blacklinesafety

UNLOCKING THE POTENTIAL OF GENERATIVE AI IN EHS

PHIL BENSON | JUNE 26, 2025

PHIL BENSON

VICE PRESIDENT OF PRODUCT

15+ years in safety tech
Oil & gas, Wastewater, Hazmat, Light manufacturing, Field services

Team leadership across
Product Management, UX & Industrial Design, Data Engineering, Business Intelligence and AI/ML

Background
Honeywell (gas-detection & fleet software)
Smart Technologies (interactive educational technology)
Blackline Safety (IoT safety wearables, gas detection & analytics)

Core focus
Advancing field safety with connected tech
Predicting and preventing risks through data
Delivering tools frontline teams can trust

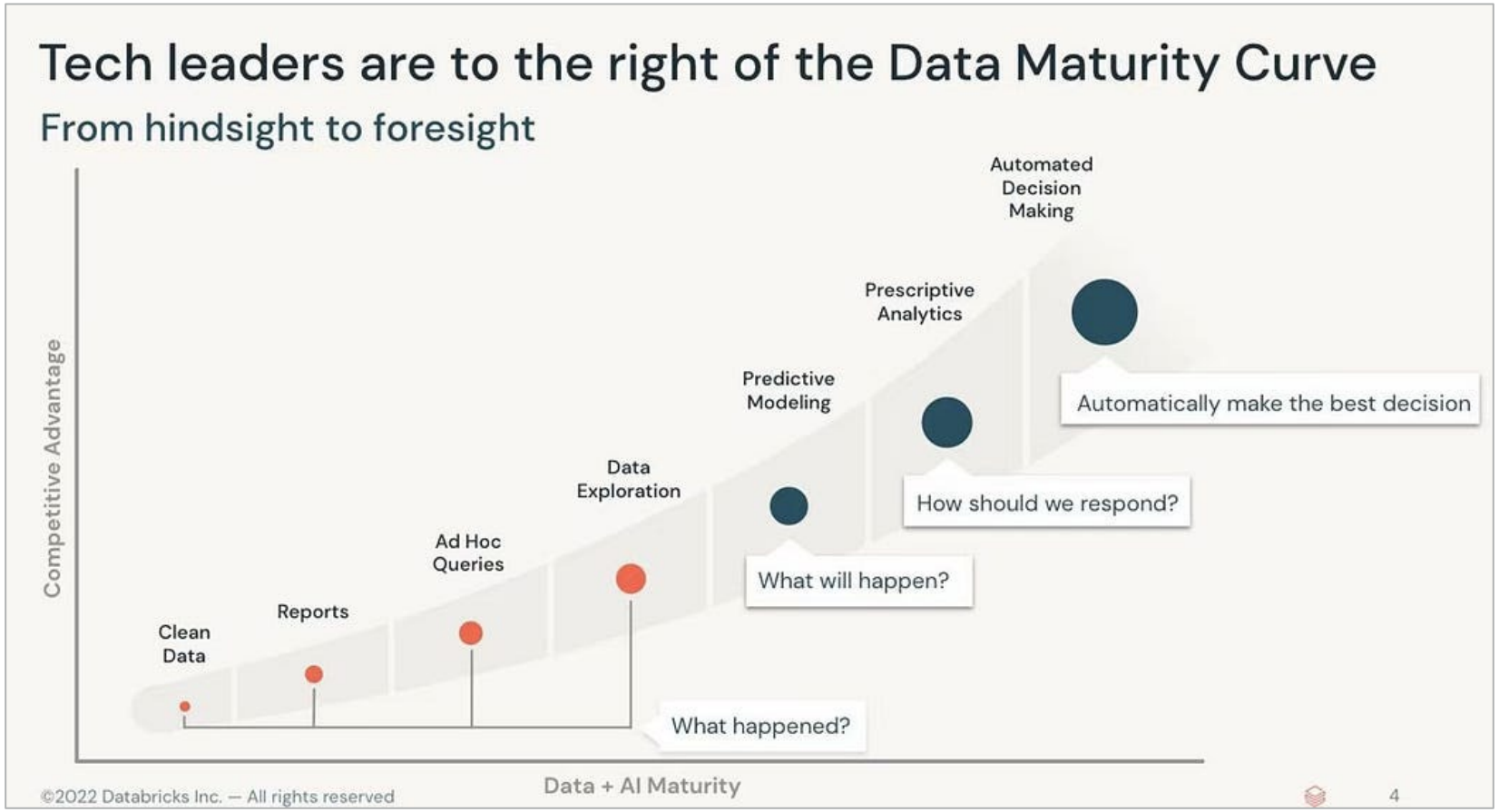
WHAT WE'LL COVER

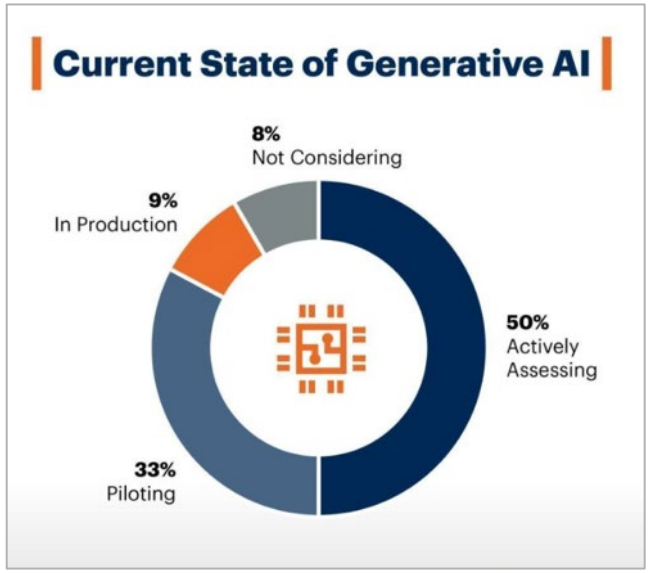
- Understanding Generative AI & Data Maturity
- 3 Keys to Getting the Most Out of GenAI
- 3 GenAI Applications for EHS
- 3 Blackline Safety AI Projects
- Key Takeaways
- Q&A


blacklinesafety
UNDERSTANDING GENERATIVE AI
blacklinevision

DATA MATURITY CURVE

Where is your company on the data journey?





Source: Gartner, How D&A Leaders Are Shaping Generative AI Initiatives, Oct 30, 2023

blacklinesafety

DISTINGUISHING BETWEEN KEY CONCEPTS

Artificial Intelligence (AI)

- AI is the simulation of human intelligence in machines.

