

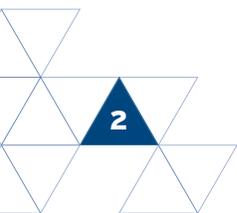
# THE NEW WORLD OF WELL FILE RECORDS MANAGEMENT

HOW UNCONVENTIONAL  
DRILLING IS DRIVING CHANGE

WHITE PAPER

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## EXECUTIVE OVERVIEW

The past decade has seen a dramatic evolution in the Exploration and Production (E&P) segment of the Oil and Gas industry, particularly with the advent of unconventional drilling. The emergence of new drilling technologies has enabled the profitable recovery of oil and gas from fields previously thought to have little value. This evolution is changing the fundamental business model, increasing data volumes, and demanding rapid access to a broad variety of information for swift decision making. Organizations that leverage better information technologies and tools focused on well file management, not only improve their oil and gas records management, but also gain additional revenue and contribution to the bottom line.

U.S. Energy Information Administration's (EIA) *Annual Energy Outlook 2013* projects U.S. natural gas production to increase from 23.0 trillion cubic feet in 2011 to 33.1 trillion cubic feet in 2040, a 44 percent increase. This is mostly due to projected growth in shale gas production<sup>1</sup>. Getting unconventional resources, such as shale gas, out of the ground requires technologies that include directional drilling and hydraulic fracturing. These technologies are being utilized as a way to increase oil production from some conventional oil reservoirs where recovery has been low or slowed. All of this is creating a 'new world' of opportunity while

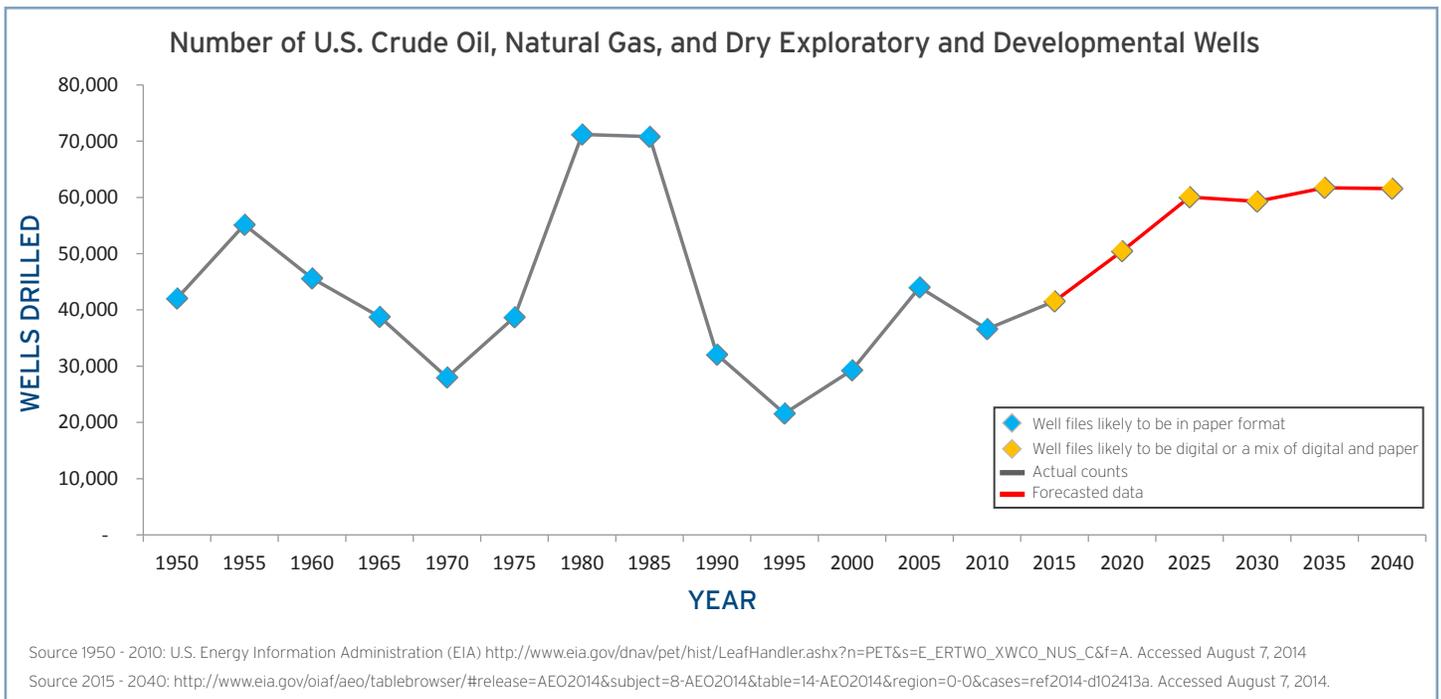
it drives high value for existing field assets and subsurface data, including structured data, spatial data, and unstructured data in the form of legacy records and information.

