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## Safety Culture Weakness Cited in BP Accident

### PURPOSE

This Advisory provides information and recommendations from an independent safety review of BP U.S. refineries following one of the most serious U.S. workplace disasters in the past two decades that resulted in 15 fatalities and more than 170 injuries at the BP Texas City refinery. The independent review cited weaknesses in corporate safety culture and process safety management, areas that are important to safe operations at Department of Energy (DOE) facilities.

In response to an urgent safety recommendation from the U.S. Chemical Safety Board (CSB), BP's Board of Directors formed the *BP U.S. Refineries Safety Review Panel* to assess and report on the effectiveness of BP North America's corporate oversight of safety management systems at its five U.S. refineries and its corporate safety culture. An 11-member panel of experts was formed and chaired by former Secretary of State James A. Baker, III.

### SUMMARY

The Baker Report points out that BP failed to adequately implement many important attributes of a sound safety program. Many of these parallel the 7 Guiding Principles of Integrated Safety Management that DOE established 10 years ago as a new approach to enhance safety awareness, upgrade formality of operations, and improve safety performance. DOE and its contractors have had to address safety conditions similar to those that were ultimately precursors to the Texas City refinery disaster. It is therefore important that DOE and its contractors identify with, and learn from, the findings and recommendations from BP's independent safety review.

### BACKGROUND

On March 23, 2005, a tremendous explosion occurred during an infrequent startup of an octane-boosting isomerization unit that produces components for unleaded gasoline. During the startup, operators accidentally overfilled a distillation tower and attached blowdown drum with highly flammable liquid hydrocarbons. The blowdown drum, which vented directly to atmosphere, spewed flammable liquid and vapor onto the grounds of the refinery, causing a series of explosions and fires. All of the fatalities occurred in and around temporary work trailers that were placed too close to the process units; areas that should have been evacuated before startup. Alarms and gauges that could have warned operators of the overfilled equipment failed to operate from lack of repair. The [CSB investigated the accident](#) and will release its final report

on March 20, 2007. An investigation by OSHA resulted in fines of more than \$21 million.

### DISCUSSION

BP tended to have a short-term focus, and their decentralized management system and entrepreneurial culture delegated substantial discretion to their U.S. refinery plant managers without clearly defining process safety expectations. The Panel's findings are divided into three categories: corporate safety culture, process safety management systems, and performance evaluation, corrective action, and corporate oversight.

#### Corporate Safety Culture

BP did not ensure its management and workforce understood what was expected of them regarding process safety; emphasizing personal safety over process safety. They relied on personal injury rate data as a process safety performance indicator, which created a false sense of confidence that process safety risks were adequately being addressed. Their employees were not empowered with a positive, trusting, and open environment with effective lines of communication between management and the workforce. Process safety was not incorporated into management decision-making and management was not held accountable for process safety. The safety culture at BP's five U.S. refineries was not unified and was fraught with a lack of operating discipline, tolerance of serious deviations from safe operating practices, and complacency toward serious process safety risks.

#### Process Safety Management Systems

BP's programs for analyzing process hazards did not ensure adequate identification and rigorous analysis of those hazards. Their corporate safety management system did not ensure timely compliance with internal process safety standards and programs for managing process risks, nor did it ensure timely implementation of external good engineering practices that could improve process safety performance. BP did not effectively define the level of process safety knowledge or competency required of senior management, refinery personnel, and contractors. Their corporate safety management system did not translate corporate expectations into measurable criteria for management of process risk.

#### Performance Evaluation, Corrective Action, and Corporate Oversight

BP's use of injury rates to measure process safety performance hindered their perception of process risk. Although they tracked some metrics relevant to process safety, they didn't understand or accept what these data

indicated about the risk of a major accident. BP did not have effective root cause analysis procedures to identify systemic causal factors; therefore, corrective actions only addressed immediate or superficial causes rather than the true root cause, which could contribute to future accidents. BP's process safety audit system relied on internal auditors that focused primarily on compliance and legal issues rather than safety performance or assessing against industry best practices. They also failed to track process safety deficiencies to completion. BP's "bottom-up" reporting system allowed refinery-specific data to be aggregated and lost as it moved up the reporting chain. Executive management either did not receive refinery-specific information regarding process safety deficiencies or didn't effectively respond to the information it received.

