



**RISK ALIVE**

# **Risk is Known but Not Reduced Fast Enough**

**Closing the Gap Between PHA and Action in 7 Days**

**SMART RISK DECISIONS DRIVEN BY DATA**

Canadian Chemical Engineering Conference May 25<sup>th</sup>, 2026 | Risk Alive Analytics Inc.

# PROUDLY PART OF THE RSD GROUP OF COMPANIES

**RISK SCIENCES  
& DEVELOPMENT**



**ACM FACILITY SAFETY INC.**  
CONSULTING

**30** years working  
with energy,  
petro-chemical,  
and agro-chemical  
teams and leaders



**RISK ALIVE ANALYTICS INC.**  
RISK ANALYSIS

**51** million  
industry learnings embedded  
in 5,600+ risk data sets



**INSTITUTE OF HAZARD  
PREVENTION INC.**  
SAFETY TRAINING

**4000+**  
people trained in 12 courses  
ranging from basic to advanced

**5,400**  
Processing Units

**262,000**  
Pieces of Equipment

**479**  
Unit Types

**500,000**  
Hazardous Scenarios

**21,000**  
Contributing Experts

# The Problem: Why Current Risk Models Fall Short

Industrial Facilities Generate Enormous Safety Data:

*1000s of pages of worksheets. . .*

- Hazard studies
- Incident reports
- Maintenance records
- Procedures
- Training documentation

Yet organizations still struggle to answer:

**Where are our highest risks?**

**What immediate actions should we take now?**



**Emergence of AI to facilitate risk mitigation at scale**

# | The Critical Gap

## The 50-Year PSM Gap

Despite robust hazard identification (HAZOP/LOPA), major incidents persist. The issue isn't a lack of knowledge. PHAs are routinely completed, but the issue is often due to a **failure to translate data into timely action**.

- Recommendations recur across cycles.
- Implementation cycles often take years, not weeks.
- Facilities operate with partially mitigated hazards.



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# Shifting The Safety Paradigm



## Periodic Safety

Documentation-driven, periodic assessments that capture risk at a static point in time, often leading to delayed action.



## Continuous Intelligence

Actionable, data-driven intelligence leveraging existing PHA data to prioritize vulnerabilities in real-time.



## Proactive Control

Rapidly moving from "knowing risk" to "reducing it" through targeted interventions within days, not years.

# | Recognizing “Grey Risk”



Red = Unacceptable High Risk

Green = Acceptable Low Risk

Grey = Partially Managed High to Moderate Risk & Weakly Controlled (High Exposure)

## THE OPERATIONAL SPACE

Grey Risk represents the critical space between documented safeguards and actual operational control. It represents risks that are known but not managed fast enough.

Some characteristics include:

- **Partially mitigated hazards** and degraded safeguards
- **Human Over-Reliance:** Fragile intervention dependencies
- **Latent Vulnerabilities:** Missed or unaddressed scenarios

### KEY INSIGHT

"Risk isn't just what's on the page.  
Risk is what's happening at 3:00 AM  
in the unit."

# | The Grey Risk Index Components

Quantifying latent vulnerabilities through six core analytical components.

## **Residual High-Risk**

Persistent vulnerability after mitigation.

## **Human Factors**

Dependency on operator decision/action.

## **Low Protection**

Single safeguard exposure on critical paths.

## **Threat Coverage**

Ability to evaluate high-inherent risks.

## **Recommendation Efficiency**

Degree of valuable risk reduction per assessment

## **Future Exposure**

Emerging high risks with no current action path.

# The Grey Risk Index Benchmarking

Unit 491 HF Alkylation Unit

GRI: 228.1

Unit 30 Naphtha Hydrotreater

GRI: 199.8

Unit 71 Sulfur Recovery Unit

GRI: 198.5

Unit 92 Sour Water Stripper

GRI: 188.0

*The Grey Risk Index quantifies hidden vulnerabilities to prioritize capital and operational attention.*

# Addressing The Critical Gap: Design vs. Field Reality

## PHA Assumption

- "The operator will notice seal-pot alarms and swap pumps immediately."
- "Dual check valves prevent backflow of olefins to atmospheric storage."
- "Release detection is instantaneous via LEL/HF grid."

## Field Reality

- During upsets, alarm flooding obscures seal-pot alerts (Cognitive Burden).
- Valves are not on the "Critical Device" list; status is unknown since 2021.
- Grid has "blind spots" near Pump L-13; reliance on rounds (Detection Lag).