The continued pace of technological advances promises to sustain the life of unconventional drilling for decades to come. The CEO of one leading energy company has said that the shale gas "revolution" in this country is only just beginning and should have several decades left of successful energy production. "What people are learning is we've only scratched the surface on what technology can do to improve that outlook over the years. We're in the first inning of a nine-inning [baseball] game on the shale revolution in the United States."<sup>2</sup>

In combination with the unprecedented aging of the workforce and their eminent retirement, unconventional drilling is introducing new challenges, demanding new approaches and redefining E&P business requirements.

Today's E&P business requirements for unconventional exploration include:

- » Increasing revenue through process-based efficiencies
- » Supporting a 'well factory' business model
- » Capturing Upstream 'institutional knowledge' and legacy data before aging workforce leads 'The Big Crew Change'



<sup>1</sup> [http://www.eia.gov/energy\\_in\\_brief/article/about\\_shale\\_gas.cfm](http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm). Accessed April 21, 2014.

<sup>2</sup> ConocoPhillips CEO says shale boom is only in the "first inning;" Houston Business Journal; February 21, 2014.

[http://www.bizjournals.com/houston/morning\\_call/2014/02/conocophillips-ceo-says-shale-boom-is-only-in-the.html?page=all](http://www.bizjournals.com/houston/morning_call/2014/02/conocophillips-ceo-says-shale-boom-is-only-in-the.html?page=all). Accessed 3/24, 2014



**PROCESS-BASED EFFICIENCIES AND THE 'WELL FACTORY' BUSINESS MODEL**

The 'Well Factory' approach integrates the rig, well-site technology and a 24/7 remote operations monitoring center staffed by engineers using real-time data. The process brings to the oil and gas drilling industry the kind of factory, or automated, approach used in the automotive and aviation industries.<sup>3</sup>

A significant challenge with unconventional drilling, and one not yet well understood, is the precipitous decline in production during the first year – often considered to be as much as 60 to 70 percent. This drives the need to drill more wells in order to maintain production. There is little time to build a support infrastructure in this fast paced environment, particularly given the very large and often remote areas of operations. Factory style project logistics and supply methodologies emerge to fill the gap. The table below summarizes a few key differences between traditional, 'vertical,' offshore drilling and unconventional onshore drilling.

The 'Well Factory' model creates a complex ecosystem characterized by a plethora of decision makers and workers who are, almost simultaneously, taking action to implement decisions spread across a multitude of service providers. Engineers and corporate staff create the well design and drilling schedules while regulatory personnel obtain and manage permits. Then onsite drilling teams, including company staff and service providers, perform operations tasks that generate data from the equipment, samples, and hand-written notes. Completion teams create similar sets of data and logistics teams generate data about material leaving the well. The production teams include office-based engineers who plan the response to problems or unexpected issues that arise. With the number of independent, yet interrelated teams who are quickly making decisions and taking actions that influence the outcome of what others are doing – and ultimately the economics of the asset – it's no surprise how important and vital it is for all authorized individuals to have access to data when they need it most. Mistakes are costly. Speed and accuracy are critical. Good outcomes are data driven and the data needs to be quickly and easily accessible.

