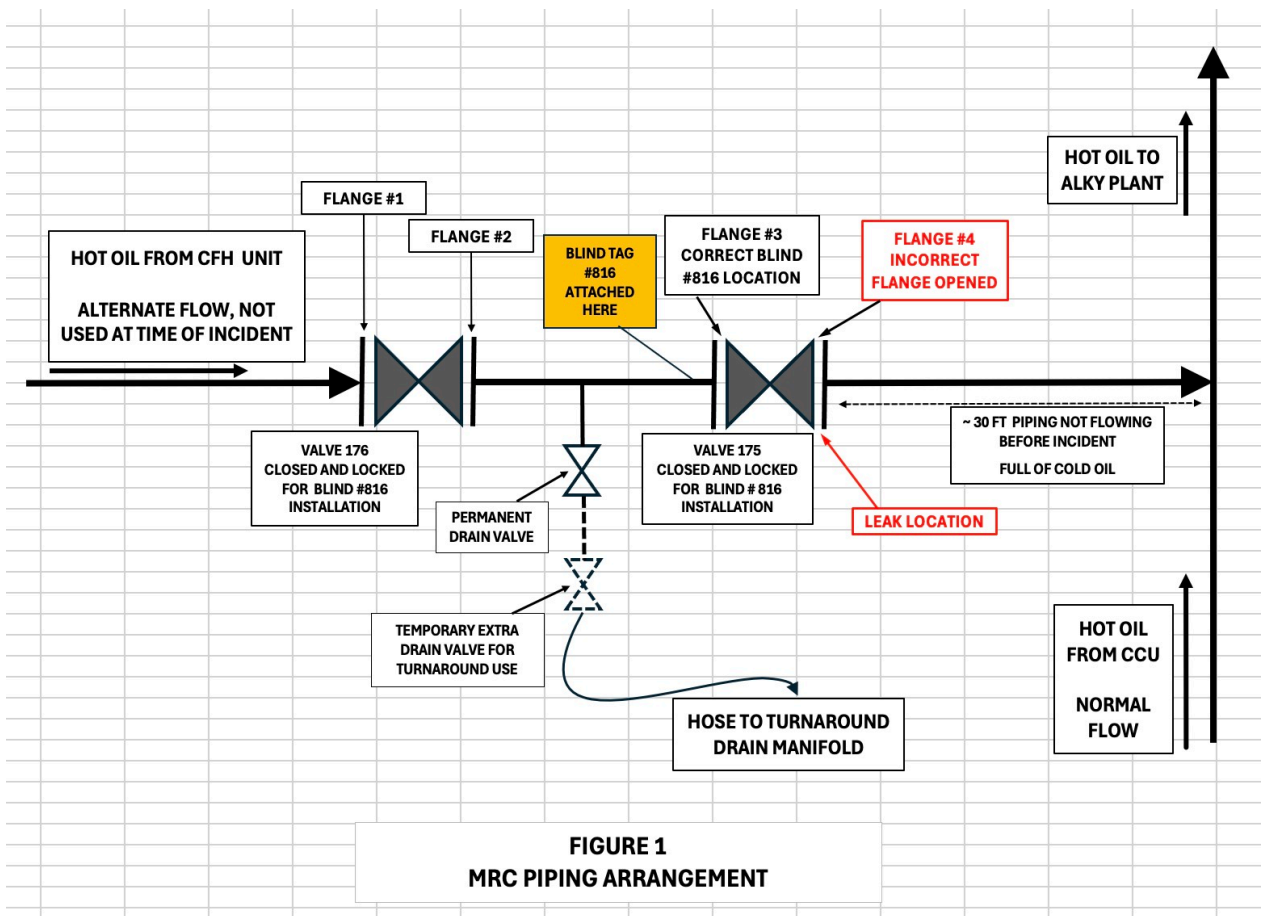
5. DESCRIPTION OF THE REFINERY PROCESS INVOLVED

The fire occurred in the Cat Cracker Unit Gas Plant (CCUGP). The piping system that was being isolated with a plate blind at the time of the incident was used to transfer heat from either the CFH or the Cat Cracker Unit (CCU) to the Alkylation Unit (Alky) to conserve energy. The line routing from the CFH to the Alky passed through the blind location in the CCUGP. The CFH was down at the time of the fire.

The isolation blind was to be installed in this piping system to allow chemical cleaning of systems in the CFH. Normal flow for this piping system routed heat from the CCU to the Alky.

The isolation blind was required to provide safe isolation for the CFH and would allow the normal flow from the CCU to the Alky to continue safely.

Figure 1 is a drawing showing the piping arrangement, including the planned blind installation location at Flange #3. Flange #4 which was incorrectly opened, causing the initial leak.



**FIGURE 1
MRC PIPING ARRANGEMENT**

6. DECIPTION OF THE INCIDENT

Prior to January 24, 2025, a blind location identification tag had been placed in the Cat Cracker Unit Gas Plant (CCUGP) to be used as a visual indicator of the correct location for isolation blind #816 to be installed. Blind #816 needed to be installed to isolate the CFH from the piping system used to transfer energy from the CCU to the Alky. The isolation blind would allow energy transfer to continue from the CCU to the Alky safely. The blind installation would take place inside a double block and bleed spool – designed to allow safe installation of the isolation blind. The blind installation was initially assigned to Global Scaffold and Construction Services (GSCS), one of the contracting companies working on this turnaround. To verify safe isolation prior to the blind installation, the two block valves (double block part of the spool) were verified closed and locked as part of the Lock Out/Tag Out procedure (LOTO) by the MRC Unit Operator. As part of the zero-energy verification process, GSCS performed a bleeder valve ‘rod out’ in the presence of the MRC Unit Operator to verify that the bleeder valve was not plugged, and that the two block valves were not leaking, providing a safe environment for the blind to be installed. As part of the process, the blind tag was identified and confirmed to be correctly placed to be a visual indicator of the correct flange to open. GSCS also added a valved connection to the existing bleeder valve and a drain hose attached

to the drain header. GSCS also placed the required blind at the job site for use during the turnaround.

On January 30, 2025, the CFH was shut down in preparation for turnaround work.

On the day of the blind installation (February 1, 2025), TIMEC (another contracting company working on the turnaround) advised the operations turnaround coordinator that they had extra workers and were available to do additional work. Prior to lunch, the operations turnaround coordinator reassigned the blind installation from GSCS to TIMEC.

In preparation for the blinding operation, prior to lunch, the unit operator (MRC Operator A) and the TIMEC supervisor walked the job, located the blind tag and the associated flange to be blinded within the double block and bleed spool. Both MRC Operator A and the TIMEC supervisor confirmed they saw blind tag #816 in place, identifying Flange #3 as the blind location (see Figure 1). The MRC Operator demonstrated zero energy in the piping spool by opening a valve at the end of the chemical cleaning hose.

MRC Operator B (temporarily assigned to the Cracked Products Area for the turnaround) completed a gas test of the immediate area to verify that it would be safe to work at that location. (Gas testing is performed as part of the permit to work process to confirm atmospheric conditions are safe for workers to be in the area and safe for performing the kind of work that is planned). Gas analysis readings were documented on the Safe Permit to Work form at around 11:00AM and conditions were normal.

Between 11:15AM and 11:30AM, the TIMEC supervisor and the TIMEC Steamfitters (one journeyman and one apprentice) walked the job. The TIMEC supervisor showed the TIMEC Steamfitters (fitters) the flange location and told the TIMEC Steamfitters that he verified 'zero energy' for the blind installation.

At 11:30AM the TIMEC Steamfitters, the TIMEC supervisor, and MRC Operator A did a third job walk to again verify the flange location. It was stated that the flange location (Flange #3) was pointed to by both the TIMEC supervisor and the MRC Operator A using a laser pointer.

Once the third job walk was completed with the TIMEC Steamfitters and their supervisor, MRC Operator A signed the permit to work and gave it to the TIMEC supervisor. It is stated that MRC Operator A told the supervisor to call him when they were ready to start work since this was a 'First Break' job as handwritten on the permit. 'First Break' is used to describe a job that is the initial opening of a system that has been isolated and verified to have zero energy.

MRC Operator A left the area to attend to other duties until called back for the start of the job. The TIMEC supervisor also left the area to arrange for a third contractor, OnPoint Safety Attendants, to provide two safety attendants and fresh air breathing apparatus for the blinding job. The TIMEC supervisor had a radio and MRC Operator A had a radio, but the two TIMEC Steamfitters did not have a radio.

At 12:20PM the OnPoint safety attendants began installing barrier tape for the job in the CFH/CCUGP areas.

At 12:30PM the TIMEC Steamfitters and the TIMEC supervisor finished their final job walk. Since the job was to be performed on a short scaffold (approximately 5 feet), they discussed

the air hose routing up the ladder for safe egress in case of a problem. The TIMEC supervisor then left the area to attend to another job.

Between 12:30PM and 1:00PM the TIMEC Steamfitters gathered their tools, including battery powered wrenches, and set up the work area. It should be noted that if they work on the correct flange (Flange #3), the battery powered wrenches will work well, because insulation has been removed. The battery powered wrenches could not be used on the wrong flange (Flange #4) because insulation was in the way and prevented them from being used. The TIMEC Steamfitters completed a Job Safety Analysis (JSA) to identify hazards for their work. Working on the wrong flange (the greatest hazard potential) was not identified as a hazard. Since neither the MRC Operator A nor the TIMEC supervisor were in the area, no one reviewed the JSA for completeness or accuracy. Current MRC work processes do not require review of the JSA by the MRC Operator approving the Permit. The TIMEC General Work Hazard Analysis/Safe Work Plan form used to document the JSA includes a space for name and signature of a supervisor or safety representative, but this was not used on this JSA, indicating no review was done.

