IPA

Independent Project Analysis Newsletter

Independent Project Analysis, Inc. is the preeminent organization for quantitative analysis of capital project effectiveness worldwide. At IPA, we provide practices you can use to ensure your success.

Volume 3, Issue 3 **October 2011**

Research Spotlight: *"Stuck In the Middle"*

Félix Parodi, Ph.D.

Most IPA clients have a stage-gated Front-End Loading (FEL) process, but over 80 percent of IBC companies[1] have unpredictable and/or poor performing projects. Not surprisingly, the best performers deliver their portfolio with a reasonable degree of predictability and strong project performance by consistently using Best Practices; underperforming companies are characterized by their weak use of Best Practices. The companies that are neither top nor bottom performers—that is, those that are usually *"stuck in the middle"*—display highly variability in their use of project management practices caused by variability in the use of their FEL process. This article discusses, in the context of organization effectiveness and project system dynamics, fundamental aspects that drive discipline in the use of the FEL process, including:

- Structure of the project organization and project teams
- Management and integration of owner core competencies and support staff
- Roles of key project system stakeholders such as the business sponsor, gatekeeper, portfolio manager, and project management organization
- Management of interfaces at the portfolio and project level
- Accountability to authorize only the "right and ready" projects

Organizational Effectiveness

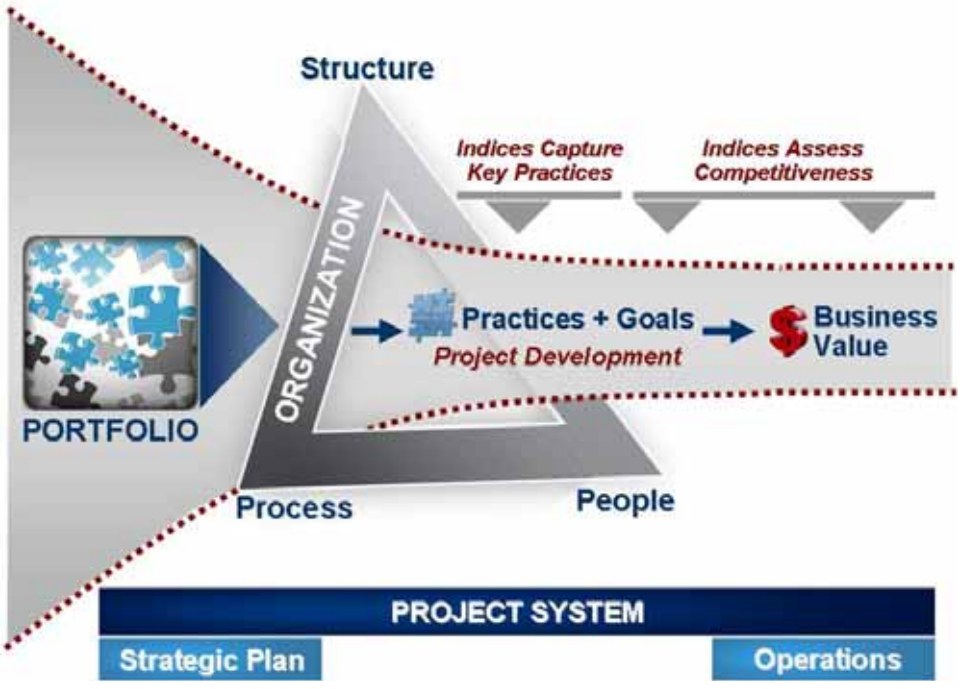

Figure 1. **Organization Facilitates Portfolio Performance - Project System Provides the Path**

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[1] The Industry Benchmarking Consortium (IBC) is a voluntary association of owner firms in the process industries that use IPA's quantitative benchmarking approach. The members exchange data, information, metrics, and lessons to improve the capital effectiveness of their project systems.

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The success of a portfolio requires an effective organization that deploys project strategies and resources according to the business' priorities defined by the strategic plan. Our research has revealed that the organizational structure, staffing, and use of the FEL process are critical to ensure organizational effectiveness, as illustrated in ***Figure 1***.

