

# ENERGY EXPERT: ISSUES IN FOCUS

*A quarterly review of disputes and complex issues in the hydrocarbon production and processing industries*

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## Turnaround Workers Avoid Serious Injury—But Could a Flash Fire Have Been Prevented?

### Jury Trial, North America

By J. David Morgan

Internal inspections and repairs on refinery or petrochemical plant vessels and other process equipment cannot normally be performed during operations. Instead, they are typically achieved during “turnarounds”—scheduled periods of maintenance during which contract organizations that have specialized expertise in performing such tasks are engaged. Due to the complexities and risks associated with such activities, worker safety is a high priority. To assist in assuring worker safety, operating companies are required to comply with various federal regulations, including the Occupational Safety & Health Administration’s (OSHA) process safety management (PSM) standard for highly hazardous chemicals. However, a company’s own maintenance and operating procedures provide a critical layer of safety to mitigate risks associated with such work activities. These procedures are developed by trained operators and maintenance personnel with intimate knowledge of specific plant, processes, and equipment.

During a turnaround at a petrochemical plant, a “flash” fire occurred in a pressure vessel after it had been cleared for entry and workers had already begun performing their work inside. A flash fire is a sudden, intense fire caused by ignition of a mixture of air and a combustible liquid or gas characterized by high temperature and short duration. Fortunately, no one was severely injured, and damage to equipment was minimal. However, because of differing views on who was at fault, Baker & O’Brien was retained to identify factors that may have contributed to the incident.

The flash fire occurred following several days of activities inside the vessel, after a work crew had already exited. It flashed outside of the vessel and quickly self-extinguished. In this particular case, prior to workers entering the vessel, it had been treated with a hydrocarbon solvent to remove as much residue as possible, and then flushed with water to remove all flammable liquids. Correctly performing such activities is important in order to clear the vessel of all hazardous and flammable materials before work activities begin.



Other preparation activities commonly include: (a) acquiring the proper tools and personal protective equipment needed for the work; (b) testing the atmosphere inside the vessel and assuring that proper safety work permits have been issued; and (c) communicating with and assuring that workers are properly trained for the work.

As part of their assignment, Baker & O’Brien consultants reviewed potential ignition and fuel sources, as well as contributing or root causes, such as inadequate procedures or non-adherence to procedures. Our consultants issued an expert report that was submitted into evidence in litigation. The case was eventually settled outside of court.

## Electrostatic Precipitator Sparks Cement Plant Explosion

### Insurance Claim, North America

By Scott Jensen

A large cement production plant experienced an explosion that caused significant damage to the facility's electrostatic precipitator (ESP), which is designed to remove dust particles from the plant's flue gas before it is released through an exhaust stack. The heart of a typical cement plant is the kiln—a large refractory-lined pipe that slowly rotates and is downward sloping so that the cement materials can travel by gravity down the pipe towards the kiln's fuel burners. The kiln's operating temperatures (in excess of 2,600°F) cause the cement materials to react and form the final product – Portland cement.

Flue gases from the kiln's burners pass through the ESP, which uses high voltage electrical wires to impart a negative charge to the dust particles which are then attracted to positive (grounded) plates. The accumulated dust particles fall by gravity into collection bins at the precipitator's base. ESPs are common air pollution control devices used across a wide range of industries, such as refineries and power plants.

Baker & O'Brien was engaged to investigate the cause and origin of the explosion. We concluded that it was caused by

a "flameout" at the kiln's burners that went unnoticed for almost 20 minutes. A flameout is the sudden extinguishing of the burner flame. In this case, unburned hydrocarbon-rich gases continued to pass through the kiln's burners until they were ignited by sparks in the ESP. Because ESPs use high voltage electricity, there is always a potential for sparking, which makes it imperative that the flue gas entering the ESP not contain any combustible gases. The facility remained down for an extended period of time following the explosion until repairs could be completed. Baker & O'Brien consultants provided a report on our findings to the owner and its insurer to support decisions regarding coverage and potential subrogation.



## Dispute Over a Flare Tip—What Constitutes Normal Wear and Tear?

### Insurance Claim, North America

By J. David Morgan

Unexpected emergency shutdowns of process plant equipment have the potential to cause premature degradation and loss of operating life by subjecting the equipment to damaging operational conditions. Such unplanned shutdowns can also result in extensive costs to clear, repair and restart the equipment, as well as lost profits due to production outages. Of course, process equipment also becomes gradually "damaged" over its normal operating life, even if it is always operated within its original design parameters. The latter is typically referred to as normal "wear and tear."

A sour gas processing plant experienced an unplanned shutdown caused by an electrical power interruption. The plant owner filed an insurance claim for both direct costs to repair or replace damaged equipment, as well as lost profits. As part of its claim, the owner requested reimbursement for damages to the plant flare tip, steam nozzles, piping and welds near the tip of the flare, alleging they were caused by the shutdown. Baker & O'Brien was retained to assess whether such damages were actually associated with the

shutdown or largely the result of normal wear and tear.

As part of their assignment, Baker & O'Brien consultants reviewed the damage in light of what would typically be expected for a flare with a similar operating history. This evaluation included examination of the old flare tip to determine whether erosion was typical for the flare's age, and historical wind and flame patterns during normal operations. We also examined the wear patterns on the stainless steel to carbon steel welds near the tip. Our opinions were presented in a report submitted during mediation proceedings. The owner and the insurance company eventually settled the claim.



## Consulting Support for Complex Commercial Disputes

When faced with complex commercial disputes in the energy-related industries, clients often turn to Baker & O'Brien for its independent and objective support. For over 20 years, the firm's consultants have employed their engineering knowledge, industry experiences, and commercial acumen to provide assistance on a wide range of matters. Our project experience includes disputes involving operational incidents, standards of care, asset valuation, commercial supply terms, product quality, large engineering and construction projects, and intellectual property.

Our clients include many of the world's largest law firms, insurance providers, and operating companies. Law firms rely upon Baker & O'Brien to evaluate

technical and commercial aspects of a case and provide expert testimony. Our analyses, conclusions, and expert testimony have been heard by judges, juries, and arbitration panels around the world. On insurance matters, clients rely upon Baker & O'Brien's assistance for investigation of industrial accidents and quantification of resultant property damage and business interruption losses. We are also called upon to assist insurers in subrogation actions by evaluating causation theories and claims for damages.

We welcome the opportunity to discuss our qualifications in more detail as they relate to your specific area of interest.

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