At 13:02PM, the TIMEC Steamfitters and the OnPoint safety watches conducted a joint safety meeting and finalized the JSA.

At 13:25PM OnPoint safety watches began their breathing air bottle watch and line of sight duties. The TIMEC Steamfitters began removing bolts from the wrong flange (Flange #4). They did not notify the TIMEC supervisor or MRC Operator A that they were starting work even though this is a requirement for this 'first break' job. MRC requires an MRC Unit Operator to be present for 'first break' of flanges for the turnaround blinding process. Neither the TIMEC supervisor nor MRC Operator A were in the area.

Since the TIMEC Steamfitters were now working on the wrong flange, insulation prevented them from using the battery-operated tools they selected earlier for this work. It appears that neither of the TIMEC Steamfitters recognized this as an issue and proceeded to remove the flange bolts with hand tools.

After loosening four bolts from the wrong flange (Flange #4), hydrocarbon fluid began to leak from the flange. This 'incorrect' set of flanges was part of the active piping system that was moving hot hydrocarbon from the CCU to the Alky at the time of the incident. Unable to stop the leak, the TIMEC Steamfitters evacuated the area. The leak prevented them from leaving the scaffolding via the ladder. The journeyman was able to disconnect his breathing air supply hose and climb down from the short scaffolding using his five-minute escape pack. The apprentice was unable to disconnect his breathing air hose due to oil making the connector slippery, so he climbed down from the scaffold pulling the air hose along with him. The apprentice then removed his harness, escape bottle and mask, and evacuated the area with the journeyman.

Approximately one minute from the start of the leak, the leaking hydrocarbon fluid ignited. Initially, ambient temperature oil in a 30' length of piping would be displaced to the leak, followed by the 630F oil from the CCU. The ignition source is likely autoignition of the hot 630F hydrocarbon (after the cool fluid in the piping is displaced). This leaking hydrocarbon

created a pool fire beneath the CCUGP pipeway, expanding in size as the fire continued. The heat from the pool fire quickly caused other piping systems to fail, adding fuel to the fire.

It was reported that within seconds of the fire starting, a fire monitor was activated and focused on the initial fire location. Refinery first responders were requested and arrived with the refinery equipment to further address the fire. The refinery also requested additional resources from the industry mutual aid group as well as city fire resources.

It was reported that the 'liquid' fire was out at 8:00PM on February 1, and only light hydrocarbon 'gas' continued to burn until Tuesday, February 4, 2025. (Nearby equipment containing light hydrocarbon material was allowed to burn itself out because MRC could not remove the material through damaged process piping).

Piping, flanges, and bolting at the blind #816 location were examined by MRC experts after the fire. The stud bolts on the wrong flange (Flange 4 in Figure 1) were found to have been loosened on the bottom side of the flanges as stated by the TIMEC Steamfitters - which resulted in the fire. Loose stud bolts on the correct flange (Flange #3 in Figure 1) were also noted.

The entire double valve piping assembly was sent to an independent laboratory for metallurgical evaluation and mechanical testing. A summary of breakaway torque measurement data from that testing was provided to JEM by MRC indicated 4 bolts on the bottom of the incorrect flange (Flange #4 on Figure 1) and all bolts on the correct flange (Flange #3 on Figure 1) were loose. An additional summary of independent laboratory results was provided verbally by MRC to JEM in late May. Based on this information, JEM concluded the four bottom stud bolts on the incorrect Flange #4 were loosened prior to the loss of containment and fire, and the bolts on Flange #3 were loosened by heat effects of the fire.²

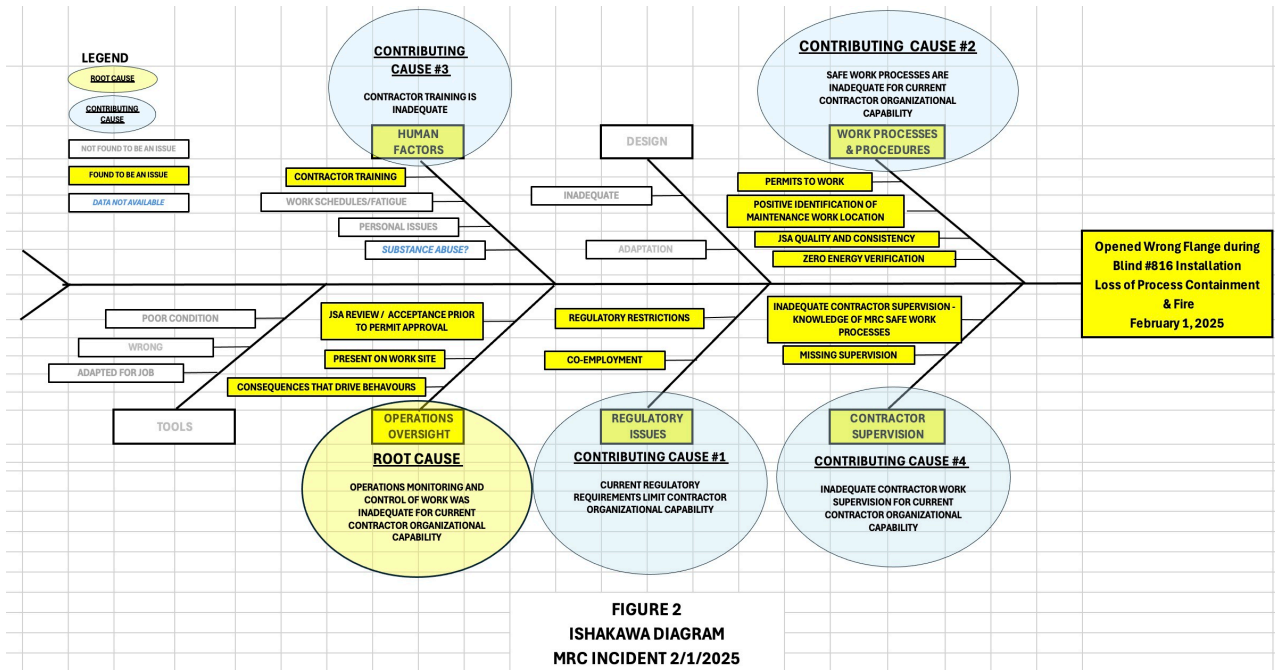
7. INCIDENT TIMELINE

The JEM independent investigation used the Incident Timeline prepared by the MRC Incident Investigation Team and validated key points in the timeline during various interviews with MRC and contractor personnel. The timeline is attached in Appendix 4.

² A verbal summary of the metallurgical examination and testing results from an independent lab were provided by MRC to JEM Advisors in late May 2025. The updated information indicated that Flange #3 stud bolts were loosened by heat effects of the fire originating at Flange #4, and JEM has changed the report text to reflect this. Evidence of this heat effect include bolt elongation, thread deformation, reduced bolt metal hardness, and changes in grain size observed in microscopy analysis. JEM has not yet received the final written report from the metallurgical lab.

8. ROOT CAUSE AND CONTRIBUTING CAUSES

JEM Advisors used the fishbone/cause and effect diagram to identify the incident causal factors and root causes for this event as shown below.



Root Cause- Operations Monitoring and Control of Work was inadequate for current Maintenance Contractor Organizational Capability

MRC Operations Oversight and Control of Maintenance Work –

- There are a number of causal factors impacting Contractor Maintenance organizational capability and performance.
- Due to regulatory issues impacting contractor skill sets, selection and training, there are few options to address the gaps brought about by the regulatory policies.
- As owners of the facility, MRC operations cannot allow the poor performance of others to impact the safety and performance of the refinery.
- Declining contractor organizational capability requires increased MRC Operator oversight, including:
 - Increased MRC Operator presence during maintenance work, especially at job start
 - Review of JSA prior to Permit approval to assure worker understanding of hazards
 - Appropriate consequences for poor performance
 - Appropriate positive consequences to reinforce excellent performance

Contributing Cause #1 – Current Regulatory Requirements Limit Contractor Organizational Capability

Regulatory Restrictions due to California Senate Bill 54 (2013) (SB-54)

- SB-54 requires contractor workers to be sourced solely from the local union hall. As a result, past resources that included 'professional shutdown execution' personnel from other locations are no longer available for MRC to use on turnarounds.
- Contracted experienced turnaround craftspeople are now more difficult to find and staff using the local union halls.

Co-Employment Regulations

- Co-Employment policies have expanded beyond the need to insert contract supervisor between the contract hourly workforce and company resources, which impedes clear communications regarding job details and safety concerns.
- Co-Employment restrictions now prevent approving contractor safety plans and providing safety training to contractor craftspeople directly by knowledgeable MRC company resources. Current requirements include sharing safety policies and procedures with contractor company leaders, with the expectation that contractor employees are fully trained in these prior to working on the refinery site.

As a result of these two regulations, there is now a higher likelihood of human errors entering into maintenance work performed by contractor resources.

Contributing Cause #2 – Safe Work Processes and Procedures are inadequate for current Contractor Organizational Capability

Permits to Work–

- Permits to work are difficult to read due to the small type size and do not contain reference to 'first break' work requirements or process service.
- MRC procedures require revalidating Permits to Work if the work is not started within 90 minutes to ensure that conditions for safe work execution have not changed. Work on this blind installation was started approximately 115 minutes after Permit approval, without revalidation approval.
- For work with potential for loss of process containment, such as 'first break' work, operational presence from the start of job until work is in a safe state is required but not always enforced and was not in place during the blind #816 work.

