U.S. Chemical Safety and Hazard Investigation Board

Office of General Counsel

Memorandum

To: Board Members

From: Christopher Warner

Cc: Leadership Team

Subject: Board Action Report – Notation Item 728

Date: December 15, 2009

On November 23, 2009, the Board approved Notation Item 728, thereby adopting, and authorizing the immediate issuance of, Urgent Recommendations to CITGO, Inc.

Voting Summary – Notation Item 728

Disposition: APPROVED

Disposition date: November 23, 2009

	Approve	Disapprove	Calendar	Not Participating	Date
J. Bresland	X				11/23/2009
G. Visscher	X				11/24/2009
W. Wark	X				11/23/2009
W. Wright	X				11/23/2009

Chemical Safety and Hazard Investigation Board

Memorandum

To: Board Members

From: John S. Bresland

Cc: Leadership Team

Subject: Notation Item 728

Date: November 20, 2009

Attached for your review and vote is Notation Item 728. This item provides for the adoption and immediate issuance of urgent recommendations to CITGO, Inc. The recommendations are based upon initial findings of the CSB investigation into the fire that occurred on July 19, 2009, at the CITGO refinery in Corpus Christi, Texas.

The factual findings in the proposed urgent recommendation document were subject to internal and external quality control reviews, consistent with the CSB Data Quality Guidelines. The quality assurance process for the factual findings is documented in the attached Investigation Product Review Verification and Certification form. Comment resolution summaries referenced in the form are also attached to it. Any inquiries about the quality review process should be made to the Investigation Supervisor, Robert Hall.

You may also direct any other questions about this item to Robert Hall. Please return completed vote sheets to Chris Kirkpatrick as soon as possible, but no later than the close of business on Monday, November 30, 2009. Thank you for your attention to this item.

Chemical Safety and Hazard Investigation Board

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD MEMBER VOTING RECORD

Notation No.: 728
Voting Period: **Urgent Notation Item, November 20 – November 30, 2009,** but votes are requested as soon as possible.

Subject: Urgent Recommendations to CITGO, Inc.

Whereas,

1. The Board is authorized by 42 U.S.C. § 7412(r)(6)(C)(i) to "investigate . . . and report to the public in writing the facts, conditions, and circumstances and the cause or probable cause of any accidental release resulting in a fatality, serious injury or substantial property damages;"
2. The Board is further authorized by 42 U.S.C. § 7412(r)(6)(C)(ii) to "issue periodic reports to the Congress, Federal, State and local agencies, including the Environmental Protection Agency and the Occupational Safety and Health Administration, concerned with the safety of chemical production, processing, handling and storage, and other interested persons recommending measures to reduce the likelihood or the consequences of accidental releases and proposing corrective steps to make chemical production, processing, handling and storage as safe and free from risk of injury as is possible;"
3. Board Order 022 provides for the development of urgent recommendations to address issues identified during the course of an investigation that are considered to be an imminent hazard and have the potential to cause serious harm unless rectified in a short timeframe;
4. Board Order 022 further provides that urgent recommendations may be issued in advance of an investigation report;
5. CSB investigators are conducting an investigation of a hydrocarbon gas release and fire that occurred on July 19, 2009, in the hydrogen fluoride (HF) alkylation unit at the CITGO Corpus Christi East Refinery in Corpus Christi, Texas; and
6. CSB investigators are proposing, based upon initial investigation findings, the attached urgent recommendations to CITGO to address safety issues considered to be an imminent hazard and that have the potential to cause serious harm unless rectified in a short timeframe.

Notation No.: 728
Subject: **Urgent Recommendations to CITGO, Inc.**

Therefore, the Board hereby votes to adopt, and to authorize the immediate issuance of, the attached Urgent Recommendations to CITGO, Inc.

_____ I **APPROVE** this notation item **AS PRESENTED.**

_____ I **CALENDAR** this notation item for discussion at a Board meeting.
_____ *Some of my concerns are discussed below or on the attached memorandum.*

_____ I **DISAPPROVE** this notation item.
_____ *A dissent is attached.*
_____ *I will not file a dissent.*

_____ I am **NOT PARTICIPATING.**

Note: An urgent notation item is either adopted or disapproved when the affirmative or negative votes of a majority of the participating members are received by the Office of General Counsel.

