

Making knowledge flow through knowledge connections

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Brochure Entry

Integrating knowledge management into the enterprise: Making knowledge flow through knowledge connections

- Facilitating knowledge flow obtain the most value from KM programs: why the upstream oil and gas industry needs this more than any other
- Managing an information governance framework on a global scale: maximizing business benefit, minimizing risk
- Identifying the IT tools that permit companies to “learn” what they already know and promote knowledge flow
- Identifying opportunities to improve productivity, enable high-quality decisions and mitigate risk
- Attacking on multiple fronts: policies, roles & responsibilities, processes, technology

Tim Stouffer, Technical Excellence Knowledge Manager, Marathon Oil

Reid G Smith, Enterprise Content Management Director, Marathon Oil

Knowledge is often gained only through experience and resides only in individual heads. For knowledge to have power it must *flow* through knowledge connections. Knowledge flow must be facilitated for companies to obtain the most value, especially in industries that must rely on individuals to rapidly assess and solve problems. Upstream Oil and Gas is just such an industry. Fortunately solutions exist, enabled by IT tools, which permit companies to “learn” what they already know and promote knowledge flow. This presentation covers some of the solutions, in varying stages of maturity, being used by Upstream Oil and Gas companies.

Marathon statistics at a glance



- Recently announced split effective July 1, 2011
 - Pre-split (Upstream + Downstream)
 - Fortune 50 company
 - Established in 1887
 - 4th largest US integrated oil & gas company
 - 5th largest US refiner
 - Current Market Cap: ~ \$37 billion
 - 2010 Revenues: \$73 billion
 - 2010 Net income: \$1.46 billion
 - Employees: > 30,000
 - Upstream Figures
 - 2010 Net Oil & Gas Production Sold: 391,000 BOE/D
 - 2010 Net Synthetic (Oil Sands) Oil Sold: 29,000 BPD
 - 2010 Net Proved Reserves: 1.638 billion barrels
 - Headquartered in Houston, Texas
 - Employees: ~3,000
 - Operations in 10 countries
 - BIG changes for Marathon!

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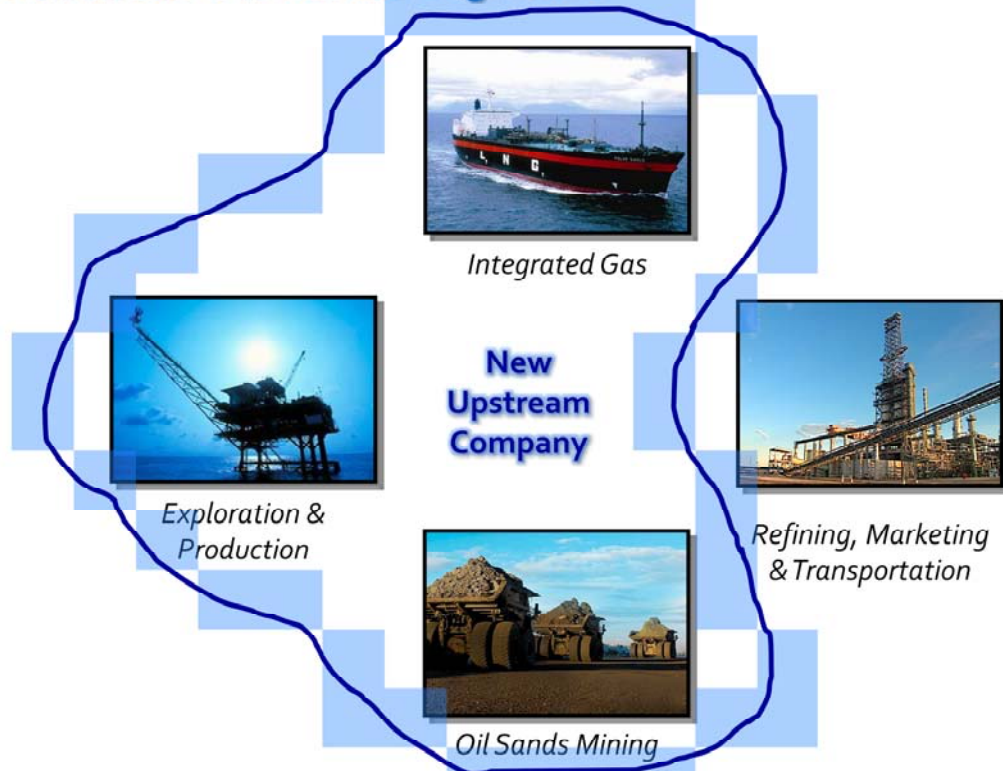
I think that some information about Marathon will help to put the work we have been doing in context.