Positive Identification of Maintenance Work Location

- MRC has a blind tagging procedure to mark blind installation locations which is not used consistently and is not consistently understood by contractor workers. The MRC procedure requires attachment of a yellow tag with the blind number next to the flange

to be blinded. Other methods of identifying blind locations are sometimes used (placement of a second pink tag, marking flange with paint or marker, pointing to the location with hands or laser pointer, etc.).

JSA Quality and Consistency–

- JSA for contractor work is completed by contractor workers, without MRC review and sometimes without contractor supervisor review and approval. JSA is written after the Permit is approved, so there is no confirmation that contract workers understand the most significant process hazards and simultaneous operation hazards.
- JSA sample for the Blind #816 installation reviewed by the investigation team had numerous errors and omissions and did not identify the highest risk for the job. It was difficult to review due to Type size and illegible text and had many check boxes that may not apply to many jobs.

Zero Energy Verification–

- Current practice allows MRC operators to validate zero energy with the contractor supervisor, at times, well before the work is executed. Contractor craftspeople are allowed to accept verbal validation of zero energy from their supervisor. MRC procedure C(F)-5 Section 6.2 Role Operations (e) and Role Maintenance (b) are not specific regarding who must verify Zero Energy. Both sections state Zero Energy is to be confirmed prior to Permit to Work approval without specifying how long in advance is acceptable.
- The Steamfitters working on blind #816 installation stated they did not have a personal lock on the locked-out isolation valves or lockbox, as required by MRC Process Isolation Procedure C(F)-5, Sections 6.2 and 7.2.

Contributing Cause #3 – Human Factors (Contractor Training is not adequate)

- Co-Employment policies have expanded beyond the need to insert contract supervisor between the contract hourly workforce and company resources, which impedes clear communications regarding job details and safety hazards / precautions.
- Co-Employment concerns now restrict approving contractor safety plans or providing safety training directly to contractor employees by knowledgeable company resources. Current requirements include sharing safety training information with contractors, with the expectation that contractors train employees in the same manner that was previously done under direct company resources.
- As a result of this co-employment interpretation, there is a higher likelihood of human errors entering into maintenance work performed by contractor resources.

Contributing Cause #4 – Contractor Supervision

Inadequate Contractor Supervision – Knowledge of MRC Safe Work Processes

- Contractor Supervisors may not be knowledgeable of MRC process information and hazards, standards for Permits, JSAs, blind tagging procedures, line break requirements, simultaneous operations, and other critical factors when supervising their crews. JEM noted evidence of this in interviews with the TIMEC Project Manager and Safety Manager.
- Co-employment issues allow sharing training information with contracting companies but prevent the actual training and documentation of the knowledge transfer process by company resources (other than periodic contractor audits).

Missing Supervision

- Contractor Supervisors often manage multiple crews in multiple locations and are not always on jobsites during potentially hazardous maintenance steps. Even with ratios as low as 1:4 (supervisor to craftspeople), they cannot be in two locations at the same time as most crew teams are two-person teams.

9. RECOMMENDATIONS FOR PERMANENT CORRECTIVE ACTIONS

All recommendations are summarized in Appendix 3.

Recommendations to Address Root Cause – MRC Operations Monitoring and Control of Work was inadequate for current Maintenance Contractor Organizational Capability

Increase MRC Operations Oversight of Contractor Maintenance Work

- Increase MRC Operations oversight for maintenance work.
 - Increase MRC Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence.
 - Review and provide endorsement of Contractor JSA prior to permit approval, to ensure workers understand the risks, and that the highest risk hazards are properly addressed (i.e. wrong flange for blinding, cutting wrong line, etc.). Do not approve Permit to Work until JSA meets these standards.
 - Provide the appropriate consequences for poor performance as well as work excellence for contractor companies.
 - For consistency, work processes for MRC Operations oversight of company maintenance work should be the same.

**Recommendations to Address Contributing Cause #1 –
Current Regulatory Requirements Limit Contractor Organizational Capability**

Regulatory Restrictions due to California Senate Bill 54 (2013) (SB-54)

Co-Employment Regulations

- No options to deal directly with this causal item were identified.
- The recommended actions for the root cause will close the gaps resulting from these regulatory issues. This includes:
 - Increase MRC Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence.
 - Review and provide endorsement of Contractor JSA prior to permit approval, to ensure workers understand the risks, and that the highest risk hazards are properly addressed (i.e. wrong flange for blinding, cutting wrong line, etc.). Do not approve Permit to Work until JSA meets these standards.
 - Provide the appropriate consequences for poor performance as well as work excellence for contractor companies.
 - For consistency, work processes for Operations oversight of company maintenance work should be the same.

**Recommendations to Address Contributing Cause #2 –
Safe Work Processes and Procedures are inadequate for current Contractor
Organizational Capability**

Permit to Work

- Revise the MRC Permit to Work form to address improvements for critical information
 - Increase Type size for readability
 - Add spaces to identify process service, blind tag numbers, MRC Operator required at start of work, and other critical Permit information.
 - Enforce requirement to revalidate permit if work is not started within 90 minutes of permit approval

Positive Identification of Maintenance Work Location-

- Clarify and reinforce adherence to existing MRC processes for use of blind tags to positively identify blind locations
- Expand the process for positive identification of maintenance work location to other MRC and contractor intrusive maintenance work, such as line cutting.

JSA Quality and Consistency–

- Require MRC Operations review and acceptance of the JSA prior to Permit approval to ensure the craftspeople performing the work understand all critical process, external, and simultaneous operations hazards before starting work.
- Require all contractor JSA processes to include contractor supervisor review and signed approval for all JSAs.
- Review JSA forms and revise (or require contractor revision) to improve readability. Include key information such as process service, external hazards, and simultaneous operation hazards.

Zero Energy Verification–

- Ensure contractor employees are using personal locks as part of the LOTO process, as required by MRC C(F)-5 Process Isolation Procedure.
- Establish or reinforce the requirement for the craftspeople performing the job to witness zero energy testing to demonstrate within an appropriate short timeframe prior to the start of work.

Recommendations to Address Contributing Cause #3 – Human Factors (Contractor Training is Inadequate)

Training: Co-Employment Regulations Impact

- No options to deal directly with this causal item were identified.
- The recommended actions for the root cause will close the gaps resulting from these regulatory issues. This includes:
 - Increase MRC Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence.
 - Review and provide endorsement of Contractor JSA prior to permit approval, to ensure workers understand the risks, and that the highest risk hazards are properly addressed (i.e. wrong flange for blinding, cutting wrong line, etc.). Do not approve Permit to Work until JSA meets these standards.
 - Provide the appropriate consequences for poor performance as well as work excellence for contractor companies.
 - For consistency, work processes for Operations oversight of company maintenance work should be the same.

Recommendations to Address Contributing Cause #4 – Contractor Supervision

Inadequate Contractor Supervision – Knowledge of MRC Safe Work Processes

Missing Supervision

- No options to deal directly with this causal item were identified.
- The recommendations for the root cause will close the gaps resulting from these regulatory issues. This includes:
 - Increase MRC Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence.
 - Review and provide endorsement of Contractor JSA prior to permit approval, to ensure workers understand the risks, and that the highest risk hazards are properly addressed (i.e. wrong flange for blinding, cutting wrong line, etc.). Do not approve Permit to Work until JSA meets these standards.
 - Provide the appropriate consequences for poor performance as well as work excellence for contractor companies.
 - For consistency, work processes for Operations oversight of company maintenance work should be the same.

MRC has implemented changes aligned with some of the JEM recommendations prior to the JEM independent investigation, namely:

- Increasing MRC Company presence during contractor maintenance work
- Reinforcing adherence to existing MRC processes for use of blind tags to positively identify blind locations
- Reinforcing adherence to existing MRC processes for testing for zero energy just before work begins and witnessed by those performing the work

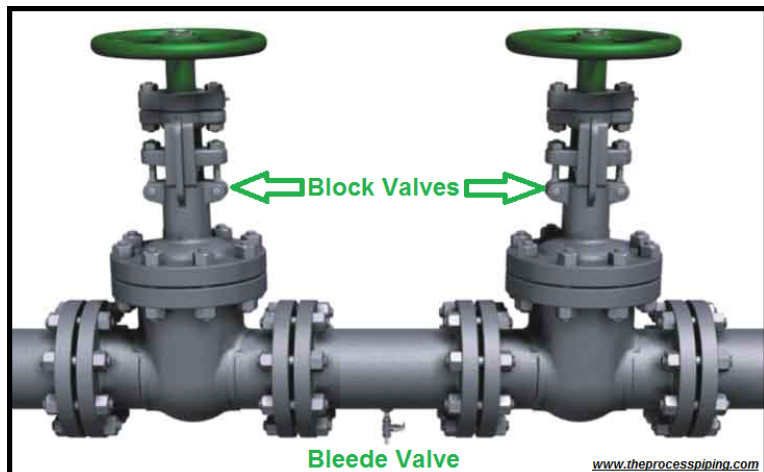
10.APPENDIX 1 – GLOSSARY OF TERMS

Term	Definition
Alky/Alkylation Plant	Process plant that converts propane, butane and pentane into a high-octane gasoline component (Alkylate)
Autoignition	Autoignition temperature, also known as self-ignition temperature, spontaneous ignition temperature, or minimum ignition temperature, is the lowest temperature at which a substance spontaneously ignites in a normal atmosphere without an external source of ignition. The autoignition temperature of a substance indicates the lowest temperature at which it may spontaneously ignite without the presence of an ignition source such as a flame or spark
Blind	A metal plate that is installed between two flanges in a piping system to provide safe isolation