A company's project organization (PO) structure, which is also called the project management organization (PMO), is often influenced by the existing company business structure, particularly in the degree of centralization of the work process and competencies and the structure of the project teams. Although centralized work processes are fairly common and are often associated with FEL process improvement efforts, we observe a wide variety of arrangements in which the key project team members may report and/or reside in business units, technology divisions, and plants or, in some cases, are managed under a separate arm of the project organization. Centralized project organizations mature faster and deliver more competitive results because they promote a disciplined use of a common work process and have competencies that have a direct line reporting relationship to the central function. Centralized organizations tend to be better organized for rapid professional development and more effective deployment of resources to support their capital project portfolios. Importantly, some of the best performing companies have leveraged central functions through the use of regional office centers with a cadre of professionals that have the deep cultural understanding required to manage the interface with local companies and institutions as well as the work force.

We have seen several different approaches to staffing project teams. Some of the companies that are stuck in the middle use a matrix organization for large projects, which is problematic because team members usually dedicate more time to interface management than real work. The matrix organization structure often dilutes accountability of project performance and limits project management authority. IPA research indicates that to achieve success in large projects, the structure needs to be "projectized"; in other words, the structure should be standalone in which the project manager is the team leader with the right level of authority and a direct reporting relationship with the core team members. However, in small plant-based projects, team members usually participate in multiple projects supported by matrix organizations and the best companies use project portfolio management tools to strategically control these projects.

In addition, the use of the right core competencies is essential for project success. Research indicates that owner leadership in key activities such as construction safety, project controls, environmental permitting, and risk management are critical, but the optimal integration of the core competencies varies depending on the project characteristics (e.g., a contract specialist is a critical function for megaprojects).

Adhering to the FEL process enables the integration of the right project professionals and use of Best Practices at the right time; in other words, it is an enabler of project performance. Many of the organizational effectiveness studies that we have completed over the past 5 years indicate that the use of contractors without retaining key owner core competencies is increasing and that the training and mentoring for project professionals is inadequate, which contributes to the inconsistent use of the FEL process and Best Practices.

Delegation of responsibility to the contractors is illustrated by the low owner staffing during FEL in terms of full-time equivalents. A lean owner staffing strategy suggests that there are severe constraints at the portfolio level and/or a limited understanding of the effects of inadequate project resource requirements. Many underperform-

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InSites: *Research and News for Small Projects*

IPA recently launched InSites, 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 drive more competitive performance from your small projects, 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*****,** or visit the IPA InSites website at ***www.IPAGlobal.com/News-Room/InSites*****.**

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ing companies do not have a balanced distribution of competencies and often experience conflicts of interests (e.g., FEL contractor will do EPCM, estimate is not validated, and incentives are part of the deal). Owner and contractors do what makes sense, but no one sees the larger system that individual actions create. This issue is exacerbated when those companies consolidate this approach using alliances with contractors. In Industry, we have observed that shifting the burden is an insidious pattern that demands quick solutions for difficult projects, often as a result of negotiations rather than using the "take charge" approach that is characteristic of the best performers.

The use of a portfolio management strategy that assigns key team roles to alliance or preferred contractors without adequate oversight is a disturbing trend we have observed in our research findings gathered from over 5,000 small plant-based projects. Contractor-led projects are less effective in using Best Practices, usually display less productive engineering, and are usually more expensive than owner-led projects. Fortunately, some of the best performers found a solution to this issue by providing clear business objectives, strictly following the FEL process, and ensuring that owner specialists validate the cost estimates.

The lack of adequate core competencies and staffing limits companies to using contracting approaches that have been shown to be very cost-effective (e.g., mixed strategy) and observed more often in the top performers. The companies stuck in the middle tend to compensate for this weakness with EPC lump-sums that have contract terms and conditions that transfer risk to contractors, often at a high price. The problem is that these companies transfer risks that the contractor cannot control or fail to implement project controls to ensure that the contractor is meeting its contractual obligations. Projects under these conditions tend to experience changes in execution plans, turnover of contractor team members, and claims that ultimately result in unpredictable and poor performance.

