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U.S. Chemical Safety and  
Hazard Investigation Board

# Investigation Digest

## The 20<sup>th</sup> Anniversary of the 2005 Fatal BP America Refinery Explosion in Texas City, TX

Lessons Learned and Improvements Implemented by Industry



## Introduction

On March 23, 2005, several severe explosions and fires occurred at the BP America Refinery in Texas City, Texas (BP Texas City Refinery) that resulted in 15 deaths, 180 injuries, and significant economic losses. The BP Texas City Refinery tragedy is one of the most serious incidents investigated by the U.S. Chemical Safety and Hazard Investigation Board (CSB) in the agency's history.<sup>1</sup>

As a result of the agency's investigation, the CSB issued 26 safety recommendations to 9 entities. To date, 25 of those recommendations have been closed successfully. Only one of the CSB's recommendations from the BP Texas City investigation – made to the federal Occupational Safety and Health Administration (OSHA) – remains open.

Twelve of the CSB's recommendations were issued to BP itself: 8 to the BP Texas City Refinery and 4 to the BP Global Executive Board of Directors. Particularly significant, the CSB issued an urgent call for the BP Global Executive Board of Director to establish an independent panel to assess and report on the effectiveness of BP North America's corporate oversight of safety management systems at their refineries as well as their corporate safety culture.

In addition to the 26 recommendations from its investigation, the CSB has released a training tool<sup>2</sup> and a [safety video](#) that illustrates the safety issues and

causal factors leading to the BP Texas City incident and the catastrophic consequences resulting from it.

On the day of the incident, during a unit startup at the refinery, a distillation tower was overfilled with a flammable hydrocarbon liquid, triggering the opening of three emergency relief valves that protected the tower from high pressure. The flammable liquid discharged into a disposal blowdown drum with a stack that was open to the atmosphere. The drum rapidly overfilled with the liquid, leading to a geyser-like release of the liquid out of the stack and subsequent explosions, fires, numerous deaths and injuries, and substantial property damage.

To prevent similar catastrophic events in the future, chemical disasters must be analyzed to determine their causes and share safety lessons with the chemical industry, regulators, standard-setting entities, and the public. The CSB stated in its [Final Investigation Report on the Fatal Naphtha Release and Fire at BP-](#)

1. For all CSB information related to the BP Texas City investigation, visit: <https://www.csb.gov/bp-america-texas-city-refinery-explosion/>.

2. For more information, visit: <https://www.csb.gov/csb-releases-new-free-online-safety-training-application-for-hazardous-chemicals/>.



[Husky Toledo Refinery](#) that the BP Texas City incident is “one of several publicly investigated incidents that are so iconic and impactful that they should become part of the basic knowledge of everyone across the chemical industry.” In that same report, the CSB quoted process safety expert Trevor Kletz on the importance of learning from chemical incidents:

*It might seem to an outsider that industrial accidents occur because we do not know how to prevent them. In fact, they occur because we do not use available knowledge.<sup>3</sup>*

The CSB also shared this key lesson:

*Organizations should develop systems to ensure that learnings from internal and external incidents are incorporated throughout the organization to prevent recurring failures, such as overflow of process vessels, that can lead to a catastrophic incident.<sup>4</sup>*

For the 20<sup>th</sup> anniversary of the BP Texas City Refinery disaster, the CSB has prepared this Investigation Digest to highlight key lessons learned from the agency’s investigation of this tragic incident.

Additionally, the CSB is recognizing and highlighting several positive changes made by the chemical industry, including:

- the development of guidance and improved practices surrounding the placement of occupied work-site trailers and other temporary structures;
- safer alternatives to atmospheric discharge;
- standards for process safety indicators;
- standards for preventing worker fatigue; and
- an increased focus on improving organizational culture and process safety management at refineries and chemical facilities.

### **Siting of Occupied Trailers and Other Temporary Structures**

The CSB BP Texas City investigation revealed that all the fatalities and many serious injuries occurred in or around the nine contractor trailers that BP located near process areas, as close as 121 feet away from the unit where the incident occurred. This unit contained large quantities of flammable hydrocarbons and had a long history of releases, fires, and other safety incidents.

3. The CSB quoting T. Kletz, *Lessons From Disaster: How Organizations Have No Memory and Accidents Recur*, Houston: Gulf Publishing Company, 1993; p 1.

4. CSB. Final Investigation Report on the Fatal Naphtha Release and Fire at BP-Husky Toledo Refinery, p.116. <https://www.csb.gov/bp-husky-oregon-chemical-release-and-fire/>.



