

Case Study: Freeport LNG Incident



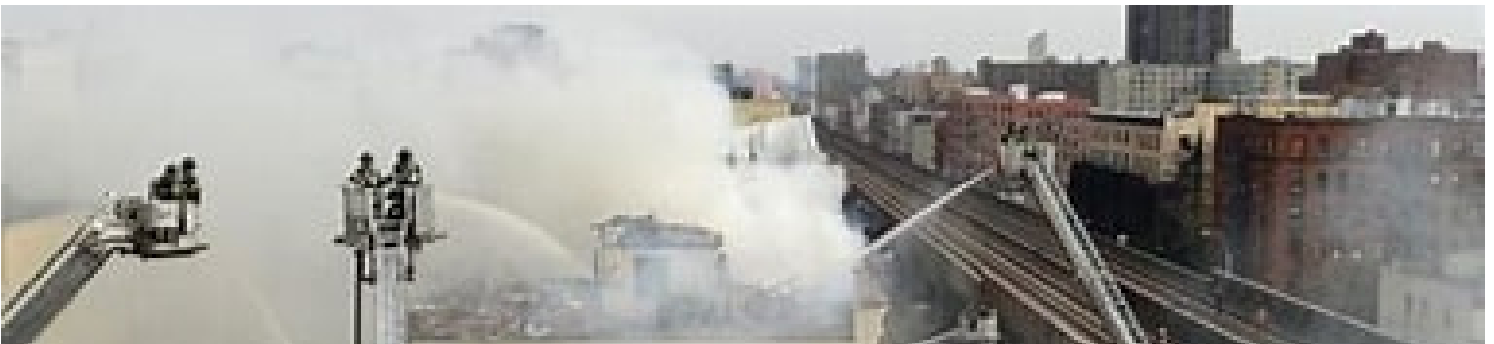
Freeport LNG, a major liquefied natural gas (LNG) export plant located south of Galveston, Texas, experienced a significant incident on June 8, 2022, resulting in an explosion and fire that temporarily shut down its operations.

IFO Group was hired to lead the investigation immediately following the loss of primary containment (LOPC).

The incident occurred at a critical facility responsible for a substantial portion of LNG shipments to Europe.

Incident Details

- The incident was attributed to the contact between flammable vapor (methane) and an ignition source (open and damaged electrical conduits and circuitry) in the pipe rack following the LOPC.
- This led to a vapor cloud explosion and a small secondary pool fire on the northeast end of the pipe rack in the elevated LNG drainage trench.
- Fortunately, a short-term release of vaporizing LNG from damaged 3" piping on the tank did not ignite, thanks to the timely deployment of firewater master streams by emergency responders.



Investigation Findings

- IFO Group identified the cause of the incident as a blocked relief valve, leading to a "low order" overpressure in an 18-in. recirculation line.
- The relief valve was not opened after maintenance, and the process valve became blocked about four days before the explosion, resulting in the inability of the pipe to contain the pressure.
- The fire marshal's report highlighted discussions with IFO Group, indicating a "high probability" that the blocked relief valve created the events leading to the accident.

Human Error and Oversight

- The report revealed that the relief valve was not opened after maintenance due to human error and not malicious behavior.
- The failure to acknowledge and address the problem in the plant, attributed to managerial hubris, played a role in the incident.
- Expansion joints designed to allow for movement of pipes were also found to be compromised, but investigations and evaluations were insufficiently acted upon.

Damage Assessment and Response

- IFO Group inspectors found relatively small damage around the pipe, indicating a low-order explosion.
- The LNG remained in the trench, and the fire was contained until the fuel burned away.
- Kiewit Corp., with the engineering, procurement, and construction (EPC) contract to repair the plant, implemented corrective measures included in a consent agreement with the pipeline agency.
- Freeport LNG was able to restart its liquefaction facility in November after completing final repair and restoration efforts and obtaining necessary regulatory approvals.

Lessons Learned

- Maintenance oversight and failure to address identified issues can lead to catastrophic incidents.
- Effective communication between investigation teams and regulatory bodies is crucial for a comprehensive understanding of the incident.
- Timely and appropriate response measures, including emergency protocols and proper equipment deployment, are critical for minimizing the impact of such incidents.
- Human error, and insufficient action on identified issues can exacerbate the consequences of industrial incidents.
- Continuous evaluation and improvement of safety protocols and maintenance procedures are essential for preventing similar incidents in the future.



IFO Group Involvement

Specialized Expertise: IFO Group brought a wealth of specialized expertise in fire and explosion investigations.

Objectivity and Independence: IFO Group maintained objectivity throughout the investigation.

Efficient Resource Allocation: Freeport LNG leveraged IFO Group's resources efficiently.

Timely Investigation: The expertise and dedication of IFO Group enabled a timely and thorough investigation.

Cost Savings: Engaging a third-party consulting firm like IFO Group proved to be a cost-effective solution for Freeport LNG.

Regulatory Compliance: IFO Group's familiarity with industry regulations ensured that Freeport LNG remained in compliance with safety and environmental standards throughout the investigation.

Freeport LNG's decision to collaborate with IFO Group not only streamlined the fire and explosion investigation, but also enabled the reopening of their site after a five-month hiatus. The use of a third-party consulting firm brought specialized expertise, objectivity, efficient resource allocation and cost savings, demonstrating the value of external experts in managing complex and critical investigations. Get to know us before you need us. Contact us at info@ifogroup.com or at 832-403-2135 to request a free consultation.

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