Blind Tag	A weatherproof identification tag which is attached to or nearby the flange where a blind is to be installed. An Owner Company qualified Operator usually places the blind tag, as a visual indicator of the flange to be opened and blinded.
Breakaway Torque	Breakaway torque is the force needed to initiate movement in a previously tightened fastener. It is the torque needed to "break loose" a bolt that has been previously tightened.
Cat Cracker Unit	Refinery unit that uses a catalyst to crack heavy hydrocarbon molecules (called gas oils) into lighter products such as propane, butane, gasoline, jet fuel and diesel

Cat Cracker Unit Gas Plant	Refinery unit that separates the lighter gases such as propane and butane from heavier gasoline molecules as it leaves the Cat Cracker Unit
Cat Feed Hydrotreater	Refinery unit that ‘cleans’ the feed stream to the Cat Cracking Unit by using a catalyst and hydrogen to remove sulfur and nitrogen contaminants prior to entering the Cat Cracker Unit
Causal factors	A factor that contributed to the incident, and that, if eliminated, would have prevented the incident or reduced its severity or probability.
Co-Employment	A term used to indicate that if a company provides certain supervisory guidance, training, or instruction to a contractor craftsperson – they open the company up to the requirements of providing company benefits to that contractor even though they are not an employee
Contributing cause	A factor that contributed to the incident
Double Block and Bleed	A piping arrangement that includes two isolation valves and a “bleeder” or vent valve. The two isolation valves are closed, and the bleeder valve opened to verify the system is depressured, drained, and safe to work on



First Break	‘First Break’ is used to describe a job that includes the initial opening of a system that has been isolated and verified to have zero energy
Flange	A mechanical device that is used to connect two pieces of pipe together or allow the insertion of a valve, blind, or other fitting into the piping system



Fresh Air Breathing	Safety equipment that includes mask, regulator, and bottled breathing air to be used when working in a hazardous or potentially hazardous atmosphere – often required for ‘First Break’ jobs
Gas Testing	Sampling/testing of an area with a handheld analyzer to confirm conditions are safe for planned work to proceed
Human factors	The evaluation of how people interact with equipment, controls, and their work environment
JSA	Job Safety Assessment. Referred to as a ‘safe work plan’ by some companies. JSA is created by the individuals that will be completing a task and includes the risks and mitigation required to do the job safely
Loss of Process Containment (LOPC)	An unplanned or uncontrolled release of material from primary containment (piping, pressure vessel, or tank), including hazardous materials (such as oil or gas) and non-toxic materials (such as steam, N2, or other utilities)
LOTO	Lock Out Tag Out – Practices and Procedures to disable equipment or machinery to safeguard workers from hazardous energy releases. This includes locking isolation and depressuring systems in piping to assure “zero energy”
Management system	Policies, procedures and standards that describe how specific functions are to be carried out, performance is verified, and performance is improved
MRC	Martinez Refining Company
NDA	Non-disclosure agreement: an agreement binding two parties to protect each other’s confidential business information

Operating procedures	Written, step-by-step instructions and information necessary to operate equipment, compiled in one document including operating instructions, process descriptions, operating limits, chemical hazards, and safety equipment requirements
Operator	An individual who is trained and qualified to operate a process or some portion of a process
OSCA	Occupational Safety Councils of America
PBF	PBF Energy – owner of the Martinez Refining Company
Rod Out	Process of connecting a special tool and inserting the tool through an open valve to ensure it is not plugged. Valves used to demonstrate “zero energy” are “rodded out” to confirm the valve path is open.
Root Cause(s)	The fundamental reason(s) why an event or problem occurred, as opposed to a symptom or a contributing factor. It's the underlying reason that, if addressed, would prevent the problem from recurring. Root causes can also be described as the underlying management systems failures which the facility has the authority to correct.
SB-54	California Senate Bill 54 (2013), codified in California Health & Safety Code section 25536.7, effective January 1, 2014. It requires oil refiners in California to use a “skilled and trained workforce” when contracting for certain construction and maintenance work at their refineries. Contractor employees must be enrolled in or graduates of one of the apprenticeship programs that have been approved by the California Department of Apprenticeship Standards. Because the California State Building Construction and Trades Council (“SBCTC”) controls the vast majority of the construction apprenticeship programs in California, a contractor that wishes to enter into new construction contracts with refineries must have an affiliation with the SBCTC. This excludes many highly experienced turnaround professionals who have worked on California turnarounds prior to 2014
Stud Bolt	A threaded rod with 2 heavy hex bolts used to tighten and seal flange connections



Valve

A device to control flow through a piping system similar to the valves in your bathroom or kitchen sink



Zero Energy

A state of an isolated system containing no pressure, electrical, or mechanical energy - required for safe work

11. APPENDIX 2 – JEM INDEPENDENT INVESTIGATION TEAM MEMBERS

Team Member	Experience and Qualifications
<p>Rex Kenyon</p>	<p>Rex has over 50 years of experience in over 100 oil industry facilities across the world, including refining, upstream (onshore and offshore), pipelines, and chemicals. Rex retired from Chevron in 2000 after 29 years of service, including executive positions at both El Segundo Refinery as well as Chevron USA Refining and Chevron Corporate Project Resources, and has extensive experience in the fourteen elements of Process Safety Management, rapid implementation of change for improved work processes, reliability, risk management, incident investigation, gated turnaround management best practices, turnaround planning and execution, and routine maintenance planning and scheduling. Rex has led and participated in multiple incident investigations during his career that include deaths, fires, explosions and hazardous material releases. Since retiring from Chevron, all investigations were ‘external’ investigations and were conducted under attorney client privilege.</p> <p>Rex spent two years in Kuwait focusing on improving operations at three Kuwait refineries with specific projects to eliminate the practice of shutting down entire refineries and country-wide gas plants to do turnaround maintenance.</p> <p>Rex held senior management roles at Chevron as well as various supervisory and engineering roles during his career. Rex received his Bachelor of Engineering, Electrical in 1971 and was a Professional Engineer in the State of California.</p>
<p>Tom Hanson</p>	<p>Tom has 44 years of oil and gas facility experience, including a 33-year career with Chevron, serving in various Engineering, Operations, Maintenance, and major project leadership roles in upstream and downstream facilities, domestic and international. In recent years, he has provided consulting services in the oil and gas, petrochemical, and LNG arenas. He brings extensive experience in maintenance organization, reliability, mechanical integrity, process safety, efficiency and production improvement, major turnaround management, and integration of major projects with existing brownfield facilities.</p> <p>Tom has led and participated in Incident Investigations and root cause analyses (RCA) for safety, process safety, and reliability events throughout his career at a number of facilities. Investigation experience includes major incidents involving fatalities, multiple injuries, and fires due to loss of process containment.</p> <p>Much of Tom’s current consulting services include performing Operational Excellence and Process Safety Management assessments (including recommendation implementation) to help facilities and organizations reduce risk of major incidents.</p> <p>Tom received his Bachelor of Engineering, Electrical in 1979.</p>

12. APPENDIX 3 – SUMMARY OF RECOMMENDED ACTIONS FOR MRC

Recommended Actions
Increase MRC Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence.
Review and provide endorsement of Contractor JSA prior to permit approval, to ensure workers understand the risks, and that the highest risk hazards are properly addressed (i.e. wrong flange for blinding, cutting wrong line, etc.). Do not approve Permit to Work until JSA meets these standards.
Provide the appropriate consequences for poor performance as well as work excellence for contractor companies.
For consistency, make work processes for MRC Operations oversight of company maintenance work the same as for contractor maintenance work.
<p>Permit to Work</p> <p>Revise the MRC Permit to Work form to address improvements for critical information</p> <ul style="list-style-type: none"> • Increase Type size for readability • Add spaces to identify process service, blind tag numbers, MRC Operations required at start of work, and other critical Permit information. • Enforce requirement to revalidate permit if work is not started within 90 minutes of permit approval
<p>Positive Identification of Maintenance Work Location-</p> <ul style="list-style-type: none"> • Clarify and reinforce adherence to existing MRC processes for use of blind tags to positively identify blind locations • Expand the process for positive identification of maintenance work location to other MRC and contractor maintenance work, such as line cutting.
<p>JSA Quality and Consistency–</p> <ul style="list-style-type: none"> • Require MRC Operations review of the JSA prior to Permit approval to ensure the craftspeople performing the work understand all critical process, external, and simultaneous operations hazards before starting work. Deny Permit approval if JSA is not sufficient. • Require all contractor JSA processes to include contractor supervisor review and signed approval for all JSAs. • Review JSA forms and revise (or require contractor revision) to improve readability. Include key information such as process service, external hazards, and simultaneous operation hazards.
<p>Zero Energy Verification–</p> <ul style="list-style-type: none"> • Ensure contractor employees are using personal locks as part of the LOTO process, as required by MRC C(F)-5 Process Isolation Procedure. • Establish or reinforce the requirement for the craftspeople performing the job to witness zero energy testing to demonstrate within an appropriate short timeframe prior to the start of work.