Project System Dynamics

One of the key factors to ensure project system effectiveness is the management of interfaces at both the project and portfolio level. Business value is accrued by the success of one project at a time, and one major project disaster can destroy the value of many successful projects (thus, project system success requires consistent project performance, which, in turn, requires sustainable discipline).

Figure 2 illustrates several aspects of a project system that can be used as a framework to understand the dynamics that affect the disciplined use of the FEL process. An essential FEL process element is the decision review board (DRB). The DRB is usually led by a gatekeeper and comprised of experienced functional managers and is often supported by technical experts. This group assesses the project's readiness to proceed to the next phase based on the completeness of the phase deliverables, assessment of risks, and available resources. The gate review is often preceded by technical audits and/or peer reviews. In essence, gatekeeping is a management process to authorize projects.

The project organization improves and facilitates the use of the process and tools and fosters the development of core competencies. The PO manager works with the business sponsor to ensure the appropriate allocation of resources according to the project's importance, technical complexity, and project development and execution

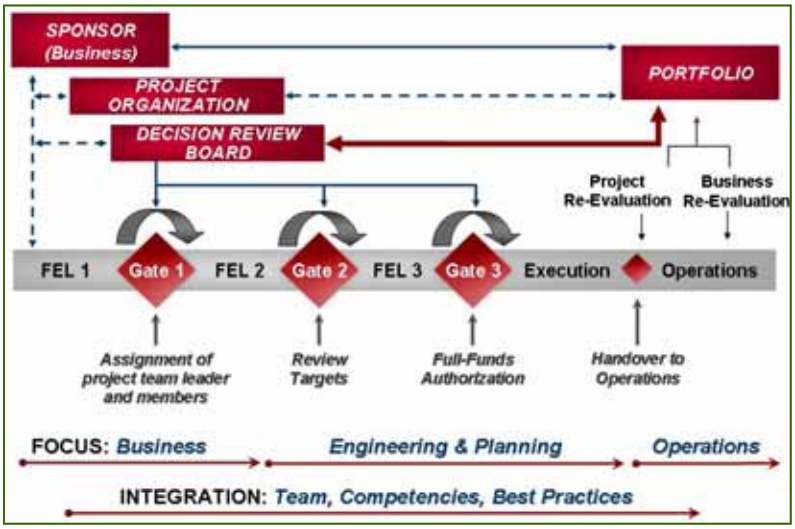

Figure 2. **Project System - Organizational Support Strengthens FEL Process**

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strategy. Essentially, the PO focuses on strengthening and using the company's project management capabilities .

The DRB gatekeeper and business sponsor play two important functions in the project system: management and leadership; only integrative approaches that focus on excellence will thrive in turbulent competitive environments.

The business sponsor represents the asset owner. This role ensures that the project is accepted and supported, establishes the business contribution for the project, and facilitates the resolution of issues that are outside the project team's control. The sponsor and project team communicate frequently (i.e., at least monthly) regarding project progress and confirm alignment with a set of priorities. In practice, companies assign business representatives to participate in specific team activities, such as Technology Selection and Classes of Facility Quality (and other Value Improving Practices [VIPs]), scope reviews, and risk management efforts. Team activities are under the team leader's domain (i.e., project manager or project director), who has access to the sponsor at any time. Not surprisingly, underperformers have weak to non-existent interfaces between the sponsor and project team.

At the individual project level, the business domain is situated in the FEL 1 and FEL 2 phases. The final alignment of the business and project objectives and scope closure is achieved at the end of FEL 2 as a result of the dialog between business, operations, and engineering. Gate 2 is also referred to as the "business gate" because it is the point at which the economic sensitivity analysis reveals whether the business case is strong enough for the project to start FEL 3 work. Gate 2 is the critical point at which the conflict between sponsor leadership and DRB management of the project system needs to be resolved. Although a detailed understanding of the strategy, risks, and economics is very important for the business case, IPA research provides overwhelming evidence that readiness (e.g., the FEL Index) correlates very strongly with improved project performance.