Marathon was established in 1887.

For comparison,

- 2008 Proved Oil & Gas Reserves: 1.2 billion barrels
- 2008 Proved Bitumen Reserves: 388 million barrels

Marathon's business segments



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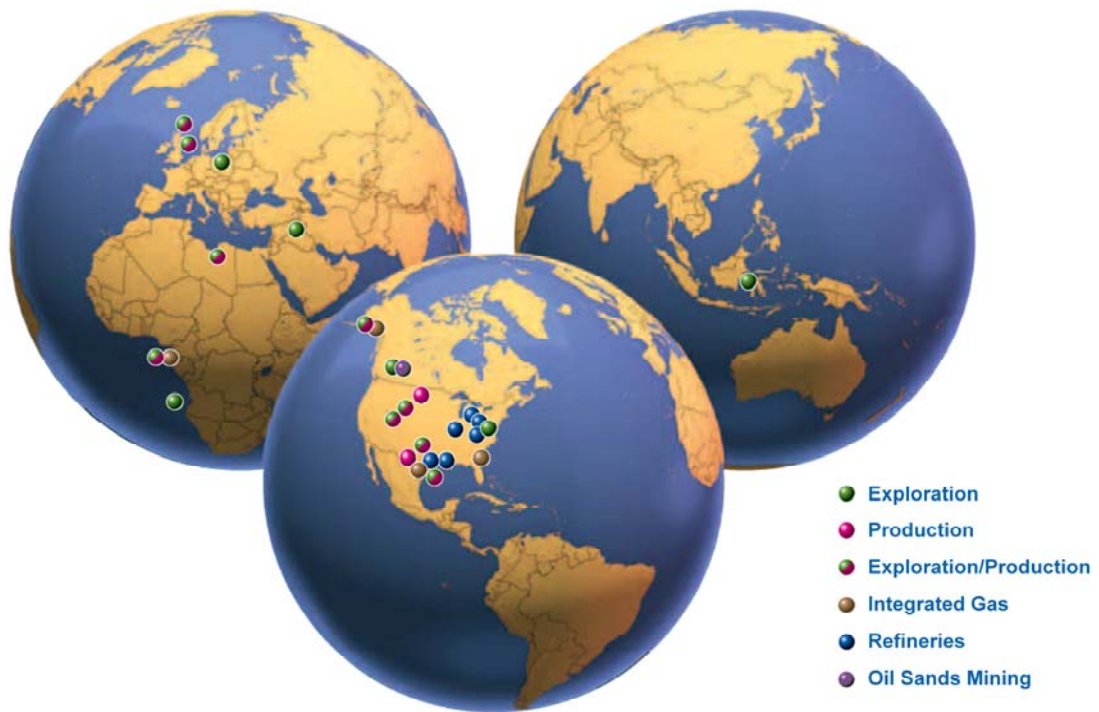
Exploration & Production

Oil Sands Mining: 20% interest in the Athabasca Oil Sands Project

Integrated Gas: Transform gas into products like LNG, methanol, ...

RMT: US – Midwest, Upper Great Plains, Gulf Coast & Southeast. Refining, Terminals & Transportation, Pipe line and retail.

Global operations



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Operations in 10 countries

$$v = -\frac{k}{\mu} \frac{\partial p}{\partial x}$$

v – flow velocity
 k – permeability
 μ – viscosity
 p – pressure
 x – distance

— Henry Darcy

Knowledge is sticky.
Without a systematic process and
enablers, it won't flow.

— Carla O'Dell

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Fluid Flow

Fluid flow in porous media (e.g., petroleum reservoirs) is governed by Darcy's Law.

- Fluid flows faster through a permeable structure
- Viscous fluid does not flow easily
- Fluid flow is improved by applying pressure (e.g., increasing inlet pressure or decreasing outlet pressure)

Knowledge Flow

The keys to knowledge flow are captured in this 2002 quote from Carla O'Dell of APQC.