13. APPENDIX 4 – INCIDENT TIMELINE / SEQUENCE OF EVENTS

Date / Time	Participants	Activity
01/13/2025, 9:30	Turnaround (T/A) Planning & T/A Contractor Management	2025 CCU Block T/A Onboarding Presentation
Before 1/24/2025	Global Scaffolding and Construction Services (GSCS) and MRC Unit Operator	Cleared bleeder and installed drain hose (fitters), hung blind (QA/QC)
01/29/2025	T/A Planning, Health & Safety (H&S) Manager, Operations Manager	Approved T/A Safety Plan
01/30/2025	Cracked Products (CP) Operations	CFH Unit Shut Down
02/01/2025, before lunch	Operations T/A Coordinator, TIMEC Supervisor	Installation of Blind #816 assigned to TIMEC
02/01/2025, before lunch	MRC Operator A, TIMEC Supervisor	Job walk for Blind #816 installation (included demonstration of zero energy)
02/01/2025, 11:00	MRC Operator B	Area gas testing performed
02/01/2025, between 11:15 & 11:30	TIMEC Supervisor, TIMEC Steamfitters	Job walk for Blind #816 installation
02/01/2025, 11:30	MRC Operator A, TIMEC Supervisor, TIMEC Steamfitters	Job walk for Blind #816 installation
02/01/2025, 11:30	MRC Operator A, TIMEC Supervisor	Permit S1622826 issued to TIMEC
02/01/2025, 12:20	OnPoint Safety Attendants	Began installing “DANGER / BREATHING AIR” barrier tape in the CFH / CCUGP areas
02/01/2025, 12:30	TIMEC Supervisor, TIMEC Steamfitters	Final job walk for Blind #816 installation
02/01/2025, between 12:30 and 13:00	TIMEC Fitters	Gathered tools, set up job site
02/01/2025, 13:02	OnPoint, TIMEC Steamfitters	Joint tailgate meeting, completed individual company Job Safety Analyses (JSA)
02/01/2025, 13:25	OnPoint	Began Air bottle watcher & Line of Sight duties
02/01/2025, 13:25	TIMEC Steamfitters	Began unbolting incorrect (North) flange on block valve 175
02/01/2025, approximately 13:30	TIMEC Steamfitters	Noticed leak, unsuccessful attempt to tighten flange, left scaffolding
02/01/2025, approximately 13:30	OnPoint, TIMEC Steamfitters	OnPoint lost sight of TIMEC Steamfitters, sounded evacuation horn
02/01/2025, approximately 13:30	OnPoint	Radioed in notification of fire to MRC Security
02/01/2025, approximately 13:30	MRC Operator B (assigned to CP Area for T/A)	Sees fire start from road, immediately turns on fire monitor and directs water at fire source.
02/01/2025, after 13:30	Emergency Responders	Arrived at site, began firefighting operations

14.APPENDIX 5 – MRC OVERSIGHT COMMITTEE COMMENTS AND RESPONSES

THIS DOCUMENT CAPTURES BOTH WRITTEN COMMENTS SUBMITTED BY THE OVERSIGHT COMMITTEE MEMBERS AND ALSO VERBAL COMMENTS GIVEN AT THE 6/3/25 MEETING.

Commenter	Comment	CCH Response	JEM Response	Changes to Document
Juan Banales	Were there any other blind tags in the immediate area? Old tags from previous jobs or current tags for a different job nearby?		None of the people interviewed mentioned other blind tags in the area prior to the fire.	No change to document.
Juan Banales	What is the purpose of this bleeder valve and drain hose if it is added after the safe verification is completed?		The bleeder valve and drain hose (connected to drain header piping) were to allow chemical cleaning of the system during the turnaround.	No change to document.
Juan Banales	What are the ISN grades for GSCS and Timec?		JEM did not request or receive information on ISN grades for these contractors as part of the independent investigation.	No change to document.
Juan Banales	Is it common to re-assign jobs to contractors?		Reassignment of jobs to alternate contractors is common, especially in early stages of turnarounds, when limited work areas are available.	No change to document.
Juan Banales	Was there a job packet which included a detailed scope of work provided to GSCS and Timec?		MRC provided the JEM investigation team a copy of the work permit, which indicated the C(F)-5 package was the Blind Book. A valve isolation checklist for Blind #816 installation was provided. No other detailed job packet with work scope was available during the investigation.	No change to document.
Juan Banales	Was the Timec crew local or a travel crew (outside the region)?		The Timec crew was sourced from the local Steamfitters Union Hall.	No change to document.
Juan Banales	Did Timec Foreman provide instruction to crew to wait for him to return prior to beginning the work after final walk was completed?		JEM did not have an opportunity to interview the TIMEC Foreman who was offsite due to a death of a family member. The MRC Operator A who approved the Permit to work stated he instructed the crew that he needed to be on site when the work started.	No change to document.
Juan Banales	Other than stating first break job on the permit, did the operator explain the requirement to the crew? Is there a plant or site indoc training that explains the first break requirement?		During the interview with MRC Operator A, he said he had the first break discussion with the foreman while the fitters were present and told them to call him before starting work. The Turnaround Onboarding presentation included a	No change to document.

			single line stating this requirement on slide 40 of a 77 slide presentation.	
Juan Banales	Was there an automated deluge type system in the unit or any other automated fire protection system available in the unit?		We understand there is no automated deluge system in the location where the fire occurred. It would not be typical to have deluge systems in refinery pipeway locations.	No change to document.
Juan Banales	What is the rationale or perspective of the Timec crew as to why they touched the wrong flange?		The Timec journeyman fitter said they worked on the flange that was pointed to with the laser pointer by MRC Operator A and the Timec Foreman.	No change to document.
Juan Banales	What was the contractor make-up for this turnaround? All sourced from the local union hall? Or were any travelers sourced?		The independent investigation focused only on the two Timec steamfitters and their supervisor. Assessment of the full contractor make-up and sourcing locations were not in the scope of the investigation.	No change to document.
Juan Banales	A journeyman was assigned to the job, what was their experience in working at shutdown or turnarounds in the industry?		This Timec employee stated in his interview that he had about 12 year's experience as a fitter and had tested in as a journeyman in the local union hall. He also stated that he had worked on turnarounds at Chevron, Marathon and Vallero refineries before starting at PBF MRC in December 2024.	No change to document.
Juan Banales	Is there a site indoctrination training requirement in order to perform work at this refinery? Is OSCA RSO training required? What training did the Timec crew have?		OSCA RSO Training is required for contractors. The Turnaround Onboarding Training was delivered to contractor Managers on January 13, 2025. The Contractor Managers were required to disseminate that training to the craftspeople working on the Turnaround. The Timec Project Manager and Safety Manager said they covered various portions of this training package in daily pre-job safety meetings (Toolbox Talks). There were no records available documenting which topics were covered on given dates, nor who participated.	No change to document.
Juan Banales	Do these co-employment restrictions prevent MRC from requiring contractors to have additional safety training prior to working at facility?		No. Our understanding is MRC can require Contractors to have additional safety training prior to working at the MRC facility, but MRC can't conduct the training directly. The Contractor will conduct the training	No change to document.
Juan Banales	What is the policy or purpose of pink tags? Is there an identification requirement for line breaks or openings such as a flange tag or marking flange with paint marker or 100% attendance and pointing to flange break location? There was a lot of discussion around blind tagging but no discussion as to whether there is a line		The Pink Tag is used on Turnarounds only and is not included in MRC Procedure C(F)-5. The Pink Tag use is described in the Turnaround Onboarding presentation as follows: <ul style="list-style-type: none"> • The Craft foreman and Operations representative writing/issuing the work permit will agree on each location of line opening. • The Craft Forman shall attach a (pink) "Identifier" tag to the flange at the location of the line opening. 	No change to document.

	opening policy and whether that was followed.		<ul style="list-style-type: none"> • This tag shall be marked with the isolation blind number CF Name and dated using a permanent marker. Note: This (pink) “Identifier” tag will validate that the flange to be opened and or blinded is correctly and clearly identified for the craft person doing the work. • The Operator will issue the permit at the job site. The permit will have the blind identification number and date written on it. • The Craft Forman shall review in the field, the isolation plan and each location of line opening with a member of the crew performing the task prior to handing over the permit. • The Craft Person ensures the (pink) “Identifier” tag(s) matches the number(s) on the permit, performs the task, removes the tag(s) and delivers the tag(s) along with the permit to their Foreman. • There will be no planned cross shift issuing of permits for blinding. • Operations shall be present at first flange break for all systems. 	
	Continuing from Question Above...		<p>The Pink Tag was not used for the Blind #816 job.</p> <p>Line breaks and equipment opening procedures are included in MRC Procedure C(F)-5 Process Isolation. Yellow blind tags are specified for identifying blind locations and are to be hung on or near the flange to be opened. An isolation package is required to identify the isolation valves to be closed and bleeders to be opened - this was available and the Permit referenced the Blind Book. C(F)-5 requires verification of zero energy before the permit is issued. This was done via the hose and drain header on the day of the job. Verification that the drain valve was not plugged was done days earlier. C(F)-5 requires use of personal locks by the craftspeople and requires the MRC Operator be present when opening the system. These requirements were not followed.</p> <p>Paint markers are not used to identify flanges to be opened, due to the possibility of old marking from the past being inadvertently used.</p>	No change to document.

