



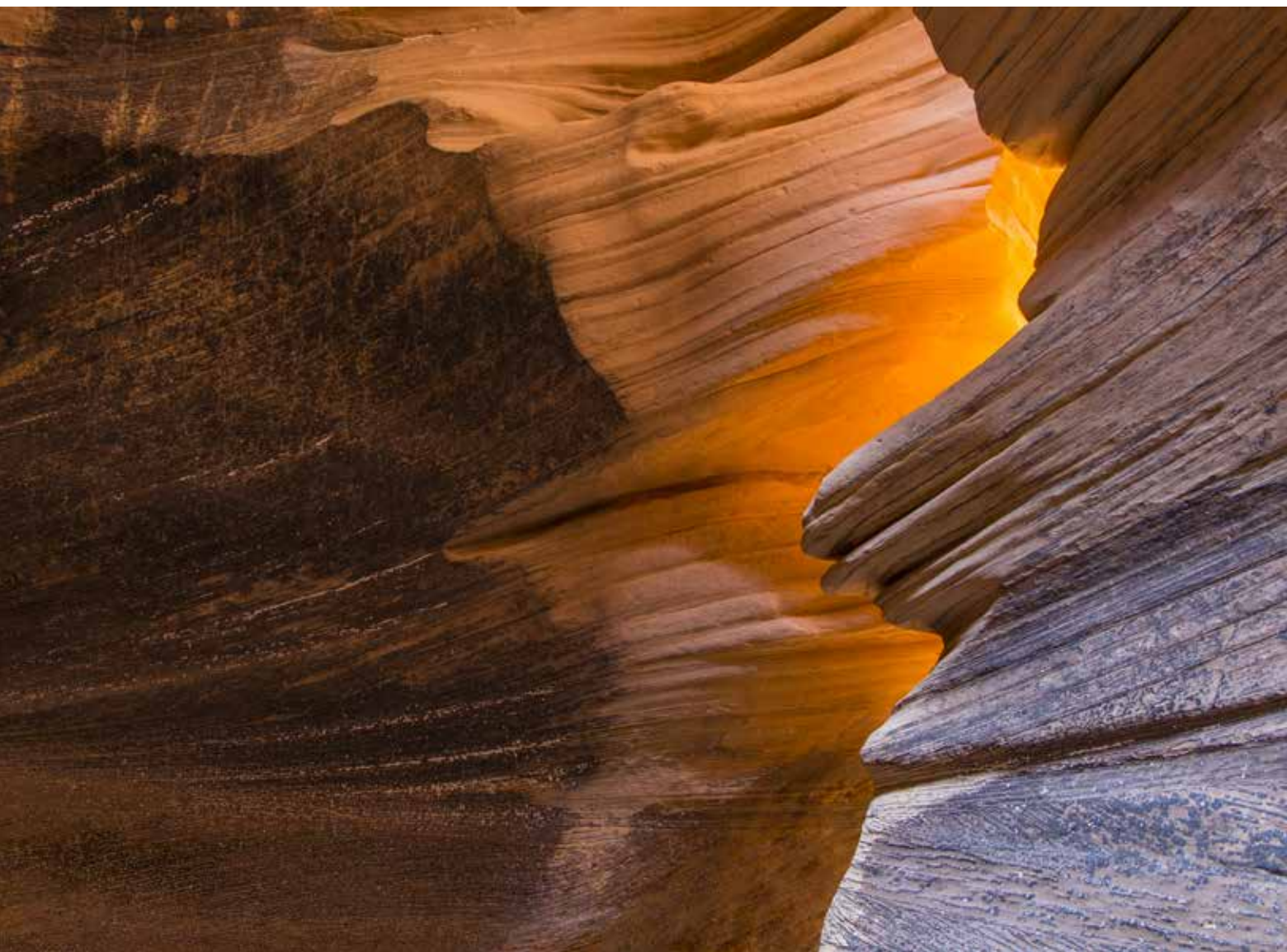
PPDM™

# Foundations

Journal of the Professional Petroleum Data Management Association

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

Volume 2 | Issue 3 | 4Q2015



**1st Place** Foundations Photo Contest Winner; Chris Ebright, "Golden Light in remote southern Utah canyon"

## CPDAs Highly Recommend Certification Programs

Certification programs ensure that a person has the knowledge and skills needed. (Page 6)

### PLUS PHOTO CONTEST:

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



Success up here

depends  
on what you know  
down here.

Subsurface intelligence is everything.

Understanding the subsurface is everything when producing unconventional assets. EnergyIQ delivers E&P Data Management Solutions that enable companies to exploit unconventional plays with less risk. Learn how our Trusted Data Manager (TDM) application suite can help you value, acquire, and produce assets with greater certainty, speed, and collaboration.

Visit [www.energyiq.info](http://www.energyiq.info), or call us at (303) 790-0919.



2329 W. Main Street, Suite 300, Littleton, CO 80120 • (303) 790-0919

# Foundations

Foundations: The Journal of the Professional Petroleum Data Management Association is published four times per year.



## CEO

Trudy Curtis

## Senior Operations Coordinator

Amanda Phillips

## Community Development Coordinator

Elise Sommer

## Article Contributors/Authors

Robert Best, Gordon Cope, Jim Crompton, B.J. Cummings, Trudy Curtis, Andrew Zolnai, Petroleum Data Management Certification Committee

## Editorial Assistance

Dave Fisher

## Graphics & Illustrations

Jasleen Viridi

## Graphic Design

McARA PRINTING



## BOARD OF DIRECTORS

### Chair

Trevor Hicks

### Vice Chair

Robert Best

### Secretary

Janet Hicks

### Treasurer

Peter MacDougall

### Directors

Trudy Curtis, Paul Haines, David Hood, Allan Huber, Adam Hutchinson, Christine Miesner, Joseph Seila, Paloma Urbano

### Head Office

Suite 860, 736 8th Ave SW  
Calgary, AB T2P 1H4  
Email: info@ppdm.org  
Phone: 403-660-7817

# Table of Contents

Volume 2 | Issue 3 | 4Q2015

## COVER FEATURE

### CPDAs highly recommend certification programs 6

Certification programs ensure that a person has knowledge and skills  
*By members of the Petroleum Data Management Certification Committee*

## FEATURES

### Digital and Raster Work Together 12

What are the implications of the new standard to data management?  
*By Gordon Cope and the Foundations Editorial Staff*

### Data to Maps: A Simpler Workflow 19

Helping rapid project start-ups for petroleum professionals in a typical operational scenario  
*By Andrew Zolnai*

### Understanding “Where” 22

Spatial Data Management  
*By Trudy Curtis*

### The Golden Record is Not Enough 24

The Case for Data Orchestration  
*By William “BJ” Cummings*

## GUEST EDITORIAL

### Broken Windows and Data Management 4

What does the broken window theory on vandalism have to do with data management?  
*By Jim Crompton*

## DEPARTMENTS

### Reserve Hierarchies in PPDM 3.9 10

Calculating reserves is as much an art as a science  
*By Trudy Curtis and Robert Best*

### PPDM Thanks its Volunteers 14

Featuring Madelyn Bell, Jim Williams and Ellen West Nodwell

### SLC Corner OGI Project Update 15

The Oil and Gas Interoperability Pilot update

### Photo Contest 16

This quarter’s winners and how YOU can get your photo on the cover of Foundations

### More Than the Data Model 18

Symposium & Workshop attendees enjoy sessions and building the Data Management community

### Upcoming Events, Training and Certification 27

Join PPDM at events and conferences around the world in 2015. Learn about upcoming CPDA Examination dates and Training Opportunities.

## ABOUT PPDM

The Professional Petroleum Data Management (PPDM) Association is a global, not-for-profit society within the petroleum industry that provides leadership for the professionalization of petroleum data management through the development and dissemination of best practices and standards, education programs, certification programs and professional development opportunities. PPDM represents and supports the needs of operating companies, regulators, software vendors, data vendors, consulting companies and management professionals around the globe.

---

## Guest Editorial

### Broken Windows and Data Management

By Jim Crompton, Data Management and Analytics Consultant



**T**he broken window theory, developed by two social scientists (James Wilson and George Kelling, *Atlantic Monthly*, March 1982), received a great deal of attention. Later authors expanded on the original ideas in relation to crime in urban neighborhoods. So what does this have to do with data management?