### SLIDE TAKEAWAY

The gap is where incidents occur. We don't always need a new design, we need to close the gap on the current design's performance. HF Alkylation Baseline GRI of 228.1 is heavily driven by unverified passive layers and high reliance on operator cognitive response.

# Risk Alive® AI Risk Intelligence Companion

## AI Risk Intelligence Companion

### Digitizing and Structuring PHA Data

Rather than replacing human expertise, it surfaces "weak signals" across a massive dataset of hazard scenarios, identifying patterns that traditional human review might miss over the lifetime of a facility.

**Actionable risk insight directly in the hands of operators and leadership.**

The screenshot displays the Risk Intelligence Companion web application. The interface is divided into a left sidebar and a main content area. The sidebar, titled "Conversations", includes a search bar for "Search conversations...", a "+ NEW CHAT" button, and a list of conversation items, such as "New conversation" dated "May 6, 4:28 PM". The main content area, titled "Risk Intelligence Companion", features a header with a hamburger menu icon and a user profile icon. Below the header, a large speech bubble icon is centered above the text "How can I help you today?" and "Risk Intelligence Companion". Three interactive cards are displayed: "Browse Project Data" (with a folder icon and subtext "See which of my published PHA files are available to explore"), "Explore Industry Data" (with a magnifying glass icon and subtext "Search through anonymized industry PHA data – causes, consequences, safeguards, and risk rankings from real studies"), and "What can you do?" (with a star icon and subtext "Learn about my capabilities and how to get started"). Below these cards is a "TRY ASKING:" section with a text input field containing the question "What are common safeguards for acid gas overpressure across the industry?". At the bottom of the main area is a large text input field with the placeholder "Type a message...". The footer contains the "RISK ALIVE" logo, "Privacy Policy Terms of Use" links, the copyright notice "© 2026 Risk Alive Analytics Inc.", a page number "9", and a chat icon.

# | THE G8 FRAMEWORK: 8 CRITICAL PROMPTS



## Identify High Residual Risks

Focus on Fire, Explosion, and LOC events.



## Highlight Grey Risks

Expose unmanaged or undocumented gaps.



## Human Dependent Safeguards

Evaluate fragility of people-based barriers.



## Operator Reality

Account for workarounds and real conditions.



## Lone Worker

Assess detection and survivability gaps.



## Readiness/Spares

Identify delays from missing critical parts.



## Immediate Detection Improvements

Apply tech to reduce detection uncertainty.

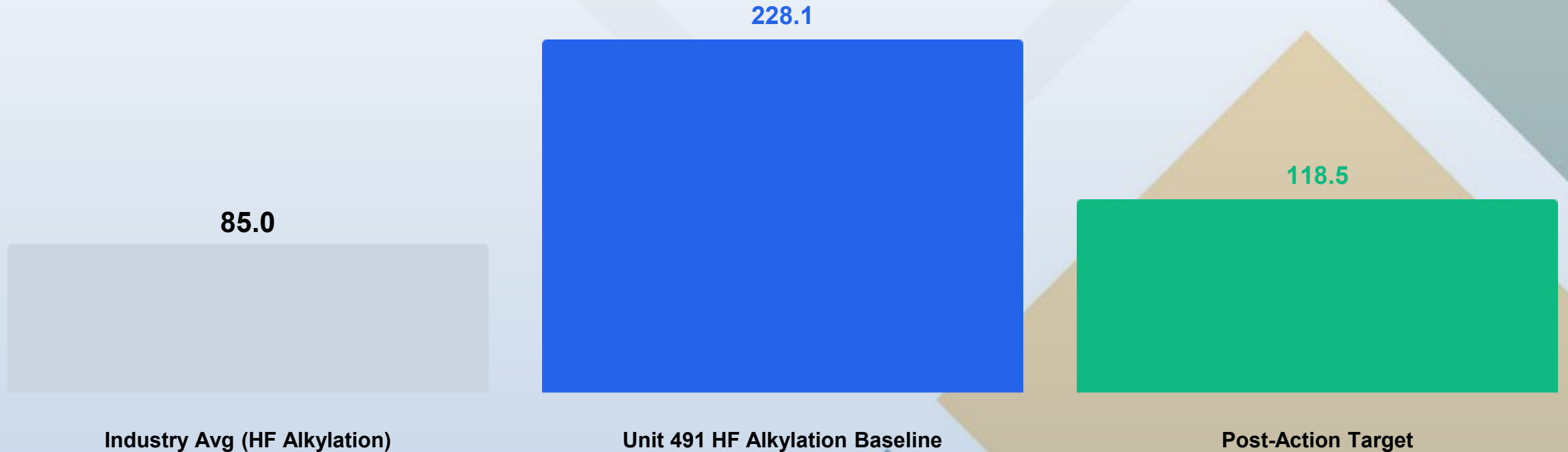


## External Intel

Incorporate industry-wide learnings.

