dexcent

UNLOCKING OPERATIONAL INTELLIGENCE IN OIL & GAS:

HOW THE AVEVA PI SYSTEM POWERS SAFER, SMARTER PERFORMANCE

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CHAPTER 1

The Stakes Are Higher Than Ever

IN TODAY'S OIL AND GAS INDUSTRY,

THERE IS NO ROOM FOR GUESSWORK.

Pipelines stretch across nations. Assets operate in some of the harshest environments on Earth. And every pressure change, flow variance, or equipment hiccup could cost millions or trigger a regulatory nightmare.

To stay competitive, safe, and compliant, operators need more than good instincts and post-shift reports. They need real-time insight.

They need operational intelligence.

That's where the **AVEVA PI System** comes in.

Used by more than 75% of the world's top oil and gas firms, PI is the industry's most trusted data infrastructure for monitoring time-series data from thousands of sensors, devices, and systems.

But here's the truth: simply having the PI System doesn't guarantee better decisions.

We've seen it time and again: oil & gas companies invest in PI but underutilize it. They collect data, but don't contextualize it. They own the system, but don't operationalize the insight.

THE RESULT?

Teams continue firefighting, audits remain painful, and leadership questions the return on investment.

This eBook is your guide to changing that.

We'll walk you through:

- **The most common pitfalls oil & gas firms face with data**
- **How real-world companies are using PI to meet compliance, reduce downtime, and boost performance**
- **And most importantly, how Dexcent helps make it all work seamlessly and securely**

If you're tasked with improving reliability, safety, or regulatory readiness across upstream, midstream, or downstream operations, this isn't just a read; it's a roadmap.

Welcome to operational clarity. Let's begin.

CHAPTER 2

The Problem:

Data Without Direction

OIL AND GAS OPERATIONS ARE SOME OF THE

MOST DATA-INTENSIVE ENVIRONMENTS IN THE WORLD.

Every second, thousands of sensors across compressor stations, pipelines, tanks, and wellheads capture temperatures, pressures, vibrations, and flow rates. Every system (SCADA, DCS, PLCs, historians) is a stream. And together, they form a flood.

But here's the uncomfortable truth: **Most of that data goes unused.**

The Illusion of Insight

You have the AVEVA PI System. You're collecting the right data. So why do field teams still chase alarms? Why is your compliance team scrambling at audit time? Why are asset failures still catching everyone off guard?

The problem isn't data, it's direction.

Here's what we see in oil & gas companies every day:

- **Siloed systems, scattered insight:** SCADA lives in one system, ERP in another, CMMS somewhere else. There's no unified view—just fragmented data and misaligned decisions.
- **Underutilized Asset Framework (AF):** Without context (hierarchies, templates, and relationships), data remains raw and reactive.
- **No real-time visibility:** Operators don't see leading indicators, just lagging results. Control rooms become response centers instead of foresight engines.
- **Compliance panic:** Reporting to regulators requires stitching together datasets manually. This is often slow, risky, and error-prone.
- **Leadership frustration:** Executives ask, "We invested in PI... where's the value?"

Without Context, Data Is Just Noise

The AVEVA PI System is an incredibly powerful platform, but like any tool, its value depends on how it's wielded.

- **Without well-structured AF models, your compressors, separators, and pumps are just tags, not assets.**
- **Without real-time calculations, your risk metrics are stale.**
- **Without purpose-built dashboards, your team is left in the dark.**

The result? Missed KPIs. Delayed decisions. Reactive maintenance. All while the data you need is sitting in your system: unseen, untrusted, and unused.

This Isn't a Technology Problem; It's a Design Problem

The challenge isn't that the PI System doesn't work. It's that it hasn't been implemented and optimized around your specific needs: your operations, your assets, your teams.

AND THAT'S WHERE DEXCENT COMES IN.

CHAPTER 3

The Guide:

How Dexcent Helps You Win with PI

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IF YOU'RE READING THIS,

YOU ALREADY KNOW THAT DATA IS THE LIFEBLOOD OF MODERN OIL & GAS OPERATIONS.

But having the data and harnessing its power are two very different things. That's where Dexcent steps in, not as a vendor, but as a guide.

We don't just install systems. We help teams unlock intelligence, from the sensor to the boardroom.