Underperforming companies and those stuck in the middle experience different degrees of the following gatekeeping issues that explain deficiencies and variability in the use of Best Practices:

- Gatekeeping that is considered only to be a necessary administrative process step and does not effectively scrutinize project readiness. Gatekeeping breaks down because of a lack of discipline; that is, "the gate is open." Our research indicates that large, strategic, revenue-generating projects experience this issue more than standard, routine projects. Many of these underperforming projects start FEL 3 with open scope.
- The increased focus on completing FEL phase deliverables to meet an established date (e.g., DRB meeting) results in a gross underestimation of the risks of taking FEL process shortcuts. It is not uncommon to undergo concurrent design and late FEL 3 changes and quick re-estimations to meet the estimate targets. Project teams "respond to the need to look good at authorization and pass the point of no return"; in other words, project practices are not as good as they should be at authorization. In some cases, the DRB meeting dates were established several months ahead of time. We have directly observed the short-cutting of the process during our FEL workshops when we noticed that project teams were working concurrently on activities that related to early FEL 2 and late FEL 3 (i.e., process fast tracking).
- The lack of alignment between the DRB and investment committee decisions (e.g., portfolio management) because the Business Case dominates Readiness. The effects of the lack of Readiness are often underestimated (e.g., benefits outweigh the risks), and the project contribution is diminished because poorly defined projects cost more and slip schedule. Not surprisingly, many of these projects fail to achieve their business objectives.

An effective capital project system requires organizational elements (e.g., structure, process, and people) and a functioning stage-gated process structure with adequate roles and responsibilities and interface management processes. The balance between the desire to be flexible regarding decisions to be made given the business case and the strength of the control mechanisms (gatekeeping, project organization guidance, commitment to one scope, priorities, etc.) is what drives project system consistency. Unfortunately, decisions in many cases

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are influenced by the value of the business opportunity, incentives, and lack of business accountability for capital project performance (e.g., projects are completed 2 years or more after authorization). Accountability to authorize only "the right and ready" projects is an essential driver of FEL process discipline.

IPA research provides overwhelming evidence that readiness (e.g., the FEL Index) correlates very strongly with improved project performance. FEL process discipline is essential.

As most experienced project professionals retire, project complexities increase, global markets expand, frontier projects increase, and talent becomes harder to find, companies that do not invest in strengthening their project systems to ensure a disciplined use of the FEL process will experience large cost overruns and schedule slips. Many of the current improvement approaches were implemented in response to the symptoms of these issues, but they may not address the real problems. This will cause the capacity to manage these projects to erode until the side effects of "patching up the system" build to overwhelming proportions and eventually lead to unavoidable system breakdowns. This risk may be exacerbated as globalization and sustainable project delivery practices are intensified.

Professional Profile: *Félix Parodi, Review Board Member*

Félix has reviewed and approved IPA deliverables for release since 2009. Prior to this role, he provided assessments and consulting for new technology projects and megaprojects, led system benchmarkings, and advised senior management on improving their company's capability and performance. Félix' work with a global company resulted in its achievement of Best-in-Class performance. He also developed a major corporate training program and facilitated workshops and courses for over 2,000 project professionals.

Prior to joining IPA in 1998, Félix held several international and product development positions with Procter & Gamble. He has a Ph.D. from Louisiana State University and was appointed a Fulbright Scholar upon his graduation from Catholic University of Perú.

Benchmarking Operability: *The Most Leveraging Capital Project Outcome*

Lara Keefer and Fred Biery

The economic importance of operability is clear: making and selling product is what makes money. A high level of stable production leverages capital, operating costs, and maintenance costs. IPA recognizes that many companies are facing operability problems and these problems are urgent. Our goal is to continue to advance our research into identifying the key drivers of achieving superior operability performance.

There are many types of problems that can plague a project's operational performance. One example is a minerals processing facility that started up reasonably well, but experienced excessive wear on various materials handling devices within the first month of operation. The project team was frustrated and did not understand why the problem was occurring so quickly after startup.

