



Failure Analysis of the Kaohsiung Gas Explosion

(2014)

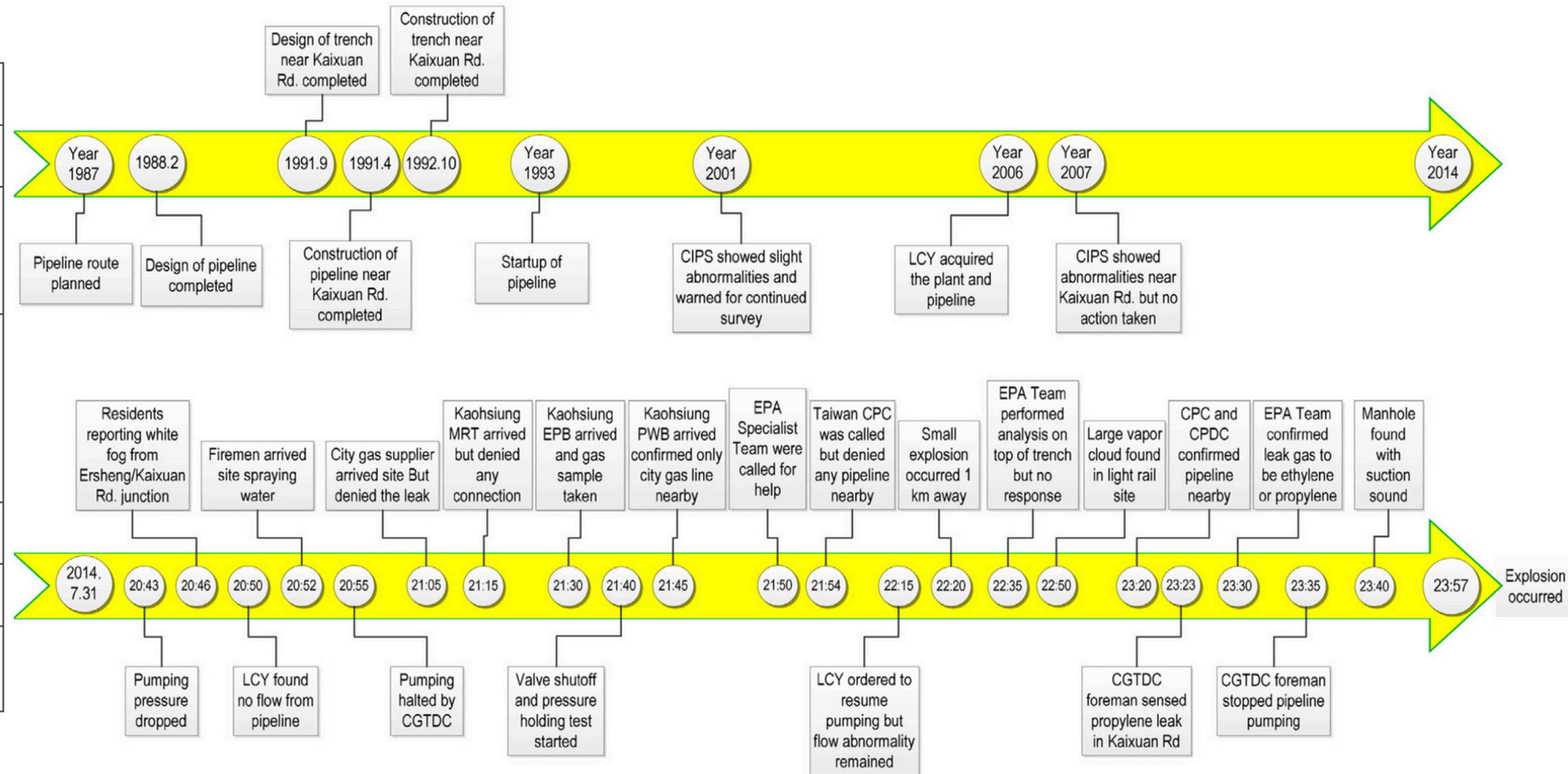
Root Cause Investigation and Liability Assessment

