

### Research Spotlight:

### *IPA's Increased Focus on Project Research to Solve Real-World Problems*

**Michael McFadden, Director, IPA Project Research Division**



We can all see that Industry's challenges have grown over the past few years. Projects are getting larger, more complex, and more difficult. In addition, Industry is suffering a scarcity of staff with the necessary experience to do the work. On top of that, we see a supply chain for projects that is increasingly stretched. IPA recognizes that we need to do more to help accelerate the learning curve within our clients' organizations by taking a more proactive look at the upcoming challenges and providing the research leadership that will help address these challenges. To that end, IPA has expanded its research department by doubling the research staff. We have changed the name from the Product Development Group (PDG) to Project Research Division (PRD) to reflect the significant shift in our focus and mission from primarily a support function to a research business as a separate division of IPA.

IPA will be actively addressing the challenges that our clients face by inviting our clients into targeted research studies, as well as more actively engaging our clients to help them harness the value of more than 25 years of industry data, learnings, and project expertise. We have several joint industry research studies that are underway but still open to new participants, such as our third in a series of studies to understand the current costs and best practices for executing projects in China. We are in the execution phase of a study to identify cost-effective strategies for decommissioning offshore platforms in the Gulf of Mexico. We are about to launch a study of global capital project procurement trends with a focus on regional cost differences.

In this issue and in the issues that will follow, we will inform the community about the studies being initiated by IPA. Each study is focused on a different Industry challenge. What these studies have in common is IPA's methodology that allows us to quickly test hypotheses and determine what actually works with data, as opposed to opinion and anecdotal observations. We are committed to deliver results in real time and to provide feedback that clients can use to make decisions. Our process is to invite interested parties to join study groups through the use of a research prospectus that frames the

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questions that the study will address. Those expressing interest are then invited to work with the IPA research team to define the study parameters. A formal proposal is issued that defines the scope, deliverables, cost, schedule, and any data requirements. This collaborative approach has been successful in shaping the studies to deliver the learnings that are of most interest to our clients.

The goal of IPA's increased focus on research is to be able to harness the value of IPA's databases, research expertise, and methodology, as well as access to data, to provide Industry with information to make better decisions in a quickly changing environment. With the significant increase in IPA resources devoted to this mission, we look forward to helping you address your particular challenges. Going forward, we will keep our clients informed of upcoming studies and new services.



**Our clients are encouraged to contact our Director of Product Research Division, Michael McFadden directly at [mmcfadden@ipaglobal.com](mailto:mmcfadden@ipaglobal.com) to discuss how we can help your organization address particular challenges that you face.**

### **Professional Profile: Michael McFadden, Director, IPA Project Research Division**



Michael joined Independent Project Analysis in 2000 and currently serves as Director of IPA's Project Research Division. In his role Mike is responsible for IPA's research organization, which leads and supports IPA's research as well as develops the analytical tools that IPA uses to evaluate capital projects.

Michael previously served as the Regional Director of North America, with responsibility for the company's North American operations, as well as Refining Area Manager, overseeing the worldwide business and technical development needs in this sector. Michael has served as coordinator of IPA's annual Industry Benchmarking Consortium (IBC). Prior to these roles, Michael was a Project Analyst, focusing on the evaluation of process projects, especially in the petroleum and chemical areas.

Michael has 15 years of experience in the paper and chemicals industries, working for major companies in the United States. He has had experience in developing and commercializing new processes and products, and many years of experience in project management.

Michael has an M.S. degree in Chemical Engineering and a B.A. degree in Chemistry, both from the University of Virginia in Charlottesville, Virginia.