The CSB noted that BP placed trailers in and around hazardous process areas to provide convenient access to work sites. The CSB issued an urgent safety recommendation (CSB Recommendation No. 2005-04-I-TX-UR2) to the American Petroleum Institute (API) to revise its Recommended Practice (RP) 752, “Management of Hazards Associated with Location of Process Plant Buildings,” to ensure that occupied trailers and similar temporary structures are placed safely away from hazardous areas.<sup>5</sup>

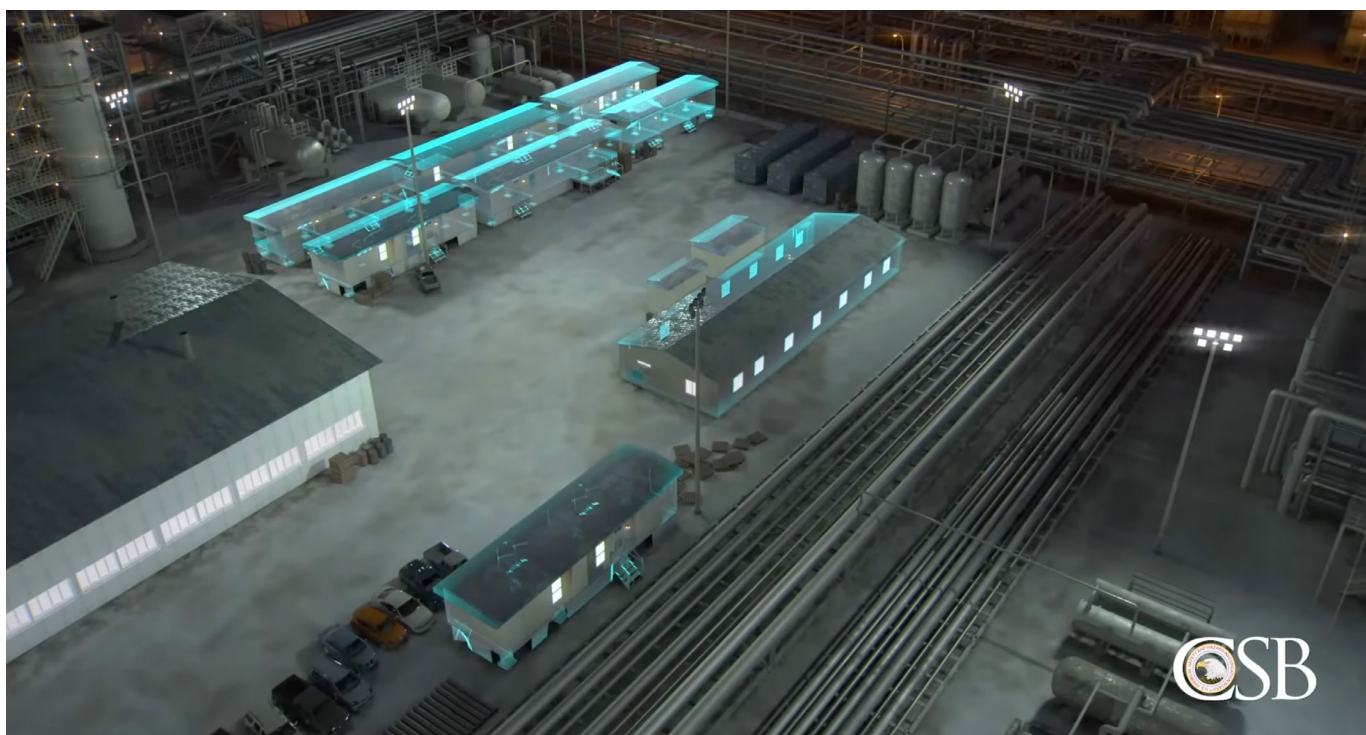
In response, API developed API RP 753, “Management of Hazards Associated with Location of Process Plant Portable Buildings.” API RP 753 bans lightweight wooden trailers from hazardous areas, limits non-essential personnel in portable buildings near these areas, and aims to minimize the number of occupied portable buildings. API RP 753 also requires safety analyses for all occupied portable buildings and emphasized designing and constructing them to protect occupants from explosions, fires, and toxic hazards.<sup>6</sup>

On March 14, 2008, the status of the recommendation was changed to: **Closed – Acceptable Action.**

## Safer Alternatives to Atmospheric Discharge

The CSB issued another recommendation to API (CSB Recommendation No. 2005-04-I-TX-R4) to revise API RP 521, “Guide for Pressure Relieving and Depressurizing Systems.” The CSB urged API to ensure that overfilling vessels is identified as a potential hazard when selecting and designing pressure relief and disposal systems. The CSB also recommended that API RP 521 warn against using atmospheric blowdown drums and stacks that are connected to collection piping systems that receive flammable discharges from multiple relief valves. To facilitate accomplishment of this, the CSB recommended the adoption of inherently safer alternatives, such as flare systems. In response to the CSB’s recommendation, API released the sixth edition of API RP 521 in January 2014, which addressed all elements of the CSB’s recommendation. This edition included a requirement to use inherently safer alternatives to atmospheric discharges when there is a flammable vapor cloud explosion risk.

On April 13, 2016, the status of the recommendation was changed to: **Closed – Acceptable Action.**



5. For a copy of the urgent safety recommendation please visit: [https://www.csb.gov/assets/1/20/bp\\_rec\\_2.pdf?13853](https://www.csb.gov/assets/1/20/bp_rec_2.pdf?13853).