Juan Banales	Is there a plant indoctrination training & test that explains unit hazards to individuals performing work in the plant? Does the safe work permit call out hazards and mitigations, did the workers sign the work permit stating they understand the hazards of the job and the required mitigations?		<p>MRC noted that all contractors involved in the TAR had been invited on January 6, 2025, to a meeting on January 13, 2025 to review PBF MRC's 2025 Turnaround Onboarding Presentation, which included details of requirements for the Contractor Foremen to confirm the Operations Yellow Blind Location Tag with a Pink Blind Tag to show craft workers where to install the blinds. The presentation also presented the requirement to have an operator present for "first break" flange opening. Since some invited Contractor leaders did not attend the presentation, the full presentation was emailed to all invitees on January 21, 2025. The Timec Project Manager and Timec Safety Manager attended the Onboarding meeting and were expected to convey all requirements to the Timec turnaround personnel.</p> <p>The Safe Work Permit identified that the Procedure C(F)-5 Package was the Blind Book, the isolation valves were closed and tagged, the bleeder was open and tagged. Cautions/Hazards checked included (1) stop work if leak occurred, (2) do not leave motorized vehicle unattended, (3) shutdown engines to refuel, (4) no sampling, venting or draining, and (5) other work in vicinity. "First Break" was written in in the section for Protective Equipment Required, and checked were (1)Gloves, (2) Air Supplied Breathing Apparatus, (3) Hearing Protection. This section also had a written-in requirement for a "bottlewatch" for the breathing air, and location of fire extinguisher and safety shower were identified as "Piperow".</p> <p>The Safe Work Permit was signed by the MRC Operator A and the Timec Supervisor. The two Steamfitters did not sign the permit.</p>	No change to document.
Juan Banales	Is the use of personal locks a requirement of MRC?		MRC Procedure C(F)-5 Process Isolation Revision 29 (10/2024) requires each craftsperson to install their personal lock on the lockbox before they start work and remove their lock when they have finished working.	No change to document.
Juan Banales	In this event the operator had multiple job walks to discuss scope with foreman and crew. How is co-employment an issue		Co-employment prevents MRC from directly supervising contractors, directly training contract workers, and approving contractor JSA. A qualified fitter would recognize that with the piping arrangement shown in	No change to document.

	here? Operator pointed out flange with laser pointer. Also a blind tag was in place.		Figure 1, only the section between the 8" block valves would be isolated and verified to have zero energy with the bleeder valve - therefore only Flange #2 and #3 can be opened safely. If they thought Flange #4 was pointed to in the job walk, the issue of safe isolation and zero energy verification should have been raised.	
Juan Banales	Increase Operator presence during contractor maintenance work to validate that the work is being done on the proper equipment at the right level of excellence." This isn't specific enough. When should operator presence occur? For the entire time the contractors are in the field?		JEM recommended that the Operator be present once the permit is signed and remain on site until the work is at a safe state with no further risk of incident.	No change to document.
Heidi Taylor	Why did existing isolation/zero-energy verification procedures fail to account for contractor capabilities? Was the "zero energy" confirmation process flawed (e.g., incomplete pressure testing, inadequate documentation)? Why were workers able to access the incorrect flange despite locked isolation valves?		There was zero energy present on the flange that was to be blinded. The process was flawed in that the contract workers did not witness zero energy themselves. It is not clear why the contract workers opened the wrong flange. The workers said MRC Operator A and the TIMEC supervisor pointed to Flange #4 with the laser pointer, while MRC Operator A and the Timec supervisor said they pointed to Flange #3. The workers said they did not see a blind tag. A qualified fitter would recognize that with the piping arrangement shown in Figure 1, only the section between the 8" block valves would be isolated and verified to have zero energy with the bleeder valve - therefore only Flange #2 and #3 can be opened safely. If they thought Flange #4 was pointed to in the job walk, the issue of safe isolation and zero energy verification should have been raised.	No change to document.
Heidi Taylor	Did the workers receive clear instructions or job-specific training for this task? Why did they switch from the correct flange (#3) to the incorrect one (#4)? Was there mislabeling, poor visibility, or distraction? What factors caused the miscommunication?		Based on interviews with multiple individuals, it appears that communications were clear, and that the instructions and labeling were proper. A verbal summary of the metallurgical examination and testing results from an independent lab were provided by MRC to JEM Advisors in late May 2025. The updated information indicated that Flange #3 stud bolts were loosened by heat effects of the fire originating at Flange #4, and JEM has changed the report text to reflect this. It is not clear why the contract workers opened the wrong flange.	Report has been amended with footnotes 1 and 2 to reflect more current information that heat effects of the fire likely caused the loosened bolts on Flange #3, rather than the workers loosening this flange. The workers

				did loosen 4 bolts on the "live" Flange #4.
Heidi Taylor	<p>Why did the double isolation valves fail to prevent leakage? Were they improperly maintained or designed?</p> <p>Why were bolts on Flange #4 already loosened? Did prior work compromise integrity, or was there undocumented tampering?</p>		<p>The double isolation valves performed as designed and protected the flange intended for the blind installation.</p> <p>It is not clear why the contract workers loosened the bolts on the wrong flange (#4). There is no evidence of prior work or tampering causing the bolts on Flange #4 to be loosened and the Timec workers said they loosened these bolts.</p>	No change to document.
Heidi Taylor	<p>What specific gaps in the Maintenance Contractor's "organizational capability" contributed to the incident (e.g., staffing, oversight)?</p> <p>How did MRC's oversight of contractor workflows fail to detect procedural noncompliance?</p>		<p>Gaps in experience, fitter familiarity with the concepts of isolation and zero energy, and familiarity with MRC procedures were noted during interviews. The JSA developed by the Timec workers did not identify the most significant hazards of the work and provide mitigations. If the MRC Operator had been present when the job started, he should have seen the workers unbolting the wrong flange and stopped work.</p>	No change to document.
Heidi Taylor	<p>How does "inadequate Operations Monitoring and Control of Work" directly link to contractor capability?</p>		<p>See Answer above, Line 25.</p>	No change to document.
Heidi Taylor	<p>Were pre-job safety briefings or toolbox talks conducted? If so, why were hazards still overlooked?</p> <p>Did leadership prioritize schedule over safety during maintenance planning?</p>		<p>Several job walks and identification of the flange to be blinded were conducted. The Timec workers and OnPoint Breathing Air monitors reviewed the JSA but the JSA did not identify all hazards. The hazard of opening the incorrect flange was not identified and addressed. Hazards were overlooked because the workers were inexperienced in the work and in MRC procedures, and because there was no oversight or review of the JSA and start of work.</p>	No change to document.
Heidi Taylor	<p>What immediate changes did MRC implement after the April 11 leadership review?</p> <p>How will recommendations address torque measurement findings (e.g., bolt-tightening protocols, real-time monitoring)?</p>		<p>JEM discussed some of the changes made after the incident with MRC, but it would be best for MRC to provide this information. Report has been amended with footnotes 1 and 2 to reflect more current information that heat effects of the fire likely caused the loosened bolts on Flange #3, rather than the workers loosening this flange. The workers did loosen 4 bolts on the "live" Flange #4. Bolt tightening protocols are important but not a cause of this incident.</p>	No change to document.
Heidi Taylor	<p>How can isolation procedures be redesigned to prevent "wrong side" errors (e.g., color-coded tags, digital verification</p>		<p>Color coded tags are currently required. JEM believes that such "wrong side errors" can be best prevented by (1) ensuring a qualified MRC Plant Operator is</p>	No change to document.

	tools)? Should contractors undergo capability assessments before high-risk tasks?		monitoring start of intrusive work until it has progressed sufficiently that no risk of loss of containment from the activity remains, (2) following all of the Process Isolation procedures that are in place, (3) ensuring contract workers understand concepts of isolation of energy, verifying zero energy, and recognition of systems not isolated, and (4) ensuring contractor workers fully understand the risks of the work, the required mitigations, and MRC procedures. Capability assessments for (3) and (4) would be helpful.	
Steve Devine	Page 6: Consider replacing manpower with "workers"		Agree.	" Manpower" has been replaced with "workers" on Page 6 and Page 10.
Steve Devine	Page 6: In reference to Operator A: Is this a MRC Employee? It should be more clear who is a contract employee, and who is an MRC Employee/MRC Supervisor.		Operator A (and Operator B) are MRC employees.	Report amended to identify Operator A as MRC Operator A, Operator B as MRC Operator B
Steve Devine	Page 6: In reference to use of foreman: Foreperson?		Noted and changed to supervisor.	"Foreman" has been revised to "Supervisor" throughout report.
Steve Devine	Page 6: In reference to Operator B: Same as prior Comment. (see row 30)		Operator A (and Operator B) are MRC employees.	Report amended to identify Operator A as MRC Operator A, Operator B as MRC Operator B
Steve Devine	Page 7: Consider adding: "(a third contractor)" [in reference to OnPoint Safety Attendant]		Agree	Added "a third contractor"
Steve Devine	Page 9: Even with the Summary, this heading and following discussion begs a brief description. [In reference to heading Co-Employment Regulations]		The 'Co-employment' issue stems from past lawsuits that found that if companies directly supervise contractors and treat them similarly to their own workforce, then those contractors should receive all the benefits that are given to employees (medical insurance, retirement programs, vacation pay, etc.). Companies no longer supervise contractors directly as a result of this legal interpretation. The interpretation via the court system has expanded the Co-employment definition to now include conducting contractor training	No change to the document. We can add this language if needed, after discussion during the 6/3/25 Oversight Committee meeting.

