The PRACTITIONER

A monthly newsletter of the Energy Facility Contractors Group's Project Delivery Working Group

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Labor Day is just around the corner!!!

Greetings PDWG Team Members. Labor Day, the first Monday in September, is a creation of the labor movement and is dedicated to the social and economic achievements of American workers. It constitutes a yearly national tribute to the contributions workers have made to the strength, prosperity, and well-being of our country!!!

The *Practitioner* salutes all those dedicated to the field of Project Management for their dedication and contribution to project management excellence.

In this month's issue we kick off a series that revisits "Appendix C" of DOE 413.3B Chg 5. As a reminder, "Appendix A" covers "Requirements", while "Appendix B" covers "Responsibilities". "Appendix C" is titled "Topical Areas" and covers important aspects of Program and Project Management for the Acquisition of Capital Assets.

DOE 413.3B 'Appendix C' Topical Areas

The project management principles (below) identify excellent attributes of a successful approach in managing any scope: Capital, Minor Construction, General Plant Projects, or Expense. Some contractors have adopted the tenets/principals below in managing all contract/project scope.

Project Management Principles

This is the Department's framework for successful project execution:

a. Line management accountability.
b. Sound, disciplined, up-front project planning.
c. Well-defined and documented project requirements.
d. Development and implementation of sound acquisition strategies that incorporate effective risk handling mechanisms.
e. Well-defined and managed project scope and risk-based PBs and stable funding profiles that support original cost baseline execution.
f. Development of reliable and accurate cost estimates using appropriate cost methodologies and databases.
g. Properly resourced and appropriately skilled project staffs.
h. Effective implementation of all management systems supporting the project (e.g., quality assurance, integrated safety management, risk management, change control, performance management and contract management).

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h. Early integration of safety into the design process.
i. Effective communication among all project stakeholders.
j. Utilization of peer reviews throughout the life of a project to appropriately assess and make course corrections.
k. Process to achieve operational readiness is defined early in the project for Hazard Category 1, 2, and 3 nuclear facilities.

DOE 413.3B "Appendix C" Topical Areas – continued

A project is a unique effort having defined start and end points which is undertaken to create a product, facility or system. Built on interdependent activities that are planned to meet a common objective, a project focuses on attaining or completing a deliverable within a predetermined cost, schedule and technical scope baseline.

A capital asset project can range from the construction of a simple facility, such as a warehouse, to a group of closely-related projects managed in a coordinated way. This effort is known as program management.

Selection and designation of a Program Manager (see Appendix B, Paragraph 6) is critical as they ensure that all their projects are properly phased, funded over time and that each project manager is meeting their key milestones. Program managers are the advocate; they ensure proper resourcing and they facilitate the execution process. A program manager is responsible for managing programmatic risks and putting mitigation strategies in place to minimize risks to projects. Programmatic risks should be identified and quantified in terms of cost and/or schedule contingency and accounted for within one or more of the projects.

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Acquisition Strategy

An Acquisition Strategy (AS) is a key activity formulated by the IPT leading up to CD-1. The AS is the FPD's overall plan for satisfying the mission need in the most effective, economical and timely manner. For more details, see FAR 34.004, DOE Acquisition Guide, Chapter 7, and DOE G 413.3-13.

Supporting the execution of the AS is the procurement strategy that must be documented in writing as prescribed by FAR 7.1 and for major systems acquisition, FAR 34.004. While the AS represents a high level plan which is approved through the CD review and approval process, the information and analysis required as part of an AP, if applicable, provides greater focus on the analysis and strategies needed to appropriately execute procurements in accordance with sound business practices, statutory, regulatory and policy requirements. Typically, the AP will not be formulated until after the CD authority has selected the programmatic approach as part of CD-1.

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The review and approval of the AP resides within the contracting authority of the Senior Procurement Executive or their designee. Therefore, approval of the AS by the PSO cannot be presumed to constitute approval of the AP.

Analysis of Alternatives

The responsible program office is required to conduct an analysis of alternatives (AoA) that is independent of the contractor organization responsible for managing the construction or constructing the capital asset project. The AoA will be conducted for projects with an estimated TPC greater than $50M prior to the approval of CD-1 and may also be conducted when a performance baseline deviation occurs or if new technologies or solutions become available. The AoA will be consistent with published GAO best practices. Refer to GAO-16-22, DOE and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices.