### RECOMMENDATIONS

The Baker Panel was charged with making recommendations to improve corporate safety culture, corporate oversight of process safety, and process safety management systems. As a result of the Panel's findings, they prepared the following ten recommendations for BP's Board of Directors. The Panel also developed commentary that is integral to the implementation of these recommendations. The complete commentary can be read in the Baker Panel Report <http://www.bp.com/bakerpanelreport>.

1. *Process Safety Leadership* – BP's Board of Directors, executive management, and other members of BP's corporate management must provide effective leadership and establish appropriate goals for process safety.
2. *Integrated and Comprehensive Process Safety Management System* – Establish and implement an integrated and comprehensive process safety management system that systematically and continuously identifies, reduces, and manages process safety risks.
3. *Process Safety Knowledge* – Develop and implement a system to ensure that executive management, refining line management, and all U.S. refining personnel, including managers, supervisors, workers, and contractors possess an appropriate level of process safety knowledge and expertise.
4. *Process Safety Culture* – Have relevant stakeholders develop a positive, trusting, and open process safety culture within each U.S. refinery.
5. *Clearly Defined Expectations and Accountability for Process Safety* – Clearly define expectations and strengthen accountability for process safety performance at all levels in executive management and in the refining managerial and supervisory reporting line.
6. *Support for Line Management* – Provide more effective and better coordinated process safety support for the U.S. refining line organization.
7. *Leading and Lagging Performance Indicators for Process Safety* – Develop, implement, maintain, and periodically update an integrated set of leading and lagging performance indicators to more effectively monitor process safety performance at its U.S. refineries.
8. *Process Safety Auditing* – Establish and implement an effective system to audit process safety performance.
9. *Board Monitoring* – BP's Board should monitor the implementation of the Panel's recommendations and the ongoing process safety performance at their U.S. refineries.
10. *Industry Leader* – Use the lessons learned from the Texas City tragedy and from the Panel's report to transform the company into a recognized industry leader in process safety management.

### MESSAGE TO DOE

In order to achieve continuous improvement in the operation of DOE facilities, it is important to foster a safety culture that sets and maintains high standards; identifies and resolves problems and deficiencies; is open to criticism and recommendations for improvement; and promotes effective communication between line managers and independent oversight. This can only be achieved if management is fully committed to safety. Guidance for implementing the *OSHA Rule for Process Safety Management of Highly Hazardous Chemicals (29 CFR 1910.119)* can be found in [DOE-HDBK-1101-2004, Process Safety Management for Highly Hazardous Chemicals](#) and in [DOE-HDBK-1100-2004, Chemical Process Hazards Analysis](#).

Safety culture has to be inherent in the thoughts and actions of all individuals within your organization. The decision to ensure workers have a safe working environment should not be based solely on the consequences if you don't, but because it's the right thing to do.

### ADDITIONAL SOURCES OF INFORMATION

- [Safety Advisory 2006-01](#): *Texas City Refinery Update: The Price of Safety Complacency*
- [Safety Bulletin 2005-09](#): *Vigilance in New or Infrequent High-Hazard Operations*
- [OE Summary 2006-05](#): *Preliminary Findings on Fatal Explosion at Texas Refinery*
- [OE Summary 2005-11](#): *Refinery Explosion Involved Infrequently Performed, High-Hazard Work*

If you have any questions, please contact Tom Williams at 301-903-4859 or by e-mail at [thomas.e.williams@hq.doe.gov](mailto:thomas.e.williams@hq.doe.gov).