Defining Operability

The early operational performance of a project is defined as the average production rate during the second 6 months of operation after mechanical completion. It is measured by comparing the actual production against the design nameplate capacity.[1] Operability shortfalls have two sources as losses can be due to technical reasons or non-technical reasons.[2] IPA separates the source of the losses through the use of two metrics: ***unad-***

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[1] As designed, the sustainable level of maximum production of the facilities installed by the project.

[2] Examples of non-technical losses include: unavailable or poor quality feedstock, lack of market demand, or the unavailability of upstream or downstream units as well as uncontrollable external events such as severe weather or labor strikes.

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justed operability and ***adjusted operability***. The unadjusted operability metric is calculated by dividing the actual production, including all losses (both technical and non-technical), by the design nameplate capacity. The adjusted operability metric only accounts for the technical losses in the actual production when divided by the design nameplate capacity. The basic equations for calculating the unadjusted and adjusted operability metrics are shown below.

$$\text{Unadjusted Operability} = \frac{\text{Actual Production}}{\text{Design Nameplate Capacity}}$$

$$\text{Adjusted Operability} = \frac{\text{Actual Production}}{\text{Adjusted Nameplate Capacity}}$$

(Design Nameplate Capacity – Non-Technical Losses)

IPA removes non-technical losses from its standard operability assessments for two primary reasons:

- The adjusted operability metric enables IPA to analyze the front-end practices that significantly affect a project's operability performance.
- Project teams, and even operations teams, generally have no control over shortfalls in operability due non-technical losses.

In some instances, business decides to operate a facility below its nameplate capacity (e.g., a change in market demand for a product at the time the facility has started up), and significant non-technical losses can obscure potential technical issues.

Operability Research Highlights

Based on operability data collected for more than 10 years, IPA has statistically linked specific practices to significantly improve operational performance. One of the most important correlations is the positive relationship between the level of Front-End Loading (FEL)[3] completed at authorization and operability ***(Figure 1)***. This relationship indicates that in order to have a facility that operates as intended, the necessary front-end work must be completed that defines the scope to meet the objectives and minimizes costly changes in execution. Projects evaluated by IPA that achieved an FEL rating of *Good or Best Practical* achieved 8 percent better operability performance than projects with a poorer level of FEL. Specific tasks and activities that can be performed during FEL to improve operability include:

Figure 1. **Project definition drives operability**

- Develop a quality management plan[4] prior to authorization
  (Operability Improvement: 14 percent)

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[3] FEL is the process by which a company develops a detailed definition of the scope of a capital project that is required to meet the business objectives. The product of the FEL process is a design basis package of customized information to support detailed or production engineering of design documents. Completion of an FEL design basis package typically coincides with project authorization.

[4] Quality management plan refers to the methodology by which a project team monitors and measures quality and addresses issues for detailed engineering, procurement, construction, and startup.

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- Ensure adequate involvement of operations and maintenance during FEL
  (Operability Improvement: 19 percent)
- Conduct a formal equipment maintenance access review before authorization
  (Operability Improvement: 8 percent)
- Develop detailed startup and commissioning plans during FEL—do not delay plan development to mid- or late execution
  (Operability Improvement: 7 percent)

IPA's research has also shown that operability problems in the first month after mechanical completion are strong predictors of reduced production in months 7 to 12 after mechanical completion ***(Figure 2)***. This relationship is driven by the following factors:

- Early problems tend to be reoccurring problems
- The problems can be attributed to poor feedstock characterization (failure to fully define the feedstock during FEL), which leads to problems once the project is started
- Early problems can further stress the process during operation