OFFSHORE	UNCONVENTIONAL ONSHORE
Lifecycle from exploration to production is years	Lifecycle from exploration to production is weeks to months
Small number of wells	Large number of wells – actively drilled simultaneously
Concentrated data collection – large scale systems with relatively small number of systems and service providers per well	Many and varied data sources – multiple wells with many simultaneous service providers per well

<sup>3</sup><http://www.drillingcontractor.org/factory-drilling-approach-seeks-to-guarantee-optimum-outcome-each-and-every-time-11515>. Accessed April 15, 2014.



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“What and where is everything that we know about this well, and all that is related to it?”

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## CAPTURING UPSTREAM ‘INSTITUTIONAL KNOWLEDGE’ FROM AN AGING WORKFORCE

The technological advances in drilling have created a ‘new world’ of opportunity for existing field assets by creating high value for existing subsurface data as well as all varieties of legacy records and information related to existing wells and land. All of this is happening while institutional knowledge of these assets and records are about to ‘walk out the door.’

The average age of workers in E&P companies is 50 years old, among the oldest of any industry. One survey predicts that 22,000 geoscientists and engineers will leave the oil business in just the next three years, mostly for retirement.<sup>4</sup> Dr. Pierce Riemer of the World Petroleum Council points out that 40 to 60 percent of aging employees will retire within the next five years, mostly geoscientists and petroleum engineers and [if nothing changes] “there will not be enough experienced employees to continue with the major E&P projects.”<sup>5</sup> This is a clear call-to-action for E&P companies to capture Upstream ‘institutional knowledge’ and protect, preserve and make available legacy information before the aging workforce leads ‘The Big Crew Change.’

## INFORMATION GOVERNANCE CHALLENGES OF WELL FILE MANAGEMENT: IT’S ABOUT ‘CONNECTING THE DOTS’

Thorough and rapid decision making, like process optimization, is data driven. The goal of well file management modernization is to improve the quality/ value and accessibility of available information for quick and secure decision making by a virtual web of data and information producers, collectors, and users in numbers never before seen.

These challenges include:

- » Answering the question: What and where is everything that we know about this well, and all that is related to it?
- » Integrating well information – both historical and current – that resides in many disconnected repositories of structured, unstructured, and spatial content.
- » Providing near real-time updates and access to critical well information, to both the office and the field, for rapid decision making.
- » Misjudgments and mistakes are very costly. It is apparent that a new way to manage well files and related records – one that ‘connects the dots’ – is vital to the oil/gas companies.