  → Example: AI systems that recognize patterns, make decisions, or solve problems.

Machine Learning (ML)

- A subset of AI where machines learn from data to improve performance without being explicitly programmed.

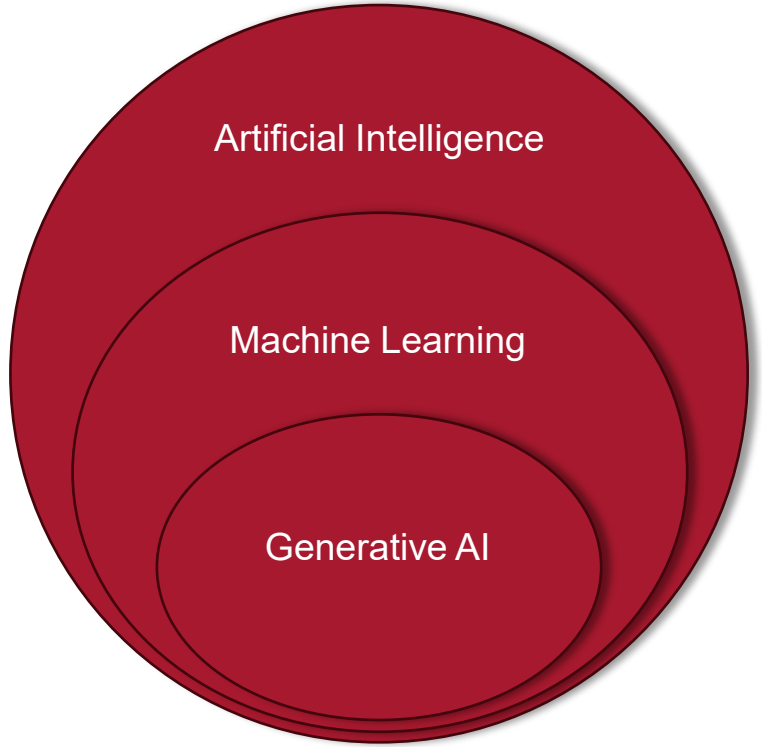
  → Example: Predictive models for safety risks based on historical data.

Generative AI (GenAI)

- A subset of ML focused on generating new data or content similar to the data it was trained on. They don't just analyze; they generate.

  → Example: Generate text, code, images, audio, and even complex simulations.

- Common technologies: Large Language Models (LLMs) like ChatGPT, image generation models like DALL-E, and video generation like Veo 3.



DON’T WORRY, IT GETS MORE COMPLICATED

Artificial Intelligence (AI)

- AI is the simulation of human intelligence in machines.

Machine Learning (ML)

- A subset of AI where machines learn from data to improve performance without being explicitly programmed.

Deep Learning (DL)

- A type of artificial intelligence (AI) that uses artificial neural networks to teach computers how to process data and make decisions based on examples.

Natural Language Processing (NLP)

- A branch of artificial intelligence (AI) that allows computers to understand, interpret, and manipulate human language.

Generative AI (GenAI)

