



PPDM™

# Foundations

Journal of the Professional Petroleum Data Management Association

Print: ISSN 2368-7533 - Online: ISSN 2368-7541

Volume 4 | Issue 2



**1st Place** Foundations Photo Contest Winner; *"Southern Utah Badlands"* (Chris Ebright)

## A (Not So) Brief History

Of Data Management In Oil & Gas. (Page 5)

### PLUS PHOTO CONTEST:

This issue's winners and how to enter (Page 16)

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# Foundations

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Publish Date: September 2017

# Table of Contents

Volume 4 | Issue 2

## COVER FEATURE

### A (Not So) Brief History

Of Data Management In Oil & Gas.

By Jim Crompton

5

## GUEST EDITORIALS

### Data Management: Job Vs Profession?

A Discussion.

By Yogi Schulz

10

## FEATURES

### Hands On With The PPDM Association Board Of Directors

Big Demand For Data Analysts.

By Shashank Panchangam

13

### Building The Boat Before The Storm

Jonah Energy's Data Management  
Journey.

Presented By Stonebridge Consulting

14

### Analytics As An Extension Of Data Modelling

Things To Think About.

By Mishtu Banerjee

18

### \$2.5 Billion Worth

Of GeoSpatial MetaData.

By Jess Kozman

21

### CPDA Certification

Have You Considered How Much You  
Know?

By Terence Broughton

24

## DEPARTMENTS

### Photo Contest

This issue's winners and how  
YOU can get your photo on the cover  
of Foundations.

16

### Progress Report

An Update On PPDM Activities.

22

### SLC Corner

### Joint Working Group Announcement

MIMOSA And OPC Foundation.

27

### Thank You To Our Volunteers

Featuring Five Great Volunteers.

28

### Where Are They Now?

A Look Back At 1991.

By Dave Fisher

30

### Upcoming Events, Training and Certification

Join PPDM at events and conferences  
around the world in 2017/2018. Learn  
about upcoming CPDA Examination  
dates and training opportunities.

31

## ABOUT PPDM

The Professional Petroleum Data Management Association (PPDM) is the not for profit, global society that enables the development of professional data managers, engages them in community, and endorses a collective body of knowledge for data management across the oil and gas industry.

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\* Gartner, The State of Data Quality: Current Practices and Evolving Trends, Dec. 2013



# A (Not So) Brief History Of Data Management In Oil & Gas

By Jim Crompton, Reflections Data Consulting

**W**

**e have been** managing data ever since there has been data to manage, but how the industry has changed with the times is an interesting story. This narrative starts in the mid-1970s. When I entered the industry, it was a world of paper documents and the information was very well managed. We had well libraries, map libraries, seismic section libraries and technical report libraries, all staffed with trained professionals. When I wanted to find a well file or interpreted maps, capable librarians were able to get me the material. Sometimes the data didn't exist, but what was cataloged was easily available.

With data assets I created, the process was also well defined. My interpretation projects always ended with a formal report (remember those?) and I was given time for documentation (remember the last time you were required to write a report

before starting the next project?). My work was sent to the library, classified, and cataloged, even if the catalog was on microfiche (remember microfiche?).

Then came the initial digital transformation where everyone had access to a mainframe terminal (remember IBM Profs?). The second stage was personal computers and office productivity suites. In response to the low-price cycle of the 1990s, management felt like they could cut libraries and move toward personal data management.

The world of personal data silos began. I remember one instance where the well-file library in an office was eliminated. This company recognized their mistake when a digital well file system project was initiated and hundreds of thousands of paper documents had been lost. They even tried an amnesty program where engineers could return well files from their offices. This helped a little but much of the work was never recovered.

It wasn't just well-files: well logs, petro-technical analysis reports, research papers and presentations were all digital, but were stored only in personal files with little documentation. This is the state that we are trying to recover from now. The mantle of responsibility fell from the librarians to the technicians and a few engineers, but continued support staff reductions presented additional challenges to data managers.

Then came the third stage, the digital oilfield, and the amount of data generated has taken off. New technologies (from relational SQL data bases to enterprise data warehouses) helped manage the growing data collections. The trend is continuing with Big Data and Industrial Internet of Things developments adding many new ways to collect many different types of data.

The new cry is data-driven analytics, but the underappreciated story of the data managers continues. The questions of who owns data, is data an enterprise asset or personal asset, and how should we govern data, persist. Are we investing enough in data management and data quality? Are we keeping up with the growth in data and the demand for insight?

## OIL AND GAS INDUSTRY INFORMATION INTENSITY

What about the information intensity of the oil and gas industry? How many oil and gas wells have been drilled since Col. Drake started this industry? The best estimate is somewhere around 4.5 million, but it depends on how you identify "what is a well" and how you count them. Better record keeping began around 1950. Since then about 2.6 million wells have been drilled with about 1.1 million active producers.

Whether you are working with hundreds to thousands of wells in a field or play (Kern River field in California has 14,000 wells), you are a data manager for the Colorado State Oil and Gas Commission (the state of Colorado has 110,000 wells), or you are a data vendor like IHS or DrillingInfo where



you have a collection in the millions of wells, information intensity is an issue.

**IMPACT ON SEISMIC ACQUISITION, PROCESSING AND INTERPRETATION**

One of the first disciplines to recognize the value of large data sets was the geophysical department. The acquisition of seismic grew from 96 to 120 channels in 1976, to 80,000+ channels, wireless land nodes, or ocean bottom nodes surveys of today. Seismic has moved from analog recording to digital, from 2D to 3D, and now 4D recording (time lapse recording). These techniques produce multi-tens of terabyte sized surveys for the processing center to deal with. Here are just a few examples of how much data is recorded by modern seismic surveys:

- March 2010, WesternGeco set a record with its UniQ integrated point-receiver land seismic system by reaching an 80,000 channel count milestone. The system acquired and quality checked one terabyte of data per hour! The WesternGeco Amazon Warrior can tow 14 streamers at 100m separation and record 40,320 traces per shot.
- Schlumberger acquired long-offset, wide-azimuth 3-D data over an area of about 80,000 square km in the Campeche Basin using eight WesternGeco vessels divided into two fleets. Each fleet deployed four seismic sources and recorded data

with up to 28 streamers, each of which is nine km long. The two fleets have covered as much as 150 sq km per day

**IMPACT ON SUBSURFACE CHARACTERIZATION AND RESERVOIR MODELING**

The seismic guys are not the only ones having fun with Big Data. From subsurface characterization products like Geoquest’s Finder and Landmark’s Openworks, to today’s multi-disciplinary platforms like Schlumberger Petrel, Studio and Landmark DecisionSpace, the interpretation community is keeping pace with the increasing size of project data collections.

As one example; oil field simulation models now contain 50 TB or more of data. Other examples for the impact on subsurface characterization and reservoir modeling include:

- 100-million-cell earth models.
- Two-million-cell simulation model.
- 3D Seismic Cubes with 400 TB or more.
- Seismic surveys of two TB / cube raw data and 100 GB / cube processed data volumes.

**IMPACT ON DRILLING AND COMPLETIONS**

Engineers have monitored drilling operations offshore in real time for decades, but more recently some operators and service companies have begun

to transmit data to onshore support centers to improve operations efficiency and risk management. Application of the industry standard WITSML protocol has enabled more effective communications of data from rig site to support center. New drilling techniques have come with a huge increase in data volumes being collected from drilling operations. These techniques include: MWD (measurement while drilling), LWD (logging while drilling), directional drilling and micro-seismic surveys to monitor the success of fracking jobs.

Examples of how much data can be collected include:

- The Transocean Clear Leader drill ship is instrumented with 30,000 sensors, with a one to five second sample rate capability,
- Data transmission via IntelliPipe (wired drill string) offers 57.6 Kbps. If LWD measurement was made continuously that would result in 622 MB/ day, say 10 GB for a 20 day well.

**IMPACT ON WELL RELATED ACTIVITIES (PRODUCTION, OPERATIONS AND MAINTENANCE)**

Operations in general has frequently been using other functions data or have evolved as the core of the “Shadow IT” world. But the digital oilfield hasn’t ignored the operations side of the business. A considerable amount of data is being

collected from the operations technology ecosystem (process control, SCADA, field instrumentation) and is finding its way into the corporate digital environment.

Examples of how much data can be collected include:

- The design of large offshore oil platforms can result in over 100,000 documents, producing 100 GB of unstructured data. Process control systems on these platforms can produce from 1-3000 I/O points with 10+ GB/day, some of this data is finding its way onshore, enabling predictive maintenance solutions, improving equipment health and process uptime improvements. A modern offshore production facility is instrumented like a medium sized refinery with equivalent automation systems deployed.
- Large onshore fields can produce up to 10-15,000 measurement points. Depending on the age of the field, manual data collection by lease operators may still be required, but more is captured either by the SCADA system or through mobile data collection.

## WHAT HAS CHANGED AND WHAT HASN'T

### *What has changed*

Many companies are now realizing the value of data. The main focus is on supporting business value creation, where data is becoming more of an enterprise asset than an individual or field asset. This perspective on data creates the need for broader integration and a new interest in the information lifecycle. Production engineers need to understand how the well was drilled and completed. Reservoir engineers need to understand how the facilities can cope with additional water production. Operations and maintenance staff need to factor in economic analysis and supply chain factors before proceeding with a well intervention. These multi-discipline workflows are becoming the norm, not the exception.