**The goal of the IPA Newsletter is to provide you with research-based articles on current capital project issues, announce upcoming IPA events and IPA Institute course offerings, and introduce new and future IPA products that can improve your project management systems.**



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**To be kept informed regarding upcoming IPA Institute programs and courses being developed for capital project improvement, please join our mailing list at [www.IPAInstitute.com](http://www.IPAInstitute.com).**

## Supply Chain Risks to Large Projects in the US

*How Will Your Company Handle the Coming Hot Market in the US?*

**Camila Lopez, Associate Project Analyst and Elizabeth Sanborn, Regional Director, North America**

The abundant low-cost gas supply in the US is changing the face of the capital projects market. The boom in shale gas and oil production in the US has spawned what could be the largest-ever build-out of infrastructure and derivative capital projects there. With natural gas prices in the US running \$10/MMBtu less than other markets, owners are racing to capitalize on the market conditions. Close to \$90B of investment has been announced for the US, including over 20 large ethylene cracker projects, creating an additional 10 million tonnes per year by 2017, about a one-third increase over current capacity. Gone are the days of only relatively small, sustaining capital projects. Welcome megaprojects! While the US Gulf Coast is the primary target for much of this investment, a number of megaprojects have been announced in the Midwest and the Northeast.



### *Performance of US Megaprojects Past*

Historically megaprojects in the US have not fared much better than their counterparts around the world, despite a much more favorable environment for project execution. IPA data show that 68 percent of megaprojects fail to meet the objectives established at authorization<sup>1</sup>; in the US, the failure rate is 65 percent, no different than elsewhere in the world. These US megaprojects were not typically derailed by stakeholder issues, remoteness, or local content requirements; rather, they self-destructed. Most failed due to basic Front-End Loading (FEL) errors and oversights. These projects started execution with *Poor* levels of project definition, as measured by IPA's FEL Index. Many of these megaprojects had poor understanding of site-specific issues, incomplete basic engineering deliverables, and suffered from inadequate execution planning. To compound the problem, all of the failed megaprojects in the US experienced turnovers of their project and construction managers.

### *Lessons Learned from Hot Markets Past*

The newly announced megaprojects will no doubt put pressure on the supply chain for capital projects and "heat up" the market for project services. Past experience shows that project excellence is difficult in hot markets. IPA's research on past hot markets in Western Australia, Alberta, the Middle East, and the post-Katrina USGC indicate that project costs rise 10-20 percent on average. The increased costs are driven by higher office costs and higher labor costs. The cost of materials also increases, but less so than office and labor. Increases in material costs are market driven. However, increases in office and labor costs are to a large extent avoidable. In a hot market, projects are under schedule pressure from business (often to take advantage of commodity pricing) and the quality of the design basis is insufficient. A poor design basis impacts the quality and timing of the design packages. In major projects in a hot market, late and poor quality engineering trigger a downward spi-

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<sup>1</sup> Edward Merrow and Jennifer Carr, *Why Large Projects Fail More Often*, IBC 2011, IPA, March 2011.

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ral from which large projects do not recover. Usually, incomplete front-end work sets the scene for engineering to slip due to quantities growth. When engineering falls behind, engineering quality deteriorates. The effects are seen not in engineering, but in field productivity and to some extent in quality (Figure 1).

