



Industrial Transformer Failures

R E A L W O R L D E X A M P L E S



Oil Refinery

Issue:

Transformer failure

Summary:

BP's 435,000-barrel-per-day Whiting refinery in Indiana—the company's largest in North America—was forced to shut down after a transformer failure caused a plant-wide power outage. All but essential staff were evacuated in what sources described as the largest evacuation in years. The outage immediately lifted gasoline and diesel prices by more than 20 cents a gallon after the refinery shut down. Canadian crude prices rose due to concerns about reduced demand. Restarting full production took two months.

Cause:

BP did not publish the findings

Steel Mill

Issue:

Transformer failure

Summary:

ArcelorMittal experienced a series of damaging power failures at its Lázaro Cárdenas, Mexico, steel mill in July 2025, leading to critical equipment failures and a temporary shutdown of the site's main blast furnace. The power cuts caused damage to the Electric Arc Furnace (EAF), which is extremely power-intensive and central to steelmaking, forcing the company to initiate a lengthy maintenance outage and leading to the suspension of its long steel production for the remainder of the year and losses of over \$40 million.

There had also been another shutdown in March of 2024 due to a transformer failure in one of its four electric furnaces.

ArcelorMittal had previously experienced a shutdown at its facility in Indiana in 2015 due to a transformer failure.

Cause:

It was damaged as a knock-on effect of external power cuts. When grid power fluctuated or dropped, it created stresses (voltage dips, surges and imbalance) that cascaded into critical plant equipment, including the transformer, until it failed.

Data Center

Issue:

Transformer failure

Summary:

An outage at Fujitsu's Sunnyvale, California data center disrupted its U.S. cloud services, including public and private cloud offerings, after a major transformer station failure caused a power distribution breakdown. Despite the site's multiple backup systems—diesel generators, UPS units and even hydrogen fuel cells—the incident left customers facing downtime that, in some cases, lasted several days. The incident raises questions about the robustness of backup and redundant systems in critical data infrastructure.

Cause:

Transformer failure at a distribution center



Polymer Manufacturing

Issue:

Transformer fails due to moisture entering insulating liquids and releasing hydrogen

Summary:

A blast and subsequent fire broke out near a 90,000-volt oil-filled measurement transformer at a technical polymers facility. Operators quickly secured the site, switching to a backup line and a 15,000-volt transformer with the support of the grid operator to maintain the power supply. Because of the danger posed by falling electrical lines, the nearby highway was shut down as firefighters deployed protective equipment.

Cause:

The accident was traced to a hydrogen release from the transformer oil—likely from heating—followed by ignition and explosion. Investigators believe moisture entered the oil, with two possible causes identified: inadequate steaming of the absorbent paper or errors during the oil replacement process.



Chemical Production

Issue:

Transformer failure

Summary:

A transformer fire broke out at the Air Liquide facility in Pasadena, Texas, following a power outage that affected several Ship Channel sites. The incident resulted in a partial shutdown of affected operations and led to street closures as emergency crews responded. Because of the loss of power, nearby facilities experienced increased flaring, adding urgency to the situation. Air Liquide — which produces specialty gas mixtures including flammable compounds like butene, butadiene and acetylene — was subject to continued on-scene air quality monitoring.

Cause:

Not released

Nuclear Power Plant

Issue:

Transformer fire

Summary:

A main transformer at Indian Point's Unit 3 short-circuited due to insulation failure in a high-voltage winding coil, sparking a fire that released dielectric fluid. Firefighting water and foam combined with the fluid exceeded the containment moat's capacity, allowing an estimated 3,000 gallons to reach the Hudson River through storm drains. Previous routine maintenance had not indicated any problems.

Cause:

Insulation failure

Solar Plant

Issue:

Twenty transformer failures in six months

Summary:

A major solar power plant in Europe suffered over twenty transformer failures within six months, prompting a complete, multidisciplinary investigation. The analysis included transformer inspections, on-site measurements, network simulations and a manufacturing process audit, along with dielectric and moisture content testing of insulation materials from failed units. This integrated approach helped pinpoint the root causes which were related to various events, including insulation breakdown.

Cause:

The failures were caused by a combination of insulation breakdown from moisture and dielectric stress

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