The focus of data managers is also



changing. Building from their traditional focus on structured data, SQL tools and relational data bases, data managers are now trying to integrate unstructured data (documents, drawings and reports) and transactional and operational data. Data quality issues aren't new but there are new ways of applying business and technical rules to data as it is acquired, in more automatic and programmatic data quality processes. With the diversity of data in the data foundation, new emphasis on master data management processes is part of an effective data governance framework.

### *What hasn't changed*

For all that has changed many things have remained the same. Business users want a single way to find all their best data. The ownership of data is still unresolved, is it my data or does the data belong to the enterprise? For all the work that data managers go through to define and publicize trusted data sources, there will always be shadow IT solutions which stubbornly resist giving up their treasures.

Data management still struggles to get the investment, priority and respect it deserves. Data management is critical, but it's not sexy. Individuals, like engineering and operations technicians, are held in high regard, but the data management function can't get recognized as a critical skill set. Data quality problems continue to plague corporations and data integration challenges continue to get harder as Big Data and new digital technologies force their way into the enterprise.

## CHANGE IN THE TECHNOLOGY FOOTPRINT

### *1990s: Digital Standalone databases and the end of the File Rooms*

The use of computers came with the first "desktops" being IBM "dumb" terminals and processing was mostly mainframe based. Digital databases for structured data begin to be introduced. An analyst had to have training on how to query and report from each database, as most of them were fit-for-purpose. A computer technician was there to help with the technology and was responsible for maintaining the database. Internal well identifiers were used for managing well files, but there was still a paper copy to go to if you needed.

The repetitive staff layoffs in the 1990s led to the end of the efficient and well-managed file rooms. This was one place where management felt that they could cut instead of getting rid of engineering and earth scientists. It turned out there was a consequence to that decision. More powerful desktop tools were given to the engineers, but they turned out to be pretty poor data managers. IBM and Oracle were the chosen technologies for the mainframe, but Microsoft was the selected supplier for the desktop. Geophysicists stayed on the mainframe until more powerful workstations arrived (initially Unix based), while engineers and operators moved quickly to the desktop computer. This split still creates a barrier to a lot of data exchange today.



As file rooms disappeared, digital databases became more sophisticated. Soon engineers and earth scientists had tools like GeoQuest's Finder and Landmark's Openworks (first introduced in 1989) to access data. Meanwhile, entering data, managing data quality and completeness, and maintaining master data and company standards still fell largely on data technicians supporting the asset teams or functional staff. The world of work was turning digital. In addition to subject matter-specific databases, companies created project databases combining well-related data into a single location.

The practice of going around IT became popular in the 1980s with the advent of PCs and, especially, spreadsheet programs. Data warehouse architecture was created, in part, to address the problems, inconsistent numbers, lack of historical data, and a complete absence of governance, created by the proliferation of spreadsheets, or spreadmarts, as they came to be called. Growing demand for analytics has exacerbated this problem.

#### **2002 Focus on Wells and Spatial Data**

While many engineers were satisfied with tabular data and the finance folks had their reporting formats, this didn't work for other analysts, especially earth

scientists, who wanted data displayed in a map format. That necessitated that spatial data be included in databases. The world of GIS (geographic information systems) took off with vendors like ESRI providing much-needed tools.

#### **2009 E&P Upstream Master with MDM, enterprise applications suites**

The need for more integrated solutions and complex data models was addressed by a variety of fit-for-purpose solutions. If your problem was seismic interpretation and subsurface characterization, then solutions like Landmark's DecisionSpace for Production (2007) and DecisionSpace Desktop (2010) filled the need. If your job responsibility was commercial or financial, then ERP solutions from SAP or Oracle became the platform you spent most of your day logged into.

A certain degree of integration was achieved through these application suites, but the demand for data beyond the scope of the existing applications continued to grow. One of the technology answers was to pull data from systems of record, transforming the data into a new data model built for a data management environment called an enterprise data warehouse. Often new requirements necessitated gathering, cleaning, and

Read more of The  
(Not So) Brief History on  
[www.ppdm.org](http://www.ppdm.org).

integrating new data from "data marts" that were tailored for ready access.

#### **The current technology environment for E&P**


The enterprise data warehouse technology is well established in most companies, as are ERP systems and subsurface interpretations platforms. RDMS (relational data management systems from vendors like Oracle and Microsoft) solutions manage structured data. EDMS (electronic document management systems such as Documentum or Sharepoint) hold the many unstructured documents that companies collect. Operational data is often collected in a data historian (from vendors like OSISOFT PI).

As data collections grow from terabytes to petabytes to exabytes, other technology is required to manage the volume and to speed up processing of the larger projects. Data appliances (from companies like Teradata/ Aster, SAP HANA) are a blended combination of hardware and software to handle Big Data challenges.

The latest addition to this sophisticated technology stack is a technology called Data Lakes, usually based on the Apache Hadoop open source technology.

Companies' data collections are a mix of proprietary data and public data available through governmental agencies or purchased from specialty consultants. So, there is a major role of data vendors

and data software providers in collecting and harmonizing public data. The integration challenge is then to merge internal and external data to make it easily available to anyone who needs it.

The final chapter of the history of data management in Oil and Gas has yet to be written. We have come a long way, but the journey is far from over. 

#### About the Author

Jim retired from Chevron in 2013 after almost 37 years with a major international oil and gas company. After retiring, Jim established Reflections Data Consulting LLC to continue his work in the area of data management, standards and analytics for the exploration and production industry.

## An Interview with Fred Kunzinger (Hess & Noah Consulting)



### 1) HOW DID YOU GET INTO DATA MANAGEMENT?

The short answer is, one day I expressed my concern about the quality of the data to the wrong person (Vice President, Exploration Technology). The next day he and my department head were at my door telling me that I had a new opportunity. Until that point, there was no "data management" group. Data handling was dispersed amongst different groups: IT handled PI updates, Drafting handled Land information, Exploration Technology loaded seismic data into the interpretation systems, and so on. The PI data was just moving from Model 204 on the mainframe to P2000 on a Unix server using PIDM, our first database based on PPDM. We had directional surveys in a relational database on the mainframe in DB2, seismic was kept on tapes, and land boundaries were loaded through the Intergraph CAD system. There were two challenges: staffing and managing

data in true silos. We integrated the data when we loaded it into the interpretation system. There was no data management for production/operations. That data was managed by the user while IT managed the applications.

### 2) WHAT CHALLENGES HAVE WE RESOLVED AND WHAT CHALLENGES ARE WE STILL FIGHTING?

First, the dragons we're still fighting... true acceptance of the data management as a competitive influencer should be staffed and managed as such. Too many companies have pockets of good DM, but overall still view it as pure G&A. Part of that is our fault for not building a good ROI case for DM, and part of it is simply changing attitudes. There are still two camps: technical data and business/financial data. As companies try to become much more efficient and cost effective in their production/operations areas, the technical and financial data needs to be just as integrated as the engineering and geoscience data, if not more so. We have resolved a number of challenges, however. We have the ability to integrate technical data across the silos using technologies such as MDM. Most companies have spatially enabled all, or most of, their data. People are recognizing that data quality is just as important, if not more so, than data access.

### 3) WHAT NEW CHALLENGES DOES THE DATA MANAGEMENT COMMUNITY FACE?

The answer is in finding people to work in data management that have a business bent, not IT. Too many companies are lumping DM in with IT thereby losing the direct interaction with the business units. Also, the assets are ready to use advanced analytics using all of their data: historical, real-time, third-party, etc., but the data and data structures are not in a state to support the types of analytics that the business wants to do. It reminds me of GIS in the 1980's. The technology was there, but it got a bad rap because it didn't work as advertised. The "wow factor" was missing. That was not the fault of the GIS technology. It was the fault of the underlying data structures. They were not in a position to support the new GIS world. Similarly, the underlying data structures today are not always ready to support the types of analytics the business wants to conduct, denying them the ability to answer the questions that will take their assets to the next level. It won't be the fault of the analytics capabilities, it will be the fault of the underlying data structures.



# Data Management: Job Vs Profession?

By Yogi Schulz, Corvelle Consulting

**I**s data management truly a profession or is this idea mostly a delusional manifestation of the narcissistic ambition of those holding data management jobs that are in fact just technicians?

This topic is taking on increasing importance as the PPDM Association seeks to build recognition of the data management profession in the energy industry. You can advance your career and deliver more value to your employer by committing to a career in the data management profession.

Perhaps a big component of the difference between a job and profession is our own attitude toward our work. For example, garbage collectors typically see themselves performing the job of disposing of garbage while sanitation engineers often see themselves as keeping the city clean, beautiful, and healthy.

## JOBS VS PROFESSIONS

What differentiates jobs from professions? Jobs and professions refer to two quite distinct concepts.

Jobs consist of many activities that employees perform for their employers in exchange for monetary value. Professions, on the other hand, are vocations that are based on specialized education and subsequent professional development.

Unfortunately, the terms job and profession are often used interchangeably perhaps because many do not know the difference between the two terms. This table describes the significant differences



between jobs and professions.