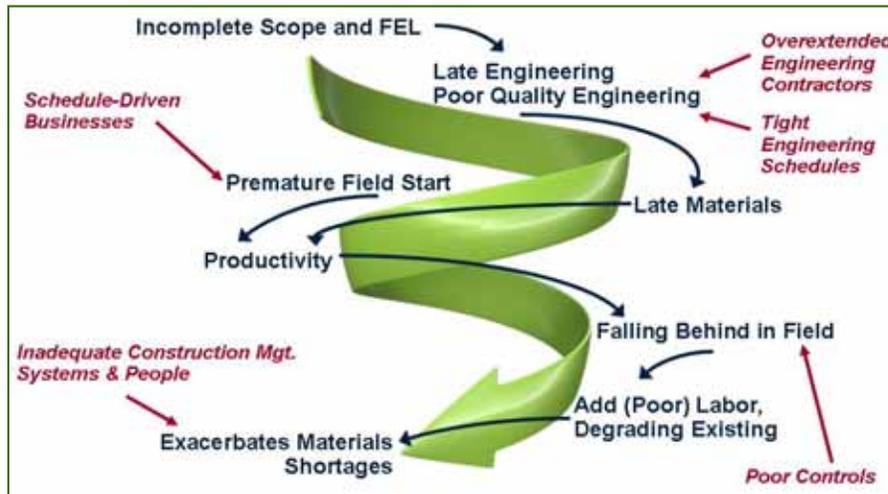


Figure 1. Experiences from Hot Markets: The Downward Productivity Spiral

### How Will Owners Navigate the Coming Hot Market in the United States?

Nearly two-thirds of the US-based megaprojects failed even in the absence of resource shortages; fewer than 20 percent of the US megaprojects in the database faced issues with labor availability. Executing megaprojects in a very hot EPC market in the US is likely to challenge US capital efficiency in the next several years. IPA is in the process of an in-depth study of the supply chain in the US to ready our clients for the coming demand. We are approaching this effort in two phases: first, we are assessing the performance of recent large projects in the US, exploring the sub-regions of the US (USGC, Ohio River Valley, Midwest, Northern Urban) to understand the peculiarities of executing projects in those regions. Next, we will complete an assessment of the supply chain to US projects—both local and global—to understand where the supply chain is likely to be stretched in the coming wave of capital investment. Based on these findings, we will study successful strategies and practices from previous hot markets that can benefit owners in dealing with the specific supply chain weaknesses anticipated in the US. The goal of the US Hot Market Study is to identify project risks and associated Best Practices for executing large projects during the coming hot market in the US.



For information on joining the US Hot Market Study, contact **Camila Lopez**, Principal Investigator at [clopez@ipaglobal.com](mailto:clopez@ipaglobal.com) or +1 (703) 726-5392 or **Elizabeth Sanborn**, North America Regional Director, at [esanborn@ipaglobal.com](mailto:esanborn@ipaglobal.com) or +1 (703) 726-5384.



#### InSites: *Research and News for Small Projects*

InSites is a blog dedicated to improving small project performance. InSites features a series of short articles to address issues specific to small, site-based projects. These articles will address everything from key practices to driving more competitive performance, to commonly asked questions about how to prepare for an IPA benchmarking.

To add your name to the distribution list, please contact **Phyllis Kulkarni**, Plant-Based Systems Manager, at [pkulkarni@ipaglobal.com](mailto:pkulkarni@ipaglobal.com), or visit the IPA InSites website at [www.IPAGlobal.com/News-Room/InSites](http://www.IPAGlobal.com/News-Room/InSites).

## IPA Kicks Off the 2013 Study on Unconventional Oil & Gas Developments

**Tom Mead, Deputy Manager, E&P Research Development**

The dramatic growth of unconventional oil and gas production and its enormous potential to reshape the global energy mix is well established. What has received far less attention, however, is how capital effective and operationally efficient operators are when responding to these opportunities. Many of our clients are spending \$1B a year in these plays but there is no well established baseline for efficiency or effectiveness. Unlike conventional offshore projects, onshore developments, including unconventional ones, have put less emphasis on modern project management practices, in part because of the operational nature of the work as well as the lower per project investment requirements. The sheer volume of investment now being poured into unconventional developments, however, is forcing companies to explore how these developments can be managed more effectively. Operators want to know where they stand relative to their peers and what they can do to improve. Without established industry benchmarks, however, operators cannot evaluate their performance against Industry—a key step in establishing Best Practices and improving performance.



To help fill in the gap in benchmarks and Best Practices and to help operators understand their performance baselines, IPA is initiating a joint industry research program for unconventional developments. Because of the magnitude of this field of study, the research program will consist of a series of annual research studies designed to address the most pressing issues facing Industry, as prioritized by participating members. The 2013 study focuses on North American plays with an emphasis on the Bakken, Eagle Ford, and Marcellus fields. We can extend our analysis to include other regions where participant interest is sufficient.