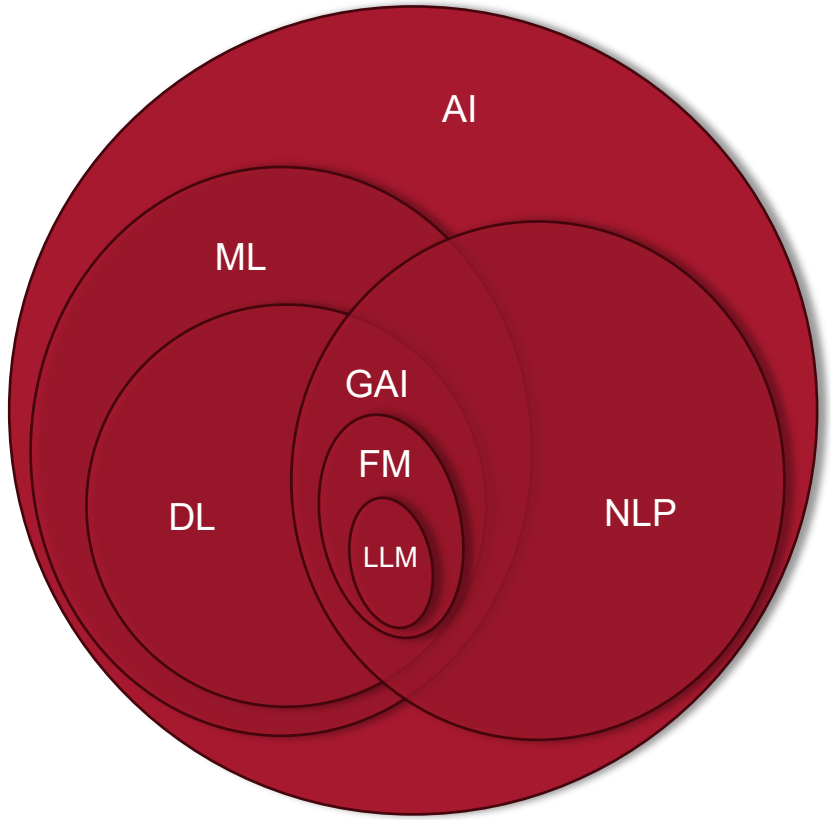
- A subset of ML focused on generating new data or content similar to the data it was trained on. They don’t just analyze; they generate.

Foundation Model (FM)

- Foundation models generate output from one or more inputs (prompts) in the form of human language instructions.

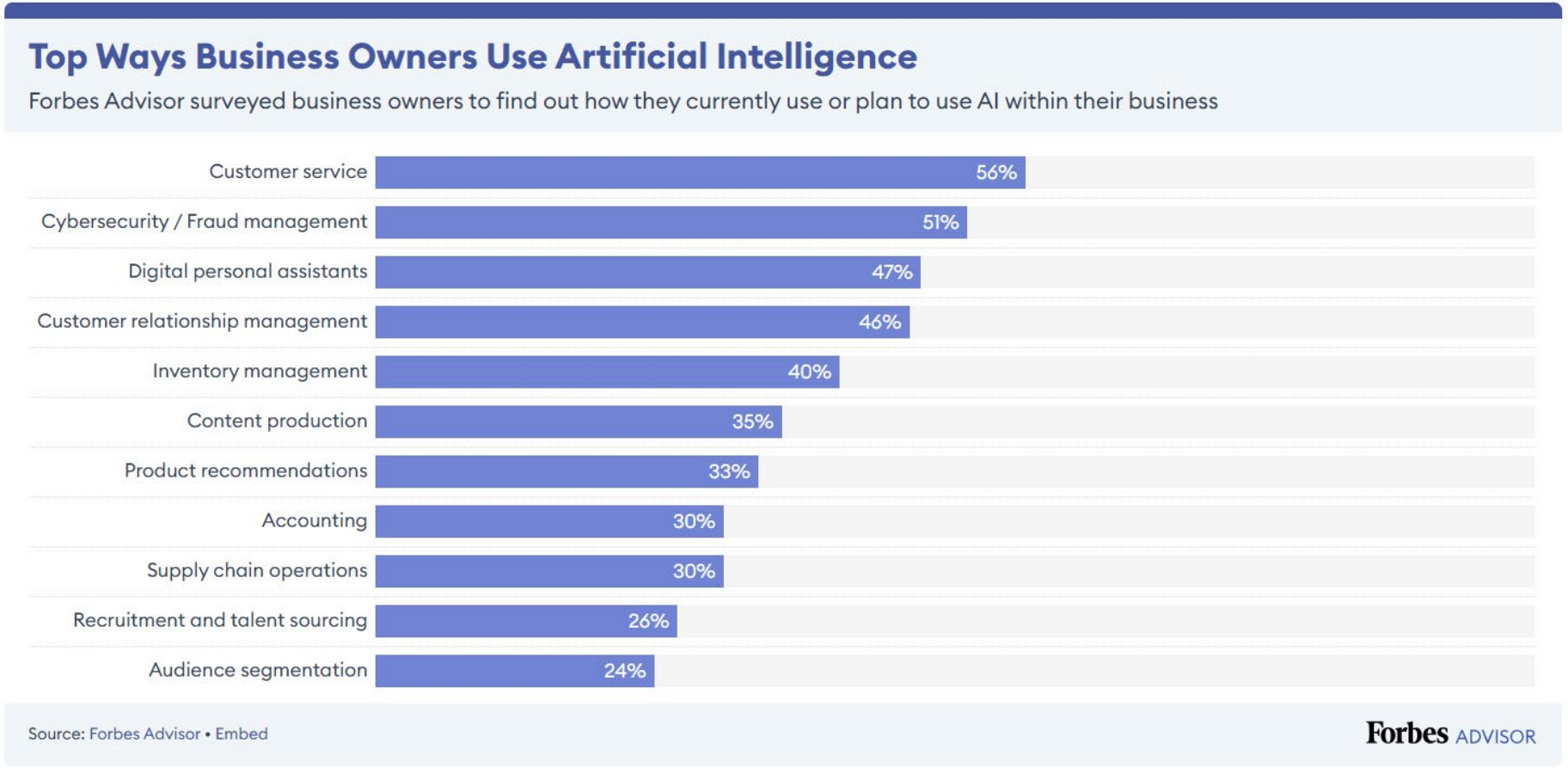
Large Language Model (LLM)

- A type of artificial intelligence (AI) that can process, understand, and generate human language. LLMs are trained on large amounts of data, such as text from books, articles, and websites, and use deep learning techniques to analyze unstructured data.