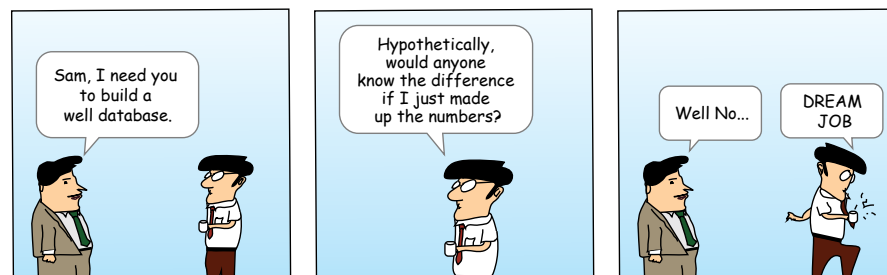
## BENEFITS OF PROFESSIONS

What makes this difference between jobs and professions worthy of further consideration or discussion?

The reasonable performance of jobs provides immediate benefits to the employee, the employer and the

customers of the business. Jobs do not produce a significant or lasting impact on the community or even on the life of the person performing the job.

The reasonable performance of professions produces the same immediate benefits but continues much further to provide a larger measure of satisfaction to the individual in the profession and a



Basis for Comparison	Job	Profession
Definition	A job refers to the regular activity performed by a person to earn their pay	A profession is a vocation that requires a high degree of knowledge, expertise and experience in the specific field
Respect and status	Low	High
Basis of pay	Production	Knowledge, expertise and experience
Regulated by statute	Sometimes	Often
Controlled by governing body	No	Yes
Code of ethical conduct	No	Yes
Enforcement of standards of practice	Rarely	Considerable
Higher education	Sometimes	Always
Education focus	Tactical how to	Strategic thinking
Training	Often optional	Compulsory
Professional development	Rarely	Frequently
Responsibility	Frequently none; Sometimes some	Always
Amount of employer supervision	Significant	Little
Degree of independence of thought and action	Little or no independence	Completely independent



more lasting impact on the community.

Here is a list of benefits that professions provide to various stakeholders.

#### Individuals in the profession

Individuals that have chosen to build a career in a profession benefit from:

1. The ability to enhance their reputations and skills.
2. The definition of the profession and expectations of professional performance.
3. Professional development.
4. Communities of interest.
5. Networking opportunities.
6. Organizations to represent the interests of the profession:
  - a. by raising public awareness of the value and contribution of the profession;
  - b. for government policy, legislation and regulatory issues; and
  - c. for the development of professional standards.

#### Customers

Professions protect customers by:

1. Ensuring all professionals are qualified.
2. Disciplining professionals found guilty of professional misconduct.
3. Taking action against unqualified individuals who inappropriately describe themselves as professionals.
4. Investigating complaints raised about unprofessional, inadequate, or incompetent services.
5. Conducting dispute resolutions.
6. Preparing performance guidelines and standards as benchmarks for quality of service in the profession including:
  - a. education requirements,
  - b. certification programs,
  - c. ethical standards,
  - d. practice standards,
  - e. codes of conduct.

#### Employers

Professions help employers by providing assurance that individuals:

1. Are professionally qualified.
2. Can demonstrate technical skills to clients.
3. Have made a commitment to their education.

4. Are participating in professional development.

### Professions

An important feature of professions is that individual professionals benefit from the respect and community trust in their expertise. Professions:

1. Improve customer access to services.
2. Improve employment and career longevity.
3. Support economic activity by encouraging confidence and trust in the services offered by professionals. This trust is increasingly important in our services-dominated economy where knowledge and expertise form the basis of many transactions.
4. Provide an important community purpose by allowing careers to contribute to the social good.

### Communities

Professions play a vital role in providing trusted expertise founded on established standards that are policed to ensure community expectations of good practice and social purpose are met.

### Regulators

Professions reduce the burden of government regulation and supervision by:

1. Improving the standards of practice of professionals to achieve:
  - a. Higher quality of service to customers.
  - b. Lower frequency of failures.
2. Performing many of the regulatory tasks within their professional communities.
3. Monitoring the provision of complex services to customers.

### DEVELOPING A CAREER IN A PROFESSION

Individuals committing to a profession tend to perform more interesting, impactful work. They feel more satisfaction from their work than individuals fulfilling a job. Individuals working in a profession tend to experience less career uncertainty and risk of layoffs.


You will advance your career and deliver more value to your employer by committing to a career in the data

management profession. The Data Management Association International (DAMA) defines four data management roles for the data management profession:

1. Data management executive - ensures that the data resource in an organization supports the goals of the organization.
2. Data manager - ensures that specific data management responsibilities are carried out for the organization.
3. Data management technician - performs data management tasks that develop and maintain a high-quality data resource for the organization.
4. Data management consultant - provides data management expertise, experience and support to an organization.

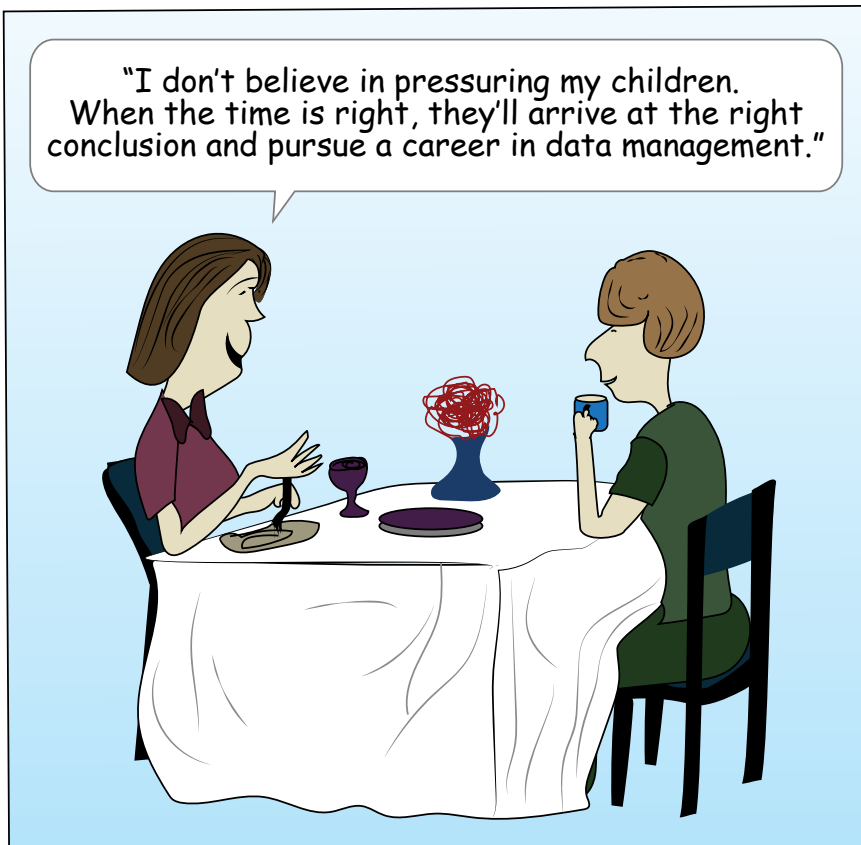
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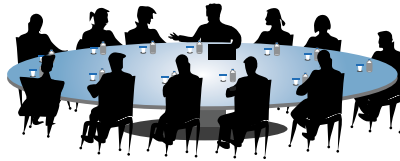
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### About the Author

Mr. Schulz has over 30 years of Information Technology experience in various industries, including serving on the PPDM Association Board of Directors for 20 years.





# Hands On With The PPDM Association Board of Directors

By Shashank Panchangam, Halliburton (Landmark)

## BIG DEMAND FOR DATA ANALYSTS IN OIL AND GAS INDUSTRY

The Oil and Gas industry is facing tremendous upheavals due to low barrel prices and is at a critical crossroad where some companies are surviving by adapting and imbibing the latest technologies to streamline business, cut down costs and solve critical problems, while others are struggling.

Sensors have become very smart and provide all types of information. Distributed Acoustic Sensors (iDAS) generate six to seven terabytes of acoustic, flow, seismic and segment depth data every day, and current environments and technologies are not equipped to store, virtualize, buffer, pre-process, analyze and transmit data from all these sensors seamlessly to operation and decision support centers real time.

Because of the low barrel price, the Oil and Gas industry has seen a huge churn in jobs and many of the traditional jobs have been downsized, but at the same time companies are eagerly hiring people with the skills to analyze these large volumes of data. According to a recent IBM analysis, fastest-growing roles across all industries are Data Scientists and Advanced Analysts, which are projected to see demand spike by 28% by 2020. Also according to the National Institutes for Science and Technology, by 2030, smart grid data analysis could be generating savings of up to \$2 trillion.

With a huge demand for Data Analysts and Scientists, the Oil and Gas industry

must offer certification courses and training courses to educate and empower our data management experts to learn new skills and take on these new challenging jobs. PPDM's Certified Petroleum Data Analyst (CPDA™) program certainly helps data managers to demonstrate some of these valuable skills. Big majors are recognizing the value of these certifications and are including them in job descriptions for data analysts and scientists.

Fig 1, courtesy of Marketing Distillery highlights typical skills required from a data science team. Teams, such as the one I work with at Halliburton, have a fast growing Data Science team with the skills highlighted above. These skills help us tackle some of the toughest problems facing the industry. Many operating and service companies have also started building their data science teams with similar skill sets.

While the conventional data management roles are shrinking there is a huge demand for data analyst and scientist skills. Learning new skills and getting certified will certainly help retain existing jobs or gain new jobs. **■**

### About the Author

Shashank Panchangam, Digital Officer MENA-AP (Middle East, North Africa & Asia Pacific) with Halliburton (Landmark) sits on PPDM Board of Directors and has 16 years of Oil & Gas experience.