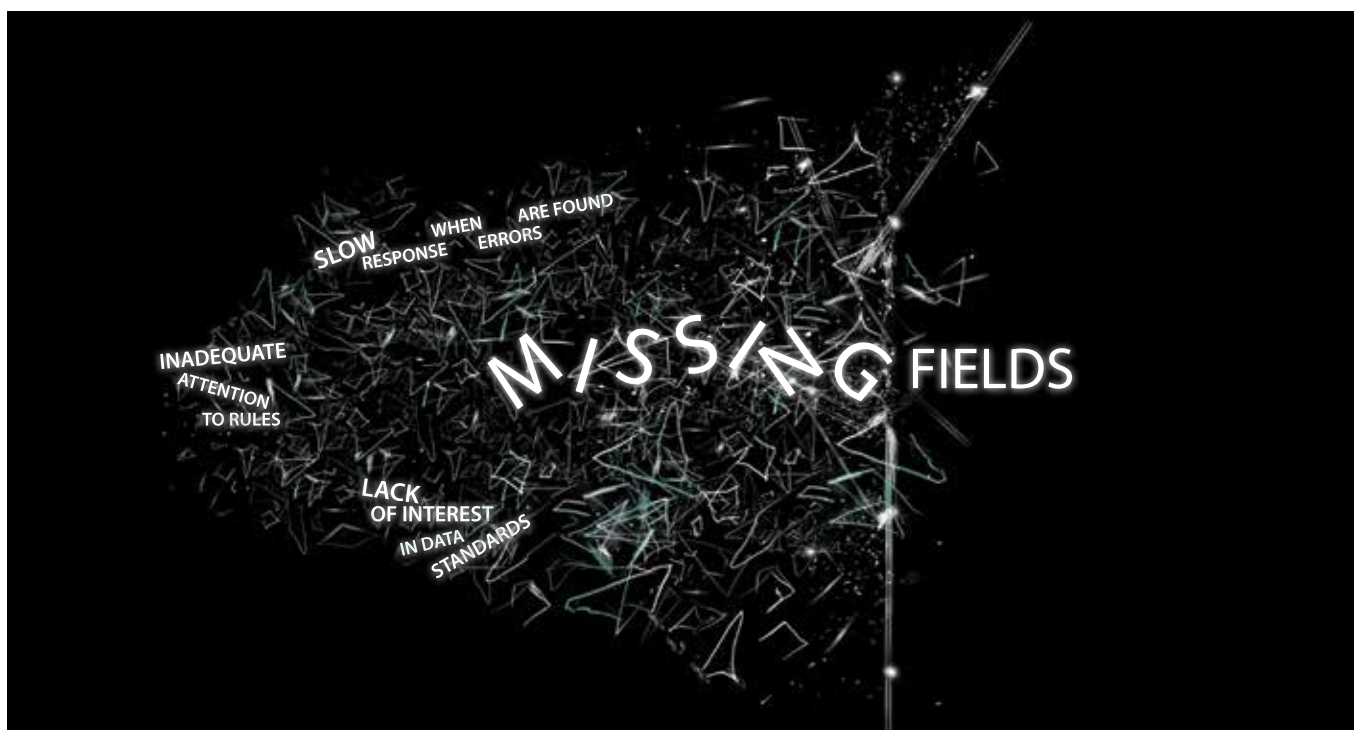
The theory proposes that vandalism can be reduced by fixing the problems when they are small. Repair the broken windows within a short time and the vandals will be less likely to break more windows. Clean up the sidewalks every day and the tendency to litter is reduced. Problems will not escalate and respectable residents will not leave. By addressing minor issues, petty crime and anti-social behavior will be deterred and ultimately major crimes will be prevented.

So here's the link you were waiting for. I would like to apply this theory to the current industry challenge with data quality and data management. What if we were to promptly deal with "broken windows" like missing fields, slow response when errors are found,

inadequate attention to business and technical rules when populating data stores, and lack of interest in data standards? Would this overcome the users' distrust of official systems of record and enterprise data warehouses, and reduce the "petty crime" of personal spreadsheets?

Several years ago, in a time of intense cost pressure, the oil and gas industry went through a series of painful downsizing steps. Most levels got hit hard, but especially our support staff. The folks who used to operate the file rooms for the well files, technical reports and maps were suddenly not there to help. Nor were the technicians who really knew how to use the corporate systems. This coincided with the rapid growth of PCs. The theory held that as engineers became their own data managers, using productivity tools like Excel and Access, the organization would survive and minimize cutting in other areas.

We survived that period but now another round of restructuring is upon us. I know that organizations are trying to keep their engineering staff, but what does the (data) neighborhood look like



now? Recent years have seen the rapid growth of digital data in many forms. More sensors in the field, more automation, larger subsurface and reservoir models are characteristics of the digital oil field.

The users have done their best to manage their files, without much help. Data volume has grown everywhere from corporate systems to personal spreadsheets stored in network drives, but has that gotten us where we need to be? We look at our “data foundation” and wonder how it got so bad. We build digital oil field workflow solutions, with advanced modeling and analytics tools, but still have difficulty getting good data into the super-turbo-charged analytical engines and integrating data across functional silos for a better look at the economic health of the field asset.

I’m writing while 2016 budgets are being put together. This year was tough and no one really knows the near-term future. Will information management be a priority or a favorite target to cut yet again? With the growing interest in analytics, it amazes me that the data foundation gets so little attention. We want to transform

the neighborhood but we don’t want to pick up the trash in our own front yard.

I am not just talking about new investments in data management technology. Good data management addresses business process maturity and the service capability issue (the broken windows root cause). Yes, there are new technologies that allow us to store more data and analyze more data faster. But is that the real problem? Have we overcome the core data management challenges? By constantly looking for a technology silver bullet are we fooling ourselves into focusing on the wrong problem?

Using the broken windows analogy, we’ve got a lot of work to do to clean up the neighborhood. Developers are eyeing the landscape with thoughts of building new exciting structures but they are not sure about the basic infrastructure, the local neighbors and the local culture. We have numerous postings for data architects, data scientists and petro-technical application support positions but few qualified applicants that are ready to move in.

Making progress towards our intended direction, whether you call it the digital

oil field, the digitized platform or something else, will require investment in new technologies. But we must not forget the basics. We need to clean up some of the graffiti, fix a few broken windows, clean up a few data bases and provide enough support that those systems stay as trusted sources. Most of all we need to pay attention to the current data foundation and make a few local investments as well as a few behavior changes. 📦

#### 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.

# CPDAs Highly Recommend Certification Programs

**Certified Petroleum Data Analysts highly recommend PPDM certification programs to fellow data management professionals**

By The Petroleum Data Management Certification Committee

**“E**ducation is what remains after one has forgotten what one has learned in school.”

Albert Einstein’s astute observation is a guiding principle for everyone who makes a commitment to be a lifelong learner. For most of us, a dozen or so years in the school system teaches us how to read, write, do basic problem solving, and how to (usually) get along with others without whacking them upside the head. University and college education mostly teaches us some specific facts about one or more subjects but mostly they teach us how to assimilate

new knowledge. This foundation sets us up with basic “rules of the game.” From there, the difference between people is really how we use that learning foundation to “play better than anyone else.” (Einstein again!)

So, just how important is education? In particular, does a data management professional have to have a degree in data management in order to be successful? In May 2013, the Federal Reserve Bank of New York spent some time thinking about post-secondary degrees. Essentially, they found that about 62.1% of college graduates have a job that requires a

degree. Does that mean nearly 40% of graduates are “underemployed”? Not necessarily. In today’s economy, new professions are swiftly springing up. Formal education system are rarely agile enough to keep up with the demand for new educational programs, so your job might be in an emerging discipline.

In the Federal Reserve study, Abel and Deitz found that only 27.3% of graduates actually have a job that is directly related to their college major. That’s interesting! Our experience with the emerging data management discipline supports this premise; very few data managers have a degree in data or information management, let alone a degree tuned to our industry. Despite this, most of our data managers are very good at what they do! In all industry sectors, for operators, regulators, service companies, large companies and small companies we see much the same thing. Data managers are bright, determined, capable and resourceful. So, what is making these people successful?



#### Andrea Conner

**Conner is a senior geological technician at American Energy Partners. She has worked for over 21 years in the Oil and Gas industry. Her current job duties include overseeing the database in the company's geological interpretation software, as well as other technical duties. Conner obtained the Certified Professional Data Management credential because she does not have a degree, and yet possesses the aptitude and skills to support her job.**

"I was not able to attend college, as I was the oldest of three children of a single mother, so I started working when I was 15½ to help support the family," said Andrea Conner. "Since I did not have a college degree, I felt (CPDA) certification would fill that void."

What's important to success is appropriate knowledge and proficiency in its application to real world situations, along with the aptitudes and attitudes that ensure you are suited to the necessary tasks. Getting this knowledge and skills into the right hands at the right time is the main challenge today's employers face.

Our parents often started and finished their working lives in the same or related professions, so a degree made a lot of sense. Today's young people question whether the value of a degree is worth the time and effort. A Canadian study suggests that today's youth can expect to hold about 15 jobs before they retire. A similar study in the UK claims that most people will have 10 – 14 different jobs and three or four career changes during their working life, while the Australians claim that you are likely to have about six career changes. No one can predict

what degree they will need in 10 years. Most young people prefer to train for the job they have when the time is right.

A couple of years ago, the Economist published an article about the value proposition for university education. It's expensive to get a degree these days; the Economist reported that between 2001 and 2010, the cost of an average post-secondary education went from 23% of median annual earnings all the way up to 38%! Students graduate with more debt than ever, so the promise of a financial reward needs to be clear before most young people will commit to the years of study required. And remember that the odds are not in favor of you ending up with a job that requires the degree you invested in.

Consider the emerging professional data management discipline. While a few degree programs exist for generalized data and information management, they tend to be very generic in nature. Those who become petroleum data managers more often do so based on their existing credentials in earth sciences or information technology. Others enter the discipline as a result of their aptitude and capability, even though their specific education might be in a distantly related discipline, like political sciences, humanities or literature. Data managers can be very successful, provided they have the capacity to learn.

Keep in mind that once you get your degree, it's yours for life. Whether or not you maintain and advance your knowledge is up to you. Whether knowledge turns into practical skills depends on each individual's aptitudes and attitudes. Degrees are starting points, not end points.

Certification programs ensure that a person has the knowledge and skills needed where they are actually working. These programs support "on the job" learning, and value your working experience. Certification programs insist on a commitment to ongoing learning and professional development.



#### Daniel Perna

**is a data management professional. He is an enterprise geoscience data coordinator with Devon Energy, where he has worked for seven years. As a part of the geoscience data management team, he helps maintain Devon's well master database and facilitates communication, work sessions, and training for stakeholders across disciplines pertaining to E&P master data management. He lends his subject matter expertise to the improvement of data quality and mappings, and helps to develop and refine enterprise geoscience data standards.**

"What I've learned on the job was definitely the most helpful factor in getting certified," said Daniel Perna. "In my experience, very few people who end up being geoscience data managers - typically with the title 'Geotech' - aim specifically for that role. Rather, my co-workers have had varied educational backgrounds spanning geography, MIS, accounting, IT, studio art, environmental science, mathematics, and more. What they brought to the job was aptitude, attention to detail, and willingness to learn, and I'm no different."