			as well as the approval of contractor safety plans - such as contractor Job Safety Analysis (JSA).	
Steve Devine	Page 10: In reference to "font of text", Type size		Agree	Changed "font of text" to "type size"
Steve Devine	Page 12 End of Section 8 beginning of Section 9: Consider moving the "Root Cause" in front of the Cause #1 through #5. Placement of this discussion here could be misperceived that it is a subset issue of #5 - versus making it more clear that it is a/the primary conclusion. Also, it seems PBF maybe be overaggressive in utilizing contractors in turnaround work as a means to save on cost, at the expense of safety: https://www.investing.com/news/transcripts/earnings-call-transcript-pbf-energy-q4-2024-results-miss-forecasts-stock-drops-93CH-3868194 .		Addressed Root Cause first in Sections 8 and 9. It is very typical for refineries and other industrial plants to bring in supplemental workers for turnarounds, when the short term personnel need is much larger than the typical daily routine maintenance requirement.	Moved Root Cause to before Contributing Causes Section 8. Moved Root Cause Recommendations to before Contributing Cause Recommendations.
Steve Devine	Page 12: In reference to use of Operator: Consider changing references like this to "Owner/Operator" or "MRC Staff" or something similar to make this plain language understandable.		Agree	Changed "Operator" to "MRC Operator" throughout sections 8 and 9.
Steve Devine	Page 15: Similar to the suggestion at the end of Section 8 to move the "Root Cause" in front of the Contributing Causes #1-5 -- consider doing that in this Section 9.		Addressed Root Cause first in Sections 8 and 9.	Moved Root Cause to before Contributing Causes Section 8. Moved Root Cause Recommendations to before Contributing Cause Recommendations.
Steve Devine	Page 15: Consider: In light of challenges introduced via SB 54 and needing to prioritize safety over costs cutting (https://www.investing.com/news/transcripts/earnings-call-transcript-pbf-energy-q4-2024-results-miss-forecasts-stock-drops-93CH-3868194) consider using in-house staff/resources to a greater extent during turnarounds.		JEM believes attempting to influence to improve contractor training and increasing oversight of contractors with in-house staff is more practical than trying to execute a significant amount of the turnaround work with in house staff. Turnarounds often bring in hundreds of contractors for a short period of time to complete the heavy workload.	No change to document.

Steve Devine	One overall comment/recommendation is to make it more clear/simple when “Operator” is mentioned that that means MRC Staff versus say an employee of a Contractor. The other overall comment/suggestion is to consider, if warranted/feasible, a finding that the Facility should consider more in-house conduct of Turnround work to the extent possible. If it is true that SB 54 so hampers the ability to obtain qualified, contract workers – then suggests more “in-house” turnaround work is necessary for safety’s sake. The second bullet of the Root Cause finding at the top of Page 12 sort makes it sound like the whole situation is a lost cause due to SB 54 – which seems like a stretch		See comment above.	Clarified MRC Operator throughout report.
CCH	Page 3 and all other applicable pages, change Contra Costa Health Services to Contra Costa Health.		Agree	Changed 'Contra Costa Health Services' to 'Contra Costa Health' or 'CCH' throughout document.
CCH	Page 3, Suggest calling out all Appendices in paragraph that calls out Appendix 2, since the report describes Appendix 4 before Appendix 3. Otherwise number appendices as they appear in the report.		Agree	Renumbered Appendix 3 and 4
CCH	Suggest adding a picture of a flange to help readers full visualize what it loos like. Can be added in the glossary or the report. (Page 3)		Agree	Pictures of flange, blind, double block & bleed, valve, and stud bolt added to Appendix 1 - Glossary of Terms
CCH	Page 6, add double block and bleed spool to glossary		Agree	Added to Appendix 1 - Glossary of Terms with picture
CCH	Page 6, blind tag: suggest this be expanded to say something like this is to be placed on or near the flange to be fitted		Agree	The suggested wording was added on Page 6.

	with a blind and is used as a visual indicator of which flange is to be opened			
CCH	Page 8, is just one flange or a set?		Flanges are often referred to as a 'set of flanges'. Two flanges are bolted together with a sealing gasket to connect piping components. (Refer to Appendix 1 - Glossary of Terms, Double Block & Bleed to visualize this)	No change to document.
CCH	Page 8, suggest expanded hydrocarbon gas. Nearby equipment containing light hydrocarbons was allowed to burn itself out since MRC could not remove the material through the damaged process lines.		Agree	The suggested wording was added on Page 8.
CCH	Page 9, change to MRC		Agree	PBF changed to MRC
CCH	Page 11, Does MRC's Lock Out Tag Out Policy require workers to place personal locks or are general locks allowed?		Yes, MRC Process Isolation Procedure C(F)-5, Sections 6.2 and 7.2. state requirement for personal locks	Clarified this MRC requirement Page 11.
CCH	Page 11, change PBF to MRC. First bullet under contributing cause #4 conflicts with the Ishikawa diagram. Please revise.		Agree	PBF changed to MRC. Made wording consistent between Ishikawa diagram and Report Text throughout.
CCH	Page 13, Contributing Cause #2 "Positive Identification of Maintenance Work Location", this is not on Ishikawa diagram, please revise as appropriate.		Agree	Revised Ishikawa diagram to include 'Positive Identification of Maintenance Work Location'
CCH	Page 14, Inadequate Contractor Supervision, see previous comments on Ishikawa diagram stating this differently.		Agree	Made wording consistent between Ishikawa diagram and Report Text throughout.
CCH	Page 18, Contra Costa County also describes this as the management systems failures that the facility has the authority to correct.		Agree	Added this wording.
Heidi Taylor	*Comments have been rephrased to assist in readability* In your presentation slide 1, you showed a blind and there was something sticking out		Response provided in recording of 6/3/25 meeting. In the photo of the installed blind, the piece sticking out is a spacer. This is called a spectacle blind, often used	Added photo of a 'flat blind' in the report Appendix 1 - Glossary of Terms

	<p>with a hole in it. What was that? Was something in the flange? In any of those flanges? Because that to me is a pretty good indication, if the empty thing is sticking out, then you're going to know that the blind is in the pipe right? Is that item used to indicate that rather than these tags? It seems to me that would tell you which end of this thing is in in there. Is that a better practice in your opinion or not? Is that that battery wrench? I appreciate that Swiss cheese model. I can see how there were many opportunities to correct this, and that did not happen. That battery wrench being one indication that that was the wrong flange. Correct? Right. So was it in?</p>		<p>in large or high pressure installations where the piping is difficult to move. If the spacer is visible, the solid part of the blind is installed, providing isolation. If the solid part of the blind is visible, the open spacer is installed and the system is in service.</p> <p>Blind #816 was a 'flat blind' and it has a handle for lifting rather than the spacer. Even if a spectacle blind was used, a Blind Tag would be required to identify the correct work location.</p> <p>Agree the insulation interfering with bolt removal with the powered tools is another indication of the wrong flange.</p>	<p>and in the Presentation.</p>
Heidi Taylor	<p>Were the loose bolts on 3 or 4? I thought they were on 4.</p>		<p>Response provided in recording of 6/3/25 meeting.</p> <p>Flange #4 had 4 bolts loose on the bottom side of the flange, loosened by the steamfitters.</p> <p>Flange #3 had all bolts loosened, apparently from heat effects of the fire. The laboratory contracted by MRC to investigate this found bolt elongation, thread deformation, and reduced hardness in the steel, all evidence of very high temperatures on Flange #3.</p>	<p>No change to document.</p>
Heidi Taylor	<p>*Comments have been rephrased to assist in readability. So I read that GSCS, (whatever GSCS is) was on the job, and then Timec at comes around and says, Oh, hey! We don't have anything to do. We're going to just pop in on here. So to me, that indicates an issue and I'm wondering why there was that change of contractor? Shouldn't it be consistent that one contractor be in charge of this and follow it from start to finish? Are these two contractors equally qualified, and did they attend whatever these briefings were that didn't filter down?</p>		<p>Response provided in recording of 6/3/25 meeting. Global Scaffolding Construction Services were initially assigned to install Blind #816. On Feb 1, 2025, TIMEC had people on site without work, so this job was reassigned to TIMEC. Reassigning work to optimize productivity is not uncommon. Either company should have been capable of safely executing this work task. JEM did not interview GSCS or evaluate their capability. TIMEC did have 2 managers attend the Turnaround Onboarding presentations and all contractors were emailed a copy of the onboarding presentation.</p>	<p>No change to document.</p>

Heidi Taylor	Does it appear to you that safety was, or schedule was emphasized more than safety in this situation?		Response provided in recording of 6/3/25 meeting. JEM did not see evidence that schedule was emphasized over safety in this investigation.	No change to document.
Heidi Taylor	Are you making any recommendations with regard to additional skills or requirements that contractors should have on refinery sites? I would appreciate that. I would also like to just add, as a comment, that I believe that there is a pattern in practice of a lack of supervision and various other things, and I think there might be a commonality here, and I'm wondering if you are able to use what you've learned, and compare those. Compare those insights with the other incidents that have occurred, namely, the spent catalyst release, the coke dust release, and you've done the fire. I mean, I think that that's really important that we discern you know what is going on. Let's get to the bottom of how to correct this. I know that there is a full safety audit coming up and if you don't handle that then maybe someone else will. But it would be helpful to look at this as a big picture rather than these isolated incidents, because otherwise we get lost in in Flange 3 and 4, and we're not looking at the big picture. And I want to make sure that this stuff doesn't happen. And the only way to do that, I believe is to look to address this kind of globally and still, you know, focus on what they can do specifically to keep us safe. And the workers safe.	CCH believes that this should be explored more as part of the full facility audit and will include in the scope.	Response provided in recording of 6/3/25 meeting.	No change to document at this time.
Kent Hull	What I really want to kind of dig down in is co employment. And, as you had stated multiple times that you know clearly, this is more of a legal issue than it is a process issue, although I think that ultimately it comes down to affecting the process. And	CCH believes that this should be explored more as part of the full facility audit and will include in the scope.	Response provided in recording of 6/3/25 meeting.	No change to document.