WE UNDERSTAND THE PRESSURE YOU'RE UNDER

Whether you operate upstream, midstream, or downstream, the challenges are real, and they're not going away:

- Aging infrastructure with high asset criticality
- Stringent compliance demands from regulators like the AER, EPA, PHMSA, OSHA, and others
- Complex SCADA, DCS, and historian environments that don't talk to each other
- Unrelenting pressure to reduce downtime without compromising safety or reliability

We understand the stakes. And more importantly, we know how to help you solve them.

WHAT DEXCENT BRINGS TO THE TABLE

- **Strategic Architecture**

  We help you architect your PI System for maximum resilience, scalability, and performance, whether on-prem, hybrid, or cloud.

- **Asset Framework Mastery**

  AF is the brain of the PI System. We design intelligent, reusable templates and hierarchies that bring context to every data stream, so you can focus on insight, not tag names.

- **Real-Time Analytics That Matter**

  We don't just set up calculations, we design analytics tied to your actual business goals: compressor efficiency, flow assurance, pressure anomalies, and environmental compliance.

- **Integrated Ecosystems**

  Need to bridge SCADA, ERP, and enterprise reporting tools like Power BI? Dexcent makes integration seamless, secure, and meaningful.

- **Human-Centred Dashboards**

  From operators in the control room to executives in HQ, we build dashboards that drive decisions, not just data dumps.

- **Ongoing Support & Training**

  You don't just get a one-time project; you get a partner. We provide documentation, hands-on training, and proactive support to ensure your system evolves with your needs.

WE'RE OT SPECIALISTS WHO UNDERSTAND THE ENTERPRISE CONTEXT

Dexcent is built by and for engineers.

We understand the realities of field operations, control systems, and safety-critical environments. But we also know that operational data doesn't live in isolation; it fuels decisions across the business.

Our strength is in making PI work where it matters most: in real-time, in the field, and in the control room.

We don't just configure systems. We empower operations teams to extract value every day.

You already have the PI System. Partnering with Dexcent ensures it becomes what it was always meant to be: **your operational intelligence engine.**

CHAPTER 4

Real Use Case:

Pipeline Monitoring for Compliance

COMPLIANCE IN OIL AND GAS ISN'T OPTIONAL

IT'S MISSION-CRITICAL

Whether you're producing, transporting, or refining hydrocarbons, your operations are under the microscope. Regulatory bodies like the **Canadian Energy Regulator (CER), PHMSA, FERC, EPA, OSHA,** and provincial or state energy commissions demand precise, timely, and auditable data.

Meeting these expectations isn't just about staying compliant; it's about avoiding costly shutdowns, penalties, and reputational risk.

That's why leading operators turn to the **AVEVA PI System.** It creates a single source of truth for real-time, regulatory-grade operational intelligence.

THE CHALLENGE:
TOO MUCH DATA, NOT ENOUGH VISIBILITY

One North American pipeline operator was collecting pressure, flow, and temperature data across a vast transmission network. Despite having the right sensors, they lacked a unified view.

- **Incident detection was slow and often reactive.**
- **Regulatory reports took days to compile manually.**
- **Compliance risks kept leadership on edge.**

They needed to move from data collection to **situational awareness.**

THE SOLUTION:

REAL-TIME MONITORING VIA THE PI SYSTEM

The operator deployed the AVEVA PI System to serve as a centralized data infrastructure. This enabled them to:

- **Stream real-time sensor data into a single environment**
- **Set up alerts for pressure anomalies and threshold breaches**
- **Use PI Vision to create dashboards for pipeline controllers**
- **Automate data aggregation for CER audit readiness**

The result? Faster operational decisions. Simplified compliance workflows. Confidence in both the control room and the boardroom.

WHAT THIS MEANS FOR YOU (WITH DEXCENT AT THE HELM)

Implementing the PI System is one thing. Designing it to meet regulatory, operational, and business needs is another. Here's how Dexcent ensures that pipeline operators like you get it right:

☑ **AF modelling tailored to pipeline assets**

We build reusable asset templates for compressors, valves, and line segments, so your structure reflects how your pipeline operates.

☑ **Configurable alerts and compliance calculations**

We help configure the exact metrics regulators care about, like pressure over time, rate-of-change thresholds, and volume balance checks.

☑ **PI Vision dashboards that support audits and daily operations**

Whether it's a controller scanning for issues or a compliance officer preparing reports, we make sure the right person sees the right data at the right time.

☑ **Data integrity and security alignment**

From failover to cybersecurity, we help architect your PI infrastructure to align with industry best practices and regulatory expectations.