Baseline Clarity

There is only one original PB and it is documented at CD-2 approval. The PB represents the Department's commitment to Congress to deliver the project's defined scope by a particular date at a specific cost. Cost estimates in advance of CD-2 do not represent such commitments. Also, there should be clarity over the terms PB and Performance Measurement Baseline (PMB) as they are different. The former is the project's baseline and the latter is for use by the EVMS. Refer to DOE G 413.3-10A for further clarification.

Federal project directors, contracting officers and program managers are accountable for ensuring contract and project documentation is complete, up-to-date, and auditable. Project baseline documentation must clearly define scope, key performance parameters, and the desired product, capability, and/or result. At project completion, there should be no question whether the objectives were achieved. Contracts and M&O work authorizations must clearly reflect project objectives and scope. Changes, especially to project objectives, need to be executed through a timely, disciplined change control process. Significant changes should be the exception, rather than the norm.

Cost Estimating

The authority and accountability for any project, including its costs, must be vested firmly in the hands of the FPD. Some cost estimate, or cost range, should be provided at each CD gateway, but the degree of rigor and detail for a cost estimate should be carefully defined, depending on the degree of confidence in project scale and scope that is reasonable to expect at that stage. Whatever figure or range

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that is provided should explicitly note relevant caveats concerning risks and uncertainties inherent in early estimates at CD-0 and CD-1 stages given the immature requirements definition at this juncture. A project owner should never be the sole cost estimator, at any stage (i.e., from CD-0 on), given the inherent conflict of interest. The second cost estimator should come from outside of the line manager's chain of command, to avoid conflict of interest.

Established methods and best practices will be used to develop, maintain, monitor, and communicate comprehensive, well-documented, accurate, credible, and defensible cost estimates. Cost estimates shall be developed, maintained, and documented in a manner consistent with methods and the best practices identified in DOE G 413.3-21, GAO Cost Estimating and Assessment Guide (GAO-09-3SP), and, as applicable, with the Federal Acquisition Regulation (e.g., FAR Subpart 15.4 – Contract Pricing; FAR Subpart 17.6 – Management and Operating Contracts), Office of Management and Budget Circular A-11, Preparation, Submission, and Execution of the Budget, and Department of Energy Acquisition Regulation (DEAR) Subpart 915-4 – Contract Pricing.

Visit this link to view the entire document. In next month's issue of the *Practitioner*, we will pick back up with "Design Maturity."

Behavior-Based Project Management

Introduction to Behavior-Based Project Planning

In past issues we've talked about how the computer between your ears acts as a biased information processor when making decisions. The accuracy of our decisions is diminished by time-pressure, how much information we've processed throughout the day (cognitive load), social pressures, mental discomfort (cognitive dissonance), and many other factors.

That said, planning is no different. As a matter of fact, planning is even more susceptible to thinking errors. Why? Because it's forward-looking, and involves the brain making predictions about the future. When making predictions, the brain tends to be optimistic, doesn't like to think about the things that can go wrong, and is highly influenced by external pressures. This changes the accuracy of our predictions in planning and forecasting – anything looking forward. The results are generally optimistic baselines and forecasts, increased project risk, schedule variances, and thus corresponding cost variances. Learning to make reliable predictions helps to reduce risk and variances, resulting in higher efficiencies, accelerated delivery, and lower cost to the government.

But how do we change that? The good news is that many researchers have been working on solving these problems for a few decades now. Some of cognitive science has already been brought forward in the domain of safety, with DOE's Human Performance Improvement (HPI) handbook. However, the handbook makes it clear that HPI is not just about safety.

Planning and prediction using knowledge of human factors has been around for some time now. DOE Order 413.3B has elements that help debias forecasts, DOE's Risk Management Guide (DOE G 413.3-7A) notes several specific forecasting biases, and HPI addresses elements that drive behavior toward errors in

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Behavior-Based Project Planning