A college or university degree demonstrates that a job candidate has several useful qualities. The difficulty and length of the degree program demonstrates that the candidate has the ability to learn and apply knowledge, the determination to see the program through to conclusion and hopefully that the candidate has foundational "business" knowledge upon which a career can be built. In that sense, a data manager with a strong background in earth sciences has an advantage

over a data manager with a degree in the financial or medical space.

What allows data managers to be successful in our industry is the capacity of an individual to learn, combined with the capacity an industry has to provide the learner with the specific knowledge and skills that they need to be successful. Alternative learning systems help learners learn the right information at the right time in order to help the learner succeed.

From a balanced perspective, the emerging data management discipline needs to leverage formal education and less formal learning mechanisms. Professionals need to see a logical path that connects what they learn to success in their jobs and careers. Employers need an environment in which staff comes to the table with a known, quantifiable background of knowledge and skills. This is the niche into which certification programs fit.

That's quite different from training someone how to perform a specific task. Historically, this was the tactical niche into which many data managers fell. Upon entry into a position, a new employee would be taught how to load seismic data into a software tool, or how to submit an appropriate regulatory application. These technicians fill many important roles in companies. But training someone how to perform a task is quite different from the professional development program that is needed to ensure that as a data manager you are strategically deployable in many situations, and that you can be effectively ported from one function to another quickly and efficiently.

Think about today's economy. Fewer wells are being drilled. Less seismic data is being acquired. But many large capital facility projects are continuing to move forward. Industry leaders have indicated that facility related data management is a critical gap that needs to be addressed. A properly certified data management professional can be

readily deployed into a function that needs help as the needs of industry shift. Appropriate learning and experience based mechanisms help the data manager apply principles of good data management to a different discipline.

Certification programs are designed to ensure that individuals are well prepared to meet expectations of this kind. In 2015, PPDM formally launched the Certified Petroleum Data Analyst (CPDA) exam.



Trevor Hicks, chairman of the PPDM board of directors, says "Industry will benefit as data management is more widely recognized as a valuable profession. Establishing PPDM certification as a global standard is good not only for the individuals that achieve that recognition, but good for the industry, because we will have a foundation for establishing standards and practices for the good of the industry."

The program was developed by subject matter experts to meet industry's needs for developing and recognizing competence in data management professionals, and is the first offering in a series of petroleum data management professional certifications planned for the future. CPDA certification was designed to demonstrate to employers, clients and colleagues that a CPDA certified professional possesses data management knowledge, experience and skills to bring success to data management projects.

Ultimately, that leads to the credibility that data managers need in order to be effective on the job. Daniel Perna found this to be very true for his situation:

"I currently communicate a lot regarding new initiatives and, in doing so, I meet new people inside and outside of Devon. I trust that an audience would soon see for themselves the benefits of what is communicated on its own merit, but being PPDM certified helps convey that there is some thought and weight behind it."

Participating in a strategic program like the CPDA means that in order to prepare for the certification, a candidate must first develop the background of knowledge and skills that is expected of a strategic resource. Experience and training work hand in hand to help prepare a data manager. The program was designed for data managers with between three and five years of experience in order to give the candidate, their employer, and human resources groups the time needed to provide that professional development program.

"There are several reasons (why I pursued the CPDA certification)," said Perna. "The first is to become a better data manager. Since the exam was developed by skilled industry professionals, I expected that by studying for and taking the exam, it would expose opportunities for me to grow. I was right; the study guide and the exam itself showed me subjects in which I was weak so I could research them, and I believe I'm becoming a more well-rounded data manager because of it."

Based on a combination of education, training and experience, an effective certification program is designed to verify that an individual has the knowledge and skills necessary to perform the functions expected of them. Data managers need to understand the life cycles in our industry, who the stakeholders are, and what impact data will have on workflows and processes over the decades-long operational periods that exist for wells and facilities. Properly done, the certification verifies that an individual has the broad background, knowledge and skills to be a strategic resource in a company.



### Olubunmi Isinkaye

**Olubunmi Isinkaye is an upstream business analyst. He has worked for more than 15 years in IT in the Oil and Gas industry including 10 years at Halliburton and two years with a major oil company.**

Olubunmi Isinkaye recently acquired the CPDA certification because “the objectives aligned with my career aspiration and background. I wanted to specialise in data management from the business/operations perspective and this certification is just for that. Preparing for a diverse array of knowledge as documented in the certification blue print was mind boggling,” said Isinkaye. “But I was able to actively get this going within a month of preparation.”

Isinkaye supports Daniel Perna’s view that credibility from certification adds weight to his role as a data manager. “It validates what I can do in the petroleum data management domain,” said Isinkaye.

At the PPDM Association, the Professional Development program is working with industry to help drive out a family of high quality, trusted learning programs. Some of these programs will ultimately include university or college degrees, but the vast majority will support the “lifelong learning” that professionals commit to.



### Zubai Abu Bakar

**Zubai Abu Bakar is an exploration database specialist at Talisman Malaysia Ltd, part of the Repsol Group. She has been working with the company for two years. Previously, she worked with Murphy Oil Sarawak for six years as data management assistant. Her duties include ensuring that data is received in industry standard formats, improving the effectiveness of database tools and services, and developing and promoting sound and consistent data management practices. Zubai recently attended a training program to prepare for the certification exam.**

“I heard about the CPDA program from Mr. Jess Kozman in the course instructed by him in November 2014 (Certificate in Advanced Petroleum Data Management – Geophysical & Wells),” said Zubai Abu Bakar.

Helping develop the multifaceted environment that is needed to support our discipline will require the concerted effort of many people. Subject matter experts in many disciplines are needed to develop the best practices and training that a data manager needs. Young data managers are very willing to learn, all they need is the right opportunity and environment.

Perna had to work hard to get ready for the certification. “I think the most challenging part for me was trying to understand exactly what might be tested and making time to prepare for it with a busy schedule. I was confident in certain areas from my industry experience. However, without a deep IT background or geophysical experience, I had to intentionally study up on things like database integration, best practices in master data management, and seismic data formats, for example. I followed most of the recommendations

in the study guide that PPDM prepared and did some extra research as well.” Even experienced data managers are participating in the program. Taking the certification was an obvious element in Broughton’s consulting practice, largely because it provides a public and tangible validation of his knowledge and skills. “It has enhanced my marketability,” said Broughton. “I have had more hits on my LinkedIn page and more contacts.”




### Terry Broughton

**Terry Broughton is president of TB Data Solutions Inc. He has spent over 20 years consulting to various energy companies in data management and data analysis.**

All of the CPDAs felt that the program was important. “I would highly recommend it to anyone who sees E&P Data Management as their career path,” said Perna. “I support PPDM’s efforts at certification because I believe everyone in the industry will benefit from better standards and training for E&P data management professionals.”

### REFERENCES:

- <http://libertystreeteconomics.newyorkfed.org/2013/05/do-big-cities-help-college-graduates-find-better-jobs.html#.VfskmflVhBc>
- <http://economist.com/news/united-states/21567373-american-universities-represent-declining-value-money-their-students-not-what-it>
- <http://workopolis.com/content/advice/article/how-many-jobs-do-canadians-hold-in-a-lifetime>
- <http://personalcareermanagement.com/individual-services/career-change/>
- [https://www.career-manage.com.au/career\\_management](https://www.career-manage.com.au/career_management) 



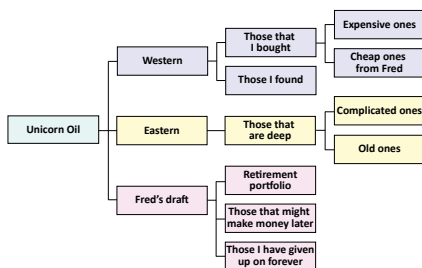
## Reserve Hierarchies in PPDM 3.9

Trudy Curtis, CEO PPDM Association and Robert Best, Noah Consulting

### ART VS. SCIENCE

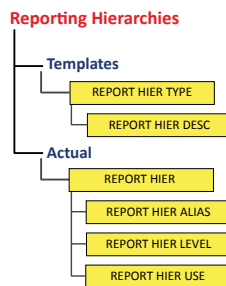
Calculating reserves is as much art as science. Working our way from the reserves we hope we have to deciding what we are sure we have is complicated and time consuming. At the corporate level, collecting reserves information and sorting out where our most technically feasible and economically profitable areas are expected to be is foundational to good business planning. The PPDM data model includes subject areas to help keep track of reserves information. It also helps us to create aggregation hierarchies within which real or expected production volumes and technical or economic reserves can be analyzed.

Globally, companies have developed hierarchical systems that they use to aggregate this information. Indeed, within a company, groups or even individuals may create aggregation hierarchies perhaps similar to the one below. At the lowest level, the analyst might collect all of the well completions that complete into the same pool or reservoir (or segment). From there, the next level might relate to a basin or field, or a corporate division. The ways in which this aggregation can happen are as varied as the imaginations and needs of the reservoir engineer.



### DATA MODEL DESIGN

I'm often asked how the data model can be used to create and manage these hierarchies. This article is intended to help users of PPDM 3.8 or 3.9 understand how these tables work. At a high level, the table set looks like this:



In PPDM, the principle of creating a template on which to base actual designs is used many times; you will find more examples of this design method in PROJECTS and AREAS if you are interested. For reserve hierarchies, implementations can start with design templates, and use them again and again, for actual hierarchies.