### *Purpose*

The purpose of the 2013 study is to establish quantitative benchmarks for cost, schedule, and production outcomes and to identify the primary factors driving these results. Through IPA's analysis of data pooled from multiple operators, participants will learn how their unconventional developments compare to other similar developments. The specific goals of the study are to:

- ***Establish cost, schedule, and production predictability metrics as well as unit development cost (UDC) and operations cost competitiveness metrics***
- ***Assess whether current processes are maintaining adequate control over unconventional oil and gas developments***
- ***Identify the key drivers affecting outcomes for these developments***
- ***Understand how regional geographic and geologic characteristics affect the relationships between drivers and outcomes***
- ***Develop conceptual frameworks for managing unconventional projects/programs***

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### Product

Each participating company will receive two deliverables from this research study: an outcomes report that focuses on industry distributions for key outcomes and a drivers report that identifies key performance drivers. The outcomes report will be delivered in summer 2013 in order to provide feedback to participants as soon as the analysis is complete. The drivers report will be delivered to participants in a private session at UIBC 2013.

For both the outcomes and drivers reports, each participating company will receive a briefing that identifies the findings from the analysis and a customized summary that highlights the performance of its specific projects relative to the peer group. These deliverables will only be available to participating companies; no individual project information will be made available to other operators under any circumstances.



**The 2013 study is currently underway; however, additional participants are welcome. For more information on this study or if you wish to participate, please contact Tom Mead, Deputy Manager, E&P Research Development, at [tmead@jpaglobal.com](mailto:tmead@jpaglobal.com).**

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## Benchmarking Sustaining Capital Allocation and Expenditure

### ***A Multi-Client Study Investigating the Drivers and Practices of Sustaining Capital Allocation and Expenditure in the Mining, Mineral, and Metals (MMM) Sector***

**Petros Kapoulitsas, Associate Project Analyst**

For organizations in the resource sector, establishing capital expenditure requirements typically involves broad considerations of their business strategies and financial situations, among others. At a minimum, every mineral production and processing facility must spend capital to maintain and sustain its asset base. Collectively, sustaining the capital spent by sites generally on small and very small capital projects constitutes a substantial proportion of corporate capital spending. Therefore, establishing the optimal level of sustaining capital requirements and planning accordingly is a good business practice.



Industry experience has shown that sustaining capital allocation may not always be subjected to the same rigor and level of review typically associated with growth and expansion project opportunities. However, when commodity prices decline, or in an attempt to reduce operating costs, sustaining capital expenditure is often subjected to urgent scrutiny. This typically results in indiscriminately scaling back or postponing sustaining capital expenditure with often detrimental consequences for the affected operating site or business. Hence, the need to effectively measure and plan the sustaining capital requirements at a site level becomes imperative. To date, no concerted effort has been made to understand, at an aggregate level, sustaining capital norms based on operating site characteristics. IPA proposes to launch a joint industry study to investigate and quantify that relationship.

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### **Purpose**

The purpose of the study is to enable participating companies to benchmark and compare sustaining capital spending levels. In addition, the study will investigate the methods used in determining and allocating sustaining capital.

IPA will accomplish these goals by collecting and analyzing relevant data for sites operated by organizations participating in this study. This prospectus includes information on the study goals, methodology, schedule, and cost.

### **Key Questions To Be Answered**

The study will answer the following key questions:

- ***What planning and development methods are typically employed to determine sustaining capital requirements?***
- ***What are the inherent site or asset-specific factors that have historically influenced sustaining capital spending?***
- ***What is the nominal level and distribution of sustaining capital investment for a given site?***
- ***What is the trend of sustaining capital expenditure over the past 5 to 7 years?***

Following release of this prospectus and submissions by interested organizations, the list of the key questions may be extended or modified.