6. In its Final Investigation Report on the 2018 Husky Energy Superior Refinery Explosion and Fire in Wisconsin, the CSB noted that prior to the incident, Husky Superior Refinery completed several facility siting projects, which included moving contractor trailers out of the refinery in the early 2000s. Beginning in 2013, the refinery required blast-resistant trailers for contractor use during turnarounds. The CSB had recommended such an action by industry as a result of the BP Texas City incident. An FCC operator at the Husky Superior Refinery told CSB investigators, “I happened to be on a good spot when it went off. I was in the thick wall control room when it went off. [...] The money they spent right away we said was worth it.” <https://www.csb.gov/husky-energy-superior-refinery-explosion-and-fire/>.

## Standards for Process Safety Indicators

A key finding of the CSB's investigation was that the oil refining and chemical manufacturing industry sectors lacked an effective system to assess process safety performance. The CSB concluded that industry needed a system to measure the performance of its process safety management systems. At the time of the BP Texas City Refinery incident, companies typically relied on personal safety indicators -- such as worker injuries from slip, trip, or fall events -- rather than focusing on indicators that could help prevent the risks of catastrophic failures, like worker deaths from explosions.

To address this issue, the CSB recommended (CSB Recommendation No. 2005-04-I-TX-R6A) that labor and management collaborate to develop new consensus standards that create performance indicators for process safety in the refinery and petrochemical industries. Specifically, the CSB called on labor and management to identify leading and lagging indicators for nationwide public reporting as well as specific indicators for use at individual facilities.

In response, in December 2007, the Center for Chemical Process Safety (CCPS) published a book

titled, "Process Safety Leading and Lagging Metrics... You Don't Improve What You Don't Measure."<sup>7</sup> Broad use and acceptance of this guidance document ultimately contributed to developing an industry standard, ANSI/API RP 754, "Process Safety Performance Indicators for the Refining and Petrochemical Industries", which was released in April 2010.

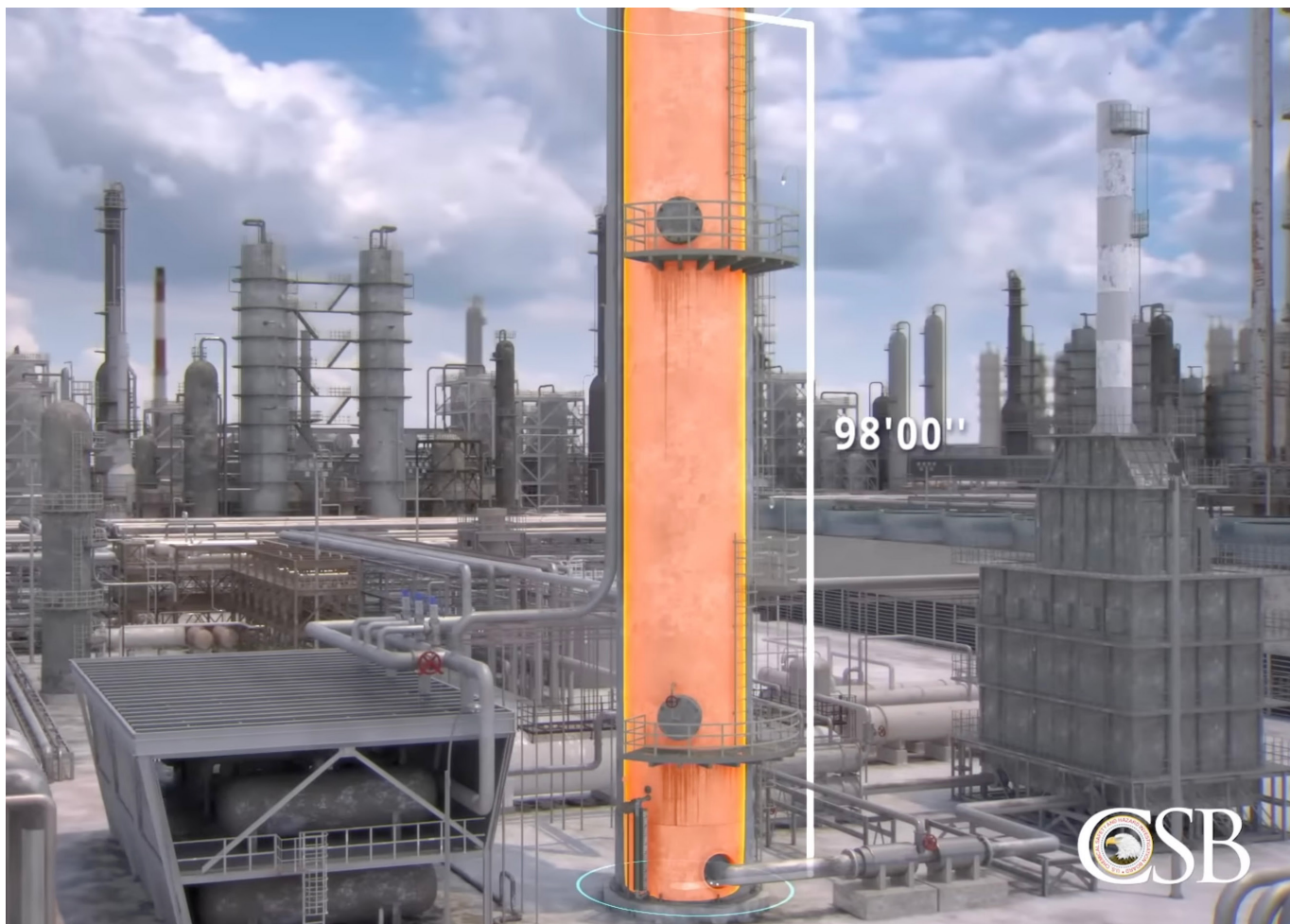
The new industry standard identifies leading and lagging indicators useful for driving performance improvement. The document classifies process safety indicators into four tiers of leading and lagging indicators. Tiers 1 and 2 are suitable for nationwide public reporting and Tiers 3 and 4 are intended for internal use at individual facilities. In April 2021, API published the third edition of ANSI/API RP 754.<sup>8</sup> The standard now incorporates the Globally Harmonized System for Classification and Labeling of Chemicals (GHS) criteria for threshold releases and mandatory weighting of Process Safety Event severity. The standard also expands the data collection capability to include non-petroleum-based chemical facilities.