# GRI Benchmarking: Example of Unit 491 vs. Industry

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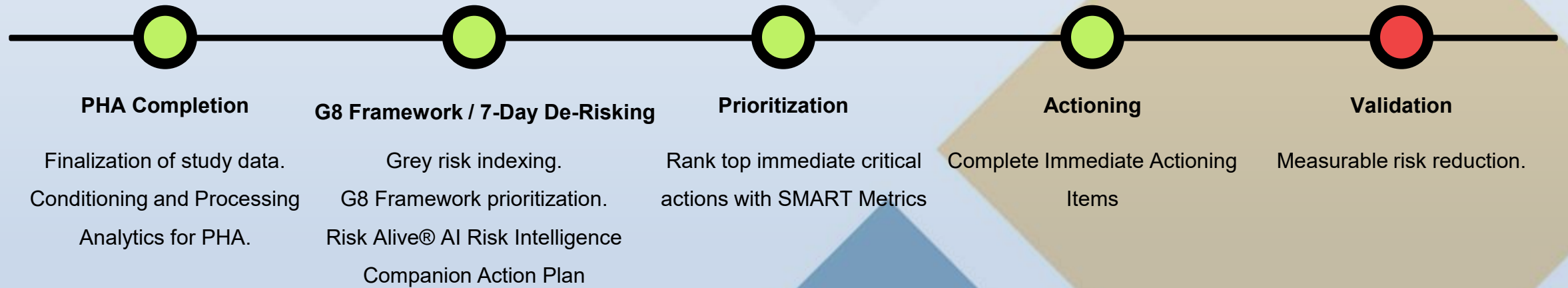


Using a "Digital Mentor" approach, we can compare Unit 491 against industry learnings to surface potential learning patterns.

## SLIDE TAKEAWAY

Unit 491 HF Alkylation is currently operating with risk levels 2.5x higher than industry average. The 7-day action plan brings the unit down closer toward the benchmark safety envelope.

# The 7-Day De-Risking Model



# Full 7-Day SMART Action Plan

Action Item	SMART Metric	Owner	Risk Impact
Portable Detection	Deploy 4 HF/LEL monitors at Node 491-V-26 and L-5 rows.	Ops Manager	Eliminates 34-min detection lag for LOC.
No-Solo Sampling	100% buddy-system for HF/Sour sampling activities.	Shift Lead	Mitigates lone-worker exposure vulnerability.
Critical Check Audit	Physical verification of dual check valves on 491-L-13.	Maintenance	Validates olefin backflow protection status.
Alarm Validation	Verify 0491PSH0435 logic visibility on main console.	I&E Tech	Ensures response-dependent barrier effectiveness.
Inventory Staging	Stage 491-L-5 seal kits and SCBA/Class B PPE at HF nodes.	Warehouse	Reduces consequence duration and injury risk.

## 1. Temporary Detection

Portable monitors deployed at high-risk nodes

## 2. Procedural Change

Enforcing buddy-checks for all sour/HF sampling

## 3. Status Verification

Physical tagging and verification of "Grey" valves

### SLIDE TAKEAWAY

Each action targets a specific "Grey Risk" component. By completing these in 7 days, we effectively bridge the gap identified in the report.

# Field Action Checklist (Operational Audit)

Use this list for immediate field walks to verify PHA assumptions on the Top 5 Nodes.

Equipment ID	Required Check	Technical Reason	Status
Pump 491-L-5 A/B	Verify seal-pot levels and local alarm light functionality.	Primary detection for Risk #1 (HF Release).	<input type="checkbox"/>
Pump 491-L-13	Verify check valve orientation and installation.	Prevent olefin backflow (Risk #3).	<input type="checkbox"/>
Valve 0491LV0027	Confirm local position matches console; check bypass status.	Prevent Mercaptan toxic gas blow-by (Risk #4).	<input type="checkbox"/>
Area Detectors	Function test HF sensors in the Isostripper node.	Primary safety layer for top facility risk.	<input type="checkbox"/>
HF Unloading V-26	Inspect hose condition and PPE staging status.	Minimize human error during transfer.	<input type="checkbox"/>

## SLIDE TAKEAWAY

This checklist is an additional physical aspect of Process Safety Management with minimal capital spending in the immediate short term.