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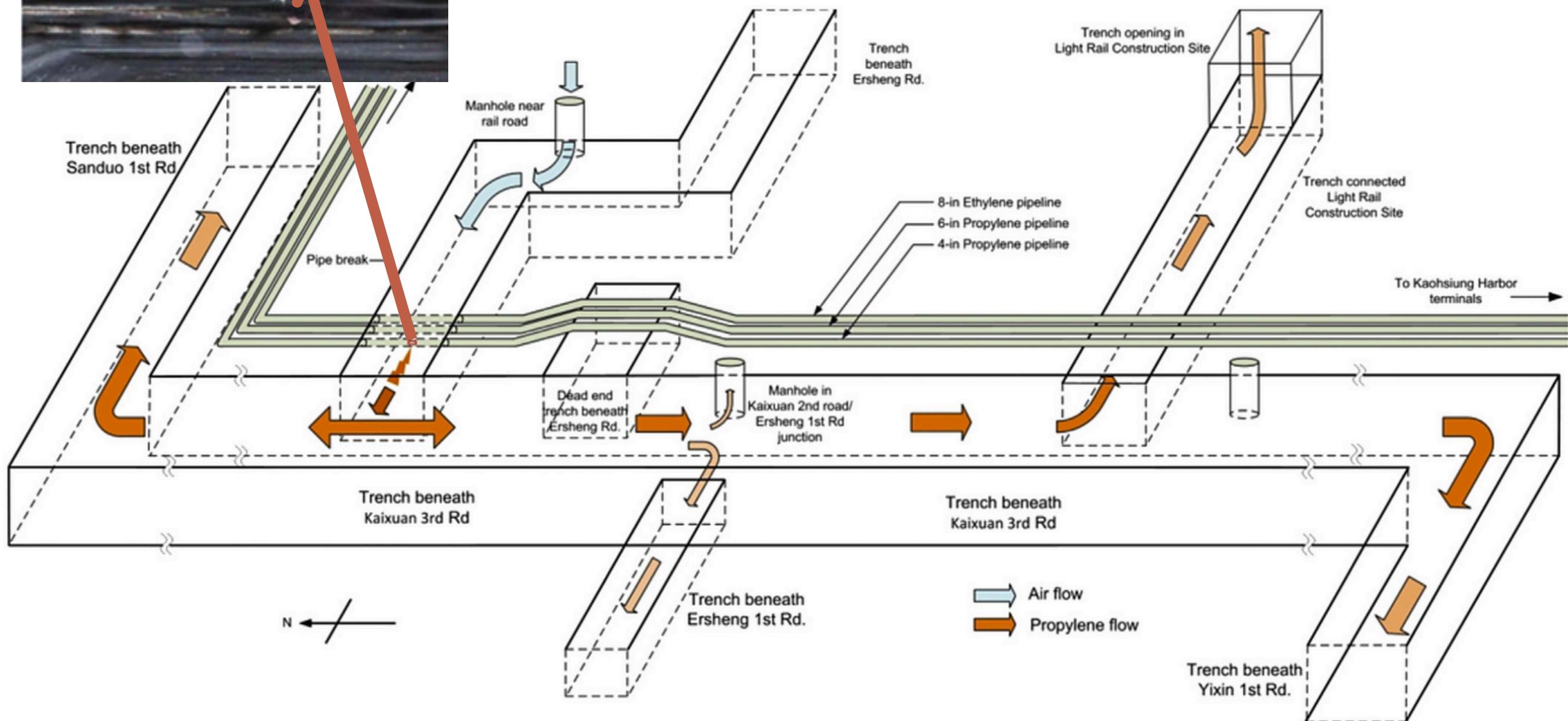
7 April, 2025

