4th Annual

THE CONNECTED WORKER ENERGY

Leveraging Data Analytics and AI at Chevron Phillips Chemical to Streamline Operational Processes

Featuring insights from

Chevron Phillips Chemical's Chief Data & Analytics Officer, **Brent Railey**

In today's rapidly evolving technological landscape, dominated by Artificial Intelligence and Generative AI, companies are racing to boost productivity and increase efficiency. However, these advancements bring their own set of challenges and user experiences.

Chevron Phillips Chemical Company, a leader in the petrochemical industry, is currently at the forefront of redefining how technology supports its connected workforce. To learn more about how the company is leveraging AI and data analytics to optimize operations and empower its workforce, we spoke with **Chevron Phillips' Chief Data & Analytics Officer, Brent Railey**.

Having worked at Chevron Phillips for over 20 years in various domestic and international roles, Brent has played a pivotal role in forming the first Data Science Team. Before stepping into a leadership role, he implemented tools like Power BI and Seeq for time-series analytics and contributed to the company's digital transformation program, building and leading the data science team, whilst also supporting the formation of a data engineering team.

Read as he shares insights into the challenges and opportunities of deploying cutting-edge technologies like Generative AI, reinforcement leaning, and machine learning in a dynamic industrial setting.

Maryam Irfan, Connected Worker Series: **To start, can you tell us about your role as Chief Data & Analytics Officer at Chevron Phillips Chemical?**

Brent Railey: My role encompasses responsibilities in data science, data engineering, and business intelligence, including everything from Power BI to Databricks to Machine Learning (ML) and Artificial Intelligence (AI). Within Chevron Phillips Chemical, my specific role is to ensure that the teams are focused on high-value projects and to provide technical guidance.

A key part of this is also ensuring that we coordinate with the lines of business to identify opportunities where we can leverage the technologies in our stack. Another significant responsibility for our group is staying informed about where AI is headed. There are a lot of trends in the field; some are ephemeral, while others have more power and show long-term potential. Generative AI is a great example...

It is important to sift through the noise, identify enduring patterns and processes, and adopt those, rather than chasing new trends.

Maryam Irfan, Connected Worker Series: How has Chevron Phillips Chemical leveraged AI and data analytics to streamline operational processes? Can you provide specific examples of improvements in efficiency or productivity?

Brent Railey: From what I can share, one of our projects involves quality inference for our polyethylene production. Essentially, we're inferencing a key quality attribute at the furthest end of production for our polyethylene propellants. This helps our operations team determine whether the product is on spec so they can switch to an on-spec tank before lab results are available. This has significantly increased the volume of our on-spec product and has been incredibly valuable.

Although we've been running this project for a couple of years now, someone from the team recently asked us to add support for a new product we're now manufacturing on a particular reactor. That's a great signal to us that the system is still highly relevant and the site continues to rely on it and expand its use.

Another area where we've streamlined operations is the logistics for our rail yards. Instead of storing product in silos, we store it in rail cars, and we manage a massive rail fleet of 8,000 to 10,000 cars. Each day, we need to build outbound trains to fulfil orders, which requires a lot of switching and planning to organize the rail cars in the yard.

We've applied reinforcement learning techniques to accelerate the development of these switch plans. What used to take 30–45 minutes is now completed in seconds. The system generates a starter plan, and the team simply tweaks it as needed. This has been a huge time-saver and has made the process much more efficient.

Maryam Irfan, Connected Worker Series: What have been the major challenges so far, and how do you ensure successful integration, data quality, and worker adoption?

Brent Railey: We face a number of challenges...

1. Worker Adoption

It's important to work alongside end users and set clear expectations, especially at the beginning of a project. These systems don't often perform perfectly right out of the gate and setting the expectation that iterative feedback is crucial helps build trust and allows users to feel involved in improving the solution. Without that early collaboration, if the initial rollout doesn't work well, it can erode trust and make it harder to gain buy-in later. Involving users throughout the development process and setting realistic expectations are key to overcoming this challenge.

> **Educating leadership about the opportunities and value of these technologies is critical"**

2. Data Quality

This is something everyone struggles with. Data quality problems can arise from a host of different sources, such as incorrect data entry or, in manufacturing environments, issues with instrumentation. For instance, instrumentation outages, biases, and drifts can make it difficult to know when the data is reliable. One opportunity we see with Machine Learning is using correlated variables to cross-check instrumentation data, detect anomalies, and trigger maintenance requests.