# Quick Measurable Risk Reduction

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92%

Reduction in Safeguard Uncertainty

7-Days

Time to Actionable Intelligence

"By focusing on immediate levers, we transition from documentation to a state of **\*\*Active Risk Intelligence\*\***."

- Lower lone-worker vulnerability.
- Higher confidence in barrier status.
- Faster detection of latent leaks.

## SLIDE TAKEAWAY

Safety is about the presence of defenses. Outcomes are measured by the health of these defenses.

# Outcomes and Limitations

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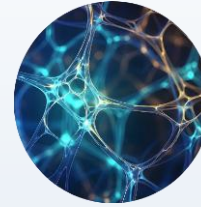
## Realistic assessment of what changes in 7 days and what stays the same

- **What Improves:** Reduction in human dependency, detection gaps, and safeguard uncertainty.
- **What Does Not Change in 7 Days:** Fundamental process design weaknesses, the need for long-term engineered safeguards, and high-energy system vulnerabilities.

## Preserving Institutional Knowledge

Using the Risk Intelligence Companion preserves institutional knowledge so we can transition from static documentation primarily based human expertise to computed actionable, structured assets that are continuously updated and used to reduce risk.

# The Decision Accelerator



One of Our Largest Clients in Europe



**Multinational Integrated Oil & Gas Corporation**

*“The tool was cutting my working time to several minutes instead of several days.”*

*“Managers are always asking questions, and they want to have a fast and very easy understandable answer.”*

*“People are not so enthusiastic to look into 400 or 600 pages of data.”*

**-MICHAELA SVOREŇOVÁ** | Group Risk Management Senior Expert

23 years of experience supporting multiple refinery sites across Central Europe

### AI FEATURES THAT ARE HARD TO IGNORE

FASTER ANSWERS. LESS EFFORT. MORE INSIGHT. STRONGER SAFETY.

- 1 RAPID COMPARISON AGAINST THOUSANDS OF PHAS**  
Challenge the completeness of your PHA with industry-wide insight.  
Deliverable Turnaround: HOURS (Typically a multi-week effort)  
Effort to Retrieve: HIGH (Manual research & multiple sources)  
• What scenarios commonly appear elsewhere but are absent here?  
• What safeguards are undersused?  
• What initiating events are routinely missed?  
• Which recommendations repeatedly fail to close risk?  
PHA UPLOAD REQUIRED | CONFIDENTIAL | NOT SHARED
- 2 WHAT DID WE MISS?**  
AI acts like a relentless reviewer to uncover gaps you may not see.  
Deliverable Turnaround: < 7 DAYS (From upload to insights)  
Effort to Retrieve: MEDIUM (Upload & context provided)  
• Identifies missing causes, consequences, safeguards and weak recommendations  
• Checks for inconsistent assumptions and recurring gaps  
• Highlights operational workarounds and drift  
PHA UPLOAD REQUIRED | CONFIDENTIAL | NOT SHARED
- 3 AI RISK COMPANION**  
Ask anything. Get answers. In minutes.  
Deliverable Turnaround: MINUTES (Real-time answers)  
Effort to Retrieve: LOW (Ask in natural language)  
• Natural language Q&A on your PHA  
• Highest risks, weak safeguards, open recommendations  
• Compare to incidents, lessons, and best practices  
• Insights at 2am on a Sunday  
PHA UPLOAD REQUIRED | CONFIDENTIAL | NOT SHARED
- 4 SEMANTIC SEARCH**  
Instantly find what matters. No PHA upload needed.  
Deliverable Turnaround: MINUTES (Instant results)  
Effort to Retrieve: LOW (Type & search)  
• Search across industry knowledge, incidents, hazards, safeguards, and recommendations  
• Find relevant insights even when you don't know the exact words  
• No PHA upload required  
NO UPLOAD REQUIRED | NOTHING SHARED

#### WHY IT MATTERS

Less time searching. More time improving safety.

- DRASTICALLY FASTER**  
From hours/weeks to minutes.
- LESS EFFORT**  
From manual research to simple questions.
- MORE INSIGHT**  
See what others see. Find what others miss.
- STRONGER SAFETY**  
Better decisions. Fewer unsafe days.

YOUR DATA IS YOURS. UPLOADED PHAs ARE CONFIDENTIAL AND NEVER SHARED.

AI is not meant to replace judgement; it provides **structured variability**.

# SUMMARY & QUESTIONS

## The Future of Safety is Immediate

Risk management should not depend on long cycles alone.

With structured data and the G8 Framework, risk is addressed before momentum is lost.

*Risk Alive Analytics Inc.*

[www.RiskAlive.com](http://www.RiskAlive.com)



Thank  
You

Thank  
You

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