*On October 25, 2022, the status of the recommendation was changed to: **Closed – Acceptable Alternative Action.***



7. A copy of the 2011 version of this CCPS book is available at: [https://www.aiche.org/sites/default/files/docs/pages/CCPS\\_ProcessSafety\\_Lagging\\_2011\\_2-24.pdf](https://www.aiche.org/sites/default/files/docs/pages/CCPS_ProcessSafety_Lagging_2011_2-24.pdf) (accessed February 11, 2025).
8. Available at <https://www.api.org/oil-and-natural-gas/health-and-safety/refinery-and-plant-safety/process-safety/process-safety-standards/rp-754> (accessed February 18, 2025).





## Preventing Worker Fatigue

In the BP Texas City Refinery investigation, the CSB concluded that worker fatigue likely contributed to the incident by impairing workers' performance. Some employees in key roles had worked 12-hour shifts for up to 39 consecutive days, leading to both acute sleep loss and cumulative sleep debt. As a result, the CSB recommended (CSB Recommendation No. 2005-04-I-TX-R7A) that API develop a consensus standard to prevent worker fatigue. The CSB recommended that the industry standard should address issues related to shift work, including limiting the number of work hours and consecutive days worked. In response to the recommendation, API developed RP 755, "Fatigue Risk Management Systems for Personnel in the Refining and Petrochemical Industries." API RP 755 provides guidelines for preventing fatigue by setting limits on work hours and days and addresses shift work.

*On January 20, 2021, the status of the recommendation was changed to: **Closed – Acceptable Action.***

## Assessing Organizational Culture

The CSB noted in its investigation report on the BP Texas City incident that among the many causes of the disaster were organizational and safety deficiencies at all levels of the BP Corporation. The CSB's investigation concluded that the BP Chief Executive and the BP Board of Directors did not exercise effective safety oversight. For example, the BP Group made budget cuts despite serious safety deficiencies at the BP Texas City refinery. The CSB found that items affected by the budget cuts included turnarounds, safety committee meetings, fire drills, and training courses. The CSB also found that BP audits, reviews, and correspondence showed that spending decisions impaired process safety performance in operator training, board operator staffing, and mechanical integrity.

As a result of its findings, the CSB issued several recommendations to the BP Global Executive Board of Directors (BP Global BOD). One of these recommendations (CSB Recommendation No. 2005-04-I-TX-R11 (R11)) required BP to appoint a

non-executive member to its Board with expertise and experience in refinery operations and process safety with the goal of ensuring that process safety would be incorporated into all levels of management decision-making. The CSB also recommended (CSB Recommendation No. 2005-04-I-TX-R13 (R13)) that senior executives use leading and lagging safety indicators. The CSB further recommended (CSB Recommendation No. 2005-04-I-TX-R12 (R12)) that the senior executives implement comprehensive incident reporting programs that encourage the reporting of incidents, require prompt corrective actions, and require the broad communication of key lessons learned.

In response to the CSB's recommendations, the BP Global BOD appointed several directors to oversee process safety in BP's refinery and other business operations and developed a variety of process safety and integrity management indicators to track, including the number of fires and explosions, loss of primary containment, flammable gas releases, the number and volume of oil spills, and overdue plant inspections and tests.