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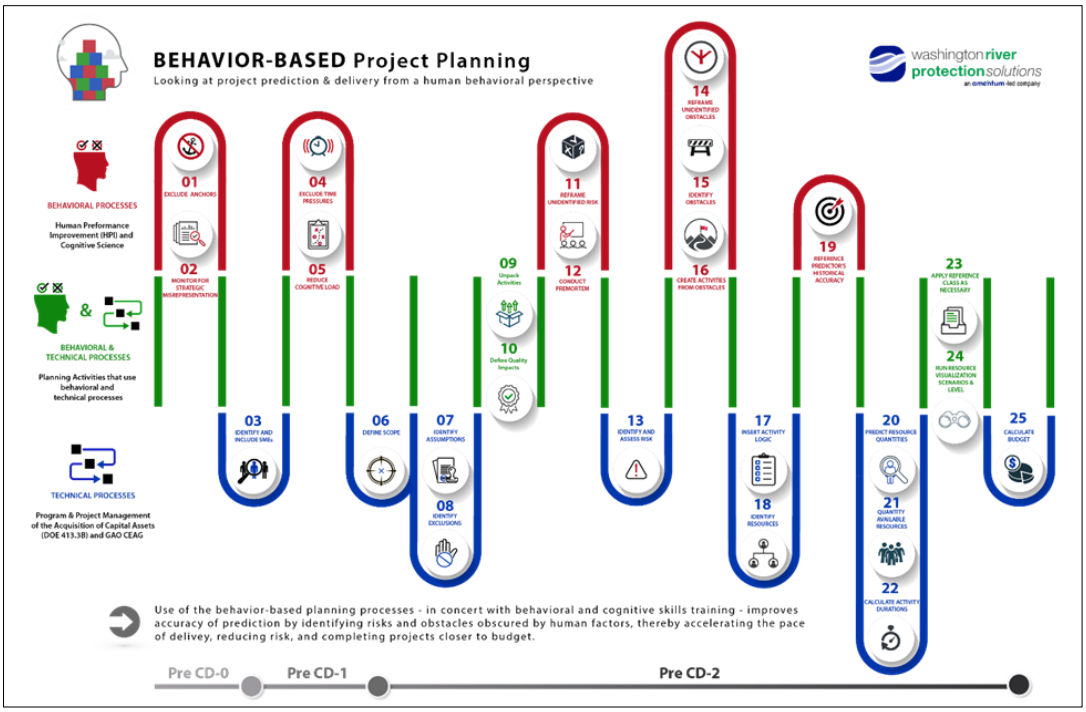
human decision-making, whether it be in project management or safety. Additional research in the behavioral and cognitive sciences fields helps tie it all together into a more complete package that meets the intent of the various DOE resources in debiasing project plans and forecasts.

We present here the first step in debiasing project predictions through the Behavior-Based Project Planning processes. The processes are intended to increase prediction reliability in planning, but are not the full package of mitigation steps. Future training will include teaching the behavioral and cognitive factors that drive the processes, some applicable skills, and organizational elements that drive erroneous predictions. Simply put, using the processes is a first step, but should not be thought of as the only tool that's required to change planning and forecasting outcomes. Debiasing planning and forecasting also takes cultural change across all levels of the organization.

The process diagram below is divided into three major areas: 1) processes that come from behavioral and cognitive science research, 2) processes that originate in both behavioral and technical project research, and 3) more standard technical project planning processes that can be found in documents such as DOE O 413.3B or the Government Accountability Office cost estimating guide. It should be noted that the processes do not address the intricate details of application in planning with EVMS. The processes should be thought of as the minimum steps needed to help create a more reliable plan. It is up to the planning practitioner applying the processes to ensure that they are also meeting any additional procedural and regulatory requirements for their contract or project.



Future training, currently being considered in cooperation with the EFCOG training group, will more thoroughly cover the processes and their application, as well as some of the background of the processes to give the practitioner context. Meanwhile, the processes can still be used by PMs, CAMs, PCEs, and Risk Engineers to begin increasing the reliability of their planning outcomes. Follow-up articles will provide additional details and explanation of the processes.

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It is Not One World — What We Do and How We Do it Matters!

Failed Projects & What We Can Learn from Them

The world is full of successful projects with which we are all familiar, and then there are failures that almost supersede the greatness of the successful ones. Here are a handful of examples of failed projects that are still in many people's memories, and some lessons learned from each one that can be implemented by any project manager.

Betamax

The word Betamax has become almost synonymous with failure. But when it was first released, Betamax was supposed to become the leader in the cassette recording industry. Developed by Sony, Betamax was introduced in the mid-1970s but was unable to get traction in the market, where JVC's VHS technology was king.

Surprisingly, Sony continued to produce Betamax all the way into 2016. Long before it discontinued the technology, Betamax was already irrelevant.

The Lesson — Betamax was an innovative product, and it even got to market before VHS. But soon the market had options that were cheaper and better than Betamax, making it a failed project. Sony's mistake was thinking that the project was complete once the product went to market. Project managers need to always follow up on their work, analyze the data and make an evaluation about what needs to be done to keep the project relevant.