- Knowledge flows faster through a permeable organization
- Tacit knowledge does not flow as easily as explicit knowledge
- Knowledge flow is improved by applying pressure (e.g., competitive pressure, compliance requirements, managerial leadership, peer pressure)

Our working hypothesis is that knowledge flow and fluid flow obey analogous laws. The analogy suggests a way of thinking for the knowledge manager. To increase knowledge flow, take actions to increase organizational permeability, reduce knowledge viscosity, increase business pressure gradient.

Context for the presentation

- **Goals**

- Construct the work platform for the next generation – a new foundation for collaboration and knowledge sharing
- Enable easy-to-use and consistent access to the *relevant, up-to-date and trusted* information needed to monitor performance, to pre-empt potential problems and to take decisions
- Implement consistent records management to ensure we preserve the information required for legal and regulatory compliance
- Make a step change in knowledge sharing

- **Foci**

- Organizational plumbing
- Communities of practice

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Our knowledge flow work is embedded in an enterprise program to make a step change in the way information is managed across the company. From these goals you can identify the different types of pressure our company is sensing around information governance, sharing and protection.

Organizational plumbing

■ Dimensions

- Policies
- Roles & Responsibilities
- Processes
- Technology
- Ongoing Support

■ Stakeholders

- Business
- Law
- HR
- Internal Audit
- Finance
- Public Affairs
- IT, ...

The Power of



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Success demands a multi-dimensional campaign: updating policies; defining roles & responsibilities; streamlining processes; installing up-to-date, commercial technology; and providing ongoing support.

Business (i.e., **Operations** in this context): Relevant, up-to-date and trusted information

Law: Consistent information management processes

HR: Management of personal information

Internal Audit: Following policies & standards

Public Affairs: Responsible for the front page news

IT: performance, reliability, scalability ... and speed

...

More detail on Law concerns: Compliance: Consistent Records Management, Policy Framework, Hold Order Management, eDiscovery, Cleanup & Migration: Legal & operational concerns. Law and HR concerns overlap when it comes to country laws for managing personal information

[http://download.microsoft.com/download/E/2/3/E23BF598-6486-40A6-8FF7-](http://download.microsoft.com/download/E/2/3/E23BF598-6486-40A6-8FF7-C9837AE91CAA/Data%20Governance%20Managing%20and%20Protecting%20Personal%20Information.docx)

[C9837AE91CAA/Data Governance Managing and Protecting Personal Information.docx](http://download.microsoft.com/download/E/2/3/E23BF598-6486-40A6-8FF7-C9837AE91CAA/Data Governance Managing and Protecting Personal Information.docx)

http://en.wikipedia.org/wiki/Information_privacy

http://en.wikipedia.org/wiki/Records_management

http://en.wikipedia.org/wiki/Information_lifecycle_management

http://en.wikipedia.org/wiki/Enterprise_content_management

http://en.wikipedia.org/wiki/Personally_identifiable_information

http://en.wikipedia.org/wiki/Sensitive_personal_information

Standards: ISO 15489, DoD 5015, MoReq, ...

Optional: Show the video.

Technology

- Electronic & Physical Information
- Email
- Instant Message
- Web (Intranet & Internet)
 - Collaboration & Social Media: blogs, wikis, discussion boards, ...
 - Videos, webcasts, podcasts, RSS feeds, ...
 - People Profiles
- File Shares / PCs ... "unstructured"
- Applications ... "structured"
- Microsoft
 - Office 2007, SharePoint 2007, Exchange
- Open Text Livelink