Date: _____

Member: _____

U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

Urgent Recommendations

Whereas:

1. On July 19, 2009 a hydrocarbon gas release occurred in the CITGO Corpus Christi East Refinery hydrogen fluoride (HF) alkylation unit at 1802 Nueces Bay Boulevard, Corpus Christi, Texas. The release ignited causing extensive damage; the ensuing fire burned for several days.

2. The fire critically injured one CITGO employee. One other employee was treated for possible HF exposure during emergency response activities.

3. The incident occurred when violent shaking in the process recycle piping broke two threaded connections, releasing highly flammable hydrocarbons. The shaking was caused by nearly complete flow blockage, which occurred due to the sudden failure of a control valve.

4. The control valve failed when an internal plug unthreaded from the valve stem, closing the valve. The only existing bypass valve was manually operated and became inaccessible following the hydrocarbon release.

5. The cloud of releasing hydrocarbons reached an adjacent unit and ignited. The ensuing fire caused multiple failures, releasing HF.

6. CITGO reported to the Texas Commission on Environmental Quality that approximately 21 tons (42,000 pounds) of HF released from alkylation unit piping and equipment, but was captured by the HF water mitigation system. CITGO reported 30 pounds of HF were not captured by the mitigation system.

7. While scientific studies have shown water mitigation systems to be an effective method of airborne HF removal, these studies indicate that the highest possible removal efficiency is 95 percent. The highest expected efficiency of field systems like the one used by CITGO is likely 90 percent or less. Based on a 90 percent efficiency, the atmospheric release from the alkylation unit would have been about 2 tons (4,000 pounds).

8. Prevailing winds during the incident carried any HF not captured by the water mitigation system toward the Corpus Christi ship channel and Nueces Bay.

9. CITGO installed the HF water mitigation system after a release and fire in the alkylation unit had resulted in an uncontrolled release of HF from the refinery in April 1997.

10. HF is a corrosive, highly toxic chemical which boils at room temperature. Contact with HF liquid or vapor can severely burn skin, eyes, and other tissue. Burns from HF are particularly dangerous and require immediate and chemical-specific treatment by trained medical personnel.

11. Processes using 1,000 pounds or more of HF must comply with the Occupational Safety and Health Administration (OSHA) Process Safety Management Standard for Highly Hazardous Chemicals (29 CFR 1910.119) and the U.S. Environmental Protection Agency (EPA) Chemical

Accident Prevention Program (40 CFR 68). In addition, HF is listed as an extremely hazardous substance for the purposes of emergency planning under the EPA Emergency Planning and Community Right-to-Know Act.

12. The CITGO Alkylation Unit Process Hazard Analysis, conducted in accordance with the OSHA Process Safety Management Standard for Highly Hazardous Chemicals (29 CFR 1910.119) and the EPA Chemical Accident Prevention Program (40 CFR 68), assumes that the HF mitigation system is available to minimize the consequences of an HF release.

13. During this incident, CITGO nearly exhausted its stored water supply for fire suppression and HF mitigation on the first day of the multi-day incident response. About 11.5 hours after the initial release, before the water supply was completely exhausted, the Refinery Terminal Fire Company began pumping salt water from the Corpus Christi ship channel into the CITGO fire water system using a barge equipped for firefighting. Multiple failures occurred during the salt water transfer, including multiple ruptures of the barge-to-shore transfer hoses and two water pump engine failures.

14. CITGO impounded the salt water used for HF mitigation and fire suppression on-site. Chemical analysis indicates salt water captured some of the released HF.

15. In the event of HF release the water mitigation system provides the last defense against an HF release into the surrounding community.

16. CITGO's PSM/RMP Incident Investigation Team Interim Recommendations (for the July 19, 2009 HF alkylation unit release and fire) did not include any recommendations addressing the HF mitigation system water supply. On November 1, 2009, CITGO restarted the HF alkylation unit.

17. CITGO operates two US refineries with HF alkylation units, one in Corpus Christi, TX and one in Lemont, IL.

18. API Recommended Practice 751, *Safe Operation of Hydrofluoric Acid Alkylation Units,* recommends refineries audit the safety of HF alkylation operations every three years. API 751 details elements to be included as part of a comprehensive audit plan.

19. CITGO has never conducted a safety audit of HF alkylation operations at either of its US refineries equipped with HF alkylation units pursuant to recommendations of API Recommended Practice 751, *Safe Operation of Hydrofluoric Acid Alkylation Units.*

20. Under 42 U.S.C. §7412(r)(6)(C) (ii), the Board is charged with "recommending measures to reduce the likelihood or the consequences of accidental releases and proposing corrective steps to make chemical production, processing, handling and storage as safe and free from risk of injury as is possible ..."