*On May 25, 2016, the status of R11 was changed to:*

**Closed – Acceptable Alternative Action.**

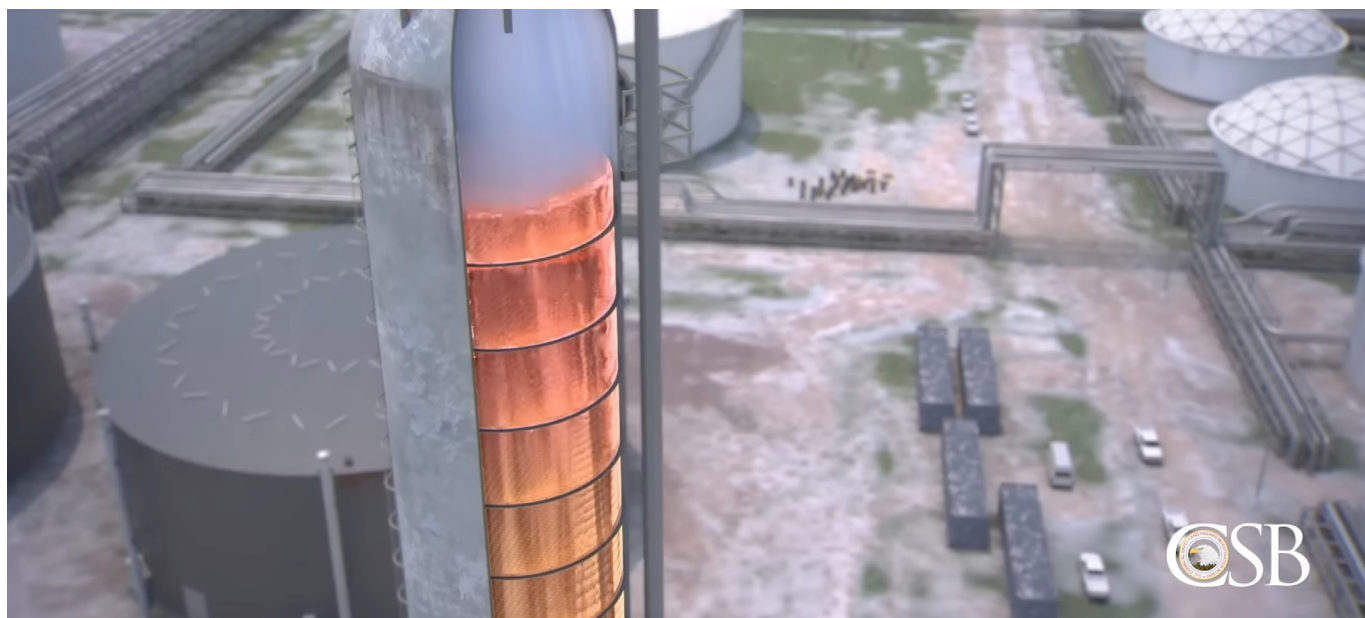
*On November 23, 2015, the status of R12 was changed to:* **Closed – Acceptable Action.**

*On January 30, 2013, the status of R13 was changed to:* **Closed – Acceptable Action.**

The CSB also issued an urgent recommendation (CSB Recommendation No. 2005-04-I-TX-UR1 (UR1)) to the BP Global BOD to commission an independent panel to assess and report on the effectiveness of BP North America's corporate oversight of safety management systems at its refineries and overall process safety culture. In response to the CSB's urgent recommendation, BP established the "BP U.S. Refineries Independent Safety Review Panel", which was chaired by former U.S. Secretary of State James Baker. The panel's report, known as the "Baker Panel Report" was released in January 2007. The Baker Panel Report identified numerous safety culture gaps and opportunities for improvement at BP and the company's U.S. refineries. The Baker Panel stated: "We are under no illusion that deficiencies in process safety culture, management, or corporate oversight are limited to the company."<sup>9</sup> According to CCPS in its book entitled "Essential Practices for Creating, Strengthening, and Sustaining Process Safety Culture," this statement by the Baker Panel motivated many process safety culture improvements in refining and chemical companies globally.<sup>10</sup>

*On March 9, 2007, the status of UR1 was changed to:*

**Closed – Acceptable Action.**



9. "The Report of the BP U.S. Refineries Independent Safety Review Panel", January 2007; p. i, *Panel Statement*. Available at <https://www.csb.gov/bp-america-texas-city-refinery-explosion/>.

10. CCPS, "Essential Practices for Creating, Strengthening, and Sustaining Process Safety Culture." 2018, p 4. [https://app.knovel.com/web/view/khtml/show/rcid:kpEPCSSPS9/cid:kt011OLTQ1/viewerType:khtml/root\\_slug:1-introduction/url\\_slug:introduction?b-q=essential%20practices%20culture&b-toc-cid=kpEPCSSPS9&b-toc-title=Essential%20Practices%20for%20Creating%2C%20Strengthening%2C%20and%20Sustaining%20Process%20Safety%20Culture&b-toc-url-slug:introduction&include\\_synonyms=no&view=collapsed&zoom=1&page=4&q=essential%20practices%20culture](https://app.knovel.com/web/view/khtml/show/rcid:kpEPCSSPS9/cid:kt011OLTQ1/viewerType:khtml/root_slug:1-introduction/url_slug:introduction?b-q=essential%20practices%20culture&b-toc-cid=kpEPCSSPS9&b-toc-title=Essential%20Practices%20for%20Creating%2C%20Strengthening%2C%20and%20Sustaining%20Process%20Safety%20Culture&b-toc-url-slug:introduction&include_synonyms=no&view=collapsed&zoom=1&page=4&q=essential%20practices%20culture) (accessed February 18, 2025).