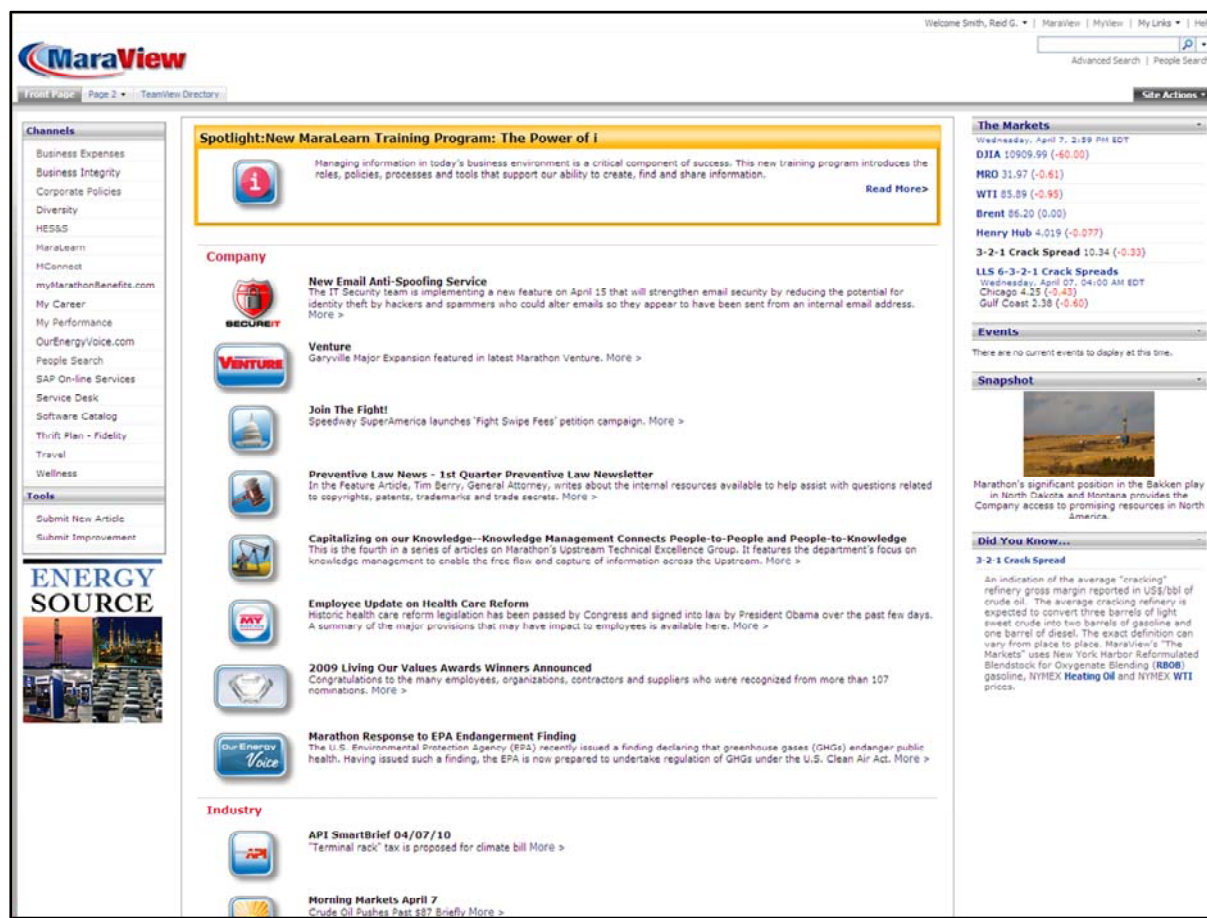
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Just to give the idea of the variety of information we are concerned with.

On the left you see the variety of channels via which information is shared.

On the right you see a sampling of information types ... many of which have been stored traditionally on shared drives.



MaraView front page is Marathon's intranet home page. It includes corporate and industry news and information, as well as real-time stock, crude oil and crack spread feeds. What every Marathoner needs to know today.

TeamView is where individual organizations, project teams and communities of practice share information – with the company and with each other. This slide shows how ECM team members share information with each other.

MyView is a customizable view for each individual. We can subscribe to news feeds, add "favorites" and manage personal information. Here you can see mine.

MyView also includes a personal profile – projects the individual has worked on, expertise, education, and so on. Here you can see what others can find on me.

Consistent search is available on every page. There are a number of Advanced Search options – for narrowing search results. There are also several options for viewing search results, including map integration.

We have also begun to implement enterprise search across technical applications. As a result, one can go to MaraView or to other applications and find the data, documents and people needed to do the job. This example shows how **ViewPoint** reports can be surfaced via MaraView search. **ViewPoint** brings together real-time and historical upstream data from sensors and applications in a series of easy-to-understand dashboards. Examples include production data and key performance indicators.

MConnect is the landing page for Marathon's communities of practice. We are largely using OOTB MOSS functionality to support the CoPs.