Fig 1- courtesy of Marketing Distillery



Fig 2-Drilling NPT- courtesy Halliburton



Fig 3- Cloud cluster analyzing well performance- courtesy Halliburton



## Building The Boat Before The Storm: Jonah Energy's Data Management Journey

By Shaam Farooq, Jonah Energy



**F**

or many reasons, data management (DM) is critical to today's Oil and Gas industry. Unlocking siloed data and making it available to the business in a useable fashion is a key differentiator between an energy company that can thrive in a volatile global pricing market, and a company that cannot. DM is one area where all operators can rein in IT costs and reap big efficiency rewards even while running a data-intensive business.

In 2014, E&P start-up Jonah Energy was formed by global private investment firm TPG with the \$1.8 billion acquisition of the Jonah field operations in Sublette County, Wyo. The purchase consisted of more than 24,000 productive acres with 1,500+ active wells plus 100,000 undeveloped acres adjacent to the active field.

As a start-up, Jonah was not shackled by an outdated IT infrastructure that bedevils so many in the industry. My team and I were struggling, however, with legacy data from multiple software programs inherited from the previous owner of the natural gas field. The data was spread throughout multiple ERP systems formerly managed by a much larger IT staff.

My team at Jonah consists of 10 IT professionals. By 2015, three members of our IT team were spending at least 20 hours of their work weeks cleansing and normalizing data to put together all of the ad hoc report requests that were coming from various departments, like operations, engineering or accounting and from our PE partner. In addition,

our business users would expend a lot of time wrangling over the quality and reliability of data that came from different applications. No one trusted data from these sources, with good reason.

The answer to a simple question, like how many wells Jonah was operating, would vary. A geologist would provide one number, an engineer another, and the financial department a third. While there might be a circumstance in which different answers to that question would be appropriate, as a rule the answer should be the same across every department.

### NEW DATA POLICY NEEDED

If we were having so much difficulty with DM at our current size, how would we as the company weather the data storm unleashed by future growth? The data situation simply was not sustainable. It was painfully obvious that we needed an overarching DM approach and the tools to establish and maintain it. The elements of such a program, of course, are data quality (DQ), data warehousing (DW) and master data management (MDM).

Our ultimate goal was to provide high-quality data available 24/7 that empowers everyone at Jonah—from the C-suite to line-of-business analysts—to be informed decision makers within their own sphere of influence.

To attain this goal, everyone needed to be working off the same data, standardized and normalized. Jonah's top executives, CEO Tom Hart and COO Craig Manaugh, supported this vision.

More important, the new system had to follow PPDM standards and the first phase would focus on ensuring data quality and consistency across systems.

As we began to research potential partners, all everyone talked about was dashboards. But all that flash and fancy graphs will yield nothing of value if the data behind them is poor quality or simply wrong. Since the data warehouse is the brain of MDM, you must ensure that the data—the grey matter of DM—is correct before you ever start to build the skull around it or anything else.

A lot of potential partners outlined their DM proposals for Jonah, but only two of them focused on DQ before dashboards. Of those two, we chose Stonebridge Consulting because its proposal was the most cost-effective. Just as critical, Stonebridge's cloud-based EnerHub™ platform, which includes separate software modules for DQ, DW and MDM, was developed by oil and gas professionals for our industry.

Stonebridge speaks our language, and the flexibility of its platform meant Jonah could put some data in the cloud while keeping other, more sensitive portions in house.

With Stonebridge as our strategic DM partner, we established the DW architecture and roadmap. All of the sources of data throughout Jonah that were to be included in the new warehouse were identified along with the operational systems where that data was stored. Then the processes used to pull and manipulate data from operational systems were determined, along with the logical layers

to stage the data gathered from these source systems within the new warehouse so that it can be easily accessed using business intelligence tools. It involved a lot of collaboration from both parties.

**DATA WAREHOUSE INVESTMENT BRINGS RETURNS**

Jonah is now in the third year of a multi-year DM journey that began in 2015. So far, there have been a number of returns on this investment. First, there has been a significant cut in the hours my IT staff devotes to cleansing data. Second, there has been a big reduction in the number of annual well management software licenses we need to buy. Instead of 15 licenses costing \$35,000 each, Jonah now needs only 10. Many of the people who used to need this costly application now just tap the data warehouse using Excel, Spotfire or a BI tool of their choice.

Third is tighter financial oversight of spend in the field.

This has lowered Jonah’s per-well cost by 30 to 40 percent compared to what the previous owner of the field used to spend. All of the preceding represents a big G&A savings—estimated at several million dollars over a five-year period—for a relatively small operation like Jonah.

We consistently rank as one of the most fiscally and operationally efficient companies in our PE firm’s portfolio and among our peers in the E&P segment.

Last is a less tangible return that comes from the data itself. Remember those inter-departmental squabbles over data from an individual application? They’re history. No one questions data from the warehouse. The data is clean, normalized and always available. All well names are the same, so no more different numbers of wells in operation depending on who’s using what system to pose the question. The data warehouse makes an enormous difference in data quality and staff members’ willingness to rely on decisions made using that data.

In short, Jonah succeeded in building a boat before the clouds gathered and the sky grew dark. But instead of an ark, the boat is a data warehouse as a source for all data trusted across the board by everyone at the company. This critical accomplishment happened none too soon. The storm broke when, in May, we announced that Jonah acquired Linn Energy’s interests in more than 1,200 producing wells and 27,000 net acres in the Jonah and Pinedale fields. More than 80 percent of this new purchase is undeveloped.

**DM STRATEGY PASSES MAJOR TEST**

We now faced the task of merging the IT data for this acquisition with our existing systems. The Linn acquisition came just two months after the March launch of the master data management phase of Jonah’s DM journey. Back in December of 2016, we again chose Stonebridge and EnerHub™ to help us drive the MDM implementation.

Just before the Linn deal happened, my management peers at Jonah who did not have any experience with our DM strategy now had questions and concerns. Why was IT spending so much time and energy on MDM when their business users needed help with applications and service desk assistance? These questions got fairly intense. IT agreed to do a soft pause on MDM efforts to devote more time to this department’s post-acquisition priorities.

A few days later, however, our PE partner and the executive management asked for reports to justify the value of this ~\$580 million Linn investment. With our existing DM tools, we could provide assurance that we have the data and can cobble together the reporting they were looking for manually. That’s when even the skeptics came to realize the true value of the DM roadmap for Jonah, and asked that IT un-pause some portions of it to help get the reports completed on time.

It’s never smooth sailing when IT spends money. The Oil and Gas industry has a long tradition of acting by the seat of the pants. The independent wildcatter is an iconic image and still a pervasive mindset throughout our industry. But



times have changed dramatically. Wells are more complex than ever before, and it’s never been more challenging to find suitable locations for drilling without spending a fortune to hunt them down and then avoid drilling dry holes.

Data holds the key, and that data must be accurate, consistent across applications and in a usable format if it is to yield the business insights that make the difference between success and failure.

Viewed through that lens, Jonah’s DM journey was and remains essential to making the company viable and profitable for the long haul. ■

**About the Author**

Shaam Farooq is the Director of IT and GIS at Jonah Energy LLC and functions as the company’s CIO. An alumnus of MIT’s Sloan School of Management’s Executive Studies program, Shaam is an accomplished senior technology executive with two decades of experience in the energy industry facilitating substantial growth, streamlining operations, and increasing operational effectiveness.

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## Foundations photo contest

### On the cover:



### “SOUTHERN UTAH BADLANDS.”

BY CHRIS EBRIGHT

*1st Place in the Volume 4, Issue 2 Foundations Photo Contest*

*“This photo was taken in southern Utah, near Hanksville.*

*This particular area is mixed use land with part reserved for protection and the other allows off road vehicle use. The fence in this photograph is the dividing line between these two use areas.” – May 1, 2015*

*Chris Ebright is a data architect/GIS manager working in the oil and gas industry. He lives in Colorado and photographs landscapes in his spare time.*

Enter your favourite photos online at [photocontest.ppdm.org](http://photocontest.ppdm.org) for a chance to be featured on the cover of our next issue of *Foundations!*





**“NO ONE RISES SUDDENLY IN THIS WORLD, NOT EVEN THE SUN.” BY VIKRANT LAKHANPAL**

*2nd Place in the Volume 4, Issue 2 Foundations Photo Contest*

*“The oil and gas prices are picking up slowly, leading to an increase in industry activity. During this time, we should stay cautious and not make desirous and anxious decisions. No one rises suddenly in this world, not even the sun.” – August 17, 2016*

**Vikrant Lakhanpal graduated from University of Houston in 2016 with a Masters in Petroleum Engineering**



# Analytics As An Extension Of Data Modelling

By Mishtu Banerjee, Refraction Asset Management Ltd.

**D**atabase analysts tend to think about their workflows in terms of entities, relationships, and queries. Data scientists tend to think about their workflows in terms of variables, transformations, and specific analysis algorithms. Both are powerful methods of conceptualizing and organizing data on their own. Combined, they are even more effective as a means to model and implement analytical systems that can automate tasks. The role of automation is to make analysts more efficient. They can run more scenarios, make fewer errors, have statistical checks and diagnostics built in, and leverage Monte-Carlo procedures to get confidence limits on their predictions.

This article is directed to several audiences in Oil and Gas, (a) Analysts familiar with databases and business intelligence who would like to expand their skill set into data science, (b) Managers who wish to integrate their database and data science teams, and finally (c) Geologists and Engineers who would like to integrate their domain knowledge and analysis skills with system design skills to create automated analytical systems.

