SAFER THAN YESTERDAY

CSChE PSM Series Presentation May 26, 2026

Using AI to Unlock PHA Data Potential and Uncover Hidden Hazards

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RSKLESS ANALYTICS

Risk Intelligence | Your Data On Your Terms

INDUSTRY CHALLENGE #1

WE NEED TO KEEP PEOPLE SAFE

INCIDENTS CONTINUE

Accidents continue to happen

SLOW LEARNING

Learning from incidents is slow

DECISIONS WITH LIMITED INFORMATION

Decision-making is not fully informed

THE HIDDEN COSTS OF RISK ASSESSMENTS NOT IMPLEMENTED

1

COMPANIES INVEST

Organizations invest time, money, and resources in risk management.

2

TIME • MONEY • RESOURCES

Risk assessments are developed with significant investment across people, processes, and tools.

3

RISK ASSESSMENTS ON THE SHELF

UNREALIZED VALUE

Reports sit unused, delivering no impact or return.

4

INCIDENTS LEAD TO DOWNTIME

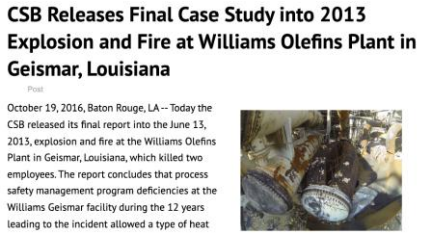
PRODUCTION LOSS

Unaddressed risks lead to incidents, downtime, injuries, and financial loss.

DON'T LET VALUABLE RISK ASSESSMENTS GATHER DUST.
TURN INSIGHT INTO ACTION. PROTECT PEOPLE, ASSETS, AND PERFORMANCE.

INDUSTRY INCIDENTS #1

PHA Related Incidents



Williams Olefins Plant Explosion (Geismar, LA - 2013)

The Failure: Ignored PHA recommendations and improper Management of Change (MOC).

- **What Happened:** A catastrophic BLEVE (Boiling Liquid Expanding Vapour Explosion) occurred in a reboiler, killing two workers and injuring 167. The explosion was caused by the thermal expansion of a liquid propane mixture when the offline reboiler was inadvertently heated while isolated from its pressure relief device.
- **The PHA/HAZOP Gap:** The CSB found that in the 12 years leading up to the incident, the facility had a notoriously weak process safety culture. Crucially, leadership had failed to implement a key hazard analysis recommendation specifically intended to protect that exact reboiler from overpressure. Furthermore, when block valves were installed that isolated the reboiler from its relief valve, the MOC and PHA reviews completely failed to identify the new hazards introduced by the change

- **Tesoro Anacortes Refinery (Anacortes, WA - 2010)**

The Failure: Improper PHA relying on unverified, judgment-based safeguards.

- **What Happened:** A nearly 40-year-old heat exchanger catastrophically ruptured due to High Temperature Hydrogen Attack (HTHA) during a hazardous, non-routine startup operation. Seven workers were killed.
- **The PHA/HAZOP Gap:** The required PHAs repeatedly failed to ensure that hazards were controlled during transient operations like startups. The CSB noted that the PHAs cited only *judgment-based safeguards* and never actually verified if the listed safeguards were effective in practice. There was no requirement for technical experts to prove safety effectiveness with actual operating data; the culture required "proof of danger" rather than "proof of effective safety."

INDUSTRY INCIDENTS #2

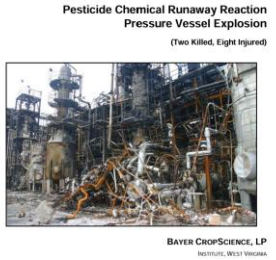
PHA Related Incidents

Chevron Richmond Refinery (Richmond, CA - 2012)

The Failure: Improper PHA lacking a formal damage mechanism methodology.

•**What Happened:** A catastrophic pipe failure in a crude unit caused the release of a massive flammable hydrocarbon vapour cloud. The vapour ignited, endangering 19 employees and sending 15,000 community members to the hospital.

•**The PHA/HAZOP Gap:** The pipe failure was caused by sulfidation corrosion, a well-known damage mechanism. However, the PHA conducted on that piping failed to identify corrosion as a potential cause of a rupture. Why? Because the facility did not require the use of a recognized methodology for determining safeguard effectiveness. They relied entirely on the personal knowledge and memory of the PHA team members. The CSB directly cited this as a major failure, leading to industry-wide pushes for formal Damage Mechanism Reviews (DMRs) to be explicitly integrated into the PHA cycle.