**The organizational plumbing is in ...
On to getting knowledge to flow**



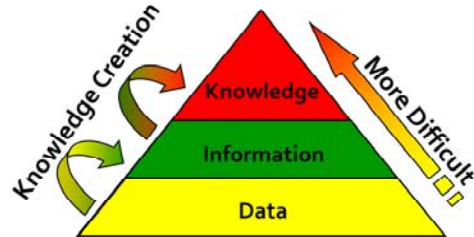
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Knowledge Premise

- Can we all agree?
 - Knowledge contained in your company adds value to your business
 - Specific knowledge often gives you a competitive edge
- But knowledge is worthless unless it *flows*
 - Flow → re-use
 - No flow → useless
- So how do we get knowledge to flow?
 - It's contained in someone's head – Tacit
 - It's contained in a file (paper, digital) – Explicit



"If We Only Knew What We Know"

– Carla O'Dell, APQC

Back to Darcy's Law...

$$v = -\frac{k}{\mu} \frac{\partial p}{\partial x}$$

v – flow velocity
 k – permeability
 μ – viscosity
 p – pressure
 x – distance

{ Mechanics: $F = ma$
Electricity: $V = iR$ }

— Henry Darcy

Knowledge is ~~sticky~~ *viscous*.
Without a systematic process and
enablers, it won't flow.

— Carla O'Dell

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Fluid Flow

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Getting Knowledge Flowing

- Must have the “plumbing” in place to facilitate knowledge flow
- Tools are important, but are *not* the solution
 - If you build it, they won’t necessarily come
 - Good tools help, bad tools hinder
- Focus on the people (customers)
 - What do they want?
 - Spread tacit knowledge (P2P and P2K)
 - Help tacit knowledge become explicit
 - Convince people of the value of sharing knowledge
 - To the company
 - To *themselves*

Cultural Legacy

- Upstream was a more decentralized organization prior to 2002
 - More employees of all professions located in regional offices: more F2F
 - Virtually all non-operational professions now in Houston: good and bad
- Very open and collaborative culture – but one-to-one
 - Historically this is how everyone was mentored and how knowledge was shared
 - Decentralized structure worked OK for each region
 - What extra value may have been achieved with cross-region collaboration?
 - Some knowledge sharing occurred simply by moving people
- *Visible* knowledge sharing and collaboration needed – one-to-many, many-to-many
 - Learning this new trick...

Some KM History

- A few local communities formed in the mid '90s, focused needs
- Formal efforts began in the late 1990s
 - IT initiative
 - Highly structured, multiple locations, highly governed
 - Established numerous Technical Peer Groups (TPGs)
 - Governance and support waned as people moved
- Remnants of the TPG effort persevered through time by
 - Enthusiastic petrotechs with credibility who wanted to lead and/or
 - One IT Business Analyst who provided continuity and support
- New IT tools gradually adopted to enhance collaboration

| | BU1 | BU2 | BU3 | BU4 | BU.. |
|---------|----------------|-----|----------------|-----|----------------|
| Job A | Rep | Rep | Rep | Rep | Rep |
| Job B | Rep | Rep | Rep | Rep | Rep |
| Job C | Rep | Rep | Rep | Rep | Rep |
| Job D | Rep | Rep | Rep | Rep | Rep |
| Job ... | Rep | Rep | Rep | Rep | Rep |

Recent Developments

- Addressing Marathon's *Upstream* business only

- Fortuitous since company is splitting in two July 1!

Operate in:
10 States
10 Countries

- Focus is on petrotechnical professions - ~715 people

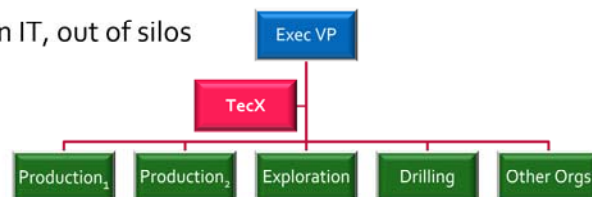
- Created a new organization in 2008: Technical Excellence (TecX)

- Career Development
- Process Improvement
- **Knowledge Management**



- TecX reports to Executive VP

- Independent of business units, not in IT, out of silos



TecX KM Activities – 1

- Knowledge Management group given goals, funding and support
 - Manager selected for knowing corporate culture first
 - Having KM awareness second (not vice versa)
- Aware of existence of 6 Communities of Practice (CoP)
 - One in the morgue
 - One in intensive care
 - Four in varying degrees of health
- Went to “school” on knowledge sharing
 - KM conferences (especially APQC’s)
 - Industry practices suited to Marathon
 - Met with other companies for BPs and LLs