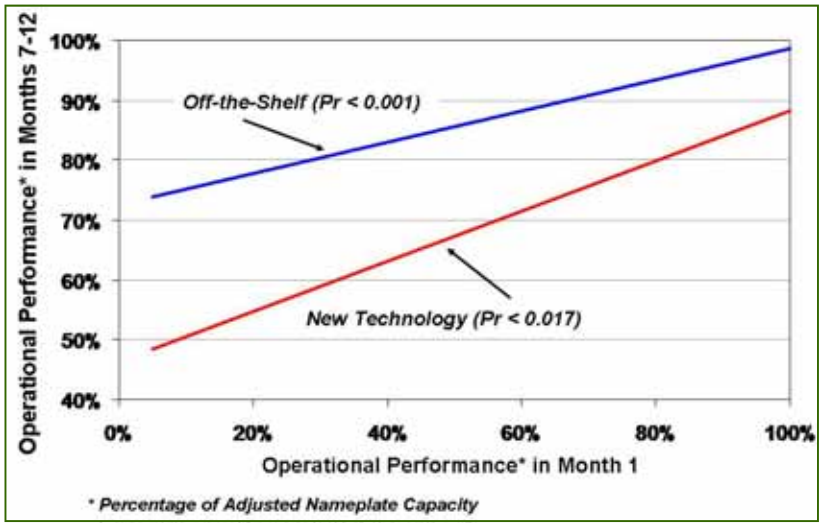

Figure 2. **Early Operability Problems Lead to Reduced Production in Months 7-12**

Let's refer back to our example project that experienced early excessive wear on the materials handling devices. The unexpected erosion was actually a direct result of incomplete geotechnical data and the lack of full understanding of the feedstock characteristics during FEL that caused the team to choose inadequate coatings and materials of construction for the various materials handling devices. The team dealt with the operability problems by changing the equipment out more often than originally planned, resulting in an increased amount of unscheduled downtime. The team continued this process until more equipment was installed in the system to change the feedstock characteristics. This example reinforces the importance of completing all of the necessary front-end work during project definition to avoid operability problems during production.

IPA benchmarks operability for each industry sector.
Below is a discussion that focuses on minerals processing projects.

Industry Sector-Specific Benchmarks – Minerals Processing Plants

As with all major capital projects, it is critical for a minerals project to meet production objectives. During the pre-feasibility and feasibility, or FEL, phases of the project, a number of risk factors, including mineral commodity prices, operating costs, capital costs, grade, and other factors, are modeled to determine the robustness of the project's potential returns. Meeting process plant production objectives is rarely part of this sensitivity analysis, but there is a fair degree of variability in mineral processing plant production attainment that is not associated with grade uncertainties.

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Figure 3 presents mineral processing plant production attainment deviation from plan for a set of 41 plants employing conventional technology. The deviation from the planned production capacity during the second 6 months after mechanical completion varies by ±20 percent. On average, projects miss their planned production levels by a small margin.

What can project teams do to increase the chances of meeting their planned production targets and thus the expected internal rate of return (IRR)? Fortunately the Best Practices for capital projects in other industries also apply to minerals projects. IPA research shows that minerals project teams that have clear objectives, good team factors as measured by the Team Development Index (TDI), and well-defined engineering levels and execution plans typically meet their planned production levels with a variability within ±10 percent. Other enabling factors are optimal Value Improving Practices (VIPs) use, particularly the use of the Reliability Simulation VIP. Maintenance involvement and an equipment review are also characteristic of the projects that meet their production capacity objectives.

The difference between meeting the operational performance objectives and achieving industry average performance (slightly missing performance objectives, as shown in ***Figure 3***) is nearly 1 percent of the IRR, as shown in ***Figure 4***.

Therefore, project economics clearly depend on achieving the production plans. During the FEL phases, due consideration should be given in the project risk analysis to the variability in attaining the production plans. To reduce production attainment risks, teams should focus on the practices noted above: ensuring the objectives are clear, developing solid teams, and completing key engineering and execution plan deliverables.