### KINDS OF HIERARCHIES

Several kinds of hierarchies are possible; which is most appropriate and useful to a particular system is a design decision that requires some thought and planning. The list below may help you move through this process with some clarity:

#### 1. Decomposition hierarchies

These hierarchies contain levels that are logically connected by the statement "is a part of". A good example of a decomposition hierarchy is regions. At the template level, a province (or

state, emirate, parish or territory) is part of a country. A country is part of a continent which is part of the planet. Vehicles are also often described using decomposition hierarchies. The physical hierarchy will be developed using the template hierarchy, so in Calgary (where I live), Calgary is part of Alberta, which is part of Canada, which is part of North America, which is part of planet Earth.

#### 2. Ontological hierarchies

These hierarchies are the ones often used in ontologies; logically, each object in the hierarchy is connected to its parent using the statement "is a kind of". The most common taxonomy, which most children learn in school, is the Linnaean Classification system. At the template level, the species exists at the lowest level, and is followed upwards by Genus, Family, Order, Class, Phylum, and finally Kingdom. The physical hierarchy that is created might contain an entry for humans, which goes something like this. Homo Sapiens is a kind of Homo, which is a kind of hominid, which is a kind of primate, which is a kind of mammal, which is a kind of vertebrate, which is a kind of animal.

#### 3. Mixed hierarchies

Commonly, classification systems employ a combination of decomposition and ontological hierarchies, and are very comfortable and familiar to users. When using these systems, it is a great idea to document the specific semantic meaning behind each layer type, along with the rules that are used when creating or changing them.

### TEMPLATE HIERARCHIES

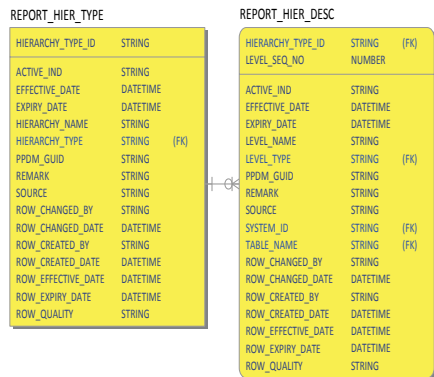
Consisting of only two tables, REPORT\_HIER\_TYPE and REPORT\_HIER\_DESC, this pair of tables set up the design for the template. The parent table, REPORT\_HIER\_TYPE, allows you to name the template, describe it, and reference the time period in which this particular template is valid. It allows you to define any number of kinds of hierarchies you might use in a company.



The child table, REPORT\_HIER\_DESC, allows you to identify and name each level of the hierarchy. In general, these will work best if you think of them as building blocks. You can describe what type of information is contained at each level. For example, you might have one level that is made of regions, another by kind of play and a third by stratigraphic zone. You can create multidimensional templates as well - the system supports both.

REPORT\_HIER\_DESC gives instructions about how to build that particular hierarchy. For example, in a regional hierarchy, for the top level, LEVEL\_SEQ\_NO = 1, LEVEL\_NAME = Country, LEVEL\_TYPE = Geopolitical country. If the objects that could be contained in a physical hierarchy are managed in a data model (which could be PPDM or some other system), the template can identify the system and table from which they can be derived. That information is useful when creating the physical hierarchy, which is the next step.

Template Hierarchies



PHYSICAL HIERARCHIES

Four key tables make up this section of the subject area. The REPORT\_HIER table is the parent of each physical hierarchy. You can name the hierarchy, indicate where it came from, and show when this hierarchy is in use. The table REPORT\_HIER\_ALIAS allows to you capture the identifier that is used for this hierarchy in other systems.

REPORT\_HIER\_LEVEL captures each object in the hierarchy at each level and indicates which object it is a child of. It's

important to keep track of the parentage of each object in the hierarchy, or you will have trouble reconstructing it later on. You can reference the template level that is used for each object if you wish. At each level you can also indicate (by foreign key reference) which object in PPDM is being used. This allows you to reference countries in the AREA table, divisions in your company (BA\_ORGANIZATION), partners (BUSINESS\_ASSOCIATE) and so on as needed.

When querying your hierarchy, this reference method allows you to query into the relevant subject area for additional detail if you need it. It also prevents the need to store descriptive information more than once (Dr Codd would approve!).

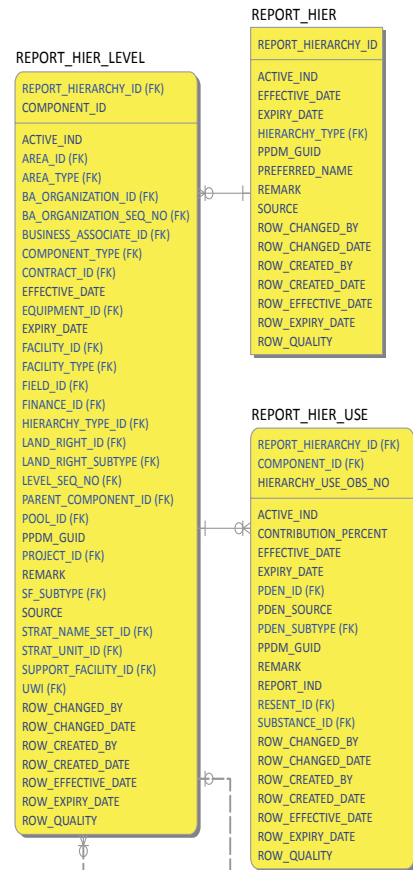
The REPORT\_HIER\_LEVEL table is also versionable, allowing you to version the participation of different objects in the hierarchy at any given time. That can be useful if your partners have changed. However, in many cases it is practical to simply create a new reporting hierarchy, and mark the old one as inactive (ACTIVE\_IND = N).

The table REPORT\_HIER\_USE helps specify a specific substance that is contributing to the hierarchy (because your hierarchy might only be for gas). You can also reference how much of the production from a particular production entity should be allocated to the contribution of the object into the reporting hierarchy (particularly useful if you have production reported by well, but your hierarchy needs to allocate to the formation). Foreign keys from PDEN and RESERVE\_ENTITY help keep those relationships clear. Note that at each level of the hierarchy, you can associate one or many production or reserves entity.

Ideally, the identity of each production or reserve entity could potentially be calculated on the fly. But that's complicated and can be difficult. Often the best choice is to query which production or reserves entities are included in the object identified in the hierarchy and then store the result in REPORT\_HIER\_USE. This allows you to keep the list you need close at hand. The potential risk is that

the list of entities might change, and your records in REPORT\_HIER\_USE be out of date. If you do capture the list, we recommend that you employ good methods to keep track of changes and make sure that the list is kept current. [E]

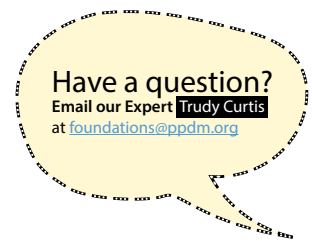
Physical Hierarchies



About the Authors

Robert Best is a Senior Principal with Noah Consulting.

Trudy Curtis is CEO of PPDM.





### Digital and Raster Work Together

Foundations Editorial Staff and Gordon Cope

Recently, Energistics and PPDM announced the development of Raster Well Log Depth Registration data objects (No More Crasteration, Foundations, Volume 2, Issue, 2). The project was a joint effort of Energistics and PPDM under the banner of the Standards Leadership Council (SLC), in which standards organizations are working together for the benefit of the industry.

According to Energistics, the set of data objects provides a common industry-standard depth calibration format that improves on and is complementary to existing proprietary standards. The new data objects allow service companies, data vendors and customers to more readily associate depth registration information with the correct log and move well logs and registration information between software systems.

But what are the implications of the new standard to data management? "It is an important development," says Jim Williams, a reservoir engineer and one of the principal proponents of the standard. "Data managers may not immediately appreciate all the ramifications, but it is going to have a significant impact over time."



#### KEY TO UNDERSTANDING

Well logs are the Rosetta Stone of the O&G industry. They give us a vast amount of information that companies then interpret in order to understand the formations that lie far out of sight. There are many different types of logs in many different forms (see Definitions Sidebar and Table 1.). Which ones are used depends upon who is using them, and for what purpose.

Geophysicists, for instance, operate primarily in the digital realm. "They use sonic logs to create synthetic seismic to tie in their seismic lines to depth and formation density logs to calculate acoustic impedance, so more digitized logs available, the better," says Williams. "The cost of digitizing raster images is tiny in comparison to the cost of a seismic acquisition project, and is very valuable."

Drilling and production engineers also benefit greatly from digitized logs. "When planning and drilling an unconventional well, digitized logs offer the opportunity to employ sophisticated software applications that combine seismic and log information to point to the best hydrocarbon areas within a shale formation, as well as ideal fracking patterns to optimize production," says Williams. "Under these circumstances, digitizing raster images is justifiable in terms of the value."

Geologists, however, regularly use and benefit from raster logs. "A large amount of an exploration or development geologist's work is devoted to rapid evaluation of a prospect," says Williams. "If the company is interested in a 30 foot Pennsylvanian-age formation in Oklahoma, for instance,

the geologist can use raster logs to quickly create a cross-section that allows them to evaluate the structural and/or stratigraphic potential. They don't care about the 5000-ft of rock above, or the 5000-ft of rock below, nor are they worried about complex petro-physical properties beyond approximate estimates of porosity, fluids and permeability. For their purposes, inexpensive raster images for wells inside their acreage position are sufficient."