TecX KM Activities – 2

- Began to implement knowledge sharing “no-brainers”
 - Saw value in CoPs as the main KM platform
 - Got CoPs to a healthier state by “pushing” and publicizing activity
 - Identified credible CoP Leaders and got their supervisors’ buy-in (for time)
 - Developed simple CoP “portal” k – permeability (increased)
 - Aligned CoP goals with business needs p – pressure (increased)
- Working with Marathon’s “plumbing” group (ECM), created a CoP portal
- KM Concepts and language new for most
 - CoP leaders and members
 - Management
- Obtained management support, got some trickle down, ... p – pressure (increased)

TecX KM Activities – 3

- Learned of 6 “Advisory Groups” set up in business units
 - Convinced them they were essentially CoPs
 - Provided resources to help them collaborate better
- Had several groups come forward suggesting CoP formation
 - Stress tested whether they should be CoPs
 - Facilitated new CoP formation and existing CoP health
- Introduced “MConnect”
 - Intranet portal for CoPs
 - Share news, **Success Stories**, all things KS
 - Repository for wiki
 - In one year MConnect generally recognized as *the* place to go for KS



k – permeability (increased)

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Sample Success Story

A Reservoir Engineer in
Aberdeen posts a
question on the
Reservoir Site...



...Most Reservoir
Engineers are in
Houston. No expertise
found among Reservoir
Engineers...

The Power of We

k – permeability (increased)

The engineer found
company expertise around
the world AND just down
the hall, via the network!

Success!!!

..... BUT one re-posts
the question on the
Production Site...



...A Chemist in
Aberdeen sees the post
and *has answers* too!



...A Chemist in Equatorial
Guinea monitoring the
Production site *has answers*,
AND re-posts on the
Chemical Site...

Continued Progress

- Performed APQC's self-assessment of KM maturity
 - Some surprises, but mostly confirmed focus areas
 - Get tacit to explicit μ – viscosity (reduced)
- Preaching *obsessively* about sharing knowledge *visibly*
 - At CoP meetings
 - Fledgling performance metrics for individuals p – pressure (increased)
 - Keeping fresh news content on MConnect
- Contracted writing of initial wiki content μ – viscosity (reduced)
 - When wiki goes live it will contain magnet content
 - Content based on previous work by internal SMEs
 - Gave wiki a recognizable identity: MWiki



Marathon's Wiki

K.I.S.S.

Marathon > MConnect

Welcome Tarcntest1 | Marathon | MyView | MyLinks | Help

Advanced Search | People Search

TeamView

Home | News Blog | Communities | Wiki

Quick Links

- All Discussions
- All Events
- All Images
- Membership Request

My Dashboards

- My Summary
- Resources
- My Action Items

Default Lists

- Task Items

Lists

- Announcements
- External Contacts
- Links

MWiki
The Power of Knowing

MWiki is the destination for contributing and sharing content for communities of practice. Included are best practices, lessons learned, definitions & terminology, technical articles and more. All wiki entries can be edited by CoP members.

Recent Activity
Recently added or updated MWiki articles. All categories.

| Name | Modified By | MWiki Section | MWiki Subject | Modified |
|--|----------------------|------------------------|------------------------|--------------------|
| Gas Lift T new | Stouffer, Tim | Wells | Best Practice | 4/26/2011 4:28 PM |
| Punger lift | Melendez, Tony | Equipment | Best Practice | 3/23/2011 3:18 PM |
| Artificial lift | Stouffer, Tim | Subsurface | Definition/Terminology | 3/23/2011 9:47 AM |
| Artificial lift | Melendez, Tony | General | Process/Procedure | 3/21/2011 11:50 AM |
| Artificial lift | Melendez, Tony | General | Process/Procedure | 3/21/2011 11:26 AM |
| Creating GEOLOG color maps | Day, Peter I. | Subsurface | Technical Article | 3/17/2011 12:02 PM |
| Artificial lift | Stouffer, Tim | Subsurface | Definition/Terminology | 3/10/2011 2:16 PM |
| Zonites near Salt Structures in the Gulf of Mexico | Stouffer, Tim | Subsurface | Technical Article | 3/10/2011 11:03 AM |
| Pressure Transient Analysis - Characteristic Plots | Broome, Casey B. | Subsurface | Technical Article | 2/23/2011 12:22 PM |
| Abandonment Pressure | Stouffer, Tim | Subsurface | Definition/Terminology | 2/17/2011 2:18 PM |
| Gravity and Magnetics | Bundalo, Neda | Subsurface: Technology | Definition/Terminology | 2/16/2011 3:17 PM |
| Seismic | Blanchard, Robert H. | General | Definition/Terminology | 1/20/2011 2:53 PM |
| 4-D Elastic Modeling | Blanchard, Robert H. | Subsurface | Technical Article | 1/20/2011 2:07 PM |
| Anisotropic correction of sonic logs in wells with large dips | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 2:01 PM |
| Shale Distribution and net-gross from Thomas-Stieber X-plots in Geolog | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:38 PM |
| Use of "Verticalized" Stacking Velocities to Constrain Shale Properties | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:36 PM |
| Statistical Method for deriving permeabilities from Core Porosity and Permeability | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:35 PM |
| New Model for Absolute and End-Point Effective Permeability Estimation | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:33 PM |
| Excel Sheet for Plotting Formation Pressures, Pressure Gradients and Contacts | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:29 PM |
| Gas Saturation Estimation Method Using NMR Data with Uncertainty | Stouffer, Tim | Subsurface | Technical Article | 1/5/2011 1:24 PM |