This real-world example proves what's possible. With Dexcent guiding the design, deployment, or optimization of your PI System, **you're not just meeting compliance, you're mastering it.**

CHAPTER 5

Beyond Compliance:
Predictive Operations

MEETING COMPLIANCE REQUIREMENTS IS CRITICAL.

But for forward-looking oil and gas leaders, compliance is just the beginning. The true value of the AVEVA PI System emerges when it becomes a platform not just for monitoring, but for anticipating.

THE SHIFT:
FROM FIREFIGHTING TO FORESIGHT

In traditional operations, teams respond after the alarm sounds. But what if you could detect the conditions that cause alarms before they happen?

This is where the PI System, especially when paired with **Asset Framework (AF) and PI Analytics,** becomes a game-changer. With the right design and implementation, your PI System can:

- **Spot anomalies in equipment behaviour before they escalate**
- **Trigger predictive maintenance work orders**
- **Reduce catastrophic failures and extend asset life**
- **Optimize performance based on real-time trends**

A REAL-WORLD SCENARIO:
COMPRESSOR STATIONS

Compressor stations are essential and expensive. Monitoring vibration, suction/discharge pressure, and motor amperage can signal early signs of degradation.

Using the PI System, one oil and gas firm configured AF templates for each compressor model. They then created analytics to calculate:

- **Operating envelope breaches**
- **Rate-of-change in bearing temperature**
- **Energy efficiency (kWh per unit volume)**

When certain thresholds were crossed, maintenance teams were notified automatically, days before the issue would have triggered downtime.

The Outcome: 15% reduction in unscheduled compressor outages. Fewer emergency callouts. More uptime. Lower risk.

WHAT DEXCENT ADDS TO THE EQUATION

Predictive analytics with PI is powerful, but only when designed with domain expertise and operational alignment.

Dexcent ensures you:

- ☑ **Build the right models for your assets**

  We help structure your AF hierarchy to reflect your real-world systems such as compressors, separators, tanks, and more.

- ☑ **Define the right calculations**

  From leading indicators to performance KPIs, we co-create the logic with your SMEs and engineering teams.

- ☑ **Validate, test, and tune**

  Our iterative approach ensures that your analytics produce trusted insights, not noise.

- ☑ **Operationalize the insights**

  We don't stop at setup. We help embed insights into your maintenance workflows, notifications, and even ERP integrations.

FROM REACTIVE TO RELIABLE

When predictive operations are in place, your teams don't just prevent downtime, they plan with confidence. They focus on high-value activities instead of chasing the latest alarm.

With Dexcent guiding your journey, the PI System becomes more than a data collector.

IT BECOMES
AN EARLY WARNING SYSTEM.
A PERFORMANCE TUNER.
A SILENT PARTNER IN EVERY DECISION.

CHAPTER 6

Integrate or Fall Behind

OIL AND GAS COMPANIES DON'T SUFFER FROM A LACK OF SYSTEMS.

THEY SUFFER FROM A LACK OF INTEGRATION.

You've got SCADA for real-time control.

ERP for business planning.

CMMS for maintenance.

Excel for... everything else.

Each system is powerful, but when they don't talk to each other, critical decisions are delayed, duplicated, or downright dangerous.

THE HIDDEN COST OF DATA SILOS

(Read Gold in the Silos: Unlocking Stranded value from Legacy & Disparate OT Data Sources in Oil & Gas for more on this.)

Let's say a pressure drop is detected by SCADA. That data gets stored in PI, but it's not connected to the maintenance schedule in SAP. Field technicians aren't alerted. And by the time someone notices the issue, it's a leak. Or worse. Multiply that across dozens of assets and dozens of sites, and it's easy to see why siloed data leads to:

- **Slow response times**
- **Misaligned teams**
- **Missed opportunities**
- **Increased risk and cost**

THE PI SYSTEM AS AN INTEGRATION HUB

One of PI's most powerful, often overlooked features is its ability to act as a central nervous system, connecting disparate OT and business systems.

In the hands of the right integrator, PI becomes the connective tissue between real-time operations and the broader digital enterprise.

It ingests high-fidelity data from sources like:

- **SCADA, DCS, and PLC systems**
- **IoT gateways and edge devices**

And it contextualizes that data to align with:

- **CMMS platforms (e.g., IBM Maximo, SAP PM)**
- **ERP systems (e.g., SAP, Oracle)**
- **Cloud analytics and BI tools (e.g., Azure, AWS, Power BI)**

The result is a **"single version of operational truth"**—highly trusted data, consistently modeled, and accessible across engineering, maintenance, and business teams.