New Coke

Coca-Cola is one of the most iconic brands in the world. It would take a lot to tarnish that reputation. But that's just what happened when New Coke was introduced in 1985. People didn't know why the Coke they loved and drank regularly was being replaced.

The company knew why. They were looking to improve quality and make a splash in the marketplace. The fact is, New Coke sunk like a stone. It wasn't like New Coke was just released on an unknowing public, though it might seem that way. In fact, the new recipe was tested on 200,000 people, who preferred it to the older version.

But after spending $4 million in development and losing another $30 million in back stocked product, the taste for New Coke evaporated. Consumers can be very loyal to a product, and once they get into a habit, it can be very difficult to break them of it in favor of something different.

The Lesson — It's not that Coca-Cola neglected market research to see if there was a need for developing a new product, but they were blind to their own customers' motivations. New Coke was a failed project because the researchers needed to do more than a mere taste test. They needed to understand how people would react when the familiar Coke they loved would be discontinued and replaced by a shiny new upstart. Market research must be handled like a science and an art.

Related: How to Know When to Kill a Project and Cut Losses

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Failed projects & what we can learn from them

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IBM Stretch Project

The Stretch project was initiated in 1956 by a group of computer scientists at IBM who wanted to build the world's fastest supercomputer. The result of this five-year project was the IBM 7030, also known as Stretch. It was the company's first transistorized supercomputer.

Though Stretch could handle a half-million instructions per second and was the fastest computer in the world up to 1964, the project was deemed a failure. Why? The project's goal was to create a computer 100 times faster than what it was built to replace. Stretch was only about 30-40 times faster.

The planned cost was $13.5 million, but the price dropped to $7.8 million; so the computer was at least completed below cost. Only nine supercomputers were built.

The Lesson — While the project was a failure in that it never achieved the goal it set, there was much IBM could salvage from the project. Stretch introduced pipelining, memory protection, memory interleaving and other technologies that helped with the development of future computers.

Creative work is rooted in failure specifically because of the serendipitous discovery that occurs. This was a creative project, which might not have met its paper objective, but created a slew of useful technologies. So, aim for your goal, and who knows what good things you'll discover along the way.

***Challenger* Space Shuttle**

The worst failure is one that results in the loss of life. When you're dealing with highly complex and dangerous projects like NASA, there's always tremendous risk that needs to be tracked. On January 28, 1986, that risk became a horrible reality as space shuttle Challenger exploded 73 seconds after launch.

The cause was a leak in one of the two solid rocket boosters that set off the main liquid fuel tank. The NASA investigation that followed said the failure was due to a faulty designed O-ring seal and the cold weather at launch, which allowed for the leak.

But it was not only a technical error that NASA discovered, but human error. NASA officials went ahead with the launch even though engineers were concerned about the safety of the project. The engineers noted the risk of the O-ring, but their communications never traveled up to managers who could have delayed the launch to ensure the safety of the mission and its astronauts.

The Lesson — Managers are only as well-informed as their team. If they're not opening lines of communication to access the data on the frontlines of a project, mistakes will be made, and in this case, fatal ones.

— *From the ProjectManager.com blog*

Just for Fun: August's Notable Events and Famous Birthdays

1 — Explorer William Clark (1770) and national anthem author Francis Scott Key (1779) were born, World War 1 began (1914), the first Six Flags amusement park opened in Texas (1961), and MTV made its debut (1981).

2 — **The Declaration of Independence was signed** (1776), Pres. Warren G. Harding died (1923), the Vietnam War began (1964), and Iraq invaded Kuwait (1990).

3 — Christopher Columbus set sail from Spain (1492), Calvin Coolidge became president (1923), entrepreneur Martha Stewart was born (1941), the NBA was founded (1949), and quarterback Tom Brady was born (1977).

4 — Champagne was invented (1693), and jazz musician Louis Armstrong (1900), President Barack Obama (1961), and racecar driver Jeff Gordon (1971) were born.

5 — The first federal income tax was imposed (1861), the first traffic light went into service in (1914), astronaut Neil Armstrong was born (1930), actress Marilyn Monroe was found dead (1962), and the NBA and ABA merged (1976).

6 — The first execution by electric chair was carried out (1890), comic actress Lucille Ball (1911) and pop artist Andy Warhol (1928) were born, the first atomic bomb was dropped on Japan (1945), and African-Americans were guaranteed the right to vote (1965).

7 — The Purple Heart was created (1782), Earth was first photographed from space (1959), and actress Charlize Theron was born (1975).