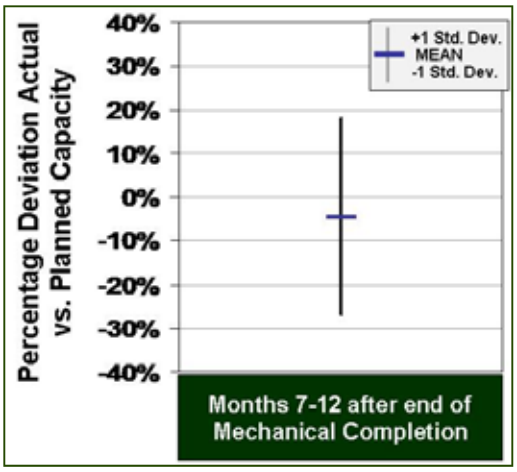

Figure 3. **Product deviation from plan**

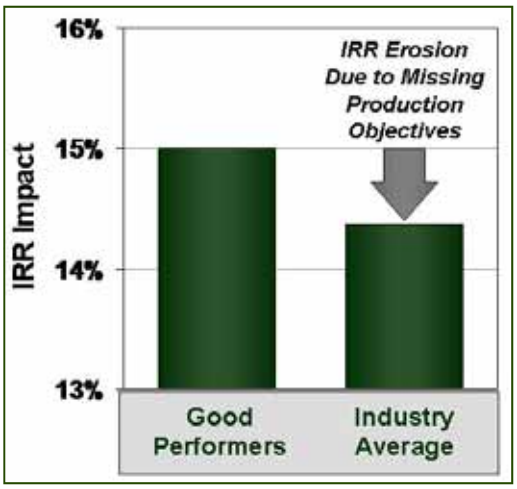

Figure 4. **Meeting production objectives**

Path Forward: Gathering More Data to Advance IPA's Research

To further advance IPA's research into improving operability, IPA continues to collect operability data for projects that have been mechanically complete for more than 12 months. The data collection process consists of:

- Obtaining planned and actual production data for up to 36 months after mechanical completion using a detailed spreadsheet and workbook.
- A telephone interview between an IPA analyst and representative(s) from the client's operations group. The phone interview enables IPA to gain a deeper understanding of the context of the answers in the workbook, the startup process, and the challenges or triumphs of the first 36 months.

As with all IPA research, project data drive our understanding of the significant relationships between drivers and performance. In addition to collecting data for individual projects, we can develop special studies on a group of company-specific projects to look at many different research questions that an individual company might have.

For all questions about IPA's operability research or assessment, please contact ***Lara Keefer***, Project Analyst, at ***lkeefer@ipaglobal.com***. For information about IPA's operability research on minerals processing plants, please contact ***Fred Biery***, Business Area Manager for Mining, Minerals, and Metals, at ***fbiery@ipaglobal.com***.

Upstream Industry Benchmarking Consortium (UIBC)

The 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 other more interactive discussions.

DETAILS: Annual meeting of the UIBC 2011 will be held ***November 14 - 16, 2011,*** at the ***Hilton McLean in Tysons Corner, Virginia***.

AGENDA TOPICS: The agenda focuses on the long-term UIBC vision of sharing performance results and practices in all aspects of E&P asset capital effectiveness, and was prepared with the guidance of the UIBC Steering Committee.

- ***Performance Metrics***

  The centerpiece of the UIBC conference is the sharing of asset development outcomes and practices of the participating project systems. The plenary metrics sessions will highlight overall industry trends and overall metrics as well as company metrics. In addition, breakout sessions will be held to discuss company-specific performance.

- ***Industry Norms and Best Practices in Field Development Planning***

  This study will examine the robustness of the field development plan (FDP) and how the quality and completeness of the FDP document influences project drivers and outcomes.

- ***Flow of Reservoir Information***

  IPA research has demonstrated that the flow of reservoir information has a significant effect on project outcomes. Phase 1 of this study looks at the flow of reservoir information to the other functions within the E&P asset development, and its effect on projects.

- ***E&P Contracting***

  This study will explore how contracting strategies affect project outcomes and how to determine if a given contracting strategy is well suited for delivering a project.

- ***Facilities FEL Update***

  This study will update IPA's E&P Facilities FEL, while focusing on the project site factors component. The impact of project site factors within E&P Facilities FEL on project success, measured by cost growth and schedule slip, will be examined.

For more information about the research topics and conference content, contact **David Rosenberg,** Senior Project Analyst, at **+1 (703) 726-5481** or **drosenberg@ipaglobal.com.** For logistical information, contact **Ellie Reynolds** at **+1 (703) 726-5471** or **ereynolds@ipaglobal.com**.