## Management of Organizational Change

Finally, while highlighting the significant industry improvements made following the BP Texas City disaster, it is important to acknowledge that the CSB's investigation revealed significant gaps in standards and practices that may still be present today. The CSB found that the federal Occupational Safety and Health Administration's (OSHA) Process Safety Management (PSM) standard<sup>11</sup> does not require Management of Change (MOC) for organizational, personnel, and policy changes that could impact process safety. The CSB noted that the BP Texas City refinery did not conduct MOCs for budget cuts, staff reductions, and organizational changes, all of which impaired process safety at the refinery. The CSB concluded that if BP had assessed the safety implications of changes concerning personnel, policies, and the organization, the disaster on March 23, 2005, would have been less likely to occur. Furthermore, the CSB recommended

(CSB Recommendation No. 2005-04-I-TX-R9) that OSHA adopt broader MOC requirements to help companies like BP prevent catastrophic events. As a result, the CSB issued the following recommendation to OSHA:

*Amend the OSHA PSM standard to require that a management of change (MOC) review be conducted for organizational changes that may impact process safety including:*

- a. major organizational changes such as mergers, acquisitions, or reorganizations;*
- b. personnel changes, including changes in staffing levels or staff experience; and*
- c. policy changes such as budget cutting.*

Currently, the recommendation status is: **Open – Unacceptable Response**. The CSB continues to advocate for OSHA to implement these changes in the next revision to its PSM standard.

11. OSHA's PSM Standard can be found at: [29 CFR 1910.119](https://www.ecfr.gov/current/title-29/chapter-I/subchapter-B/part-1910/subpart-119/section-1910.119).





## Conclusion

The BP Texas City disaster presented significant opportunities for industry to learn valuable lessons and implement meaningful improvements in process safety management at chemical and petrochemical facilities across the country. In the 20 years since the BP Texas City incident, there have been significant advancements in trailer siting safety, the creation of a worker fatigue standard, the development and tracking

of performance safety indicators, and an increased focus on process safety management at refineries and chemical facilities, to highlight just a few.


A full list of the CSB's recommendations issued from the BP Texas City investigation report is provided in Appendix A to this Investigation Digest.

An Investigation Digest is a CSB advocacy product that provides plain-language summaries of completed Investigation Reports for the continued sharing of important chemical safety information.




# Appendix A:

## CSB RECOMMENDATIONS ISSUED FROM THE BP TEXAS CITY INVESTIGATION REPORT

RECIPIENT	REC NO.	RECOMMENDATION STATUS
BP Global Executive Board of Directors	2005-04-I-TX-UR1 URGENT	 Closed – Acceptable Action

### Recommendation Text:


1. Commission an independent panel to assess and report on the effectiveness of BP North America's corporate oversight of safety management systems at its refineries and its corporate safety culture. Provide the panel with necessary funding, resources, and authority - including full access to relevant data, corporate records, and employee interviews - in order to conduct a thorough, independent, and credible inquiry.
2. Ensure that, at a minimum, the panel report examines and recommends any needed improvements to: Corporate safety oversight, including the safe management of refineries obtained through mergers and acquisitions; Corporate safety culture, including the degree to which: - Corporate officials exercise appropriate leadership to promote adherence to safety management systems; - Process safety is effectively incorporated into management decisionmaking at all levels; - Employees at all levels are empowered to promote improved process safety; - Process safety programs receive adequate resources and are appropriately positioned within organizational structures; Corporate and site safety management systems, specifically: - Near-miss reporting and investigation programs; - Mechanical integrity programs; - Hazard analysis programs, management-of-change programs, and up-to-date operating procedures for processes with catastrophic potential; - Siting policies for occupied structures near hazardous operating units.
3. Ensure that the panel has a diverse makeup, including an external chairperson; employee representatives; and outside safety experts, such as experts in process safety; experts in corporate culture, organizational behavior, and human factors; and experts from other high-risk sectors such as aviation, space exploration, nuclear energy, and the undersea navy.
4. Ensure that the report and recommendations of the independent panel, which should be completed within 12 months, are made available to the BP workforce and to the public.

American Petroleum Institute	2005-04-I-TX-UR2 URGENT	 Closed – Acceptable Action
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### Recommendation Text:


In light of the findings concerning the March 23rd incident at BP's Texas City refinery, revise your Recommended Practice 752, Management of Hazards Associated with Location of Process Plant Buildings or issue a new Recommended Practice to ensure the safe placement of occupied trailers and similar temporary structures away from hazardous areas of process plants. Ensure that the new recommended practice:

- Protects occupants from accident hazards such as heat, blast overpressure, and projectiles;
- Establishes minimum safe distances for trailers and similar temporary structures away from hazardous areas of process plants;
- Evaluates the siting of trailers under a separate methodology from permanent structures, since trailers are more susceptible to damage, are more readily relocated, and likely do not need to be placed near hazardous areas.

American Petroleum Institute	2005-04-I-TX-UR3 URGENT	 Closed – Acceptable Action
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### Recommendation Text:

Issue a safety alert to your membership to take prompt action to ensure the safe placement of occupied trailers away from hazardous areas of process plants.

BP Texas City Refinery	2005-04-B-TX-R1	 Closed – Acceptable Action
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### Recommendation Text:






Revise the maintenance quality control program to require positive material identification testing or another suitable material verification process for all critical service alloy steel piping components removed and reinstalled during maintenance and inform work crews of special material handling precautions.