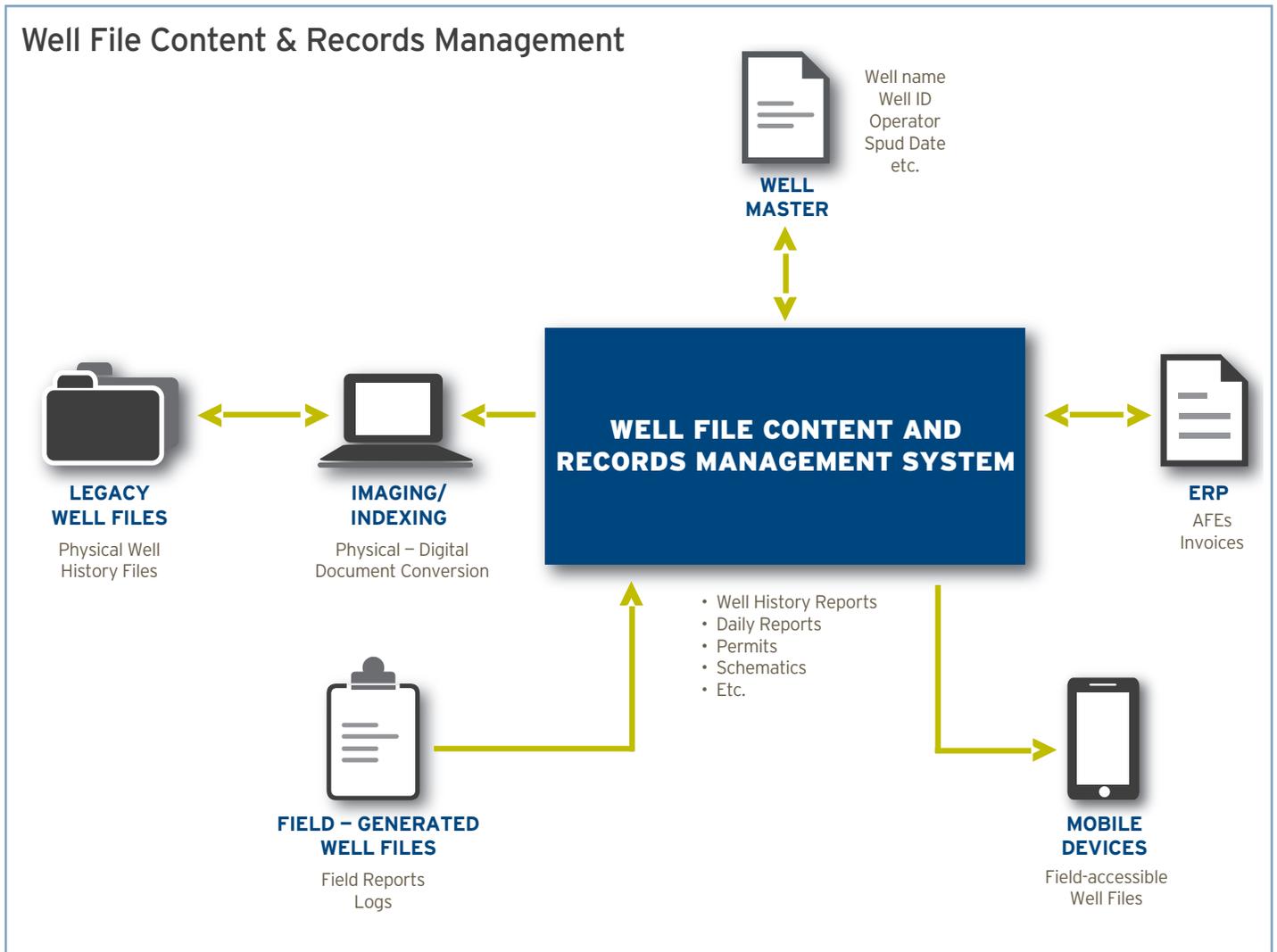
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<sup>4</sup>Booming Oil Industry Struggles To Fill Jobs. <http://www.npr.org/2012/05/09/152366886/booming-oil-industry-struggles-to-fill-jobs>. Accessed April 26, 2014.

<sup>5</sup>The Oil & Gas Industry On The Edge of a Demographic Cliff <http://www.world-petroleum.org/docs/docs/speeches/wpc%20Presentation%20the%20Aging%20Workforce%202.swf>. Accessed April 26, 2014.



## Well File Content & Records Management



### FOUR PILLARS OF ELECTRONIC WELL FILE MANAGEMENT

#### 1. A Single Point of Access

Good decisions require accurate data. Therefore, it is vital to E&P organizations to have a single unified system where all data and information can be used by all authorized decision makers. A synchronized data source provides consistent and easy access for all relevant data along with a significant competitive advantage in well file management. The objective is to have a single view of the well with accurate, up-to-date information as well as access to historic well files and data, which have been verified, uploaded, and classified by the data owners and accessible to all authorized users. Thus, answering the question “What and where is everything that we know about this well, and all that is related to it?”

#### 2. Integration of spatial and structured data with unstructured or other data residing in other systems

In order to achieve the goal of a single view for all well information, the solution must integrate unstructured well files with structured and spatial data. Well files become much more usable when labeled with well header information, top and bottom hole locations, and other structured data. Integration with structured databases is equally important, enabling auto-classification and minimizing user tagging.