21. Board procedures authorize the issuance of an urgent safety recommendation before a final investigation report is completed where there is a safety issue considered an imminent hazard that has the potential to cause serious harm unless it is rectified in a short timeframe.

Accordingly:

Pursuant to its authority under 42 U.S.C. §7412(r)(6)(C)(i) and (ii), and in the interest of promoting safer operations at U.S. facilities handling hazardous chemicals and protecting workers and communities from future accidents, the Board makes the following urgent safety recommendations:

To CITGO, Inc.

2009-14-I-TX-UR1

- Within 30 days, develop and initiate actions to ensure adequate water supply to the CITGO HF mitigation system. Actions could include, but are not limited to, increasing onsite storage capacity, installing a permanent backup system, and developing procedures and training for water management in an emergency.

- Every 30 days, report actions planned or completed to the Refinery Terminal Fire Company and Local Emergency Planning Committee. Continue the 30-day periodic reporting until all planned actions are fully implemented.

2009-14-I-TX-UR2

- Within 60 days, complete a third-party audit of all (Corpus Christi, TX and Lemont, IL) CITGO HF alkylation unit operations in the United States as recommended by API Recommended Practice 751, *Safe Operation of Hydrofluoric Acid Alkylation Units*, Third Edition June 2007. The selected lead auditor shall have extensive knowledge of HF hazards, HF alkylation units, and API 751.

- Consistent with the employee participation requirements of the Process Safety Management Standard for Highly Hazardous Chemicals (29 CFR 1910.119(c)), share all audit results and actions planned or completed to correct deficiencies in each refinery with all CITGO and contract employees whose work area includes that refinery's alkylation unit.

Investigation Product Review Verification and Certification

Investigation Product: Citgo Urgent Recommendation

Investigation Supervisor: HALL **Investigator-in-Charge:** HALL

Review step:	Investigator-in-Charge (Initial / Date)	Investigation Supervisor (Initial / Date)
Reviewed the accuracy and completeness of the case file information to be used in the preparation of the product.	TJH 10/6/09	
Reviewed the draft investigation product to verify that it is based upon and supported by evidence in the case file.	PA 10/6/09	
Considered, and resolved comments received from, the internal staff review process, including reviewers from the Office of Investigations; Office of Recommendations; Office of General Counsel; and Office of Congressional, Public, and Board Affairs. [Attach summary of comment resolution and remaining significant issues.]	TJH 10/7/09	
Held a review meeting to discuss comments from the internal staff review process.	~~TJH~~ 10/8/09	
Completed Technical Editor review.	N/A	
Provided a copy of the draft product to each Board Member for preliminary review. Resolved or addressed Board Member comments. [Attach summary of comment resolution] *	11-4-09 TJH	
Provided a copy of the draft product to the company or companies that are its subject and: • Received confirmation that the draft product does not contain trade secrets or confidential business information (CBI); or • Deleted from the draft product information claimed to be trade secret or CBI. [Attach summary of claims and deleted information]; or • Determined in writing that information claimed to be trade secret or CBI is not actually confidential. [Attach written determination.]	11-13 09 TJH	
Provided a copy of the draft product to the company or companies that are its subject for comments on factual and technical accuracy. Resolved all factual and technical accuracy issues raised. [Attach summary of comment resolution.]	11-13-09 TJH	
Provided a copy of the draft product to other external parties (as specified in the Data Quality Guidelines and Investigation Protocol) for comments on factual and technical accuracy. Resolved all factual and technical accuracy issues raised. [Attach summary of comment resolution.]	N/A	
Held recommendation recipient meetings (if applicable).	11/20/09	

Certification:
The undersigned Investigation Supervisor and Investigator-in-Charge certify that the review steps listed above have been fully and satisfactorily completed.

TJH HALL
Investigation Supervisor

Investigator-in-Charge

11/20/09
Date

* ~~HALL~~ Presented @ Quorum meeting to Board & staff to review comments.

Note on Notation Item 728

Company comments on the draft urgent recommendation and the CSB staff analysis of how the comments were resolved, both of which were part of the original Notation Item package, are not included here. Those two documents are being evaluated to assess the extent to which they contain information that is exempt from public disclosure.