REAL-WORLD IMPACT:

SCADA + PI + ERP

One operator integrated SCADA and PI with SAP maintenance. The PI System calculated asset health scores, and when a critical threshold was breached, it automatically created a work order in SAP.

The Outcome: Reduced maintenance backlog by **20%. Fewer manual steps. Faster repairs. Better resource allocation.**

HOW DEXCENT MAKES INTEGRATION WORK

System integration isn't just about APIs and connectors; it's about meaningful architecture.

Here's how Dexcent delivers:

- ☑ **End-to-end architecture**

  We design integrations that work with your existing systems and security posture - no rip and replace.

- ☑ **Secure, scalable data pipelines**

  From edge to cloud, we ensure performance, encryption, and high availability.

- ☑ **Semantic modelling**

  We don't just move data. We structure it with context so your teams can act on it.

- ☑ **Cross-functional alignment**

  We bring OT, engineering, and IT (where required) to the table, ensuring everyone's needs are reflected in the design.

INTEGRATION ISN'T OPTIONAL ANYMORE

The leaders in oil and gas are building interconnected operations that adapt in real time. If your systems are still siloed, your organization is flying blind while others navigate with precision.

Let Dexcent help you build the operational nervous system your future demands.

CHAPTER 7

The Plan:

What Working with Dexcent Looks Like

BY NOW, YOU KNOW WHAT'S POSSIBLE

WITH THE AVEVA PI SYSTEM.

You've seen how real-time monitoring, predictive analytics, and system integration can unlock smarter, safer, more efficient operations.

But you might still be asking: **"How do we actually get there?"**

That's where Dexcent's process comes in.

We don't offer generic consulting or plug-and-play templates. We offer a clear, guided path from wherever you are today to where your operations need to be tomorrow.

Here's how it works:

STEP 1:

DISCOVERY & HEALTH CHECK

We start by understanding your current state:

- **What systems are in place?**
- **What data are you collecting and missing?**
- **What use cases matter most to your teams?**

We'll evaluate your PI architecture, Asset Framework, calculations, alerts, and dashboards.

Then we benchmark performance and identify quick wins and long-term opportunities.

Deliverable: A comprehensive PI System Health Report and roadmap aligned to your goals.

STEP 2:

SOLUTION DESIGN & ARCHITECTURE

We co-design a solution that reflects your operational realities:

- **AF templates that match your physical assets**
- **Calculations that reflect your KPIs**
- **Alerting strategies that prioritize the right thresholds**
- **Integration points for ERP, CMMS, SCADA, and cloud**

Every design decision is grounded in your workflow, safety requirements, and performance targets.

The Value: A blueprint you can execute with confidence, knowing it's been engineered for your context.

STEP 3:

IMPLEMENTATION & ROLLOUT

With the design approved, we go hands-on:

- Building or restructuring your AF models
- Developing calculations and analytics
- Creating dashboards in PI Vision or third-party tools
- Testing everything in a secure staging environment

We follow agile principles, releasing in phases so your teams can start seeing value early and often.

Support: We work side-by-side with your teams. You're never left wondering what's next.

STEP 4:

ENABLEMENT & TRAINING

The best system in the world is useless if your people don't use it. That's why we deliver tailored training for every role: from field operators to analysts to engineering leads.

We also provide:

- SOP documentation
- Training videos
- On-call support during rollout

Goal: Build internal confidence so your teams can own the system long after we leave.

STEP 5:

OPTIMIZATION & GROWTH

Your needs will evolve, and so should your PI System. We offer post-project optimization services to:

- Refine calculations based on live feedback
- Tune alerts for relevance
- Extend to new assets or sites
- Enable cloud analytics and dashboards

Outcome: A living system that grows with you and continues to deliver value quarter after quarter.

With Dexcent, transformation doesn't mean disruption. It means STRUCTURE. CONFIDENCE. AND RESULTS.

CHAPTER 8

What Transformation Looks Like in the Real World

WHEN WE TALK ABOUT UNLOCKING OPERATIONAL INTELLIGENCE,
IT CAN SOUND ABSTRACT.

But for oil and gas operators across upstream, midstream, and downstream environments, the value of a well-architected PI System is both tangible and proven. The following real-world snapshots highlight what's possible when industrial data is converted into actionable insight.