Tags or metadata allow for well files to be searched, filtered, and sorted based on key items like field, well status, or spud date. Location tags enable map-based viewing and filtering of wells, along with other relevant data such as leases. Using this approach, two categories of tags are associated with each well file: tags describing the well file (e. g. the type of content in the file and the date that it was created) and tags associated with

the well (e.g. the name(s) of the well – API, accounting ID, lease name, etc., the operator and some of the well header information).

The benefits of integration are amplified when well files are linked to related data in the Enterprise Resource Planning (ERP) and financial systems. Many operators are able to streamline and track the Authorization for Expenditure (AFE) package approval process (expenditure authorization to prepare for the well or drill it) by linking data in the financial system to the AFE documents and also provide visibility to the invoices that have been processed against it. This allows for the ability to rapidly view actual costs compared to estimated costs as drilling progresses.

### **3. Access to well files from anywhere**

Providing workers with mobile access to electronic well files is a powerful adjunct that enhances critical and prompt decision making. Teams of experts, regardless of location, can quickly and efficiently collaborate on decisions ranging from exploration and re-exploration to designing a solution to resolve an unanticipated problem at a well site. With cloud-based solutions, individuals no longer need to be tethered to a desk with centralized database access in order to make data driven decisions based on near real-time information. Automated uploading and classification of well files generated in the field each day during the drilling process means information is almost immediately available to all who need it. Combining the same cloud computing infrastructure with mobile devices ensures decision makers and workers have access to well files regardless of their location.

### **4. Unified access to historic and current well information**

In the new world of well file management, 'everything old is new again' and with renewed interest in previously-explored fields, historical data has increased value. Most companies have a large number of physical records that make up the well file history. These include paper and seismic records as well as core and cuttings, on-premises or offsite. Many of these records were thought to have little residual value and lack adequate indexing, classification and metadata. Modernizing your well file management system to include a single interface where information about the well can be easily accessed, regardless of format or repository, increases the value and availability of information for secure and quick decision making.

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## SUMMARY

Unconventional drilling and the associated proliferation of new technologies are profoundly affecting the E&P segment of the Oil and Gas industry. It's driving change in the fundamental business model that demands rapid access to a broad variety of records and information for fast decision making. Organizations that use this opportunity to modernize their well file management will unlock and increase the value of their existing records as well as the quality and speed of decision making, and deliver additional revenue and contribution to their bottom line.

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Lisa Derenthal is a Managing Director at Gimmel Group. She has over 25 years of experience leading the implementation of enterprise-scale solutions for the energy industry. Lisa specializes in information management systems, application portals, and the integration of unstructured, structured, and spatial content. She holds an MBA from Rice University and a B.S. in Computer Science. Lisa is a frequent speaker at energy conferences and events. She also serves on the board of oil and gas industry committees and user groups.

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## ABOUT GIMMAL

Gimmel is the world's leading provider of solutions built on Microsoft SharePoint® that extend and enhance its broad enterprise information management and governance capabilities and provide SAP content archiving and interoperability. With Gimmel's ground-breaking and award-winning solutions you can easily transform SharePoint into a single point of access, governance and management for all content, documents, and records and work with content online or offline from your Windows® 8 PC, Tablet, or Windows Phone. Gimmel's SAP-certified content archiving and interoperability solution enables increased productivity and efficiency by delivering composite business applications in line with organizational and industry requirements, on-premises, in Office 365®, or in the Azure® Cloud. For more information, visit <http://www.gimmel.com>.

## ABOUT IRON MOUNTAIN

Founded in 1951, Iron Mountain (NYSE:IRM) is a leader in information management and has 30 years of experience in the oil and gas industry. Our comprehensive Oil & Gas solutions combine records management expertise with in-depth experience managing exploration and production data for the oil and gas industry. Iron Mountain helps customers reduce costs, mitigate risk, and improve inefficiencies in managing physical and digital assets and information, including core storage, tape transcription, business records management, pipeline integrity compliance, well and land file management, and data backup and recovery. For more information, visit <http://www.ironmountain.com/Solutions/Energy-Records-Management/Oil-Gas-Records-Management.aspx>

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