Our focus in this article is on the system design principles to integrate database models and analytical models into a

single automatable system design. We will sketch a very minimal conceptual data model, to keep things as simple as possible, with the understanding that additional details will need to be added to go from conceptual design to implementation.

## USE CASE - TYPE CURVES

Type curves are the Swiss Army knife of Oil and Gas analytics. They appear in considerations of Estimated Ultimate Recovery (EUR) [Currie, et al. 2010], the economic feasibility of investment allocations [Penner, 2013], developing oil field production buildout via simulation, or even diagnosing individual well production relative to a standard type curve for a geological or engineering scenario.

A type curve in its simplest form is a decline curve on oil or gas production for a given scenario. The scenario could be a geologically uniform area, a particular engineering practice, or the area under production by a company. While there are several ways to calculate and represent type curves, the simplest is via decline curve analysis and forecasting using Arps equations, which were developed by J.J. Arps. Arps equations are a closely related family of equations that result in simple curves where the X-axis is time and the Y-axis is production rate. They are based on three variables: production rates at time  $t$ ,

an initial decline rate, and the curvature of the decline line (see [PetroWiki], which provides a capsule summary of these variables, as well as a very brief history of the Arps equations and their extension by other researchers). Golko [2016] provides calculation and model fitting details, as well as a state-of-the-art methodology for developing type curves around geological scenarios and performance bins.

Type curves are a good use case for looking at design issues on the integration of relational and analytical perspectives, as their source data resides in industry, corporate and application relational databases.

Their development requires basic analytical skills of model fitting, classification, forecasting and associated analytical diagnostics.

Turk [2017] provides an open source package in R, for those who would like to experiment with type curve development via decline curve analysis. This package is also a good introduction to the input-output functional style of data transformation and of the thinking common in data science.

## IMPEDANCE MISMATCH

Database designers, and data analysis designers approach their tasks with very different sets of skills and concepts. Analytical models tend to be functional,



rather than relational in form. This creates an impedance mismatch between the conceptual design of relational models which focus on identifying entities, and analytical models which focus on data transformations during statistical processing. Just as the impedance mismatch between relational design and object-oriented design needed to be understood and resolved in pragmatic system designs, so too does the impedance mismatch between the thought processes of database designers and analysis designers.

A good starting point to resolve the two perspectives is to begin with common ground for both database and analysis designers — the need for clean, validated, data. Wickham [2014], in examining how data for analysis needs to be structured, introduces a set of rules for “Tidy Data” that will immediately be familiar to database designers conversant with the rules to refine a database design to third normal form. So, something old from the database world gets introduced as something new to the analytical world. In a similar vein, we will rapidly switch between relational and analytical thinking styles to sketch out a conceptual database design that captures the analysis pattern for type curves generation. Add in your system specific details to this sketch, and you have a first iteration design for automating type curves generation.

Let’s start.

## DESIGN METHOD

Base Relational Tables.

We will use a convention for sketching table designs:

*TableName*(**PrimaryKeys**, *FocusVariables*, <Placeholders for other variables in the table>)

where:

PrimaryKeys are in bold.

FocusVariables are those used as analysis variables, that are not already within the primary key and <> is a placeholder for any other fields in the table that ride along with the primary key.

Throughout our table sketches, we’ll simplify and ignore a few real world issues like multiple entries that increase complexity of the base data model but don’t add to the conceptual integration of data and analytical models.

What is our world? We have wells producing oil or gas over time.

So, we need tables for wells, what they produce, and the production over time. We will represent well identifiers by the field UWI. Associated with UWI is all the “permanent” identifying information for a well.

*Wells*(**UWI**, <Stable details of wells, e.g. Location, Pool, etc>)

*ProductionType*

(**ProductionCode**, <Stable details of a production code, e.g. units, description of code>)

Production codes are codes for various grades of oil, gas, and other well outputs and condensates produced by a well.

*WellProduction*(**UWI**, **ProductionCode**, *TimeStamp*, *ProductionValue*, <other temporal details or observations for a single moment in production >)

TimeStamp is our analytical X variable, while ProductionValue is our analytical Y variable for decline curve generation.

These three tables capture the source data.

## BASE ANALYTICAL TABLES.

Now thinking of the analytical process at the very high level of WHAT it

produces, rather than HOW it produces it (i.e., the analytical details). We need a few more tables that reflect the analytical process at a high level.

First, we have to fit linear regression (log scale) and Arps models to the data for each well. We need a table to hold those parameters.

Secondly, we want to forecast the individual wells, using our models. We need a table with the same structure as WellProduction, but which now holds well forecasts, rather than the raw production data.

Third, we want to build our type curves on either production or engineering bins, under the assumption that each well is assigned to one bin only. How do we come up with these bins? They may be determined based on expert judgement, or an analytical performance criteria such as production at month T, or via a classification algorithm. Parameters(**UWI**, **Parameter**, **ParameterValue** <other information that rides along with a parameter such as confidence limits>).

*WellForecast*(**UWI**, **ProductionCode**, **TimeStamp**, *ForecastValue*, <other temporal details or observations for a single moment in production >)

Note that WellProduction and WellForecast, in having exactly the same keys, have a 1-1 relationship; they could be called “sibling” tables.

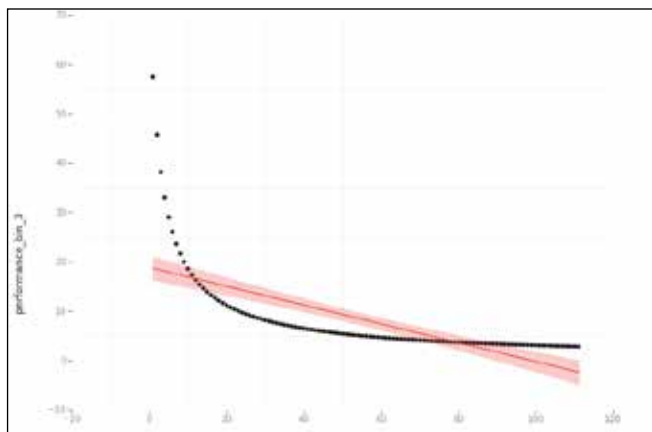
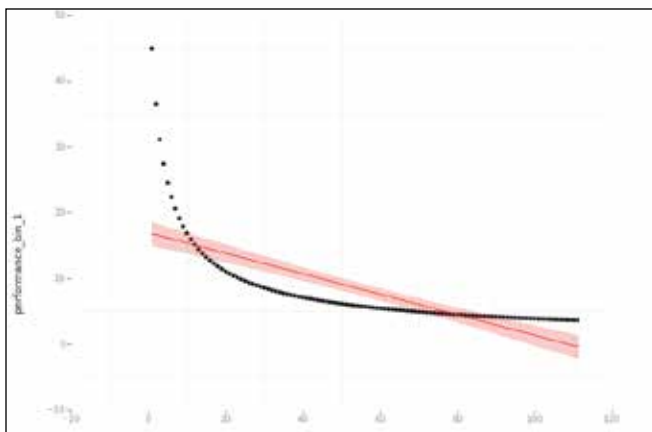
*BinType*(**BinCode**, <Stable details of a bin such as its description, bounds, classification method>)

*Bins*(**UWI**, **BinCode**, <additional information of the assignment of a UWI to a specific bin>).

The basic outputs from analysis of raw data are now captured as Tables. These tables can be “fed” by analytical code (see [Tuck 2017]) to create an automated type curves generation system.

## DERIVED ANALYTICAL TABLES

We’re not done. Analytic processes consist of long chains of input-output data transformations. So, statistical summaries from raw data are usually only the first step. Those summaries are transformed, and



transformed again to develop analytical models, predictions, forecasts, probabilistic simulations, classifications, and statistical learning systems associated with AI.

In the case of type curves, we need only one more table, derived from the previous Analytical Tables.

*TypeCurves(BinCode, ProductionCode, TimeStamp, TypeCurveValue, <Other details on the value of a type curve at a point in time>).*

A typical process to feed this particular table is to calculate the average at each point in time for all well forecasts within a particular bin. That is, do an aggregate query on data already in the system in the analytics base tables. In that sense, the final TypeCurve table is essentially a view.

We have taken individual well data and summarized it at the higher level of bins, that reflect a group of similar wells.

Now, while we've focussed on TypeCurves analysis as our analytical motivation, our table design is more general than that. With slight modifications to table structure and naming conventions, we could capture a completely different analytical process, that includes parameter based models, forecasts, and higher-level groups (bins). For example, a very similar looking model could capture the process of calculating petrophysical outputs from "raw" well logs data, binning them to geologic tops and creating predictive Tops profiles of petrophysical outputs. The specific calculations and transformations would be very different, but the data model structure holding the outputs of the analytical process would be similar.

There is power in combining relational and analytical thought styles into analysis patterns that can be automated, and allow you to template a set of related problems in an industry.

### ANALYTICS IN OIL AND GAS RESOURCES

Data science and analytics are rapidly developing fields with many moving parts. A good place to keep up with the confluence of data science driven analytics and specific analytical techniques in oil and gas is the Agile Blog [Hall 2017].

Another resource, more specific to Type Curves is the Verdazo Blog:

<http://www.verdazo.com/blog/type-curves-part-8-eur-value-uncertainty-auto-forecasts/>

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### About the Author

Mishtu Banerjee, head of data science at Refraction Asset Management Ltd has 25+ years developing data driven analytical systems in multiple industries, combining databases, predictive analytics, and artificial intelligence (AI) techniques.