"Using images tacked on a wall to make a cross-section may sound like a down-and-dirty method, but a lot of oil has been found that way," says Phillip Sand Hansel II, a principal consultant with Infosys. "The point is, when do you bring historical paper logs into the digital world? When do you computerize logs that were acquired before computers evolved into the wonderful machines we know today?"

#### UBIQUITY AND COST OF DIGITAL CONVERSION

As advertised on a data vendor's web site, there are over 8 million logs worldwide, which comprises scanned raster logs (TIF) and digital logs in Log ASCII Standard (LAS). "Almost half of these are located in the US, about 3.8 million logs," says Williams. "Of the 8 million logs, approximately 1 million are available in LAS format, or 14%."

There are 2.2 million depth-registered raster logs ready-for-use in modern geoscience software. "If these logs were digitized into LAS format (using back-of-envelope calculation), the cost of digitizing all these logs is over \$300 million," says Williams. "Clearly, this is too much for any one company or vendor to undertake."

Several years ago, the medical sector underwent a collaborative effort, the Human Genome Project, to classify the human DNA. Could the O&G industry do something similar with logs? "Clearly, we could," says Williams. "But conflicting interests would make the undertaking very difficult."

In addition, there is a further concern. "Digital conversion still relies on human input which can be a significant source of error," says Williams. "A density porosity curve incorrectly digitized might show a reservoir with a higher 12% porosity, instead of 8%, reducing potential reserves. Shale reservoirs have even less room

for laxity; a digitized log that shows 8% porosity instead of 6% may result in a poor well or render acreage useless. That is why managers invariably call for a raster image prior to making a decision.”

## STANDARDIZATION

Digitizing several million raster logs remains a daunting task; a far more reachable goal was attainable, however. Major vendors rely on proprietary file formats for raster log calibration, a system that introduced the potential for error when converting from one system to another. Could the sector create a new, standardized calibration format to eliminate problems?

With industry approval, Energistics and PPDM launched the Raster Log Calibration Project. The initiative resulted in the development of a standard XML format for the purpose of standardizing the raster log depth registration across all data and software vendor platforms. Digital logs already use the LAS 2.0 standard; the XML format only applies to depth registered raster logs. “Instead of four proprietary calibration formats, you now have one open standardized format,” says Hansel.

“The new format allows a standard format to move between platforms without introducing inadvertent error; it is similar in function which allows you to share Excel spreadsheets without jumbling the numbers,” says Williams. “It has the advantage of eliminating time wasted on confirming that logs have indeed been correctly transformed.”

## TOWARDS THE FUTURE

Currently, all newly drilled wells are logged and supply data in a digital format (LAS, WITSML or DLIS). Even with the new depth calibration file standard, however, the industry still has to deal with significant costs. To purchase a digital log in LAS format costs, on average, around \$300 from a data vendor. The cost to digitize a raster log is between \$75 and \$200 depending on the log type and number of curves. A raster log supplied in TIF format costs anywhere from a few dollars to \$15.

What a geoscientist or engineer chooses will continue to depend on their requirements and budget. “A geophysicist wishing to create a synthetic seismic

log will use LAS; a geologist creating a cross-section for quick evaluation may employ the raster,” says Williams. “A petro-physicist will use an LAS file for advanced calculations such as determining effective porosity, flow units, etc. A reservoir engineer may use an LAS file for volumetric analysis, but a raster log to pick perforations for the completion/production engineer. And, a stimulation company will use an LAS file for calculating rock strength or brittleness as input to hydraulic fracturing models.”

Will all legacy raster logs eventually be converted? “It is my belief that the answer depends largely on technology,” says Williams. “The current cost of conversion is due to human interface; a software process that automatically converted logs would be much cheaper, faster and efficient. Unfortunately, logs have many different scales, imperfections and anomalies that are easy for a human to spot visually, but fiendishly difficult to program the same abilities into a computer. Perhaps, someday, technology advances and innovations in the field of artificial intelligence will make such an application efficient, reliable and economical.”

In the meantime, the data management community can take pride in modest, but important advancements like the standardization of raster log calibrations. “It’s not earth-shattering, but it will save countless hours, reduce confusion and make life a lot easier for everyone concerned,” says Hansel. 📄

## LOG FORMAT DEFINITIONS

**Raster Log** – Paper, Mylar or film copies of electronic logs are scanned as raster images, usually in Tagged Image File (TIF) format. The resulting electronic file is a picture that can be easily analyzed and interpreted by a human, but is not well suited to machine processing. Often, the original physical copy of the log is stretched or unevenly reproduced, or the log may be difficult to read.

**Digitized Log** – A scanned raster image of a log is reviewed by a digitizing expert, and one or more of the curves are traced manually or automatically using modern digitizing software. As this is done, the digitized log curve is matched (calibrated) with the appropriate index (usually depth or time). This converts the picture of the curve into a series of amplitude/index pairs (a digital version of the curve that is usable by software). This information is typically stored in the Log ASCII Standard (LAS) format created by the Canadian Well Logging Society.

**Digital Log** – Modern well logs are captured in digital form in the field, using the Log ASCII Standard (LAS) format, WITSML (Wellsite Information Transfer Standard Markup Language) or Digital Log Interchange Standard (DLIS). These formats are now part of the standard delivery from service companies.

### About the Author

Gord Cope is an international energy correspondent and author. He recently released a travel memoir, *A Paris Moment*, in eBook form. [www.gordoncope.com](http://www.gordoncope.com)

Table 1

	Raster Logs	Digitized Logs	Digital Logs
<b>Cost</b>	Very inexpensive	Medium	High
<b>Abundance</b>	Very abundant	About a quarter of logs have been at least partly digitized	About 1 million are available
<b>Availability</b>	Easy to find and use	Must be created or purchased	Only for modern logs
<b>Usefulness</b>	General formation analysis by geologists	Geophysics	Detailed reservoir analysis
<b>Limitations</b>	Can't be easily used in log analysis software	Subject to digitization errors	Only available for modern logs

# NEWS

## PPDM Thanks its Volunteers

The PPDM Association is fortunate to have a dedicated volunteer base that makes so many PPDM programs possible. In appreciation of our volunteers, in July the Volunteer of the Month program began:



### Madelyn Bell

Madelyn Bell, the PPDM Association's first Volunteer of the Month, has been instrumental in the creation and growth of the PPDM Rules Repository. Madelyn Bell retired after 36 years with Mobil/ExxonMobil where she spent 20 years in Production Geoscience as interpreter/supervisor working mainly US properties. The remaining years were spent in various data roles focused on vendor data, data quality and data training across Upstream. Madelyn also represented ExxonMobil for 2 years on the PPDM Board of Directors, and was the recipient of the PNEC "Cornerstone Award" in 2012 for "advocacy to the industry for data quality." An avid quilter, Madelyn has an M.S. in Geology from Texas A&M University.

"Madelyn has been essential to the development of our PPDM Rules Repository and has been our biggest champion for the program. We truly appreciate all the time, talent and passion she has dedicated to our organization," said Trudy Curtis, CEO of the PPDM Association.



### Jim Williams

Jim Williams was named as our Volunteer of the Month in August. Jim is a reservoir engineer and a founding member of "Creating a Raster Well Log Calibration Format," a joint work group between the PPDM Association and Energistics under the banner of The Standards Leadership Council. Jim was most recently a Petroleum Engineer with Ground Metrics Inc., but also spent time working for Kaiser-Francis Oil Company, IHS, Cimarex Energy Co, and Pogo Producing Company. His extensive experience includes onshore and offshore work environments, specializing in vertical, directional and horizontal drilling operations, reservoir engineering and commercial software development.

Jim recently collaborated on an article on Raster Log Calibration in the 2Q Edition of Foundations, and will continue working with the work group as it goes through its current review and comment period. "Jim has been a valuable asset to our Raster Well Log team and we have found his experience and insights invaluable, and we look forward to collaborating with Jim on future projects," says Trudy Curtis, CEO of the PPDM Association. Jim has developed electric log depth registration software that will read an unregistered TIF image and provide XML depth registration files in accordance with the standard format as defined by the aforementioned industry work group. Both are executable with source code available for purchase.



### Ellen West Nodwell

Ellen West Nodwell was named the September 2015 Volunteer of the Month. An Owner-Partner in IntegraShare Solutioneering, Inc., Ellen is an Independent Petroleum Industry Consultant, Specializing in GIS, Petroleum, and Pipeline Data Management. Ellen has been in the Oil and Gas Industry since 1981 and has been involved in data management "from the ground up" starting on the business side, transitioning to information technology in 1995.

Ellen joined her husband, Gus, in the consulting space in May of 2013, starting the next chapter of her career. Gus is originally from New Zealand, and IntegraShare is a global organization with organizations in UK and in New Zealand, as well as the home base in the US. As a volunteer, she has been in leadership roles with the PPDM, the Association of Petroleum Surveying and Geomatics (APSG), and Esri Petroleum User Group, as well as serving over ten years as an advisor to PNEC Conferences. She has also worked in a consulting role to the Pipeline Open Data Standard Association (PODS). In addition to those organizations, Ellen is a member of AAPG, URISA, GITA, GIS Corps, DAMA International and the Houston Geological Society. Ellen also supports The Cystic Fibrosis Foundation with her distance running efforts, as well as Montgomery County Court Appointed Special Advocates for Children (CASA), as an advisor, and the Susan G. Komen Foundation, as a runner. 