Bayer CropScience (Institute, WV - 2008)

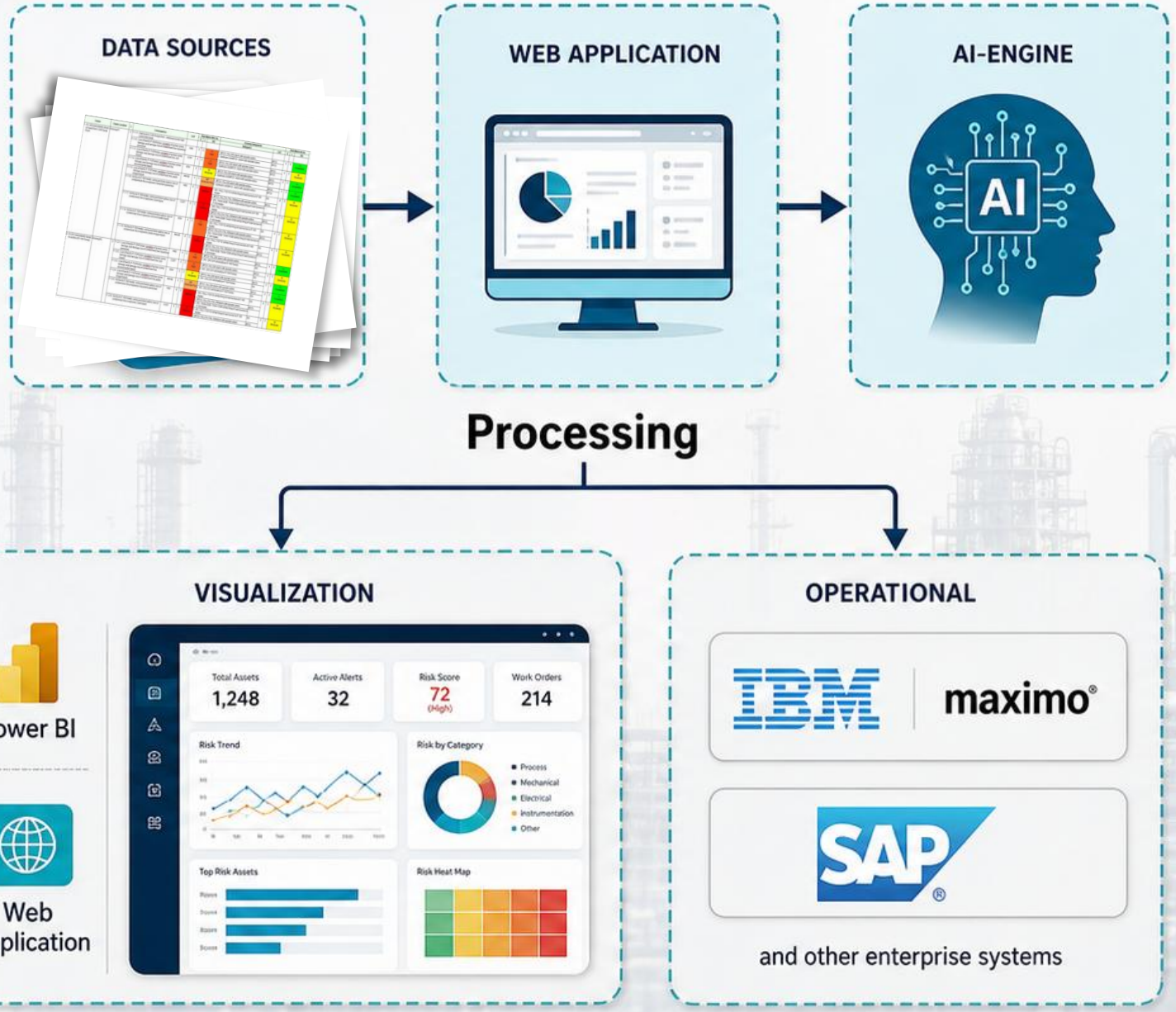
•**The Failure:** Incomplete PHA and failure to mandate Safety Instrumented Systems (SIS).

•**What Happened:** A runaway chemical reaction occurred inside a residue treater pressure vessel, causing it to explode, killing two workers.