Do you  
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to see it in our next edition.



## \$2.5 Billion Worth Of GeoSpatial MetaData?

By Jess Kozman, PPDM Association

**A** t a presentation of considerable interest for data managers, Colin Murray addressed the SouthEast Asia Petroleum Exploration (SEAPEX) Society about the “The Prehistory of the Jasmine Field, a Cautionary Tale from the Bottom of the Filing Cabinet.” The Jasmine Field is located in Block B5/27 offshore in the Gulf of Thailand, and has cumulatively recorded more than 50 million barrels of oil production since being developed on a block originally leased by Amoco in 1971. It is an Asia-Pacific success story, consistently performing above expectations and adding reserves substantially from estimates made at the time of purchase by Mubadala Petroleum in 2004.

Mr. Murray recounted several generations of seismic surveying, some short-cable 2D work to fill in between the territorial waters of Thailand and Cambodia. The original structure of Jasmine Field was reportedly defined on a grid of 2D lines spaced approximately seven kilometers apart.

The 6-2-L discovery well by Amoco and partner Idemitsu in 1974 tested oil from several zones, but was considered uneconomic, and the block was relinquished in 1978. It was picked up again in 1980 by PTT, Harrods Energy and Texaco. Harrods Energy owner Mohammed Al Fayed had apparently become interested in the oil industry after

an abandoned business venture to build an oil refinery in Haiti. In 1999, a three-well drilling program was proposed based on reprocessed 2D data.

The field was approved for fast track appraisal in 2000 and 11 wells were drilled in 70 days to prove up reserves, using a method of extracting every 10th inline and crossline from the 3D survey and mapping it as 2D data (effectively ignoring 90% of the available data). During this time, interpreters noticed that there was a consistent 400 meter offset between the locations of faults on the 2D and 3D surveys, and went back to investigate the original navigation data from the Canadian survey, which could not be found.

All the data managers had to work with were antenna XY locations, with no information about datum or projection systems. A quick fix was devised by shooting a small 3D well tie survey and applying the resulting empirically calculated data shift. This process revealed that the original wells had actually tested a hanging wall play. In the words of the operators, crestal oil accumulations were missed by discovery wells drilled on 2D seismic data, and there were “delineation wells drilled non-optimally on 3D seismic data by a previous operator due to a geodetic datum error.” This meant that there was potentially more oil in the originally interpreted, but as-yet untested, reservoir compartments.

At the time that the field development plans were being priced, Fayed sold the field to Pearl Oil and its successor, Mubadala Petroleum, which continues to operate the field today.

Mr. Murray ended this rather unusual

discourse by pointing out that even today, the industry remains replete with examples of wells drilled in the wrong place because of geodetic datum errors, and pleaded with his professional colleagues to recognize the importance of geospatial metadata. In this case, geospatial errors contributed to an underestimation of the ultimate recoverable reserves by a factor of seven, compared to the current estimates of 50-70 MMBO. The value of that spatial metadata could thus be empirically set at more than USD \$2.5 Billion at today’s commodity prices.

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### About the Author

Jess Kozman is the Asia-Pacific Regional Representative for PPDM and the Managing Director of CLTech Consulting Pte Ltd in Singapore

# PPDM Progress Report

T

he **PPDM Association** focusses on three strategic areas as it promotes professional recognition for the petroleum data management field. Within these three areas, Community, International Petroleum Data Standards, and Professional Development, ongoing projects, committees and teams are hard at work progressing the strategic vision.

## COMMUNITY

PPDM's Community of Practice is a purposeful and intentional community of data managers who build personal, professional and technical relationships with each other.



*The Oklahoma City Leadership Team facilitated the Oklahoma City Data Management Workshop on May 2, 2017.*



*Perth Data Management Workshop & Field Trip, August 9 and 10, 2017.*



*The Calgary Leadership Team has been working on the upcoming Calgary Data Management Symposium, Tradeshow & AGM, October 23 – 25, 2017.*



*The Houston Leadership Team has been working on the new Houston Professional Petroleum Data Expo for April 17 – 18, 2018.*

*Denver Leadership Team is has pulled together a great agenda for the Denver Data Management Workshop on October 18, 2017.*

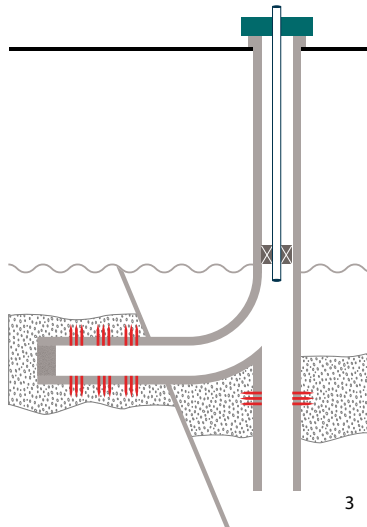
*The Foundations Editorial Committee worked hard to create this edition of Foundations.*

**INTERNATIONAL PETROLEUM DATA STANDARDS (IPDS)**

The IPDS are developed by industry experts, and are valued at hundreds of millions of dollars.

Regulatory Data Standards Committee (RDS) – Made up primarily of Regulators from around the world, the RDS meets monthly and focusses on how PPDM data standards can be deployed and expanded to fully support the needs of regulators to create standards based information foundation. Updates following each meeting are available on the Committee page of the website.

Sample from the new “What Is A Completion” Booklet



The What Is A Completion (WIAC) Work

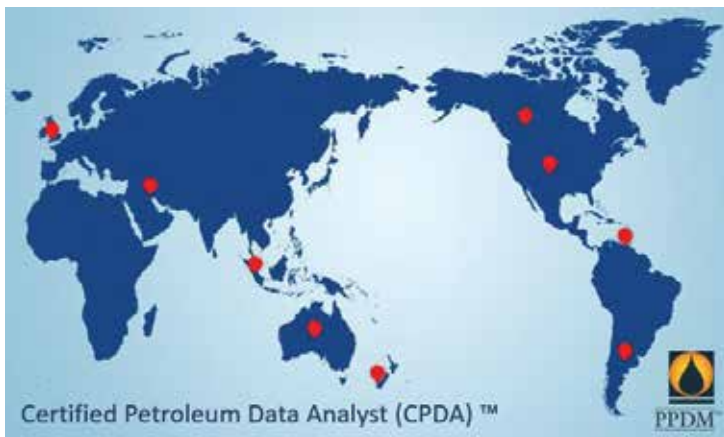
Group has been working for more than a year on disambiguating the term ‘Completion’ - final elements including the website and booklet are expected to be completed in Q4 2017.

The Rules Committee has been working on improvements to the current Rules Library system.

**PROFESSIONAL DEVELOPMENT**

Certification, training, career development, gathering a body of knowledge, and leading the emergence of a recognized professional discipline of petroleum data managers are all a part of PPDM’s Professional Development.

Petroleum Data Management Certification Committee (PDMCC) has been identifying improvements to the candidate experience. The next exam is November 8, 2017, and 2018 dates have been posted on [www.ppdm.org/certification](http://www.ppdm.org/certification).



The Professional Development Committee (PDC) completed the first draft of a professional development governance document, which will guide Training Providers through a process for posting their data management-related program information in PPDM’s online Professional Development Catalogue.

Want to stay current on what’s happening at PPDM? Keep your communications preferences up to date in your profile on [www.ppdm.org](http://www.ppdm.org), and you’ll receive our monthly newsletters, event invitations and other important updates.



# CPDA Certification

By Terence Broughton, TB Data Solutions



**H**ave you ever considered how much you know about petroleum data? For

example, consider the life cycle of a well - there are many dates associated with a wellbore. Which of these sequences of dates makes the most sense to you?

- Spud date → Permit date → Completion date → Rig release date?
- Permit date → Spud date → Completion date → Rig release date?
- Permit date → Spud date → Rig release date → Completion date?

How about this scenario: you have to load a newly acquired pipeline data set to your existing GIS project. Which data type in the new data set is essential to ensure consistency between the spatial layers?

- The geodetic datum?
- The project boundaries?
- The coordinate reference system?

Or say you're loading some marker picks to a well database and you notice that some of them are deeper than the total depth of the well. What would you do first to resolve this issue?

- Would you just change the pick value to be less than the total depth?
- Would you contact the source of the marker picks?

- Would you check the total depth of the well?

One final example - you are part of a team merging data from a newly acquired company and you need to find accurate surface and subsurface co-ordinate information. From which of the following records of the acquired company would you be most likely to find the information?

- The license application and lease plan?
- The drilling tour sheets?
- The well report and directional survey?

If the correct choices seem obvious to you, chances are you have a relatively good understanding of petroleum data and should consider the Certified Petroleum Data Analyst (CPDA™) certification offered by PPDM. According to *The Guide to National Professional Certification Programs* (1997) by Phillip Barnhart, “certifications are portable, since they do not depend on one company’s definition of a certain job” and they provide potential employers with “an impartial, third-party endorsement of an individual’s professional knowledge and experience.” For those of us involved in petroleum data management certification ensures that best practices are shared and upheld within our industry,

thereby reducing risk and allowing better decision making. Your certification as a Certified Petroleum Data Analyst can verify that you have that established level of expertise. If this sounds like something that could benefit you then read on.

