

# SAFETY & HEALTH BULLETIN

Assistant Secretary for Environment, Safety & Health • U.S. Department of Energy • Washington, DC 20585

## Vigilance in New or Infrequent High-Hazard Operations

DOE/EH-0697

Issue No. 2005-09

July 2005

**Special Operations Reports** are issued to initiate management actions in response to events whose subject matter represents significant departmental safety concerns.

**Environment, Safety and Health Alerts** are issued to initiate immediate action on potentially significant safety issues.

**Environment, Safety and Health Bulletins** are issued to share information and recommend actions on potential safety issues.

**Operating Experience Summaries** are issued to share lessons learned information, operating experience information, and best practices from significant events or important individual DOE activities.

### PURPOSE

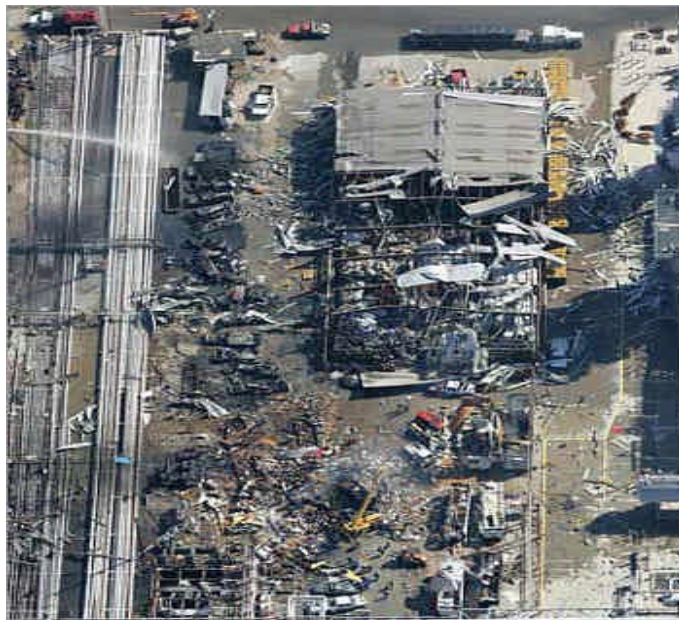
This Bulletin provides information about several serious events caused by a lack of vigilance and attentiveness on the part of those involved in conducting first-time or infrequently performed high-hazard activities. Failure to identify the hazards, develop appropriate actions, and remain alert to the possible dangers involved in such activities could lead to potentially catastrophic outcomes at DOE sites.

### DISCUSSION

In March 2005, a large explosion killed 15 workers and injured over 150 at the BP Texas City Refinery. The unit was undergoing a phased restart operation following isomerization catalyst replacement, which is performed every 10 years. The explosion occurred during the restart of the Isomerization Unit and was caused by an ignited hydrocarbon vapor cloud that was inadvertently released from a raffinate splitter that was overfilled and overheated. The pressure in the splitter column increased rapidly and exceeded the set pressure of the overhead line relief valves, overloading the stack with vapors and liquid. An unknown ignition source from one of numerous sources in the uncontrolled area ignited the resulting vapor cloud and triggered the explosion.

BP Products North America, Inc. published an interim investigation report on the Texas City Refinery explosion on May 12, 2005 that identified many deficiencies and

safety concerns. For example, the 1950s-designed vent system on the blowdown drum was antiquated and did not tie into a flare system to safely combust flammable vapors during a release. Also, temporary office and work trailers were sited only 150 feet from the blowdown drum and vent stack, tragically placing their occupants in the blast area. The report also identified various conduct of operations deficiencies and inadequacies.



**Explosion site at BP Texas City Refinery in March 2005**

Although DOE does not operate refineries, this event demonstrates the dangers associated with performing first-time or infrequent high-hazard operations. A review of the interim investigation report from the perspective of DOE facility operations reveals similar causal factors seen in the following DOE occurrences:

**April 2005:** During the replacement of a conveyor belt in a casting line glovebox at the Y-12 Site, Enriched Uranium Operations personnel failed to apply a job-specific hazard analysis, which should have been required based on the criteria for breaching a boundary of a hazardous system. The task had not been performed in several years, and no work planning review protocols for potentially high-hazard

work were used. (DNFSB Site Representative Weekly Reports dated April 1 and April 15, 2005)

**July 2004:** During reactor restart at the Idaho National Laboratory's Advanced Test Reactor following a shutdown, a second shutdown on high coolant pressure occurred. The facility was minimally staffed and faced a very limited recovery time. The procedure used to perform a quick reactor restart did not address possible operational difficulties, and command and control personnel did not identify error precursors before conducting critical, time-sensitive evolutions. (ORPS Report ID--BBWI-ATR-2004-0007)

**December 1999:** While a crucible in a furnace was being changed out at the Y-12 Plant after 6 years of use, an explosion injured 11 workers when a new procedure, which was found to have numerous deficiencies, was used. The procedure had unreviewed, unapproved handwritten changes and was missing a key step vital to preventing an explosion accident. (Type A Accident Investigation, *Multiple Injury Accident Resulting from Sodium-Potassium Explosion in Building 9201-5 at the Y-12 Plant*, dated February 2000)

Causal factors for these events reveal similar inadequacies in work performed.

#### **Procedures**

- omitting steps
- using an incorrect or unapproved procedure
- allowing operators' process knowledge to override procedural compliance

#### **Hazards analysis**

- not recognizing the potential for multiple failure modes
- failing to comply with existing safety requirements
- ineffective emergency management planning

#### **Operational oversight**

- less than adequate command and control during an unfamiliar operation and during upset conditions
- insufficient communication of process activities


#### **RECOMMENDATIONS**

Below are recommendations for conducting infrequent or first-time applications when performing potentially high-hazard work.

- Perform a hazards evaluation and operational assessment that are commensurate with the activity's complexity and associated safety risks.
- Conduct a detailed briefing with all parties involved in the project evolution. Discuss expected responses and necessary actions if problems occur.
- Always follow all of the procedures.

- Ensure that procedures used are current and incorporate system or equipment modifications and ensure that operators are trained on any changes.
- Conduct a tabletop review or walkthrough of procedures for first-time or infrequent evolutions.
- Ensure safety systems, instrumentation, and alarms are functional.
- Practice, from start to finish, all activities involved in the project evolution.
- Ensure that all personnel, including supervisors, have the required levels of experience and that training or certifications are current.
- Ensure that the command and control authority is clearly understood by all parties and is present during the evolution.

Questions regarding this Safety Bulletin should be directed to Rolland Sigler at (301) 903-4658 or by email at [Rolland.Sigler@eh.doe.gov](mailto:Rolland.Sigler@eh.doe.gov).



John Spitaleri Shaw  
Assistant Secretary for  
Environment, Safety and Health