Introduction and Timeline of the Incident

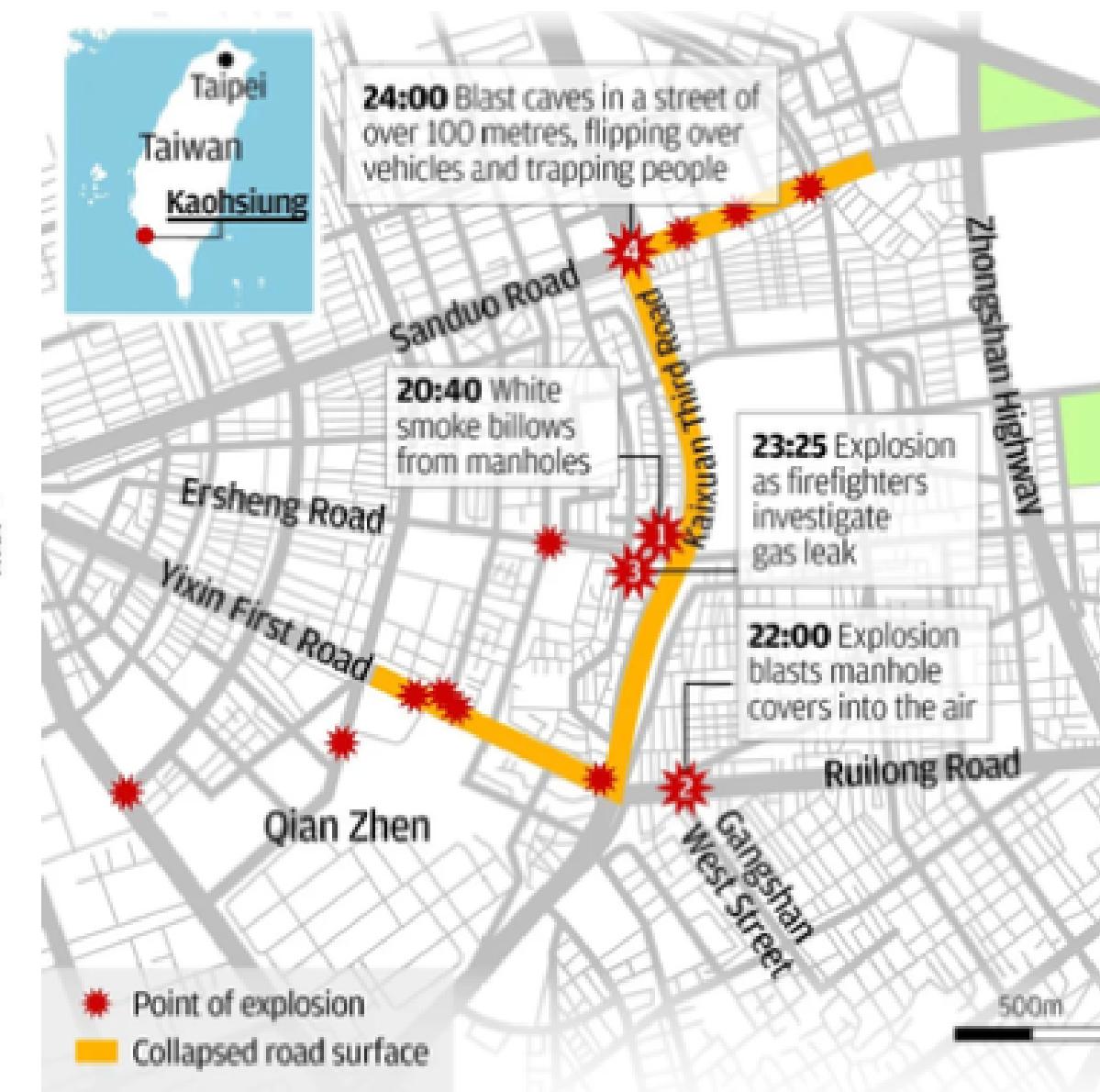
Incident Date	July 31 st , 2014
Location	Kaohsiung City, Taiwan
What Happened	Underground propylene pipeline rupture → vapor accumulation → massive explosion
Pipeline Operator	(1) LCY Chemical Corporation (2) China General Terminal & Distribution Corporation (CGTDC)
Fatalities	32 deaths
Injuries	321 people
Damage	4.5 km of roads destroyed 3,259 buildings damaged