In order to acquire CPDA certification you must meet some pre-requisites and successfully complete the exam. The pre-requisites consist of a combination of five years of relevant education and experience related to the petroleum and data analyst profession. You will also need to provide some references who can verify your experience. Once your pre-requisites have been validated, you will need to sit the exam. The exam is a four-hour questionnaire consisting of 200 multiple choice questions related to various aspects (competency areas) of petroleum data, including but not limited to:

1. E&P lifecycle,
2. Spatial data,
3. Data governance,
4. Data quality management.

The four questions at the start of this article are examples from these areas. Other competency areas included in the exam are:

5. Data analysis,
6. Data security,
7. Master data management,
8. Communication.

It doesn't end with getting the certificate. It has to be maintained by doing several hours of activities related to professional skill enhancement such as education and training courses, industry engagement activities (such as volunteering, mentoring, presentations

or serving on committees), and work experience within the area of Data Analysis. Details about maintaining your CPDA certification are available at [ppdm.org/certification](http://ppdm.org/certification) under Credential Maintenance. Don't be intimidated by this aspect of CPDA certification. You have a three-year period to accrue your maintenance activities and it's less demanding than the continuing professional development requirements of some other certifications.

With more than 40 active CPDA's worldwide, now is a good time to get in on the ground floor and establish your credentials early. **The next exam date is March 7, 2018; but you must apply by January 24.** The exam is written online under a proctoring service so you do not have to travel to a designated exam site.

Concerned about whether you have the smarts to pass the exam? You can get

a feel for the kind of questions to expect by visiting [www.ppdm.org/certification](http://www.ppdm.org/certification).

Is the CPDA certification worthwhile for you? From my own perspective as a contractor it lends credence to my knowledge and experience. I have also had more hits on my LinkedIn page.

Don't just take my word for it. I know two other CPDA's who are employed by a multinational energy corporation who both tell me they used the Certification Handbook as a guide in preparing for the exam. When it came to actually writing the exam, all three of us found that our professional experience contributed more significantly to our success than we had anticipated. Now, we have each been recognized internally within our organizations for acquiring the CPDA.

Today's challenging economic environment means that employers can be more selective when it comes to hiring

or retaining employees and awarding contracts. CPDA certification is one way to get an edge up on the competition. In fact, some companies today have already begun to specify the CPDA certification as a requirement when advertising for positions. In summary, I recommend that if you are contemplating maintaining a career in petroleum data management, you seriously consider the CPDA certification. **■**

#### About the Author

Terence Broughton is a CPDA and president of TB Data Solutions Inc. He is also a member of the Petroleum Data Management Certification Committee (PDMCC).



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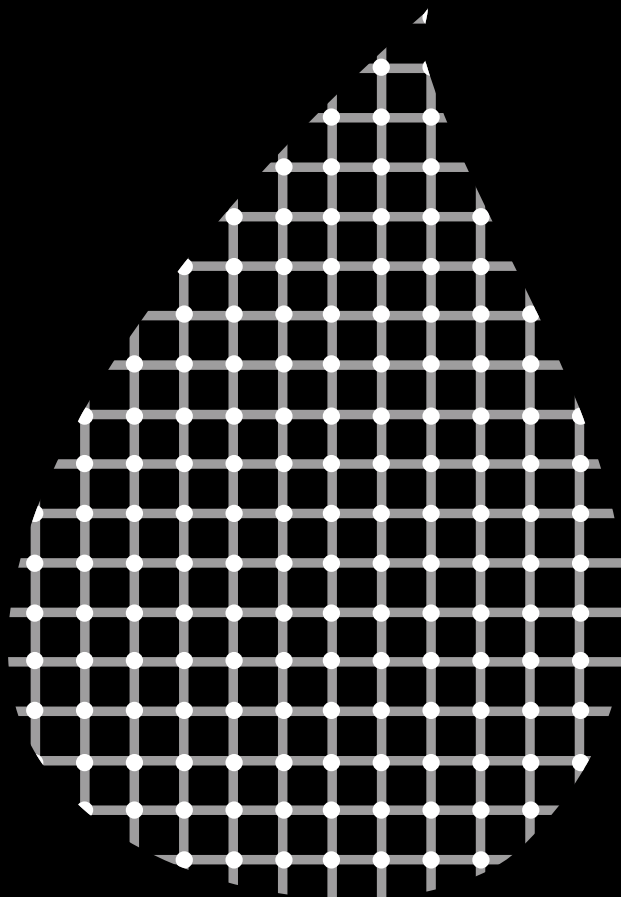
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## SLC Corner

### MIMOSA and OPC Foundation Announce Joint Working Group



# M

**MIMOSA**

([www.mimosa.org](http://www.mimosa.org), an operations and maintenance information open system alliance) and the OPC Foundation ([www.opcfoundation.org](http://www.opcfoundation.org)) have announced a joint working group to develop a companion specification for MIMOSA's CCOM standard and OPC UA.

MIMOSA is a not-for-profit trade association dedicated to developing and encouraging the adoption of open information standards for Operations and Maintenance in manufacturing, fleet, and facility environments. MIMOSA's open standards enable collaborative asset lifecycle management in both commercial and military applications.

MIMOSA CCOM (Common Collaborative Object Model) serves as an information model for the exchange of asset information. Its core mission is to facilitate standards-based interoperability between systems: providing an XML model to allow systems to electronically exchange data.

OPC Foundation is a not-for-profit

association dedicated to providing the interoperability standard for the secure and reliable exchange of data in the industrial automation space and in other industries. The OPC UA (Unified Architecture) is platform independent and ensures the seamless flow of information among devices from multiple vendors.


The OPC UA standard is a series of specifications developed by industry vendors, end-users and software developers. These specifications define the interface between Clients and Servers, as well as Servers and Servers, including secure access to real-time data, monitoring of alarms and events, access to historical data and other applications. The standard includes the ability to securely transport any information model between the systems. It is a key standard for Industry 4.0.

The joint MIMOSA and OPC Foundation CCOM OPC UA Working Group will develop an OPC UA Information Model for CCOM. The information model specified by CCOM will be defined in a UA companion specification using OPC UA constructs

for the purpose of exposing CCOM information to OPC UA applications, with an initial focus on existing Use Cases relating to information exchange to and from the control system. This will combine the existing strengths of each organization for some near-term wins, where OPC UA is used to bring information from the factory floor and where MIMOSA plays its traditional role in Asset Management.

The working group will deliver the following:

- OPC UA Information Model for CCOM (Standard OPC UA companion specification, Nodeset file and prototype implementation)
- A write up for the OPC Wiki describing the Companion specification
- Trade show demonstration and information material

Anyone who would like to contribute to this industry specification please contact one of the working group co-chairs: Paul Hunkar ([paul.hunkar@dsinteroperability.com](mailto:paul.hunkar@dsinteroperability.com)) and James Fort ([jfort@newgensys.com](mailto:jfort@newgensys.com)). 

## Caught the Photobug?

Enter the Foundations Photo Contest to get your photo published!



Photo Courtesy of Ernest Harrison, 2014.



Catch an amazing nature shot?  
Got perfect lighting on that rig?  
Get 'exposed' with Foundations!

Enter the Contest to WIN >

## Thanks to our Volunteers

### MARCH 2017

#### Beci Carrington

Beci Carrington was our March Volunteer of the Month. "Beci joined the Foundations editorial team back in 2015 and has been a wonderful addition to this small team. She is very detailed and always provides great suggestions – we truly appreciate the time she takes to make Foundations a success," said Elise Sommer, Senior Community Development Coordinator, PPDM Association. Pam Koscinski, Community Relations Coordinator with the PPDM Association, also appreciates Beci's ongoing support: "Beci's active participation in PPDM events as well as her continued support of PPDM are a true asset to our Houston data management community."

Beci started working with well logs at QC data. After completing her degree at Duke University, she was one of the first employees of A2D Technologies. She has been responsible for the quality of data production for digitizing logs and has an intimate understanding of the value of well products related to the life cycle of a well. From permitting through production and forecasting, she has in-depth understanding of the rule these varied datasets play in the G&G world. Beci continues to be instrumental in kicking off TGS's entrance into new products including the validated well header, production data, scout, frac, completion, forecasting and other products provided to the marketplaces. Today, Beci leads the Data Governance efforts at TGS, where she is responsible for ensuring data quality and integrity, and data integration across all of TGS's geological data sets and products. Beci



also plays a key role in collaborating with technology for the visualization and integration of products in TGS' software and ecommerce site. Beci has a tireless devotion to data process improvement, data quality, and data management at both PPDM and TGS.

### APRIL 2017

#### Joseph Suarez

Joseph Suarez, April's Volunteer of the Month, has been a valuable member of the Petroleum Data Management Certification Committee (PDMCC) for several years. An author and contributor to the Foundations Journal, Joe has provided guidance and advice on many activities. "Joe has been a delight to work with as a member of the PDMCC. He has helped us keep our community updated with the exciting activities of the Certification Committee, providing valuable advice and support for our communications team, and more. We have truly enjoyed working with him," said Ingrid Kristel, Senior Project Manager with the Professional Petroleum Data Management (PPDM) Association.

Joe has recently accepted a position with Seaboard Foods, but spent several years prior with ConocoPhillips as an Electronic Data Interchange (EDI) subject matter expert. He specializes in EDI, and as a Programmer Analyst throughout his career, has worked with Computer Sciences Corporation (CSC) and Emblem Health. Through the New York Institute of Technology, Joe holds both a BS in General Studies and an MS in Instructional Technology. He also has a Certificate in Data Processing from Farmingdale State College. Beyond his technical and educational background, Joe possesses a friendly and helpful personality that makes him a valuable member of the PPDM.