### **Product**

Each participating company will receive a copy of a presentation that identifies the findings from this research study and a customized executive summary that highlights the sustaining capital of its sites relative to the average performance of the group. The deliverables from this study will only be available to participating companies. The target completion date for this study is August 2013.

### **Requirements for Participation**

To participate in this study, each organization must contribute representative data and other information as required from operating assets/sites within each major commodity business currently operated by the participating organization. Specifically, we will request that forecast sustaining capital budget allocations and actual expenditures and related information be provided for at least three operating sites for the last 5 to 7 years.



For more information contact Petros Kapoulitsas, at [pkapoulitsas@ipaglobal.com](mailto:pkapoulitsas@ipaglobal.com) or at +61 (0) 39 458-7300.



## *New IPA Subscriptions and Original Publications*

Available only to existing clients, IPA's subscription newsletters and original publications are designed for those who are serious about improving capital project performance. Three different options give readers regular access to original articles, exclusive data, market trends, and more.

### *Business Professionals' Capital Projects Newsletter*

The connection between business and capital representatives has proven to be a critical leveraging point for improved financial returns. This quarterly newsletter focuses on improving the interface between these two functions. **3<sup>rd</sup> issue expected in April!**

### *Capital Project Regional Publications*

How does the local situation where the project is being executed affect the project scope, the implementing organization, specific project practices, and in turn, capital project performance? Each issue casts a spotlight on the problems presented by a different region of the world. **Western Canada featured in April. West Africa featured in second half of 2013.**

### *EPC Market Forecast Newsletter*

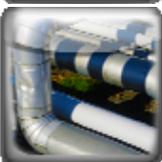
IPA publishes this quarterly EPC newsletter to forecast capital project price trends five years into the future for nine regions of the world. It has become the standard source of cost escalation information of the Engineering, Procurement, and Construction markets, and is widely used in estimating the escalation line item in cost estimates. **Next issue available in May.**



Contact Dean Findley, Director Subscription Services, at [dfindley@ipaglobal.com](mailto:dfindley@ipaglobal.com) or visit [www.IPAGlobal.com/Subscriptions](http://www.IPAGlobal.com/Subscriptions) to learn more.

## Introducing IPA's Hydrocarbon Processing and Transportation (HPT) Business Area

**Andras Marton, Business Area Manager, HPT**



IPA has changed its Refining and Petrochemicals Business Area to **Hydrocarbon Processing and Transportation (HPT)**. This change reflects the increasing number of midstream processing projects and transportation-related projects that IPA is analyzing. One objective for a business area is to manage and improve sector-specific intellectual property, including analytical models, assessment tools, and new products, and to initiate and manage research that addresses current sector-specific topics. The HPT business area will use these tools and research findings to build relationships with existing clients by providing increasing value, and to broaden relevant project representation by engaging new clients. HPT covers projects in the refining, petrochemical, gas processing, midstream processing, pipeline, terminal, and transportation areas, and works with integrated, independent, and state-owned companies in all regions of the world.

## Upcoming IPA Events & Presentations for 2013



**March 19 - 21**

### ***IPA to Speak at the Offshore West Africa Conference in Accra, Ghana***

Rolando Gächter, IPA Manager of Exploration & Production, is scheduled to speak at the upcoming Offshore West Africa Conference. The conference, now in its 17th year, will deliver the latest technological innovations, solutions and lessons learned from leading industry professionals from a local perspective. Rolando's topic during the debate session is Offshore West Africa Project Performance. For more information please visit [www.offshorewestafrica.com](http://www.offshorewestafrica.com).

**April 9 - 10**

### ***IPA to Speak at the LARTC 2nd Annual Meeting in Rio de Janeiro, Brazil***

Carlos Flesch, Regional Director IPA Latin America and Félix Parodi, Ph.D., Review Board Member, will present a paper titled ***Reinvigoration of Capital Projects in Latin America*** at the Latin America Technology Conference (LARTC) 2nd Annual Meeting. Carlos and Félix will discuss Best Practices and Lessons Learned on capital projects of the Latin America region.