AI FOR BUSINESS OPERATIONS

Exploring AI Beyond Product Initiatives



https://www.forbes.com/advisor/business/software/ai-in-business/

blacklinesafety

3 KEYS TO GETTING THE MOST OUT OF GEN AI

START WITH PURPOSE

What's Your Problem?

- Generative AI works best when it's given a defined task and a specific goal
- Start with the pain point, not the tool
- Ask: *"What are we trying to improve, learn, automate, or predict?"*
- Think of one EHS challenge in your organization that's:
  - Repetitive
  - Data-heavy
  - Time-consuming
  - Prone to error

Image generated using ChatGPT

KNOW YOUR DATA

What's Already in Your Hands?

- **Safety Management System (SMS)**
  Paperwork, forms, incident reports, and procedures.
- **Wearable devices and the Internet of Things (IoT)**
  Locations, Environmental (gas, temp, humidity), and Biometrics.
- **Cameras**
  General security cameras, flame detection, and methane detection.
- **Regulatory Databases**
  Government or industry safety and environmental standards databases (e.g., OSHA, EPA, ISO standards).
- **Operational Data**
  Machine performance logs, production throughput data, and downtime records.

 Image generated using ChatGPT

UNDERSTAND THE TOOL

It’s Not a Magic Wand

Understand the strengths and limitations

- Great at summarizing, drafting, exploring ideas—not great at knowing truth or interpreting complex context without guidance.

Gen AI is a tool, not a shortcut to wisdom

- Your experience, context, and goals still drive the outcome of the tool.

Think of it like a calculator, Excel, or your smartphone:

- Huge advantage when used correctly
- Still needs human judgment
- Still prone to error or misuse

Image generated using ChatGPT

ARE YOU USING AI AS PART OF YOUR EHS STRATEGY?

Not yet – exploring potential cases	60.7%
No – no current plans to use AI in EHS	19.1%
Yes – actively using AI	10.5%
Yes – piloting AI in one or two areas	9.7%


blacklinesafety
3
GEN AI APPLICATIONS FOR EHS
blacklinevision

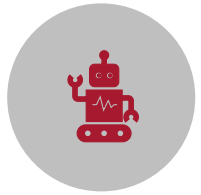
WARNINGS & DISCLAIMERS

Be mindful of your corporate policies, especially ethical and security concerns

(e.g., misuse, data privacy).

Be mindful of "hallucinations".

(Use the "new employee" technique).



AI requires quality training data.

(But you can improve data over time).

Not a replacement for human judgment. You are responsible for your choices and actions.

Don't give private corporate info to public Gen AI tools.

The software tools referenced are not endorsed.

Don't be intimidated!

These are considerations for any data-related project.
Play by the rules and question the outcomes.

COMPLIANCE & REGULATION

Staying up to date with evolving regulations across regions

The Problem

- Regulations change constantly—local, national, and international. EHS teams struggle to track and interpret what matters, especially across multiple jurisdictions.

How GenAI Can Help

- Upload or link to new regulatory documents (PDFs, web content, or newsletters)
- Have GenAI summarize changes in plain language
- Prompt GenAI to compare new language with past versions or your own internal polices
- Output can flag misalignments or needed updates