### MAY 2017

#### Tracy Heim

In May, we celebrated Tracy Heim as our Volunteer of the Month. Tracy volunteered to take on the role of Secretary for the Professional Development Committee when it formed in early 2016. Through this role, Tracy has provided valuable input, assistance, and guidance as the Committee heads towards its goal of making Professional Development opportunities more accessible to our community. "Tracy has been invaluable to this Committee. Her meticulous attention to detail, willingness to roll up her sleeves, and organized approach to any task have kept us on track and making progress. We really appreciate all the time and effort Tracy has donated to PPDM," said Margaret Barron, Chief, Professional Development.

Tracy's experience includes more than two years as the Subsurface Lead, Information & Data Management at BP, along with five years at Devon Energy as Supervisor, Exploration Data Management, and Exploration Data Coordinator. An alumnus of the University of Calgary with a Bachelor of Commerce in Marketing, Tracy also holds a Certificate in Petroleum Geological Applications from the Southern Alberta Institute of Technology (SAIT).



### JUNE 2017

#### Alex Ross

Alex Ross was our June PPDM Volunteer of the Month. Alex is a member of the Regulatory Data Standards Committee, Co-Chair of the Petroleum Data Management Certification Committee (PDMCC), and one of the first Australian Certified Petroleum Data Analysts (CPDA). As the Certification Committee shifted its focus to a better candidate experience, Alex played an



important role. “Alex has brought a unique perspective to the PDMCC, an individual who has taken the CPDA instead of being on the other side, as an author of the exam. This perspective is helping us to create programs that really help our CPDAs get the most out of their experience and their certification. I know the PDMCC has many exciting ideas and programs underway and, with Alex’s leadership, will continue to grow this exciting program,” said Ingrid Kristel, Senior Project Manager with the PPDM Association.

Alex describes himself as an data and information savvy geologist who effectively combines digital geoscience, workflow optimisation, and change management for customers. Currently the Senior Information Strategist in the Minerals and Energy Resources Division of the Department of State Development with the Government of South Australia, Alex

also has experience as a consultant and was previously at AWR Services Inc, Beach Energy Ltd., Santos Ltd and Schlumberger. Alex holds a Master’s Degree in Sedimentology and a Bachelor’s Degree in Geology from the University of London.


#### AUGUST 2017

##### Tim Coburn

Tim Coburn was the August Volunteer of the Month for PPDM. As Director, School of Energy Economics, Policy, and Commerce, and Professor of Energy and Operations Management, at the University of Tulsa, Tim Coburn has quickly developed a strong relationship between PPDM and the University of Tulsa. He has been with the University of Tulsa since 2011, and holds



a Ph.D. and an M.S. in Statistics from Oklahoma State University. Prior to his time at the University of Tulsa, Tim worked at Abilene Christian University as a Professor, Administrator, and Director, along with many other organizations through his private practice.

“Working with Tim has been an excellent opportunity to collaborate and grow with an academic institution here in Oklahoma,” said Pam Koscinski, PPDM U.S. Representative. “Tim brings such energy and enthusiasm, and we look forward to his presentation in Tulsa at the September 14 luncheon.” 

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## Where Are They Now?

By Dave Fisher, PPDM Association



**he Public Petroleum** Data Model Association was incorporated in July 1991. Its

first news publication (Fall 1991) listed 24 member companies; a year later there were 56 members.

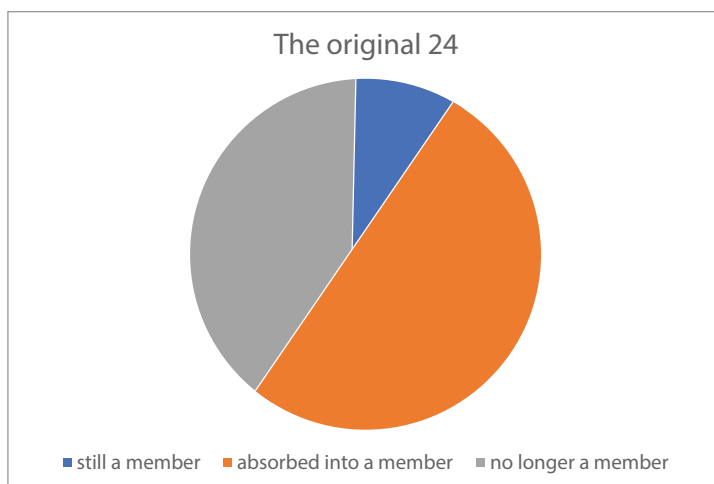
We all know the dynamics of the upstream oil and gas industry; companies and products come and go through sale, merger, rebranding or closure. As the PPDM's name has changed from the Public Petroleum Data Model to the Professional Petroleum Data Management Association, the list of members has changed over the years.

The following is a summary of the fate of these original 24. Half of them are still members of the PPDM Association. In many cases, the business changed hands more than once but only the current owner is shown. Often, the original business's assets (software, services or producing operations) that were the basis for PPDM membership were divested. The names in **bold** are current PPDM members. The year refers to the time of sale of the original name.

In summary, the pie-chart shows the fate of these original members. Although half are still members, only two have continued under the same name. Some are no longer members. All or part of the others were acquired by companies that are currently members.

*Original company names are as-listed in PPDM News, Fall 1991. Today's company names are interpretations of sometimes complex transactions and ownership history and are not necessarily correct. The names as shown may not be complete, actual or official names.*

Original name	Change year	Today
Amoco Production Co	1998	<b>BP Upstream</b>
Applied Terravision Systems	2002	CGI
Autotrol Technology (Canada)		Autotrol
BP Canada	1992	<b>Repsol</b>
Canadian Hunter	2001	<b>COP</b>
Canadian Occidental	2000	<b>Nexen</b>
Canex Exploration Services	1994?	<b>CGG</b>
Digitech Information Services	1996	<b>IHS Markit</b>
Encor Energy Corp	1993	<b>Repsol</b>
Ernst & Young		Ernst & Young
Esso Resources Canada		Imperial Oil (Exxon)
Finder Graphics	1992	Schlumberger
Gulf Canada Resources	2001	<b>ConocoPhillips</b>
Home Oil Co	1995	<b>Devon Energy</b>
Landmark Canada		<b>Landmark Software</b>
Lasmo Oil (Malacca)	1995	<b>BP Upstream</b>
LGS Group	2000	IBM
Munro Engineering (Calgary)	1992	<b>Landmark Software</b>
Oracle Canada		Oracle
Qbyte Services	2005	P2 Energy
Shell Canada		<b>Shell Canada</b>
Simon-Horizon	1993	Eagle Geophysical
Sun Microsystems	2010	Oracle
Virtual Computing Services	1997	<b>geoLOGIC systems</b>



**LUNCHEONS**

**OCTOBER 4, 2017**  
**PITTSBURGH DATA MANAGEMENT LUNCHEON**  
 Pittsburgh, PA, USA

**NOVEMBER 15, 2017**  
**OKLAHOMA CITY DATA MANAGEMENT LUNCHEON**  
 Oklahoma City, OK, USA

**NOVEMBER 30, 2017**  
**PERTH DATA MANAGEMENT LUNCHEON**  
 Perth, WA, AUS

**JANUARY 10, 2018**  
**OKLAHOMA CITY DATA MANAGEMENT LUNCHEON**  
 Oklahoma City, OK, USA

**JANUARY 23, 2018**  
**DENVER DATA MANAGEMENT LUNCHEON**  
 Denver, CO, USA

**FEBRUARY 1, 2018**  
**HOUSTON DATA MANAGEMENT LUNCHEON**  
 Houston, TX, USA

**FEBRUARY 7, 2018**  
**DALLAS/FORT WORTH DATA MANAGEMENT LUNCHEON**  
 Dallas/Fort Worth, TX, USA

**APRIL 5, 2018**  
**MIDLAND DATA MANAGEMENT LUNCHEON**  
 Midland, TX, USA

**WORKSHOPS, SYMPOSIA & EXPOS**

**OCTOBER 18, 2017**  
**DENVER DATA MANAGEMENT WORKSHOP**  
 Denver, CO, USA

**OCTOBER 23-25, 2017**  
**CALGARY DATA MANAGEMENT SYMPOSIUM, TRADESHOW & AGM**  
 Calgary, AB, Canada

**APRIL 17-18, 2018**  
**NEW HOUSTON PROFESSIONAL PETROLEUM DATA EXPO**  
 Houston, TX, USA

**JUNE 4, 2018**  
**OKLAHOMA CITY DATA MANAGEMENT WORKSHOP**  
 Oklahoma City, OK, USA

**CERTIFICATION - CERTIFIED PETROLEUM DATA ANALYST** NEW DATES ANNOUNCED

**NOVEMBER 8, 2017**  
**CPDA EXAM**  
 (Application Deadline September 27, 2017)

**MARCH 7, 2018**  
**CPDA EXAM**  
 (Application Deadline January 24, 2018)

**JUNE 6, 2018**  
**CPDA EXAM**  
 (Application Deadline April 25, 2018)

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**OCTOBER 2017**

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**JANUARY 2018**

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“

**WITHOUT *knowledge*  
action IS USELESS  
AND *knowledge*  
without ACTION  
IS futile.**”

Abu Bakr



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