Upcoming IPA Events & Presentations for 2011

October 5

IPA to Present at OTC Brasil 2011, Rio de Janeiro, Brazil

Carlos Tapia, IPA's Regional Director for Latin America, will present at OTC Brasil 2011. The title of his presentation is "**Oil Industry Megaprojects: Our Recent Track Record**." The conference is being held from October 4 - 6 in Rio de Janeiro, Brazil. For conference details, please visit **www.otcbrasil.org**.

October 10

IPA President to Present at the IPMA World Congress 2011, Brisbane, Australia

Ed Merrow, President and CEO of IPA, will deliver the Opening Keynote Address at the 25th International Project Management Association (IPMA) World Congress 2011. The theme of this year's IPMA World Congress event is "Project Management - Delivering the Promise" and will take place from October 9 - 12, 2011, at the Brisbane Convention & Exhibition Centre, Queensland, Australia. For more information, please visit **www.ipma2011.com**.

November 14 - 16

UIBC 2011 in Tysons Corner, Virginia

The UIBC 2011 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. For more information, please contact **David Rosenberg** at **drosenberg@ipaglobal.com**.

November 18

IPA to Present at PMI Tour 2011, Cono Sur, Santiago, Chile

IPA will present at the PMI Tour 2011 Cono Sur for Southern Latin America. The presentation topic is an article written by Carlos Flesch, IPA Business Area Manager for Mining, Minerals, and Metals, and Félix Parodi, Review Board Member, on Investments in Latin America with a focus on Chile. The event will be held on November 18, 2011, in Santiago, Chile. For more information, please visit PMI's website at www.pmi.org.

November 19

IPA to Present at PMI Tour 2011, Cono Sur, Antofagasta, Chile

IPA will present at the PMI Tour 2011 Cono Sur for Southern Latin America. The presentation topic is a focus on executing mining projects, based on extensive research on IPA's database. The event will be held on November 19, 2011, in Antofagasta, Chile. For more information, please visit PMI's website at www.pmi.org

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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.

To subscribe to the IPA Newsletter and to view an archive of all past issues, please visit our website at *www.ipaglobal.com/Newsletter*.

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*.

Follow IPA on LinkedIn at *http://www.linkedin.com/company/independent-project-analysis*

2011 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

Public Courses

Establishing Effective Capital Cost and Schedule Processes *(16 Professional Development Units)*

October 4 - 5: Kuala Lumpur, Malaysia

Project Management Best Practices *(22 Professional Development Units)*

October 4 - 6: Houston, Texas
November 8 - 10: Buenos Aires, Argentina
November 22 - 24: Johannesburg, South Africa

Best Practices for Small and Plant Projects *(22 Professional Development Units)*

October 11 - 13: Las Vegas, Nevada

Megaprojects - Concepts, Strategies, and Practices for Success *(22 Professional Development Units)*

October 11 - 13: Brisbane, Australia
October 18 - 20: Calgary, Alberta, Canada
October 24 - 26: Lima, Peru
December 13 - 15: Beijing, China

Contracting in the Changing World of Projects *(12 Professional Development Units)*

October 18 - 19: Rio de Janeiro, Brazil
October 25 - 26: Houston, Texas

Private Programs *Contact IPAInstitute@ipaglobal.com for more information*

Exploration and Production Project Best Practices *(22 Professional Development Units)*

October 18 - 20: Stavenger, Norway *(Statoil)*

Megaprojects - Concepts, Strategies, and Practices for Success *(22 Professional Development Units)*

November 7 - 9: Madrid, Spain *(Repsol)*

Survey - Where Do You Want IPA Institute Courses to be Held?

The IPA Institute is giving you the opportunity to directly impact the assembly of the 2012 course schedule. If you are thinking about participating in a professional education course next year, please take a minute to complete a short online survey. It's quick and easy! Simply fill in your contact information and then enter your course and location preference.

http://IPAGlobal.com/Institute/schedule_survey

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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.

www.IPAInstitute.com

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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