UPSTREAM: PREDICTIVE MAINTENANCE THAT PAYS OFF

A study by the U.S. Department of Energy found that organizations implementing predictive maintenance can achieve up to a 30% reduction in maintenance costs, a 45% reduction in unplanned downtime, and a 70% reduction in equipment breakdowns. These benefits do not require additional manpower or maintenance frequency. Instead, they result from better data use, especially real-time anomaly detection powered by technologies like the AVEVA PI System.

In upstream oil and gas operations, which depend heavily on compressors, pumps, and rotating assets, the ability to detect early signs of failure can prevent catastrophic outages and reduce overall maintenance spending.

The study also revealed that 82% of equipment failures are random, not related to age or service time. This undermines traditional scheduled maintenance approaches and highlights the value of analytics that identify emerging issues based on asset behavior.

Source:

U.S. Department of Energy - O&M Best Practices Guide

(see Chapter 5.3 Predictive Maintenance, p. 5.21)

MIDSTREAM: DOWNTIME REDUCED, MILLIONS SAVED

Petronas, one of the world's largest integrated oil and gas companies, reported $33 million in avoided downtime as a result of its investments in digital operations. The result was shared publicly in AVEVA's 2024 Industrial Intelligence Summit presentation.

Although full technical details were not disclosed, Petronas's outcome reflects the power of using real-time operational data to improve visibility, optimize performance, and reduce unplanned interruptions across midstream assets.

By using their AVEVA PI System infrastructure more effectively, Petronas was able to gain better situational awareness and faster response times, leading to measurable financial outcomes.

Source:

AVEVA Industrial Intelligence Summit 2024 – Slide 28 (Image)

DOWNSTREAM: MAKING DOWNTIME VISIBLE AND ACTIONABLE

In downstream environments such as refineries and chemical processing plants, the cost of unplanned downtime is high. Early adopters using PI System Asset Framework and Analytics tools have reported reductions in equipment downtime ranging from 15% to 50%. These improvements are often achieved by using existing sensor data more effectively, not by adding new hardware.

Operators and engineers were able to detect patterns, set proactive alerts, and visualize performance in ways that aligned decisions across units and departments. Instead of reacting to failures, teams could anticipate them and respond with speed and precision.

These benefits are part of the broader trend toward standardizing operational KPIs, reducing variability, and empowering plant personnel with better visibility into asset health.

Source:

AVEVA Industrial Intelligence Summit 2024 – Presentation (PDF)

WHY THESE EXAMPLES MATTER

These examples illustrate how companies across all segments of the oil and gas industry can leverage the AVEVA PI System to generate measurable returns. Whether the goal is reliability, visibility, safety, or cost control, the common factor is data—and the ability to extract meaning from it in real time.

But the outcomes are only possible when the PI System is strategically aligned with operational and business objectives. Success depends on clarity, domain knowledge, and a plan for maturity.

CHAPTER 9

Conclusion

The Opportunity Is Now

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THE OIL AND GAS INDUSTRY IS

CHANGING FAST.

Margins are tight. Safety and compliance pressures are growing. And the companies thriving in this environment are the ones making data work for them, not the other way around.

If you have the AVEVA PI System, you already own the technology trusted by 75% of the world's leading oil and gas operators.

But ownership isn't enough.

Operational intelligence only emerges when that system is intentionally designed, rigorously maintained, and strategically aligned.

That's what Dexcent delivers.

YOU'VE SEEN WHAT'S POSSIBLE:

- ☑ **Real-time monitoring** that keeps control rooms focused and fast
- ☑ **Predictive analytics** that reduce downtime and extend asset life
- ☑ **Seamless integration** between OT systems and enterprise tools
- ☑ **Compliance workflows** that are built-in, not bolted on
- ☑ **Teams that trust the data...and use it to lead**

DON'T WAIT FOR THE

NEXT INCIDENT OR AUDIT TO ACT

The opportunity is here:

- **To stop firefighting and start forecasting.**
- **To shift from tag management to strategic intelligence.**
- **To make your PI System the engine of your operational advantage.**

LET'S TALK ABOUT WHAT'S POSSIBLE

Not sure if your PI System is truly performing at its best?
Book a quick, no-pressure meeting with one of our PI specialists. We'll discuss your current setup, key goals, and outline practical next steps, so you can start turning data into decisions that matter.

BOOK A MEETING WITH A PI SPECIALIST

YOUR DATA HOLDS THE ANSWERS. DEXCENT HELPS YOU UNLOCK THEM.

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