**April**

### ***IPA to Deliver Webinar for the Society for Mining, Metallurgy, & Exploration***

Fred Biery, IPA Manager of Mining, Minerals, and Metals, will deliver a webinar on "Key Practices for Executing Successful Mining and Mineral Projects" for the Society for Mining, Metallurgy, and Exploration. For more information visit [www.smenet.org](http://www.smenet.org). A specific date for the webinar is pending.

**May 7**

### ***IPA to Deliver Keynote at a Bentley Systems Event in Perth, Australia***

Bill Bowman, IPA Manager, Asia Pacific E&P Business Development, will deliver a keynote speech for a Bentley Systems, Inc. thought leadership event with the theme of "Strategies for Infrastructure Project Success." For more information visit [www.bentley.com](http://www.bentley.com).

**June 11**

### ***UIBC 2012 Roadshow***

The UIBC 2012 Roadshow will be hosted by Shell in Houston, Texas. The UIBC Roadshow is open to all UIBC companies, and provides an opportunity to extend the UIBC metrics and research to company participants that were unable to attend the main UIBC 2012. For more information, contact **Neeraj Nandurdikar** at [nnandurdikar@ipaglobal.com](mailto:nnandurdikar@ipaglobal.com).

**June 12 - 13**

### ***2013 Upstream Cost Engineering Committee (UCEC) in Houston, Texas***

The UCEC, formally organized in 1999, is an approved subcommittee of the UIBC. The purpose of the UCEC is to improve upstream project and business results by providing metrics for better cost engineering. The UCEC metrics provide asset evaluation and concept development professionals with a better understanding of costs and schedules. The fifteenth annual UCEC meeting will be hosted by Shell in Houston, Texas. For more information, contact **Carlton Karlik** at [ckarlik@ipaglobal.com](mailto:ckarlik@ipaglobal.com).

### ***September 17 - 18 Cost Engineering Committee (CEC) 2013 in Tysons Corner, Virginia***

The CEC, formally organized in 1998, is an approved subcommittee of the IBC. The CEC focuses on all aspects of cost (or investment) engineering, including cost estimating, scheduling, and project control practices and metrics, with the goal of expanding the capability of the owner cost engineer. The primary vehicles for accomplishing these objectives are metrics, research, and practice sharing. The event is structured as a working meeting in which active participation is expected; the reward for participants is greater insight into the metrics and Best Practices.

### ***November 18 - 20 UIBC 2013 in Leesburg, Virginia***

The Upstream Industry Benchmarking Consortium (UIBC) provides an independent forum for each participating company to view its performance against the performance of other companies. The consortium highlights Best Practices, reinforcing their importance in driving improvements in asset development and capital effectiveness. Consortium attendees learn ways to improve specific elements of capital project execution through presentations and interactive discussions. For more information, contact **David Rosenberg** at [drosenberg@ipaglobal.com](mailto:drosenberg@ipaglobal.com).



## 2013 IPA Institute Programs Schedule

To view full course descriptions, pricing, up-to-date registration details, and special discounts, please visit our website at [www.IPAInstitute.com](http://www.IPAInstitute.com)

### Public Courses

#### *Megaprojects - Concepts, Strategies, and Practices for Success (22 PDUs)*

March 12 - 14: Rio de Janeiro, Brazil  
 June 11 - 13: Calgary, Alberta, Canada  
 October 15 - 17: Bogotá, Colombia

May 20 - 22: Moscow, Russia  
 October 9 - 11: Perth, Australia  
 October 22 - 24: Houston, Texas