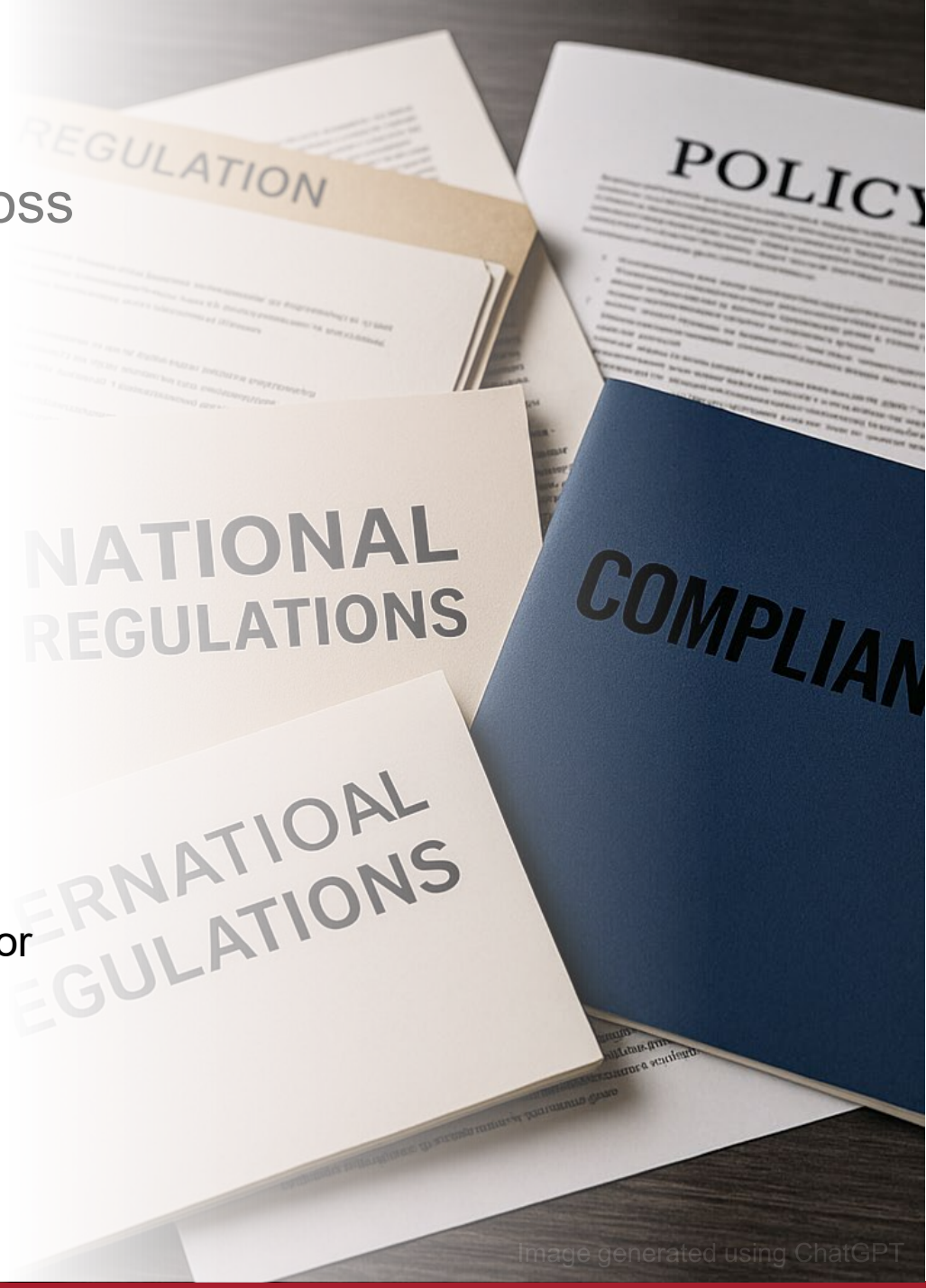


Image generated using ChatGPT

COMPLIANCE & REGULATION

Staying up to date with evolving regulations across regions

Example Prompts

- *“Summarize the key safety policy changes in this PDF in 3 bullet points.”*
- *“How does this new EPA guidance differ from our internal SOP?”*
- *“Generate a comparison table between this standard and our safety manual section 4.”*

Semi-Automation is Possible

- AI Agents can scrape or monitor regulatory sources (e.g., government RSS feeds, bulletins).
- With well-structured inputs, GenAI can summarize or compare content
- Tools like Zapier, Make, and n8n can create workflows and route documents to LLMs automatically.
- Off-the-shelf solutions like Verano.ai, can automate 80%+ of regulatory compliance tasks using AI agents and deliver real-time risk mitigation info.