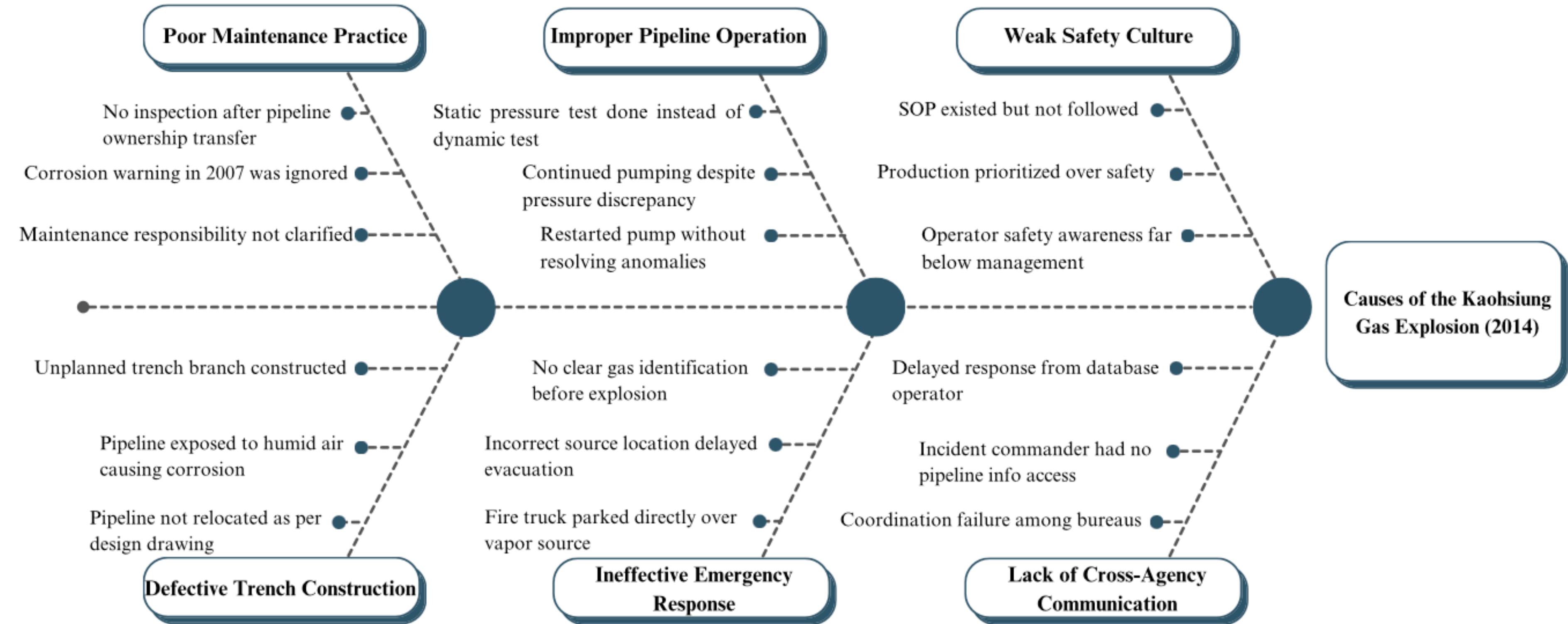
Leak Propagation Path and Explosion Sites