8 — Actor Dustin Hoffman was born (1937), and President Richard Nixon announced his resignation from office (1974) .

9 — Cartoon character Betty Boop debuted (1930), actor Sam Elliott was born (1944), the second atomic bomb was dropped on Japan (1945), singer Whitney Houston (1963) and athlete Deion Sanders (1967) were born, and Gerald Ford became president (1974).

10 — Missouri became the first state west of the Mississippi River (1821), President Herbert Hoover was born (1874), the electric guitar was patented (1937), and ***Red Dawn* premiered as the first movie with a PG-13 rating** (1984).

11 — Wrestler Hulk Hogan was born (1953), hip-hop was created (1973), the longest major league baseball strike began (1994), and actor Robin Williams died (2014).

12 — Filmmaker Cecil B. DeMille was born (1881), the Spanish-American War ended (1898), and The Wizard of Oz premiered (1939).

13 — Filmmaker Alfred Hitchcock was born (1899), Cuban president Fidel Castro was born (1926), and baseball legend Mickey Mantle died (1995).

14 — The Social Security Act was signed (1935), comedic actor Steve Martin was born (1945), the Whiffle Ball was patented (1953), and basketball star Magic Johnson (1959) and actress Halle Berry (1968) were born.

15 — French emperor Napoleon Bonaparte (1769) and chef Julia Child (1912) were born, the Panama Canal opened (1914), construction began on the Berlin Wall (1961), the Woodstock Music Festival opened (1969), and actor Ben Affleck was born (1972).

16 — The Klondike Gold Rush began (1896), baseball legend Babe Ruth died (1948), TV personality Kathy Lee Gifford (1953) and singer Madonna (1958) were born, the punk rock revolution began (1974), and singer Elvis Presley died (1977).

17 — Lou Gehrig became baseball's ironman (1933), and actor Robert De Niro was born (1943).

18 — Explorer Meriwether Lewis (1774), baseball legend Roberto Clemente (1934), and actors Robert Redford (1937) and Patrick Swayze (1954) were born, and basketball legend Larry Bird retired (1992).

19 — Aviator Orville Wright was born (1871), **the first race was held at the Indianapolis Motor Speedway** (1909), Star Trek creator Gene Roddenberry was born (1921), Adolph Hitler became president of Germany (1934), President Bill Clinton was born (1948), the Beatles began their first U.S. tour (1964), and actors Matthew Perry and Christian Slater were born (1969).

20 — President Benjamin Harrison was born (1833), the National Football League was organized (1920), and the Soviet Union invaded Czechoslovakia (1968).

21 — Oldsmobile was founded (1897), basketball legend Wilt Chamberlain (1936) and singer Kenny Rogers (1938) were born, Hawaii became the 50th U.S. state (1959), the Ruby Ridge standoff began (1992), and swimmer Michael Phelps won a record 8th Olympic gold medal (2004).

22 — The first America's Cup yacht race was held (1851), the International Red Cross was founded (1864), and **Nolan Ryan recorded his 5,000th strikeout** (1989).

23 — The tire chain was patented (1904), basketball star Kobe Bryant (RIP) was born (1978), baseball legend Pete Rose was banned for life (1989), and the first case of West Nile virus in the U.S. was reported (1999).

24 — Mt. Vesuvius erupted, instantly burying two cities (79), British troops set the White House on fire (1814), the waffle iron was patented (1869), and baseball ironman Cal Ripken Jr. was born (1960).

25 — The first person swam across the English Channel (1875), actor Sean Connery (1930) and TV personality Regis Philbin (1933) were born, The Wizard of Oz debuted (1939), and Paris was liberated by Allied troops (1944).

26 — Women gained the right to vote (1920), the first televised baseball game aired (1939), and aviator Charles Lindbergh died (1974).

27 — Krakatoa erupted in the world's most powerful volcanic blast (1883), President Lyndon B. Johnson (1908) and Mother Teresa (1910) were born, and the first edition of "The Guinness Book of Records" was published (1955).

28 — **Martin Luther King, Jr. made his "I have a dream" speech** (1963).

29 — The Soviet Union detonated its first nuclear test bomb (1949), singer Michael Jackson was born (1958), and Hurricane Katrina made landfall on the Gulf Coast (2005).

30 — Baseball legend Ted Williams was born (1918), and Thurgood Marshall became the first African-American Supreme Court justice (1967).

31 — The first solar-powered car was demonstrated (1955), and boxing legend Rocky Marciano died in a plane crash (1964).