	<p>so the company from the legal perspective, MRC is not allowed to train the contractors, which means that they don't really have control over the contractors knowledge and ability. so that seems like it's sort of a perfect storm, a convenient way of avoiding responsibility, because MRC can say, well, look, we didn't train them. We couldn't really tell the contractors what to do. So we're not responsible. And because the contractors are working at the behest of MRC, they're not liable for their actions. And so it seems like it's sort of this great, great, convenient way of avoiding any responsibility. And so the we're left with the only thing that can actually be done in order to work with the contractors is that there has to be MRC employees monitoring the work at all times in order to make sure that they're compliant. And I don't know if that's actually practical. And if that is even as effective as the workers being trained themselves. And so It makes me wonder if a recommendation should be that there actually are procedures, processes, things that the contractors are doing that they actually should not be doing so. Anything that has the potential to explode, you know. Maybe contractors that can't be trained by MRC should not be allowed to be hired, and so I mean, I don't know if this is reasonable or legal, or whatever, but it seems to me that that is a huge gap in liability as well as control over the knowledge base of the workers that are actually performing the actions. And that's just really what I wanted to bring up. So thank you.</p>			
Tony Semenza	When I read the report it states that at least 3 job walks were done prior to the work		Response provided in recording of 6/3/25 meeting.	No changes to document

	<p>starting. Is that correct? So at least 3 different times. The operator, the Timex supervisor and the mechanics where they are on the job talking about the job. Is that correct? Okay, also that the contract and I'm not I. I winna make a comment before I continue this and that I fully, you know. To me. The company has a responsibility to have the safety operator there before the job starts and that'll always be my position. But when we do 3 job walks and 3 times people are told what valve, how to do it, and everybody agrees. And then the operator, the mechanics are also told, then that do not start the work until the supervisor is present and the operator is present. Is that correct? So the operator had to be there. They were told this right. And yet we and yet we have them going from a bare flange where the insulation was taking off to the other side of the flange, where you have to take off the insulation to get to the valves or to get to the bolts. Is that right? They used hand tools rather than the battery operated wrenches. But I'm what I'm saying, stop short of the bolts, right? The insulation was off on the on the right side wasn't on the wrong side. Okay, so I'm not, you know, I hate to put blame on someone. But here's my problem, who was transported to the hospital, were some of those operators transported to the hospital. the mechanics too. They also go to the hospital. Were any of these people given a drug test? I don't understand that. Why? Why? Perfect location to do it, though I mean that's where you would. You do something like that? I don't. Wanna. I'm not trying to put blame. But when there's a serious accident, whether it's a truck driver gets in an accident, whether it's a an airplane</p>		<p>Confirming from interview and timeline information that the job was walked multiple times, 3 times with the Steamfitters. Multiple people (but not the fitters) confirmed the blind Tag was attached to the pipe adjacent to Valve #3. The Operator who cleared the permit told us in interview that he instructed TIMEC to call him back before starting the job. The two steamfitters did not have radio or other means of communicating with the Operator, however the OnPoint beathing air attendant did have a radio (and later called in the emergency on the radio to security).</p> <p>JEM asked about drug testing during the investigation and MRC confirmed drug testing was not conducted.</p>	
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	<p>accident. The 1st thing you do is you drug test the people involved as long as they're not injured you, you drug, test them just to be sure that everything is right. I have a hard time having somebody be told 3 different times. This is the valve. This is the side of the valve. You have to work on. Point it to 3 different times. I have a problem with the operator not being there. I that that goes without saying okay. But then, again, no way of communicating when they were ready to do the job, because the both the supervisor for Timec and the operator had radios. But yet the mechanics who were going to do the job didn't have a radio, and they were specifically told to contact their supervisor before the job was to begin. Is that correct? I'm just. I'm just frustrated on another note.</p>			
Tony Semenza	<p>Quick note, Nicole. I'm also wondering when are we going to get MRC's RCA. I mean the last time we had an incident we had that done in 6, 7 weeks. And now it's 4 months later, and we're still waiting for their root cause analysis to, you know. See them side by side to see if there's any consistency or agreements.</p>	<p>CCH has been informed that the internal MRC Root Cause Analysis will be submitted no later than the end of June. During the 6/3/25 meeting Ken Axe of MRC clarified that it will be provided in the next couple of weeks.</p>	<p>Response provided in recording of 6/3/25 meeting. MRC provided response.</p>	<p>No change to document.</p>
Tony Semenza	<p>One question, if I may, for Ken. Ken any requirements for drug testing after an incident company policy? Just so we understand what the company policy is.</p>		<p>Response provided in recording of 6/3/25 meeting. MRC provided response.</p>	<p>No change to document.</p>
Juan Banales	<p>One of the things that I didn't ask, but I'll ask now is around the experience of the work crew. So the 2 steam fitters that were working were those by chance nested contractors, meaning that they've worked on the facility before, or were they brand new to the facility?</p>		<p>Response provided in recording of 6/3/25 meeting. JEM interviewed the work crew. The journeyman fitter said he started fitter work "just out of high school", which would be about 12 years. He worked in other states and migrated to California in the process. He stated he tested in as a journeyman and joined the local</p>	<p>No change to document.</p>

			<p>union in summer of 2024. He had worked on turnarounds at the Chevron, Valero, and Marathon refineries before coming to MRC in December 2024.</p> <p>The apprentice said he had 1 year of experience at the Chevron refinery before coming to MRC in December 2024.</p>	
Juan Banales	<p>Yeah. So I guess to that point, right? I mean, I know one of the causal findings was around the SB. 54, and the potential impacts that it's had on MRC and the kind of talent pool, as I read it from your report. But in this specific situation, the journeyman appears to be experienced. and I mean, from what you just said, and then also has some time on the site. So I mean, I'm having a little bit of difficulty kind of understanding that nexus there between the 2 as it relates specifically to the incident right? I don't maybe dispute some of the experience that MRC has had at large. But I guess I would say specific to this root cause investigation. I'm failing to see a nexus if we did, in fact, have a somewhat experienced journeyman on the on the job.</p>		<p>Response provided in recording of 6/3/25 meeting.</p>	<p>No change to document.</p>
Juan Banales	<p>Yeah, I mean, I was just as shocked in reading the report, but also in your presentation. I mean the lockout/tagout as well as a big concern. I totally agree with kind of what you've laid out in terms of the other causal findings. I'm amazed that lockout/tagout was not used in this process. I think that would have helped to further the understanding and validate the understanding of the worker as to the isolate. What's within the isolation scope and what's outside the isolation scope which in this case Flange Number 4 was outside.</p>		<p>Response provided in recording of 6/3/25 meeting.</p> <p>JEM agrees that a thorough review of the Process Isolation (Lock Out Tag Out) by the fitters, along with the Contractor Supervisor and the MRC Operator would improve understanding of the people executing the work. The blind tag should be pointed out during this review so the fitters have a reference when they return to start the job.</p>	<p>No change to document.</p>
Juan Banales	<p>*Comments have been rephrased to assist in readability*</p>	<p>CCH believes that this should be explored more as part of the full</p>	<p>Response provided in recording of 6/3/25 meeting.</p>	<p>No change to document.</p>

	<p>I appreciate you elaborating on that because I think that allow us to maybe go a little bit further than just the high-level causal factor on SB. 54 right? It was mentioned that the contract employee tested in. There may be an issue with the testing requirements if people are able to pass the test but do not have the qualifications to safely execute the work. I would like to ask for a further analysis on what about the requirements of SB. 54 are not allowing work to be performed safely and provide concrete solutions. This is important to all who are reviewing this report and hearing this presentation especially those who are able to influence change. Doing so would also be more impactful than the current finding in the report. We need to go one layer deeper and provide recommendations around specific work processes or regulatory processes. The current report is too broad. If we don't know exactly what can be addressed or corrected or slightly changed to best address this kind of leaves a lot to the imagination, if you will, versus a little bit more specificity around a finding and I think that will also force us to provide some context some background supporting evidence to that causal finding as well. Because I think you know, there's a lot there in it. If there was a lot some evidence that that could be provided. whether by you know your interviews with MRC, when they're looking for contractors. to support their turnarounds, you know. Have they had difficulty? You know, sourcing different</p>	<p>facility audit and will include in the scope.</p>		
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	<p>contractors. At what price point, you know. Are they going out, you know? Are they going for lowest bidder? Is that an issue here? Are there qualified contractors that can provide the resources, but at a higher price and MRC is choosing not to do that right. I think a little bit more evidence here is needed to try to understand that. And really. I think, make the causal finding that was a contributing factor.</p>			
Juan Banales	<p>I don't know, Nicole, if you had planned on bringing the revised draft report back to like a committee setting such as this, but I think it would be helpful just to understand and be able to further respond or comment. I think there was a lot of information that has been added just even from some of the items in the presentation that you know from my mind, I have even more questions right? And not to say that it has to be an iterative process, but at least another chance for us to take a look at the revised report in a public meeting, I think, would be helpful. I don't know how other members feel, but that that's just my comment.</p>	<p>CCH continues to follow its established process with regards to the independent evaluations and the Oversight Committee. The next step is to incorporate all comments into the report and open the public comment period. The Oversight Committee will be able to continue to provide comments during this process. The presentation on June 17 will also provide insight to any changes to the report and how comments were addressed.</p>	<p>Response provided in recording of 6/3/25 meeting. CCH provided response.</p>	<p>No change to document.</p>