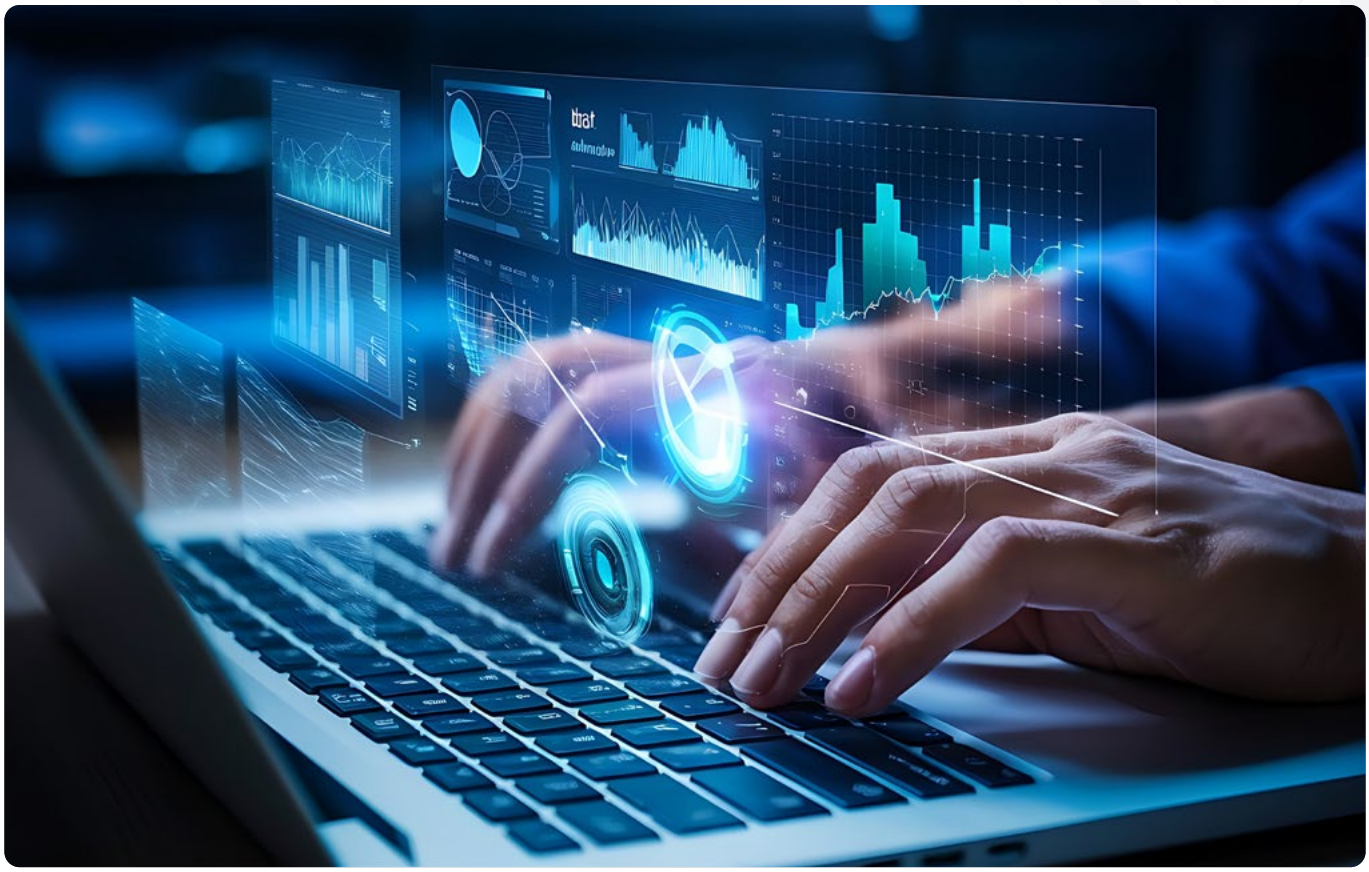
3. Leadership Buy-in

Support can fluctuate over time, so educating leadership about the opportunities and value of these technologies is critical. Helping them understand both the potential impact and the challenges of implementation can maintain alignment and support throughout the project lifecycle.

4. Evolving Technical Landscape

Particularly with Generative AI, the landscape is moving incredibly fast. While the ideas are exciting, there's a risk of building solutions that quickly become outdated if they're not architected with a long-term vision. This creates a tension between the fear of missing out (FOMO) and the accumulation of technical debt. In traditional software development, you might expect tech debt to surface over three to seven years. With AI—and especially Generative AI—it happens much faster. You need to anticipate how to replace components with newer, more reliable options and manage both your content and costs effectively.

Generative AI also exposes data governance challenges, particularly with unstructured data. Outside of a few tech companies, most organizations, including ours, struggle with managing unstructured data effectively. This is an area where companies need to improve to fully leverage the potential of these technologies.