## SLC Corner




### Standards Leadership Council (SLC) Update OGI Pilot Update

**T**he Oil and Gas Interoperability (OGI) Pilot is a public interoperability test-bed jointly run by MIMOSA and POSC Caesar Association, with participation from OPC Foundation, that uses the Open Industrial Interoperability Ecosystem (OIIE) architecture and feeds back lessons learned. The OGI Pilot's purpose is to support the broader adoption of the OIIE

within the oil and gas industry (both upstream and downstream) by facilitating collaboration between participants and demonstrating the current capability of software products to support the OIIE Use Cases and Scenarios. Test data sets and software tools and libraries are made freely and publicly available to support unit and integration test cases. This project supports the ISO TC184 OGI

Technical Specification in conjunction with the joint MIMOSA/PCA Special Interest Groups (SIGs).

MIMOSA hosts an online meeting for the OGI Pilot Team every two weeks. If you are interested in participating, please contact Alan Johnston (atjohn@mimosa.org) for more information. 

**LAND INFORMATION SERVICES**  
Solutions Forward

- **Process Efficiency**
  - Workflows & Internal Process Re-design
  - Data Integrity Stress Tests
  - Data Conversions
- **Back Office Land Administration**
  - Lease Records Input & Maintenance
  - Proposal & Hearing Tracking
  - Division Orders & Owner Relations

Property Administration, Systems, Training & Consulting

RECORDS MANAGEMENT

DIVISION ORDERS

A&D

LEASES & CONTRACTS

LAND DOCUMENTS & PROPOSALS

INSOURCING

LANDVANTAGE

CONSULTING

Land Information Services | 405.875.1670 | 100 N Broadway, Ste. 2010 | Oklahoma City, OK 73102 | Landinfoserv.com

## Foundations photo contest

**“THERE IS A CASTLE ON A CLOUD”**

**BY DAVE FISHER**

*2nd Place in the 4Q2015 Foundations Photo Contest*

*Neuschwanstein castle, Bavaria – April 2014*





On the cover:



**“GOLDEN LIGHT IN REMOTE SOUTHERN UTAH CANYON” BY CHRIS EBRIGHT**

*1st Place in the 4Q2015 Foundations Photo Contest*

*This very narrow slot canyon in southern Utah gets a soft orange glow when the sun hits the canyon just right. – Southern Utah, May 2015*

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*!

# NEWS

## More than the Data Model

### SYMPOSIUM & WORKSHOP ATTENDEES ENJOY SESSIONS AND BUILDING THE DATA MANAGEMENT COMMUNITY

July and August saw the data management community come together to network, build relationships, learn what's new in the industry and share experiences in Australia and Oklahoma City, with three large events taking place over the course of two months.


The Brisbane Data Management Workshop, the first of these three large events, took place on July 30, 2015, at the Sofitel Hotel. Workshop attendees were treated to presentations on Marketing the Value of Data Management Skills, Data as an Asset and Solution Adoption by industry speakers along with updates from PPDM Association representatives. The most popular part of the workshop was the field trip to Moreton Basin, led by PPDM's Asia Pacific representative, Jess Kozman. The field trip, which visited outcrops of Triassic and Jurassic sandstones from the Moreton Basin, included a setting where attendees could view, handle and discuss the rock properties represented by technical data types and promote understanding of why geotechnical data is essential to the hydrocarbon lifecycle. Thank you to sponsors geoLOGIC, Stonebridge, Santos, CLTech Consulting, AGIA and DAMA for making this event possible.

The 2015 Perth Data Management Symposium, the largest Australian PPDM event, was held August 5-6, 2015, at the Parmelia Hilton and included a special half-day training class on the Business Lifecycle of the Well. With two days of sessions, including presentations on NOPTA, Master Data Quality, Decision-Making Frameworks and Sourcing Data,

attendees enjoyed a mix of academic, regulatory, industry and PPDM speakers. Highlights included Molly Green's presentation on finding influences in your organization, a case study on data quality and confidence, updates from the Australian regulatory authority and, of course, the chocolates. Thank you to sponsors geoLOGIC, Stonebridge and AGIA and to our Event Promotion Partner DAMA for being a part of this event.

August also saw the 2015 Oklahoma City Data Management Workshop on August 11 at the National Weather Center. The agenda covered topics including Data Governance, Operationalizing Data Management and PPDM in Action. This workshop was well attended. Special speaker Gary England, Consulting Meteorologist in Residence at Oklahoma University, was very well received prior to a tour of the National Weather Center.

Sponsors geoLOGIC, Stonebridge, Land Information Services, Noah Consulting, EnergyIQ and Informatica came forward to make this event possible and affordable for attendees.

The PPDM Association looks forward to continuing community building events around the world, including the upcoming Calgary Data Management Symposium, Tradeshow & AGM. 



Jess Kozman leads the field trip at the Brisbane Data Management Workshop, July 30, 2015.



Attendees from the Oklahoma City Data Management Luncheon, August 11, 2015.



# Data to Maps: A Simpler Workflow

By Andrew Zolnai, Certified Petroleum Geologist

**A** **BSTRACT** This exercise helps a user through the initial steps many petroleum data managers face at the start of a project: extract well data as text files, transform its format without compromising its integrity, load it into PPDM WELL table and post it on a map. The input dataset is freely available US Gulf of Mexico wells from MMS (now BOEM), and the outputs are a PPDM table and a GIS and web map of well spots. The tools are relatively simple to use and readily available,

the concepts simple yet important to understand basic data management, and the results are readily displayed and operationally useful. This also introduces users to PPDM's standards and procedures in its community of practice.

## SIMPLE WORKFLOW

Our aim is to help rapid project start-ups for petroleum professionals in a typical operational scenario. The audience is neither data managers nor technical staff, who already have procedures this can be incorporate in. To keep it simple we'll use

the PPDM Schema as repository, Microsoft SQL Server Express as database, Safe FME Workbench to transform, and Esri ArcGIS Desktop and Online to mash up and distribute. The process (Fig. 0) is first to create the schema of PPDM Well tables, then to map the tables via ETL (Extract, Transform & Load), and finally to post the results to a database and a map.

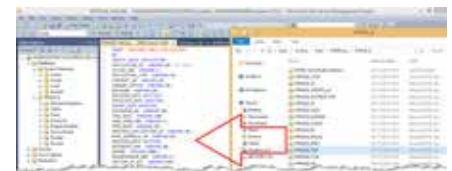
Fig.0: Workflow schematic



## CREATE SCHEMA

The SQL Server Express database and its Management Studio front-end are a free and easy to use, and thus minimise the barrier to entry for users. We will use the 'Create' scripts (Fig. 1) from ppdm.org for v.3.8. Even though all 1712 features are created, we only use the dbo.WELL attributes here.

Fig. 1: Schema setup



The free Gulf of Mexico dataset comes from US BOEM (Bureau of Ocean and Environment Management) website as a flat ASCII file, Fig. 2, and their web page describes metadata (description of the dataset) without imposing restriction to their reuse other than standard proper attribution.

Fig.2: Well list



## ETL WELL TABLES

The flat file is reformatted in FME Workbench directly from the BOEM website. This software isn't free but is widely adopted among operators and universities – its canvas-like drag&drop interface help users quickly write their own Readers and Writers, or to use

those provided for this exercise.

First we extract the well file data from BOEM website, that is, reformat a flat ASCII file and run a few checks such as null values etc. (Fig. 3).

Fig. 3: Process Text Data into Attributes



Second we transform the data from the BOEM to the PPDM format using Schema Mapper (Fig. 4).

Fig. 4: Map Attributes from BOEM to PPDM Schema



Third we load the reformatted text into the PPDM schema by running the entire Workbench model.

Management Studio is the quickest and easiest way to view the results in SQL Server (Fig. 5). Users can either list the top 1000 wells to quickly view the data structure. Users can either write a simple SQL Query, or use one provided to list all the wells and match the count against FME's. This can be passed on or tied into corporate data management practices.

Fig. 5: Verify Schema in SQL Server

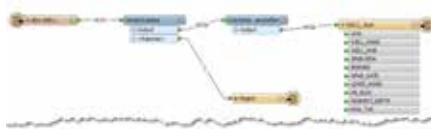


### ETL WELL FEATURES

From an operational perspective, however, a GIS map is far more effective: not only will it show where the wells are for engineers and geoscientists directly involved; it can also show the spatial relationship to other data such as transportation and environment for management or partners.

First we spatialise the non-spatial PPDM database. FME Workbench allows to create vertices or well spots (Fig. 6), as well as set the coordinates to the BOEM's "NAD27 for lower 48 States" (see Fig. 7).

Fig. 6: Transform Tables into Features



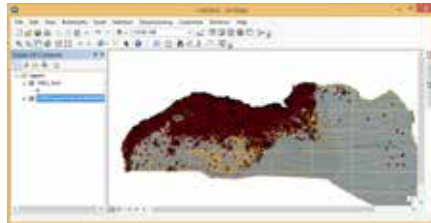
Note in Fig. 7 that the projection available to FME Workbench and ArcGIS Desktop, as well as BOEM's data posted on ArcGIS Online, are all the same.

Fig. 7: Geodetic parameters



ArcGIS Desktop is widely adopted among operators and universities. Free alternatives exist but don't have petroleum symbology yet, and don't mash up on the web as easily as ArcGIS Online. First load the Well spot feature just created, Fig. 8, then add BOEM BSEE infrastructure webmap as a rich and relatively current backdrop.

Fig. 8: ArcGIS Desktop



These well spots can then be symbolised using BOEM's metadata and adapting the Esri petroleum symbols – this is one area of improvement as BOEM statuses are not standard, and editing the look-up table may help match ppdm.org, pugonline.org or opengeospatial.org well symbols.

After metadata are added to ArcGIS for Desktop, these well spots can be shared with the organisation via ArcGIS Online. Et voila! Fig. 9 is a BOEM well mashup in PPDM format.