#### *Best Practices for Mining Projects (16 PDUs)*

April 23 - 24: Santiago, Chile  
 September 24 - 25: Belo Horizonte, Brazil

June 25 - 26: Brisbane, Australia

#### *Project Management Best Practices (22 PDUs)*

May 7 - 9: Seoul, South Korea  
 May 14 - 16: Houston, Texas  
 July 23 - 25: Perth, Australia  
 August 13 - 15: Houston, Texas  
 October 8 - 10: Moscow, Russia  
 November 12 - 14: Johannesburg, South Africa

May 14 - 16: Sao Paulo, Brazil  
 June 18 - 20: Lima, Peru  
 July 23 - 25: Calgary, Canada  
 September 17 - 19: Abu Dhabi, UAE  
 October 29 - 31: Shanghai, China

#### *Gatekeeping For Capital Project Governance (16 PDUs)*

May 14 - 15: Bangkok, Thailand  
 September 4 - 5: Gold Coast, Australia

July 30 - 31: Johannesburg, South Africa  
 September 25 - 26: Houston, Texas

#### *Best Practices for Small Projects (22 PDUs)*

May 28 - 30: Beijing, China  
 July 2 - 4: Kuala Lumpur, Malaysia  
 October 8 - 10: Orlando, Florida  
 November 12 - 14: Curitiba, Brazil

June 4 - 6: New Orleans, Louisiana  
 September 24 - 26: The Hague, The Netherlands  
 November 12 - 14: Sydney, Australia

#### *Contracting in the Changing World of Projects (12 PDUs)*

July 17 - 18: Santiago, Chile

#### *Exploration and Production Project Best Practices (22 PDUs)*

August 6 - 8: Rio de Janeiro, Brazil  
 October 22 - 24: Kuala Lumpur, Malaysia

September 9 - 11: Las Vegas, Nevada

#### *Establishing Effective Capital Cost and Schedule Processes (16 PDUs)*

August 27 - 28: Sao Paulo, Brazil

#### *Practices for Shorter, More Cost-Effective Turnarounds (14 PDUs)*

December 11 - 12: The Hague, The Netherlands

## New EMEA Leadership Roles Established

**Mary Ellen Yarossi, Regional Director, Europe**

The IPA Europe, Middle East, Africa (EMEA) office serves a diverse geographic region. IPA EMEA has had a presence in Europe for over 20 years serving our clients through our understanding of the drivers of project success and failure in Western Europe. As IPA EMEA's work in the Middle East and CIS (Commonwealth of Independent States) has grown, we felt the need to adapt the organization to deepen our knowledge of project practices and performance as well as strengthen our client relationships in areas outside of Western Europe. To meet these changing needs, two groups of analysts were formed: one under the leadership of Mark Etchells will focus on project issues in the Middle East, and a second under the leadership of Elke Skwirblies will increase knowledge of capital effectiveness in the CIS.



### **Mark Etchells - Middle East**



Mark Etchells joined IPA in 2008 and has worked on project evaluations, benchmarkings and consulting engagements for projects in all major industry sectors. He is IPA's coordinator for several clients in the Middle East. Prior to joining IPA, Mark worked to transfer technologies from R&D to production at sites around the world. Mark holds a Doctor of Philosophy degree in Chemistry and Engineering from Oxford University in the UK.

### **Elke Skwirblies - Commonwealth of Independent States**



Elke Skwirblies has been leading project evaluations and benchmarking studies with IPA for 15 years. She has coordinated activities for major clients. Most recently her efforts were focused on developing IPA's work with companies in Germany.

Elke holds a Masters degree in Economics from Cologne University in Germany.



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IPA improves the competitiveness of our customers through enabling more effective use of capital in their businesses. It is our mission and unique competence to conduct research into the functioning of capital projects and project systems and to apply the results of that research to help our customers create and use capital assets more efficiently.