JV Industrial Companies	2005-04-B-TX-R2	 Closed – Acceptable Action
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### Recommendation Text:






Develop / update the written piping component installation quality control procedure to require positive material identification testing or other suitable verification or tracking process for all alloy steel piping components removed during maintenance.

## Appendix A: continued







RECIPIENT	REC NO.	RECOMMENDATION STATUS
National Petrochemical and Refiners Association (NPRA)	2005-04-I-TX-R3	 Closed – Acceptable Action
<b>Recommendation Text:</b> Issue a safety alert to your membership to take prompt action to ensure the safe placement of occupied trailers away from hazardous areas of process plants.		
American Petroleum Institute	2005-04-I-TX-R4	 Closed – Acceptable Action
<b>Recommendation Text:</b> Revise API Recommended Practice 521, Guide for Pressure Relieving and Depressurizing Systems to ensure that the guidelines: <ul style="list-style-type: none"> <li>Identifies overfilling vessels as a potential hazard for evaluation in selecting and designing pressure relief and disposal systems;</li> <li>Addresses the need to adequately size disposal drums for credible worse-case liquid relief scenarios, based on accurate relief valve and disposal collection piping studies;</li> <li>Warns against the use of atmospheric blowdown drums and stacks attached to collection piping systems that receive flammable discharges from multiple relief valves; and</li> <li>Urges the use of appropriate inherently safer alternatives such as a flare system.</li> </ul>		
Occupational Safety and Health Administration (OSHA)	2005-04-I-TX-R5	 Closed – Acceptable Action
<b>Recommendation Text:</b> 1. Implement a national emphasis program for all oil refineries that focuses on: <ul style="list-style-type: none"> <li>The hazards of blowdown drums and stacks that release flammables to the atmosphere instead of to an inherently safer disposal system such as a flare;</li> <li>Particular attention should be paid to blowdown drums attached to collection piping systems servicing multiple relief valves;</li> <li>The need for adequately sized disposal knockout drums to safely contain discharged flammable liquid based on accurate relief valve and disposal collection piping studies</li> </ul> 2. Urge states that administer their own OSHA plan to implement comparable emphasis programs within their respective jurisdictions.		
American Petroleum Institute	2005-04-I-TX-R6a	 Closed – Acceptable Alternative Action
<b>Recommendation Text:</b> Develop a new consensus American National Standards Institute (ANSI) standard that creates performance indicators for process safety in the refinery and petrochemical industries. Ensure that the standard identifies leading and lagging indicators for nationwide public reporting as well as indicators for use at individual facilities. Include methods for the development and use of the performance indicators. In the development of each standard, ensure that the committees are accredited and conform to ANSI principles of openness, balance, due process, and consensus; and include representation of diverse sectors such as industry, labor, government, public interest and environmental organizations and experts from relevant scientific organizations and disciplines.		
United Steelworkers of America (USW)	2005-04-I-TX-R6b	 Closed – Acceptable Action
<b>Recommendation Text:</b> Work with API to develop a new consensus American National Standards Institute (ANSI) standard that creates performance indicators for process safety in the refinery and petrochemical industries. Ensure that the standard identifies leading and lagging indicators for nationwide public reporting as well as indicators for use at individual facilities. Include methods for the development and use of the performance indicators.		



## Appendix A: continued






RECIPIENT	REC NO.	RECOMMENDATION STATUS
American Petroleum Institute	2005-04-I-TX-R7a	 Closed – Acceptable Action
<b>Recommendation Text:</b> Develop a new consensus American National Standards Institute (ANSI) standard that has fatigue prevention guidelines for the refining and petrochemical industries that, at a minimum, limit hours and days of work and address shift work. In the development of each standard, ensure that the committees are accredited and conform to ANSI principles of openness, balance, due process, and consensus; and include representation of diverse sectors such as industry, labor, government, public interest and environmental organizations and experts from relevant scientific organizations and disciplines.		
United Steelworkers of America (USW)	2005-04-I-TX-R7b	 Closed – Acceptable Action
<b>Recommendation Text:</b> Work with API to develop a new consensus American National Standards Institute (ANSI) standard that has fatigue prevention guidelines for the refining and petrochemical industries that, at a minimum, limit hours and days of work and address shift work.		
Occupation Safety and Health Administration (OSHA)	2005-04-I-TX-R8	 Closed – Acceptable Alternative Action
<b>Recommendation Text:</b> Strengthen the planned comprehensive enforcement of the OSHA Process Safety Management (PSM) standard. At a minimum: <ol style="list-style-type: none"> <li>Identify those facilities at greatest risk of a catastrophic accident by using available indicators of process safety performance and information gathered by the EPA under its Risk Management Program (RMP).</li> <li>Conduct, or have conducted, comprehensive inspections, such as those under your Program Quality Verification (PQV) program at facilities identified as presenting the greatest risk.</li> <li>Establish the capacity to conduct more comprehensive PSM inspections by hiring or developing a sufficient cadre of highly trained and experienced inspectors.</li> <li>Expand the PSM training offered to inspectors at the OSHA National Training Institute.</li> </ol>		
Occupation Safety and Health Administration (OSHA)	2005-04-I-TX-R9	 Open – Unacceptable Response/ No Response Received
<b>Recommendation Text:</b> Amend the OSHA PSM standard to require that a management of change (MOC) review be conducted for organizational changes that may impact process safety including: <ol style="list-style-type: none"> <li>major organizational changes such as mergers, acquisitions, or reorganizations;</li> <li>personnel changes, including changes in staffing levels or staff experience; and</li> <li>policy changes such as budget cutting.</li> </ol>		
Center for Chemical Process Safety (CCPS)	2005-04-I-TX-R10	 Closed – Acceptable Action
<b>Recommendation Text:</b> Issue management of change guidelines that address the safe control of the following: <ol style="list-style-type: none"> <li>major organizational changes including mergers, acquisitions, and reorganizations;</li> <li>changes in policies and budgets;</li> <li>personnel changes;</li> <li>staffing during process startups, shutdowns and other abnormal conditions.</li> </ol>		