Fig. 9: ArcGIS Online

### OPTION

Well data can be posted direct-from-database, so the map is always synchronized with the source. Although this method is quicker and easier, XY Event layers have some limitations:

1. An in-memory feature layer might work for the 50,000 or so wells in GOM, but it would buckle with of all 4.5 Million wells in US
2. It does not have an Object ID, so it does not support selection on the map or Select by Location queries, which greatly limits its purpose.

### ACCOMPLISHMENT

1. Learned tools that are either free or widely available in industry or academia
2. Performed two ETL functions important for everyday petro-data management
3. Posted it in a timely and meaningful fashion for all operational parties involved
4. Understood a PPDM schema as part of industry-driven tools and practices
5. Plugged into a community that promotes standards and interoperability

### FOOTNOTE

Presented at 2015 Esri Petroleum GIS Conference and Safe FME World Tour, and as AAPG Visiting Geoscientist. Full class notes & data available under Creative Commons - ShareAlike 3.0 Unported (CC BY-SA 3.0) – on Dropbox here: <http://bit.ly/1b5SKNg> (no need to either sign up or sign in).

### About Andrew

A Certified Petroleum Geologist & PUG member since 1997, he helped launch PPDM over 20 years ago, and his primary areas of interest are Geoscience Workflows and 3D GIS for the past 35 years.



Business advisory and technology services for next-gen oil and gas



- + Business Alignment
- + Process Optimization
- + Technology Enablement
- + Managed Services
- + ENERHUB™
- + Peloton® Services

**In today's dynamic energy market, oil and gas companies are looking to achieve the optimal balance:** retaining the ability to move quickly and decisively on emerging opportunities while maintaining leaner, more efficient operations. Stonebridge Consulting provides business advisory and technology services that enable oil and gas companies to get lean and stay lean through improved operational performance across the entire enterprise.

[www.sbti.com](http://www.sbti.com)

800.776.9755

SERVING CLIENTS THROUGHOUT NORTH AMERICA



# Understanding “Where”

## Spatial Data Management

By Trudy Curtis, CEO PPDM Association

**T**here are lots of ways to describe a location on our planet. Historically, our industry has used everything from the “pirate map” that uses distances and offsets from natural features (like river edges) to hand digitized base-maps and GPS surveyed coordinates. Every industry that depends on knowing where assets are struggles with the levels of trust that locations bring with them. The oil and gas industry depends on location information for virtually every asset on its books, so understanding how locations were

created, and how trustworthy they are is very important.



To add to the difficulty of uncertain provenance and quality of locations, our

assets (wells, seismic lines, facilities, pipelines or land rights) can change locations many times between planning and construction, and even during maintenance! And changes to the location information may or may not be given to every stakeholder; some stakeholders never receive updated information once the planned locations are determined.

For example, the 2010 San Bruno pipeline explosion cost eight people their lives and injured another 58. Over 100 homes were damaged or destroyed. The lawsuits that are still in courts will result in huge settlements, and a loss of reputation for the company. It will take many years to recover from this disaster. From a data management point of view, company records showed that the section of pipe that exploded was seamless. In fact, investigators found that it was actually a collection of pipe segment that were installed in 1956 (and improperly welded). Regulators and operators need up to date, complete and accurate information about facilities “as built” so that they can effectively manage public safety.

Further, each stakeholder wants to get location information in a particular way, whether they want a different Coordinate Reference System used, or a different map grid projection. And if a land owner or regulator gives consent for a particular operation to be conducted in a specific location, it’s important to make sure that changes are properly distributed, and necessary amended consents obtained. The result is that for an asset, the data manager must keep track of changes in locations through planning or construction of an asset, changes in location (or even the specific asset) through maintenance programs, versions in multiple coordinate systems, versions that are estimated or precise, and exactly who has been given each version of each location. It’s a challenge

## Locations are Complex!

Location quality varies	Locations digitized from a base map are less accurate than locations surveyed with GPS. Do you have provenance about how your coordinates were acquired?
Locations change over time	Once a plan is approved and sent to the construction crew, specific field conditions may require the location to be moved (such as a marsh along a seismic survey), or operational failures (such as a lost hole in well drilling). Do you know whether your location is the final “real” location, or a planned location?
Locations can exist in many survey systems	Geographic or map based coordinate reference systems all introduce uncertainty or bias into how trustworthy a location is. As locations are converted from one system to another, errors may be made. Do you know how your locations were calculated?
Locations exist in three dimensions	Many mapping environments are two dimensional, or perhaps 2 ½ dimensions. Elevations or depths, particularly in non-vertical constructions, can result in three dimensional offsets. Do you have information about elevations and depths?
Natural identifiers often embed location information into them.	Natural identifiers may be created during planning stages, but as assets are constructed or divested, choices to change the identifier may be made. Do you know how strong the connection between identifiers and locations are in your systems? How is change managed?

for even the most sophisticated systems!

Even more challenging is the problem of identification. Humans love identifiers that embed locations into them; the legacy US and Canadian well identification systems embedded locations into well identifiers for decades. Facilities, pipelines or other assets may be named using the name of the owning company or a nearby geographic feature. That’s a challenge, particularly when the logic to create a popular natural identifier results in that identifier changing during the life of an asset (sometimes many times!). Convincing users to de-emphasize these “location rich” identifiers is extraordinarily difficult, even when these systems prove themselves to be fallible and misleading.

Managing the different levels of quality, survey system, time or event versioning, identification and stakeholder expectation has become a huge undertaking for many data management departments. My role as CEO of the PPDM Association includes helping with these problems as much as I can through training and standards that support the necessary business processes.

As the chief architect of the PPDM data model, I’m often asked how the model should be used to manage spatial

information. Unfortunately that’s not always an easy question to answer, because the answer is nearly always some version of “Well, it depends!” Managing location information in any data model can be complicated and confusing, even though most locations can be described as the value triplet of latitude, longitude and coordinate reference system or CRS (or quadruplet that includes elevations or depths). In an ideal world that’s not particularly difficult. But the reality is that the business is pretty complicated. Often, the problem is more in how we have thought about and managed locations in our various legacy systems in our past.

The PPDM data model supports each of the challenges I’ve described above. The result is a rich and robust system that can handle nearly everything. But supporting all of this richness is not as easy as simply capturing a latitude, longitude and CRS. We actually need quite a lot of information, much of which may never be available to data managers. And that makes our jobs more difficult.

This year, why we have worked with a small but mighty set of subject matter experts to create a set of training programs designed specifically to teach data

managers, system developers and users about the challenges and opportunities available to them when using PPDM 3.9 to manage location information.

We are proud to release a series of training modules about the data model that will help users understand the data model better, and use it with more confidence. We hope you will get value from these classes, as they are presented in PPDM classrooms in coming years.

The new PPDM 3.9 Spatial course covers several key subjects:

- How Coordinate Reference systems are used in PPDM 3.9
- CRS additional meta data needed to manage location information effectively.
- How Areas are managed in PPDM 3.9.
- How the Spatial Descriptions subject area works in PPDM 3.9.
- How well and seismic locations are managed in PPDM 3.9. [\[X\]](#)

### About the Author

Trudy Curtis is CEO of PPDM.



# The Golden Record is Not Enough

## The Case For Data Orchestration

By William “BJ” Cummings, ENERHUB Enterprise Director, Stonebridge Consulting.

**F**or PPDM true believers, an enterprise master data management (MDM) solution is our nirvana. Achieving that elevated state of bliss – variously referred to as the single version of the truth, the gold standard, the golden record – depends on policies, rules and processes for managing and accessing data. Which is to say that our primary focus is on data. Reasonable? Yes. Sufficient? No.

Data always has a business context animated by interconnected processes and functions. In upstream oil and gas, that

animating context is the well life cycle (WLC). The WLC comprises the system of entry for the well, the system of record for the well header, well data ownership across departments, primary and secondary well attributes, and tracking the status of the well throughout its life.

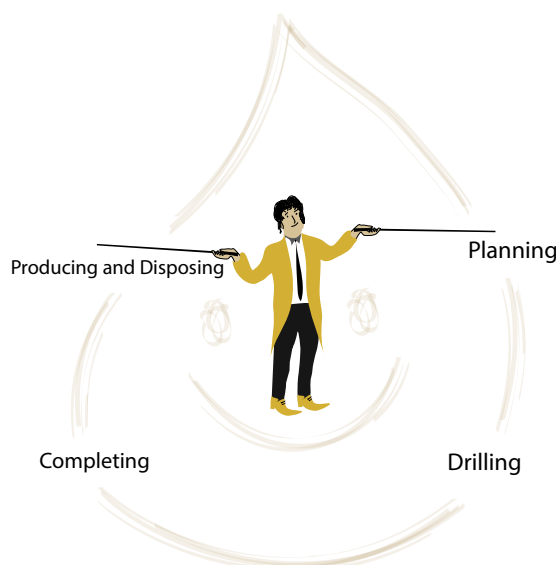
In short, the WLC is the upstream business and data is just one component of the WLC. The ideal MDM strategy is more than data and data management: it mirrors the WLC. Mastering MDM depends on the orchestration of process, function, and data throughout the WLC.

Creating the golden record isn't enough. A viable MDM strategy is more than loading data and creating a single version of the truth. It means actually doing something with the golden record to create value for the business. For that reason, data orchestration throughout the WLC is the next step in mastering MDM in upstream oil and gas.

### WHY ISN'T THE GOLDEN RECORD ENOUGH?

A lot of effort is put into creating an MDM system, and people want to see a real ROI from all that effort. Creating the golden record only gets you started on the road to measurable business value. The real ROI is when you share that data across multiple systems, thereby reducing the time spent entering and maintaining the data and cutting the human error. An MDM strategy with orchestration at its core allows you to do that with less effort and greater accuracy. You save time and money, and you have better information to make better decisions. These are long-term, quantifiable benefits.