Maryam Irfan, Connected Worker Series:

With multiple ongoing projects, how do you measure the ROI of your initiatives?

Brent Railey: When evaluating projects, we focus on a simple but effective framework: **cost versus value versus effort**. In other words, we consider how long it will take to implement, how much it will cost, and what value we expect to generate on the other side. It's a straightforward matrix!

The challenging part, particularly with Generative AI and productivity-focused projects, is that the value can often be difficult to quantify. For example, in cases like the logistics optimization in the rail yard and the quality inference system I mentioned earlier, we were able to tie clear dollar values to those projects. But some Generative AI use cases—like improving productivity—can have softer, less tangible value. That said, we do have a few generative AI projects tied to "hard-dollar" outcomes. For instance, we've reduced spending on outside service tasks by using AI to automate processes, effectively eliminating that expense when the project succeeds.

Another example is document processing. Instead of paying external teams to classify or review documents for specific projects, we're leveraging AI to handle those tasks. This allows us to reduce costs associated with manual work while maintaining efficiency.

Maryam Irfan:

What metrics do you track to assess their impact on both operational efficiency and the overall user experience?

Brent Railey: Regarding metrics to measure success, for operational efficiency we ask: *Does the project achieve its intended goals?* For instance, does it increase the amount of prime product we produce? Does it boost uptime? Does it reduce spending? We revisit and evaluate the results as best as we can, though in some cases measuring outcomes is easier than in others—like with the quality inference system, where the impact is clear.

For user experience, we track adoption and engagement with the tool. Are users logging in? How often are they using it? How much time are they spending with it? We rely on traditional software usage analytics to understand whether the tool is being effectively used and if it's making a meaningful difference for users.

> **We're leveraging AI to handle those tasksl"**

Maryam Irfan, Connected Worker Series:

Beyond immediate operational improvements, how do you see AI and data analytics delivering long-term value for Chevron Phillips Chemical, particularly in the connected worker space?

Brent Railey: Optimization is an area we're increasingly focused on, and we're seeing a lot of internal demand for help with these types of projects. Traditional machine learning models are generally more focused on inference and predictive analytics rather than prescriptive analytics, which is where optimization comes into play.

Prescriptive analytics involves stepping into the realm of optimization techniques, where models suggest specific decisions or actions. Approaches like reinforcement learning and genetic algorithms fall under this category, as they're designed to generate recommendations rather than just predictions. We see a growing need for these methods in the future. At the same time, we're also exploring hyperscaled classical optimization methods—where instead of relying on machine learning models, we leverage compute power for linear programming or other optimization techniques. Our team is becoming increasingly adept at blending these approaches to find the best solutions.

Another area we're focused on, particularly with the rise of Generative AI, is making information more accessible. One key element is isolating authoritative and valuable information so that it's easily accessible and trustworthy. For example, not everything on SharePoint is valuable, but some documents there are critical. Identifying and curating those important resources is essential for integrating them into systems where they can be effectively processed and made actionable.

From there, we can use AI tools, like language models to connect this curated information with enterprise applications. The goal is to make information not only easier to find but also seamlessly linkable. For example, if a user consults a chatbot about a policy, the system could direct them immediately to the relevant document and even the specific section within that document. This drastically reduces the time spent searching for information.

Right now, employees often spend several hours each week searching for the right information to solve problems. With better information management and integration of Generative AI, that time becomes unnecessary. The real value lies in reallocating their effort from searching for information to actually acting on it. In other words, the more we enable people to focus on solving problems rather than locating information, the more productive and impactful they can be.

Maryam Irfan,

Connected Worker Series: What are you most looking forward to at the Connected Worker Houston Summit?

Brent Railey: The talks and networking opportunities are what stand out to me. The Connected Worker Summit brings in people from really interesting places, and because the event spans multiple industries, it provides perspectives beyond the usual bubbles of chemicals or oil and gas. That broader perspective is one of the aspects I'm really looking forward to.

4th Annual

THE CONNECTED WORKER ENERGY

March 18-20, 2025
The Westin Galleria, Houston

Join us at The Connected Worker: Energy Summit

To learn more about data analytics technologies and the implementation of AI, join Brent and other industry leaders from Koch, Thermon Inc, and more at our upcoming Connected Worker: Energy Summit in Houston from March 18-20, 2025.

This year's Summit will have a strong focus on the oil and gas and utilities sector, offering real-time visibility into field and plant-critical activities. Walk away with exclusive insights on enhancing the ways frontline workers track, monitor, and collaborate on operational processes while improving accuracy, efficiency, and safety.

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Chief Data & Analytics Officer
Chevron Phillips Chemical

To learn more, ACCESS THE 2025 EVENT GUIDE HERE