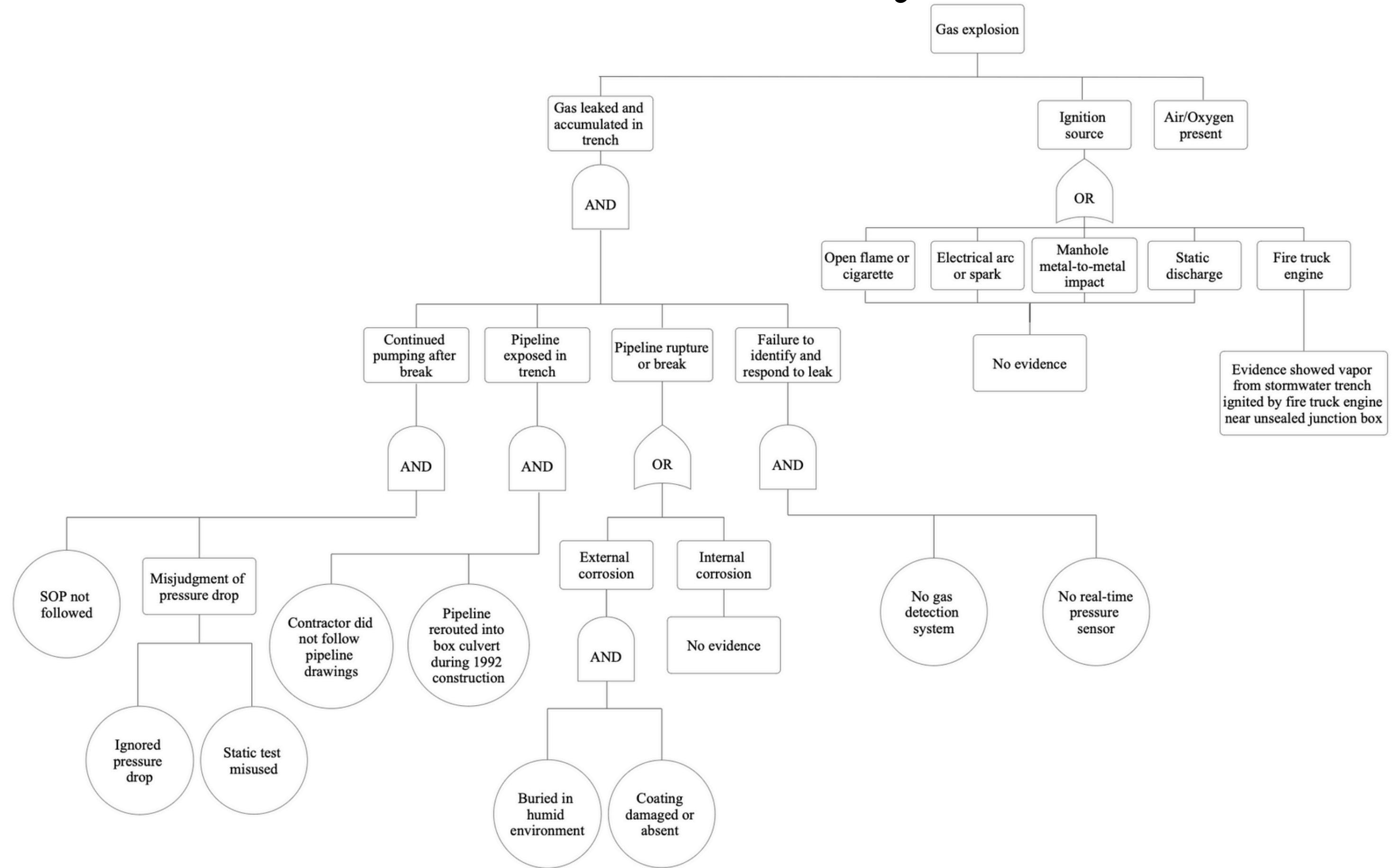
- Schematic diagram of trench, pipeline, and the spread of the leak propylene



Fishbone Diagram



Fault Tree Analysis



Product Liability

Liable parties	Canada (Negligence-Based Tort Law)	United States (Strict Product Liability)	Taiwan (Civil Code + Product Liability Act + Judicial Ruling)
LCY Chemical Corp.	Liable if negligence is proven, such as failure to monitor pipeline conditions or act on warnings. Courts require breach of duty of care and causation. Civil liability likely.	Strictly liable under Restatement §402A if the pipeline is deemed defective. Liability applies even without fault. Subject to tort claims and potential punitive damages.	Held civilly liable for 30% in 2024 ruling. Although criminally acquitted, the court cited failure to manage known operational risks under Civil Code §184.
CGTDC (Port Operation)	Potential shared liability for negligent operation, such as failure to stop pumping during abnormal pressure events. Liability depends on foreseeability and duty of care.	May be liable under co-operator and failure-to-warn doctrines. Contributory negligence can result in civil liability.	Held civilly liable for 30%. Court found its decision to resume pumping significantly contributed to the explosion. No criminal charges filed.
Government (Municipal and Central)	Can be held liable only if gross negligence or breach of statutory duties is proven. Courts generally defer to governmental immunity unless systemic failure is evident.	Generally protected under qualified immunity. Civil suits are possible only if clear, willful disregard for safety is shown.	Held civilly liable for 40%. Court emphasized trench design flaws, outdated GIS data, and oversight failures. Criminal convictions imposed on three public officials.
CPC Corporation (former pipeline operator)	Liability requires proof of original design or maintenance negligence. Rarely held liable after ownership transfer unless continuing duty is breached.	May be liable under product origin theory if design defects are proven to have caused harm. Must demonstrate causation.	Not held liable. No civil or criminal responsibility found due to lack of causal connection between prior work and incident.