Agenda

• Board Opening Remarks
• Statements from Elected Officials
• Investigation Team Presentation
• Board Questions to Team
• Torrance Refinery Action Alliance
• Break
• PSM Panel
• Board Questions to Panel
• Public Comment
• Closing Comments
Board Opening Remarks
Statements from Elected Officials
Investigation Team Presentation
Investigation Presentation

- Background and Process Description
- Incident Description
- Modified Hydrofluoric Acid Near Miss and Off-site Consequences
- Key Issues
- Path Forward
- Obstacles
Background and Process Design
Refinery was constructed in 1928-29

The Torrance Refinery represents about 1/5th of southern California’s fluid catalytic cracking capacity.
Refinery Proximity to Public Receptors

Within a 3-mile radius of the refinery, there are:

- 330,000 residents
- 71 schools
- 8 hospitals
Fluid Catalytic Cracking (FCC) Unit

The FCC converts low-value, thick oil to higher value gasoline by “cracking” the large molecules apart into smaller molecules.
FCC Layout
Catalyst
Main Column Operation
Incident Overview

• February 11 – FCC expander began to experience vibrations
• February 16- Expander vibrations exceeded limit and unit was automatically put in “safe park” by logic controls
Incident Overview

• Incident Response Team formed to deal with expander issue

• IRT ultimately decided to use same plan from 2012 to go into expander and clean it, staying in safe park
Incident Timeline

• Early on February 18, maintenance workers who were to blind the expander outlet became concerned due to steam coming out of expander
• Steam reduced, allowing hydrocarbons to flow from main column to flue gas piping
• Workers started getting hydrogen sulfide alarms and exited the unit
Modified Hydrofluoric Acid

Serious Near Miss

“Dropping loads or other falling objects within damage range of equipment containing flammable or toxic material”

-ExxonMobil Corporate example of a near miss incident
Settler tanks

- Two tank system
- Approximately 80 feet south of the ESP
- Still outside of ExxonMobil’s minimum equipment spacing requirement
Potential Health Effects of HF and MHF

- HF acid is a toxic chemical and poses a severe hazard to the population and environment when a release occurs.
- Causes severe damage to skin, respiratory system, and bones after exposure and can lead to death.
- Large release could impact hundreds of thousands of residents.
Community Exposure

- A large quantity of catalyst dust was released due to the ESP explosion
- Catalyst dust fell in the nearby communities as far as a mile away
- SCAQMD report can be found on their website: [http://www.aqmd.gov/](http://www.aqmd.gov/)
Key Issues Identified in Investigation

- Implementation of ExxonMobil Operations Integrity Management System (OIMS)
  - Process Hazard Analysis
  - Mechanical Integrity
  - Worker Participation
- Process Safety Regulatory Gaps
- Community Impacts
Issue: Process Hazard Analysis

• PHA failed to adequately consider hydrocarbons reaching the ESP
  – PHA only considered carbon monoxide entering the ESP
  – As a result, detectors used to shut down the ESP were only calibrated to read carbon monoxide

• Investigation team is currently working to determine rationale behind the ExxonMobil PHA process
Issue: Process Hazard Analysis Cont.

- Spent Catalyst Slide Valve not maintaining catalyst level
- Hydrocarbons in main column
- No analysis of steam flow rate needed into column
Issue: Mechanical Integrity

- Pressure transmitter in the main column
- Expander
- CO gas detectors
- Heat exchangers leaking naphtha
- Valves attached to these heat exchangers
Issue: Worker Participation

- Hourly workers were not included in Incident Response Team
- Input was not given for the variance
- Workers expressed concern for actions being taken
- Concerns by operators are handled in a Job Safety and Environmental Analysis (JSEA), however a JSEA was not done.
Issue: Lack of Hierarchy of Controls Analysis

• Could have prevented incident through utilization of passive barriers.
  • Shutting all valves leading to the ESP, or
  • A blind at the top of the main column.

• HOC Principles could have been applied.
  • Design of SCSV
  • Removing HC from MC
  • Evaluate the use of modified HF
Process Safety Management

• A safety management system approach focused on the prevention and mitigation of catastrophic releases of chemicals or energy from a process associated with a facility.

• Elements of PSM include:
  – Process Hazard Analysis (PHA),
  – Operating Procedures,
  – Management of Change (MOC), and
  – Employee Participation.
California Process Safety Management (PSM) Reform

• Some PSM failures would not have been identified under the current CA PSM regulation.
  • Certain PSM elements fail to require an assessment of their adequacy of completion.
  • Current PSM regulation also lacks key process safety requirements
• CA draft PSM regulations will be discussed in a later panel tonight
Previous CSB investigations

- Previous CSB reports have identified similar regulatory gaps in CA and other jurisdiction’s PSM regulations
  - [Chevron Refinery Fire](#) (2012)
  - [Tesoro Refinery Fatal Explosion and Fire](#) (2010)
Additional Issues

• Organizational Failures
• ESP Siting
• Non-routine operating conditions
• Safety Critical Equipment Management
Investigation Obstacles

- ExxonMobil refusing to provide safety-related documentation
- ExxonMobil subpoena responses:
  - 51% - Fully Responsive
  - 24% - Partially Responsive
  - 25% - Not Responsive
Path Forward

• Incorporate/Investigate Public Input from this Meeting into the Investigation
• Finalize Investigation and Plan for Report
• Issue Report with Recommendations
• Safety Video
• PSM Advocacy Efforts
Board Questions for Investigation Team
Break
Bibliography


"Electrostatic precipitator" by Evan Mason - Own work. Licensed under CC BY-SA 3.0 via Commons - https://commons.wikimedia.org/wiki/File:Electrostatic_precipitator.svg#/media/File:Electrostatic_precipitator.svg