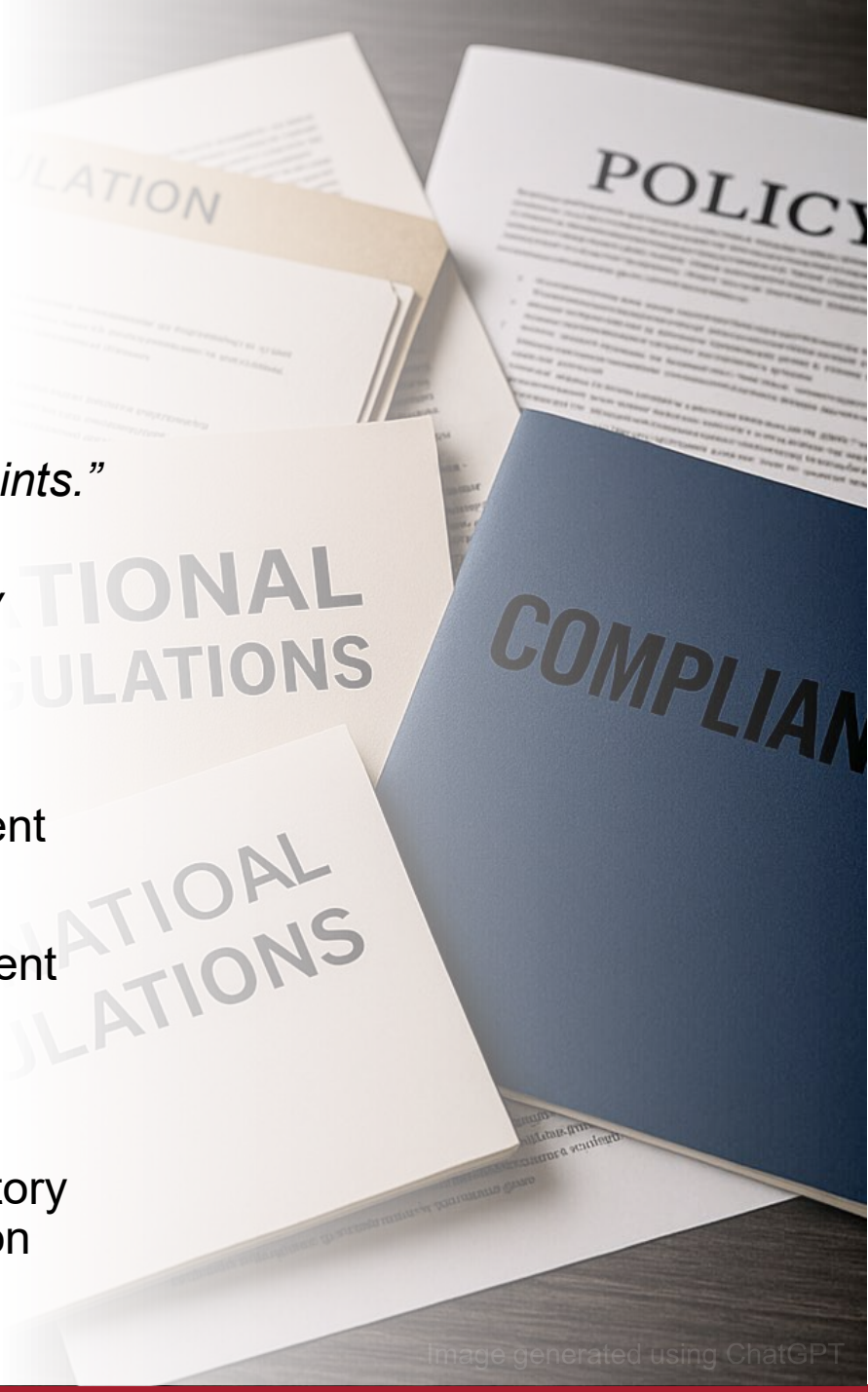


Image generated using ChatGPT

DATA ANALYSIS & REPORTING

Manual Reporting Slows Down EHS Teams

The Problem

- Building reports for presentations, audits, leadership updates, and investigations is time-consuming. Tracking trends, preparing data, or responding to stakeholder questions often depends on busy BI teams.

How GenAI Can Help

- Connect to your existing EHS data sources (incident logs, sensor data, compliance audits)
- Ask natural language questions and get custom ad-hoc data visualizations and reports.
- Example prompts:
  - *“Show incidents by location over the past 12 months”*
  - *“What are the top three gas exposures this quarter?”*
- The system returns a chart, summary, or table instantly.

DATA ANALYSIS & REPORTING

Manual Reporting Slows Down EHS Teams

Limitations & Setup Requirements

- Data structure matters — fields must be clean, well-labeled, and consistent
- Column metadata (names, synonyms, and descriptions) help GenAI tools understand your data
- Tools may misinterpret poorly labeled data or return generic results without good context

How to Get Started

- Identify a BI tool with GenAI capabilities (e.g., Amazon Q for QuickSight, Tableau GPT, Power BI Copilot)
- Work with your BI or data team to:
  - Add field descriptions and synonyms
  - Map important tables to safety, compliance, and environmental domains
- Start small: practice asking simple questions and iterating from the answers

RISK ASSESSMENT

Reviewing incident or inspection data for potential hazards

The Problem

- EHS teams spend significant time manually reviewing incident reports, audits, and inspection notes.

How GenAI Can Help

- Scan large volumes of historical reports (PDFs, spreadsheets, notes) to detect recurring language, locations, or root causes
- Cluster similar incidents to uncover hidden trends or high-risk areas
- Summarize findings in plain language or generate visual summaries (e.g., “Top 3 contributing factors over last 12 months”)
- Flag outliers, anomalies, or new patterns that merit deeper review

Image generated using ChatGPT

RISK ASSESSMENT

Reviewing incident or inspection data for potential hazards

How to Get Started

- Select a Data Set
  → Safety incidents, near-misses, inspections, or audit logs
- Start Small
  → 6-12 months of data from a single site or region
- Use GenAI Tools for Pattern Recognition
  → ChatGPT (Pro), Claude / Perplexity AI

Future Potential

- Build a real-time risk monitoring tool using GenAI connected to your safety data pipeline
- Use AI outputs to inform preventive action plans or dynamic training programs

Image generated using ChatGPT

RISK ASSESSMENT

Reviewing incident or inspection data for potential hazards

Document Ingestion & Preprocessing

- PDFs, Word files, Excel sheets, and form entries.
- RAG (Retrieval-Augmented Generation) system to store, chunk, vector documents for use by an LLM.
- Handwritten documents can be used but require an extra OCR (Optical Character Recognition) step.

Embedding & Vector Store

- Turn text into high-dimensional vectors that capture semantic meaning.
- “all-MiniLM-L6-v2” and “text-embedding-3-small” are examples of embedding models.
- A vector store is like a semantic search engine behind your RAG system. It indexes and organizes metadata at scale.