•**The PHA/HAZOP Gap:** The CSB found the company failed to perform a thorough PHA. The existing PHA team had actually recognised that the control system was antiquated and lacked a proper Safety Instrumented System (SIS) for a highly hazardous process. However, instead of mandating an engineered safeguard, they evaluated the risk of high chemical concentrations as a mere "product quality problem" to be handled by operator intervention. The lack of automated interlocks directly allowed the runaway reaction to occur.

YOUR DATA, ON YOUR TERMS

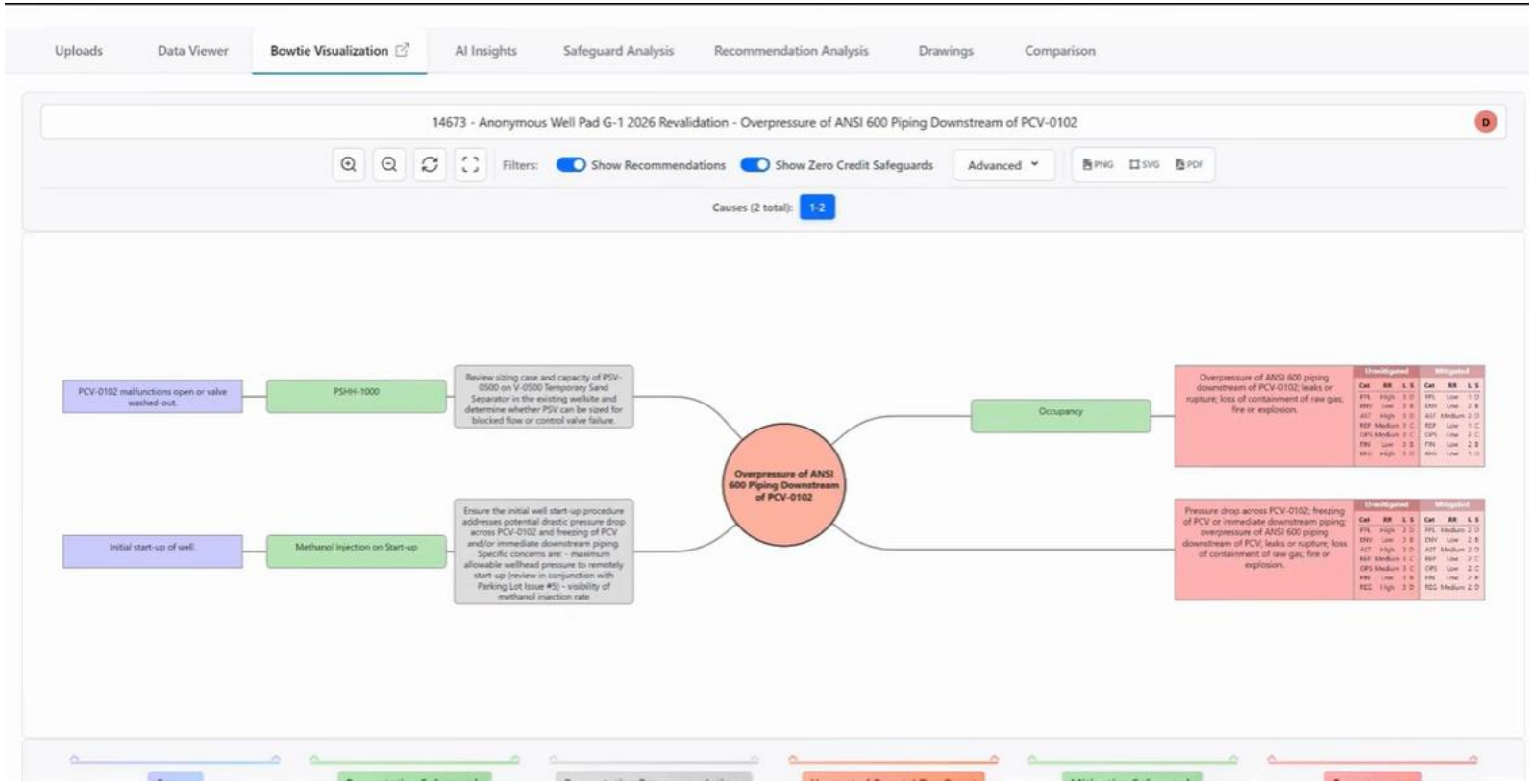
- Custom Branded Web App
- Pre-Programmed Analytics
- Filter, Sort, and Export
- Customizable Widgets
- Risk Visualization
- AI Insights
- Open API Configuration