## Appendix A: continued

RECIPIENT	REC NO.	RECOMMENDATION STATUS
BP Global Executive Board of Directors	2005-04-I-TX-R11	 Closed – Acceptable Alternative Action
<b>Recommendation Text:</b> Appoint an additional non-executive member of the Board of Directors with specific professional expertise and experience in refinery operations and process safety. Appoint this person to be a member of the Board Ethics and Environmental Assurance Committee.		
BP Global Executive Board of Directors	2005-04-I-TX-R12	 Closed – Acceptable Action
<b>Recommendation Text:</b> Ensure and monitor that senior executives implement an incident reporting program throughout your refinery organization that: <ol style="list-style-type: none"> <li>encourages the reporting of incidents without fear of retaliation;</li> <li>requires prompt corrective actions based on incident reports and recommendations, and tracks closure of action items at the refinery where the incident occurred and other affected facilities; and</li> <li>requires communication of key lessons learned to management and hourly employees as well as to the industry.</li> </ol>		
BP Global Executive Board of Directors	2005-04-I-TX-R13	 Closed – Acceptable Action
<b>Recommendation Text:</b> Ensure and monitor that senior executives use leading and lagging process safety indicators to measure and strengthen safety performance in your refineries.		
BP Texas City Refinery	2005-04-I-TX-R14	 Closed – Acceptable Action
<b>Recommendation Text:</b> Evaluate your refinery process units to ensure that critical process equipment is safely designed. At a minimum: <ol style="list-style-type: none"> <li>Ensure that distillation towers have effective instrumentation and control systems to prevent overfilling such as multiple level indicators and appropriate automatic controls.</li> <li>Configure control board displays to clearly indicate material balance for distillation towers.</li> </ol>		
BP Texas City Refinery	2005-04-I-TX-R15	 Closed – Acceptable Action
<b>Recommendation Text:</b> Ensure that instrumentation and process equipment necessary for safe operation is properly maintained and tested. At a minimum: <ol style="list-style-type: none"> <li>Establish an equipment database that captures the history of testing, inspections, repair, and successful work order completion.</li> <li>Analyze repair trends and adjust maintenance and testing intervals to prevent breakdowns.</li> <li>Require repair of malfunctioning process equipment prior to unit startups.</li> </ol>		
BP Texas City Refinery	2005-04-I-TX-R16	 Closed – Acceptable Action
<b>Recommendation Text:</b> Work with the United Steelworkers Union and Local 13-1 to establish a joint program that promotes the reporting, investigation, and analysis of incidents, near-misses, process upsets, and major plant hazards without fear of retaliation. Ensure that the program tracks recommendations to completion and shares lessons learned with the workforce.		



## Appendix A: continued

RECIPIENT	REC NO.	RECOMMENDATION STATUS
BP Texas City Refinery	2005-04-I-TX-R17	 Closed – Acceptable Action
<b>Recommendation Text:</b> Improve the operator training program. At a minimum, require: <ol style="list-style-type: none"> <li>face-to-face training conducted by personnel with process-specific knowledge and experience who can assess trainee competency, and;</li> <li>training on recognizing and handling abnormal situations including the use of simulators or similar training tools.</li> </ol>		
BP Texas City Refinery	2005-04-I-TX-R18	 Closed – Acceptable Action
<b>Recommendation Text:</b> Require additional board operator staffing during the startup of process units. Ensure that hazard reviews address staffing levels during abnormal conditions such as startups, shutdowns, and unit upsets.		
BP Texas City Refinery	2005-04-I-TX-R19	 Closed – Acceptable Action
<b>Recommendation Text:</b> Require knowledgeable supervisors or technically trained personnel to be present during especially hazardous operation phases such as unit startup.		
BP Texas City Refinery	2005-04-I-TX-R20	 Closed – Acceptable Action
<b>Recommendation Text:</b> Ensure that process startup procedures are updated to reflect actual process conditions.		
USW Local 13-1	2005-04-I-TX-R21	 Closed – Acceptable Action
<b>Recommendation Text:</b> Work with BP to establish a joint program that promotes reporting, investigating, and analyzing incidents, near-misses, process upsets, and major plant hazards without fear of retaliation. Ensure that the program tracks recommendations to completion and shares lessons learned with the workforce.		



U.S. Chemical Safety and  
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