Clustering & Trend Analysis

- Group similar incidents and uncover patterns across the data, not just in response to queries.
- K-Means or DBSCAN are examples of Clustering Algorithms.

Image generated using ChatGPT

WHAT IS YOUR BIGGEST CHALLENGE WHEN IT COMES TO USING AI?

Don’t know where to start / lack of expertise	49.3%
Data readiness and quality	13.1%
Regulatory concerns	8.0%
Privacy concerns	8.5%
Budget constraints	6.6%
Other	14.5%

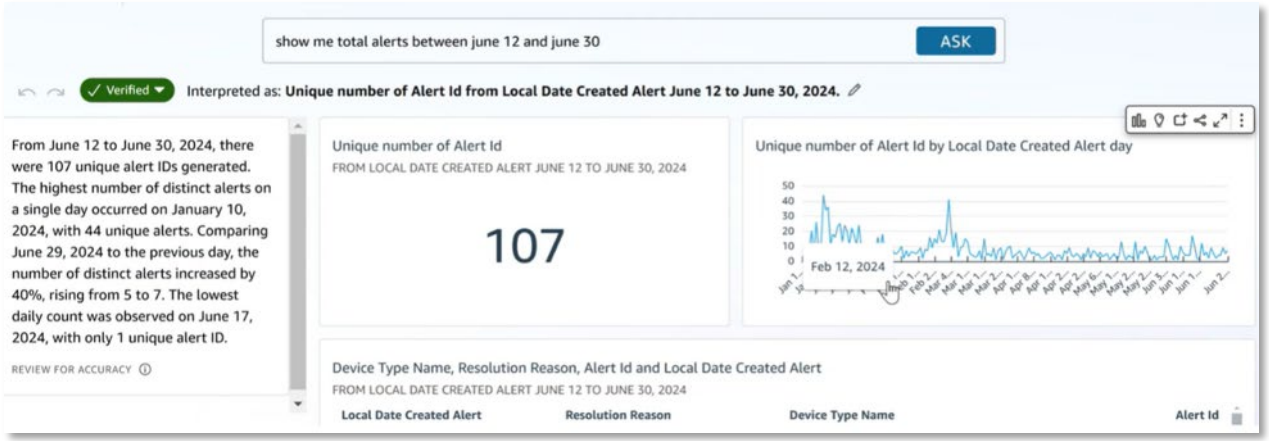

blacklinesafety
3
BLACKLINE SAFETY
AI PROJECTS
blacklinevision

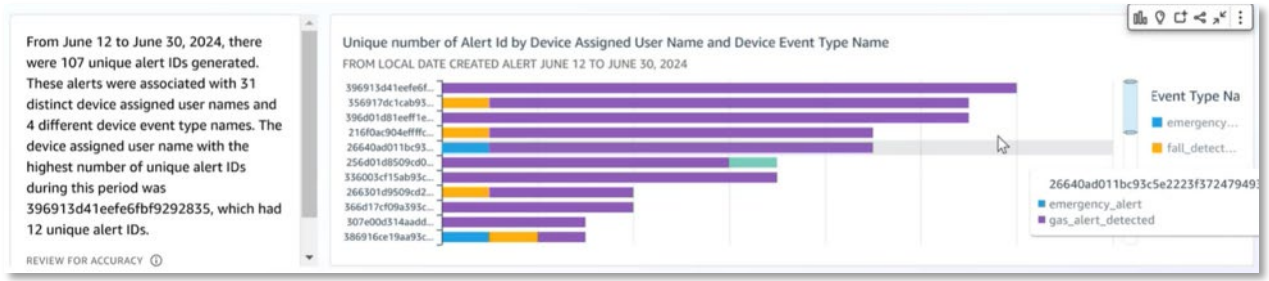
CUSTOM REPORTING

The Problem: Despite offering 15+ standard reports, customer needs are often unique—requiring custom, one-off report builds. Historically, this meant our team manually developed each request.

How We're Doing It

- Amazon Q for QuickSight (POC in partnership with AWS):
  - Enables free-form questions with automatic chart generation
  - Currently testing on anonymized data with guardrails
  - Evaluating suitability for external customer use
- Power BI Copilot (Internal Initiative):
  - Used to generate summaries, report narratives, and mirror Q functionality
  - Supports deeper integration with our current BI workflow