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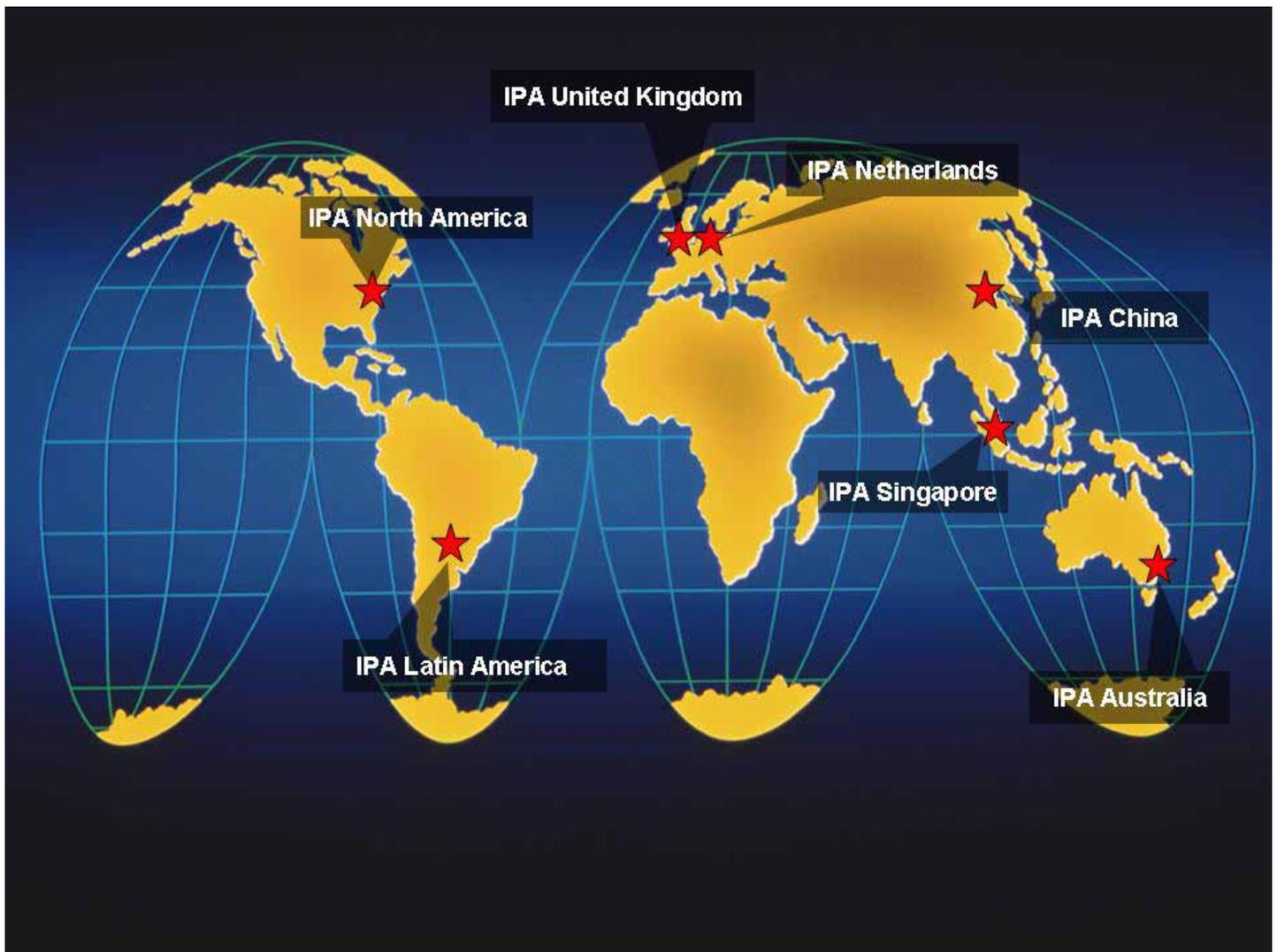
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The IPA Institute's mission is aligned with the overall IPA mission to improve the capital productivity of its clients. The programs offered provide a forum for in-depth understanding of key elements of the capital project process and how to apply these learnings to effect positive changes and improvements, resulting in the more effective use of capital.

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