YOUR DATA, OPERATIONALIZED

- Guided by Decades of PSM, Operations, and Technology Experience
- Aligned to industry best practices and standards API 750, OSHA 1910, CSA Z767, CCPS Risk-Based PSM
- Trained on Hundreds of PHA Data sets from Oil and Gas, Chemical, Petrochemical, etc, from Canada, USA, Pakistan, GCC Region

UPLOAD & ANALYZE AI BOWTIES



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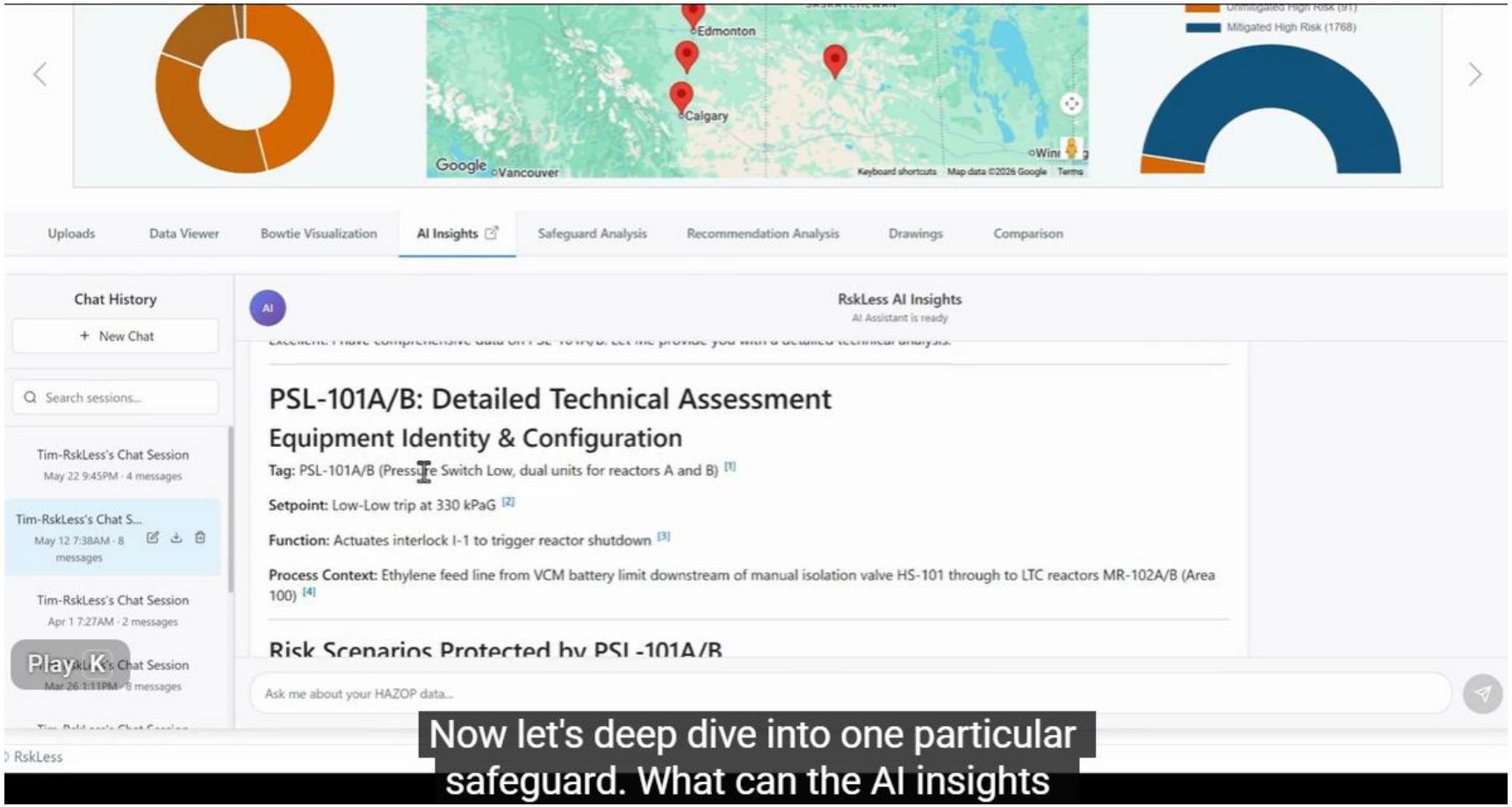
AI INSIGHTS



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