blacklinesafety

SENSOR FORECASTING

Improving the reliability and operational longevity of gas sensors

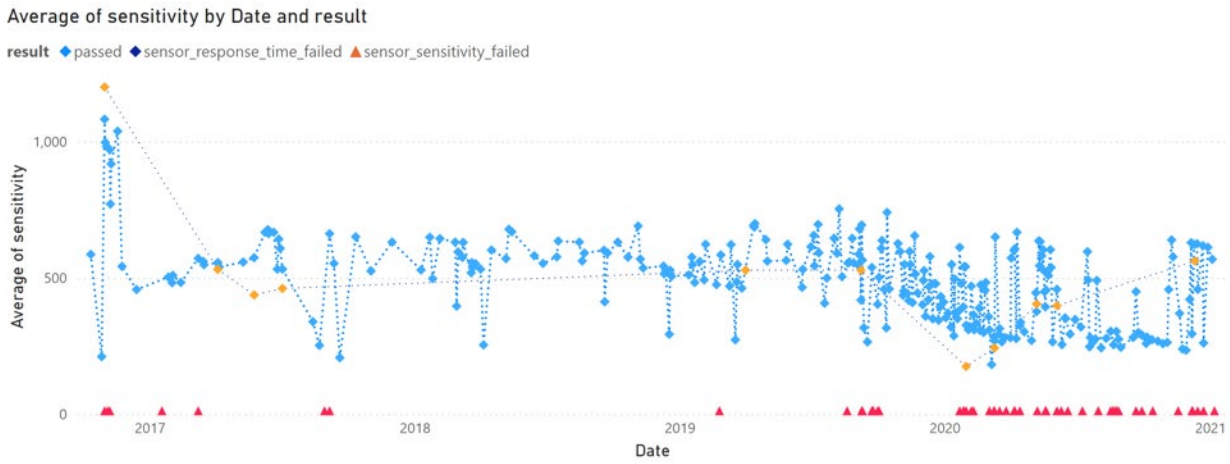
The Problem: Detecting environmental hazards relies on sensors that degrade over time due to environmental exposure and material wear.

Project Goals

- By developing a monitoring system that uses historical data on sensor performance and environmental conditions, we predict when a sensor will likely fail and require replacement.

Impact

- This proactive prediction is vital for assisting customers with efficient fleet management by ensuring the timely replacement of sensors and enhancing internal processes such as quality control, RMA (Return Merchandise Authorization) analysis, and warranty management.



blacklinesafety

PREDICTIVE RISK MITIGATION

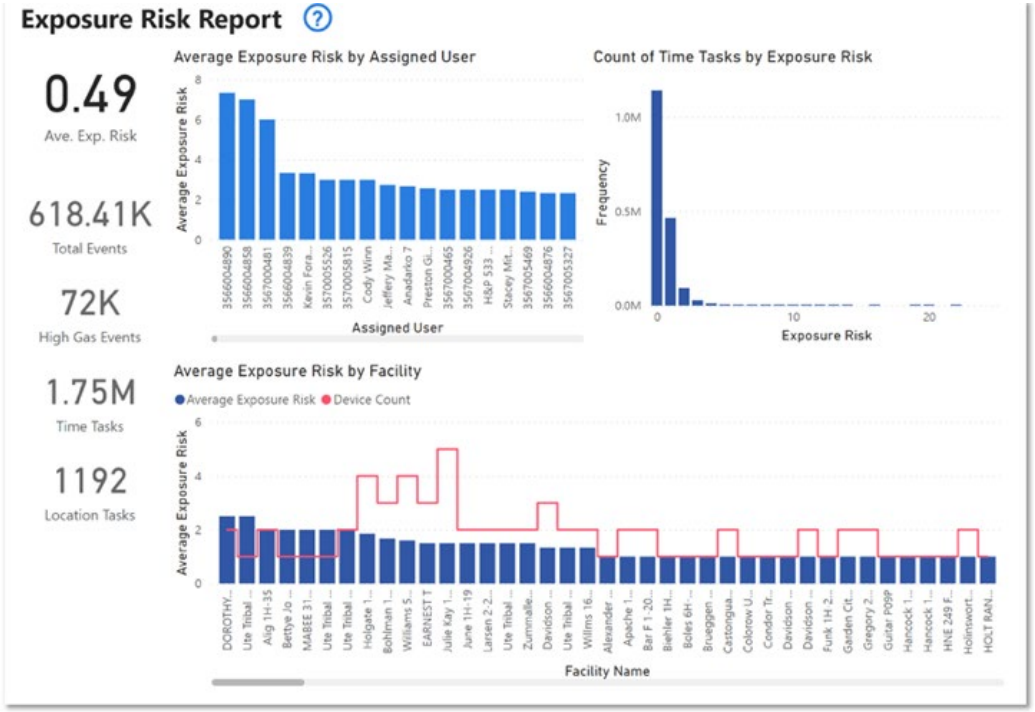
AI prediction to estimate the probability of a safety incident

partnership project

The Problem: Safety monitoring relies on reactive measures, often addressing hazards after an alert has already been triggered.

Project Goals
Shift to proactive safety management by predicting safety threats before they happen.

Develop a monitoring system that uses historical data on sensor performance and environmental conditions, to uncover patterns and risk indicators.



Blackline Safety uses anonymized data consisting of:

- ✓ Device logs
- ✓ Gas exposure logs
- ✓ Alerts and usage data
- ✓ Compliance records
- ✓ Pump testing and calibration data√

Impact: This collaboration surfaces novel relationships in the data that will lead to the development of new capabilities in our offering, enabling Blackline to deliver more predictive, proactive solutions to our customers.

blacklinesafety

blacklinesafety

KEY TAKEAWAYS

- Your **domain expertise** is the key
- Work with **partners** commercially available solutions
- **Start playing**! Gen AI has never been more accessible
- Practice your **prompt engineering** and iterate, iterate, iterate

READY TO LEARN MORE?

Contact us to discover how to unlock more value from your data.

blacklinesafety.com/analytics

blacklinesafety

Phil Benson

Vice President, Product

analytics@blacklinesafety.com