Page Contact:
Melendez, Tony
Knowledge Management Specialist
713-296-2632

Guidelines
Guidelines for adding and editing MWiki content and frequently asked questions.

Create a new MWiki article
Add a MWiki Alert

Who to contact for support:

- Tony Melendez
- Tim Stouffer

Subjects
There are six subject areas of wiki pages. Each subject can contain content from any section.

- Best Practices
- Definitions
- Lessons Learned
- Process/Procedure
- Software
- Technical Article

Done

Local Intranet 100%

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Current Status

p – pressure (increased)

■ Developed CoP award program

- Rewarding behaviors
- Coveted year-end awards



- Community of the Year
- Success Story of the Year
- Executive Champion of the Year
- Discussion Post of the Year
- KS Event of the Year
- New Community of the Year
- Leader of the Year



■ Capturing and publishing success stories

- Quantifying value whenever possible (time saved, \$ earned, \$ saved, ...)
- Demonstrates individual and company benefits

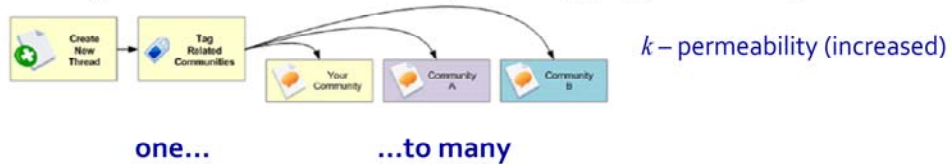
Current Status

- Loading and linking initial wiki content
- All CoPs migrated from old sites, facilitating new CoP startups
- Promoting more KS events and activities



Knowledge Sharing
Event of the Year
Organizers

- Taking advantage of new features of the plumbing (e.g., cross talk)



Going Forward

- More management interaction
 - Meaningful metrics
 - Add CoPs to new tool as needed
 - Encourage use of Mwiki
 - Continue to improve plumbing
 - Support more KS events (F2F still needed)
 - Support more KS *between* events
 - Investigate additional rewards
- p – pressure (increased)
- k – permeability (increased)
- p – pressure (increased)

Conclusions: Get Knowledge to FLOW!

- Getting Knowledge to flow is much like the physics contained in Darcy's Law
- Increase "Permeability"
 - Improve access to knowledge
 - Build knowledge connections: P2P and P2K
- Increase "Pressure"
 - Management leadership
 - Metrics
- Decrease "Viscosity"
 - Turn tacit knowledge into explicit, actionable knowledge
- Decrease "Distance" (make things easy)
 - Bring people, knowledge and communities closer together

$$v = -\frac{k}{\mu} \frac{\partial p}{\partial x}$$

v – flow velocity
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Increase organizational permeability. First, remind ourselves that porosity is people, knowledge bases and workflows. Focus on connecting them: p2p, p2i, ...

How do you reduce viscosity in oilfield applications: raise temperature (big effect); raise pressure (small effect); gel breakers (used in fracturing ... normally done with enzymes at the lower temperatures and oxidizers at elevated temperatures. The challenge has been adding sufficient breaker to provide a complete break while being able to place the proppant before breaking begins);

Note that in the oilfield, sometimes we want to increase viscosity and sometimes to reduce it.

Remember that in changing the pressure gradient in an organization, you have two variables to work with: pressure and distance. You can reduce organizational distance (e.g., via reorganization).

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