These benefits are especially meaningful in today's economic climate that demands efficient decisions, reduced duplication of effort, and managed costs. The current downturn gives you the time and focus to get your house in order. You can create an environment where master and transactional data, business rules, applications and processes are synchronized and orchestrated. You can benefit from cost savings today,



and create a competitive advantage for tomorrow. The key lies in how you manage your master and transactional data.

### HOW SHOULD YOU MANAGE YOUR MASTER AND TRANSACTIONAL DATA?

There are many different classifications of data: master data, reporting data, metadata, reference data, unstructured data, big data, and so on. All are important. But too many times organizations put them into the same bucket, which is a mistake. It is absolutely critical in your enterprise MDM strategy to recognize the classification of the data and fully understand its characteristics and value so it can be managed effectively.

Master data represents the ‘nouns’ of the upstream business: wells, business associates, equipment, facilities and so forth. It is authored and shared across multiple systems. For instance, ‘well identifier’ exists in most upstream systems. Master data is low volume but high importance. It’s scattered across many systems and duplicated throughout the WLC, and typically is not truly managed at the enterprise level.

Well header is an example of master data. Information is generated in multiple systems, such as planning, accounting and production. Its attributes are defined and owned by the different systems. Master data is transferred from system to system based upon events. Once a well is completed and starts production, for instance, the well header data is sent from System A to System B.

Transactional data is different. It is event-centric, high volume, changes frequently, and is best transferred in batches. Some transactional data is shared, but most is generated and used in one system. It usually changes with each successive time interval. Daily production volumes are a good example of transactional data.

### WHY SHOULD THEY BE MANAGED DIFFERENTLY?

Master data and transactional data are very different. Transactional data is high volume and event-driven; it is difficult to move in real-time while maintaining the validity required for a trusted source. There’s much more value derived from a set of data versus checking each record. For example, you load volumes in the warehouse after allocations are complete. You don’t move them as each calculation is performed.

On the other hand, you need to be able to validate master data on a record-by-record basis. For example, is my well identifier valid? Is well depth valid? PPDM has done a great service in identifying many of the master data rules that can be put in place today. When you look at master data, you want it to be consistent across systems and you want it to reflect the most recent data as soon as possible. Critical decisions are made on well master data throughout the WLC, so it needs to be in-sync and orchestrated across our systems all the time, and preferably in real time.

### WHY SHOULD MASTER DATA BE MANAGED REAL TIME?

Keeping master data consistent is critical. Keeping it in-sync in real time is even more critical. Different departments may have different needs for the same data. For example, drilling may need a spud date, but accounting may need the number of wells spudded in the last month. Having information up-to-date, standardized and in-sync meets everyone’s requirements.

Critical decisions are based on master data, and yet companies spend an enormous amount of time trying to figure out why reports don’t match or why the well was reported as producing to the regulators but not in the financials. With an MDM strategy based on data orchestration, these inconsistencies can be remedied and better decisions made.

### WHAT IS ORCHESTRATION?

Orchestration is a process that allows attributes to be updated across the system in close to real-time. It must be built from the ground up. To capitalize on your investment in the golden record, you must share it across systems and deliver it to the people who are making decisions. So, when you update a well name or location in one system, it matches across all your systems. That’s orchestration, and that’s where the value is generated – in time saved maintaining and entering data, in ensuring quality, and in the ability to make better decisions based on the best data.

## WHAT ARE THE SYMPTOMS OF DATA MANAGEMENT WITHOUT ORCHESTRATION?

Many companies rely on a reporting system in which information is gathered manually and cross-referenced by hand. They do it day in, day out. It is time-consuming and error-prone, with multiple people entering the same data in multiple systems. The unfortunate outcome is that you are integrating inconsistent and inaccurate data. It should be no surprise that this produces inconsistent and inaccurate results. When you consider how much time people are spending to collect data, match it all up, and produce a report, it's mind-bogglingly inefficient. A report filled with inaccuracies and presented on a spreadsheet with multiple versions just adds insult to injury.

## WHAT IS THE VALUE OF ORCHESTRATION TO A COMPANY?

Establishing an MDM strategy that orchestrates process, function and data throughout the WLC will save hundreds of thousands of dollars. There are other advantages that have the potential for greater value. In current market conditions, for instance, we will see a wave of acquisitions. Having your own house in order allows you to take advantage of opportunities because it is

faster and easier to integrate acquired assets and incorporate new data systems.


## WHAT IS THE VALUE OF STANDARDIZATION TO MDM?

PPDM has advanced MDM in many ways. We now have standardized definitions, a well life cycle, ownership of data and a common data model. Before, companies were spending huge amounts of time defining their own MDM systems. With PPDM, you can load your data in a standardized way that can be transferred efficiently. Instead of taking years to build an MDM framework, a company can do it in weeks. This also gives the baseline to create connectors to systems to pull the data quickly and efficiently, thereby reducing the time and cost to implement solutions.

## WHAT ABOUT DATA QUALITY?

If you orchestrate bad data across different systems, aren't you making the problem worse? The key is in a good data governance policy. Instead of being wrong and not knowing it, you know that something is wrong across systems and can correct it. Mind you, governance is more than technology or a standard data model. It's about the entire upstream ecosystem: people, process, and technology.

## HOW DOES A COMPANY ORCHESTRATE AN MDM SYSTEM?

First, understand your data issues and how to address them. Then create and implement a fit-for-purpose governance strategy. This cannot be treated as a project; it must be a corporate capability that will evolve and drive value. The entire process requires close collaboration across the enterprise and with the implementation service provider. The best practice approach is in understanding the WLC and data ownership across systems, identifying a common data model, and putting the right technologies and processes in place. Finally, it's creating connectors among commonly used systems so you can pull the master data in PPDM format. 

### About the Author

William "BJ" Cummings is Executive Director for ENERHUB, Stonebridge's enterprise data management solution for oil and gas. BJ has more than 10 years' experience in developing business intelligence solutions for oil and gas companies. He is the chief solution architect for Stonebridge's Upstream Reference Architecture, which is built around PPDM standards and today serves as the framework of Stonebridge's ENERHUB solution for upstream operators.



**Caught the Photobug?**  
Enter the Foundations Photo Contest to get your photo published!

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

Enter the Contest to WIN >

Photos Courtesy of Ernest Harrison, 2014.



## LUNCHEONS

**OCTOBER 29, 2015**  
**MIDLAND Q4 DATA**  
**MANAGEMENT LUNCHEON**  
 Midland, TX USA

**NOVEMBER 10, 2015**  
**DALLAS/ FORT WORTH Q4 DATA**  
**MANAGEMENT LUNCHEON**  
 TX, USA

**DECEMBER 8, 2015**  
**DENVER Q4 DATA**  
**MANAGEMENT LUNCHEON**  
 Denver, CO USA

**NOVEMBER 10, 2015**  
**BRISBANE Q4 DATA**  
**MANAGEMENT LUNCHEON**  
 Brisbane, Australia

**DECEMBER 10, 2015**  
**HOUSTON Q4 DATA**  
**MANAGEMENT LUNCHEON**  
 Houston, TX USA

**NOVEMBER 17, 2015**  
**TULSA Q4 DATA MANAGEMENT**  
**LUNCHEON**  
 Tulsa, OK USA

**NOVEMBER 24, 2015**  
**PERTH Q4 DATA MANAGEMENT**  
**LUNCHEON**  
 Perth, Australia

## CERTIFICATION - CERTIFIED PETROLEUM DATA ANALYST

**MARCH 16, 2016**  
**CPDA EXAM ONE ADMINISTRATION**  
 (The application deadline for this administration is February 3, 2016)

**JUNE 15, 2016**  
**CPDA EXAM TWO ADMINISTRATION**  
 (The application deadline for this administration is May 4, 2016)

## UPCOMING PUBLIC TRAINING SESSIONS

Houston Public Training 2015

**NOVEMBER 16-19, 2015**  
 Houston, TX USA

## ONLINE TRAINING OPPORTUNITIES

PPDM recently announced that it is supporting its membership by **discounting** online training courses! Online training courses are available year round and are ideal for individuals looking to learn at their own pace.

For an in-class experience, private training is now booking for 2015-2016. Public training sessions are on now.

All dates subject to change.  
**VISIT PPDM.ORG FOR MORE INFORMATION**

## SYMPOSIUMS

**OCTOBER 20-21, 2015**  
**CALGARY DATA**  
**MANAGEMENT**  
**SYMPOSIUM,**  
**TRADESHOW & AGM**  
 Calgary, AB, Canada

**APRIL 11-12, 2016**  
**HOUSTON DATA**  
**MANAGEMENT**  
**SYMPOSIUM**  
 Houston, TX USA

### OCTOBER 2015

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

### NOVEMBER 2015

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

### DECEMBER 2015

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			



Find us on Facebook  
 Follow @PPDMAssociation on Twitter  
 Join PPDM on LinkedIn

“



*knowledge*

IS POWER.”

Francis Bacon

**Power your upstream decision-making with customer-driven data, integrated software and services from geoLOGIC.**

At geoLOGIC, we help turn raw data into actionable knowledge. That's a powerful tool to leverage all your decision making, whether it's at head office or out in the field. From comprehensive oil and gas data to mapping and analysis, we've got you covered. Get all the knowledge you need, all in one place with geoLOGIC.

For more on our full suite of decision support tools, visit [geoLOGIC.com](http://geoLOGIC.com)

