THE PRACTITIONER

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

Issue 30 *January 2022*

New Year, New Look

Greetings PDWG Team Members. Welcome to the 30th edition of the *Practitioner*! As we launch into 2022, it's a safe bet that most of you have set some sort of "New Year's Resolution." Popular ones include losing weight, exercising more, and better time management. We decided that a good one for this newsletter was to provide a makeover of sorts. Not everything has changed, but you might notice a new title banner, which is the most obvious change. We've also switched up the fonts and made some subtle color changes. One thing that hasn't changed, though, is the great content that you've come to expect in the previous 29 issues.

To begin our third full year of publication, we present a timely Behavior-Based Project Management article on Obstacle Identification. As with our New Year's Resolutions, we must recognize those things that might stand in the way of accomplishing our goals and do our best to either avoid or overcome them. The same holds true with managing projects, and PMP PhD Josh Ramirez will explain how. We'll also look at the 2020 PMI Project of the Year winner in our recurring "It's Not One World" segment, and we'll keep a little fun by highlighting some notable historical events and celebrity birthdays.

So grab a cup of coffee and your favorite chair, and enjoy our new and (hopefully) improved *Practitioner* newsletter.

Behavior-Based Project Management

Behavioral Planning Hack: Obstacle Identification

— By Dr. Josh Ramirez

Back in August 2020, I presented an article introducing Behavior-Based Project Planning (you can read it here and refer to the diagram on page 3). In this issue, we are going to break down obstacle identification (which is step 15 in the process) and provide a brief explanation of each of the steps to put it all in context. We are also focusing on the deep dive into obstacle identification in this issue because of the ease of implementation and the significant value added in reducing optimism bias and increasing project acceleration.

As you may recall, using behavioral science to design project management processes helps reduce errors and risk, increase efficiency, and accelerate projects. And the great news is that DOE is starting to incorporate this human behavioral side of project management in the Environmental Factors portion of the IP2M METRR (we'll have more on this in future articles).

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Behavioral science research has found that a focus on obstacles in project planning can reduce optimism bias. An obstacle is defined as a thing that blocks one's way or prevents or hinders progress. Why is this relevant to project planning and forecasting? The first reason is research has found that the focus on obstacles, versus the plan itself, tends to reduce optimistic predictions. Second, identifying obstacles gives the planner an opportunity to identify mitigation strategies to eliminate or navigate the obstacles.

Imagine an obstacle course. As you look at the obstacle course you see various elements that you have to climb over, jump over, run through, etc. The obstacles are in your way, and they have to be navigated in order to reach the finish line. As you look at the obstacles you mentally prepare to overcome them and create strategies to navigate them. Obstacles are much different than risks in this regard. The obstacle course presents objects that must be overcome to reach the end of the course, whereas risk would represent things that could go wrong (such as slips and falls) and may or may not occur. This is where the focus on risk in traditional project management methodologies has fallen slightly short of creating better plans. Risk may or may not occur, while obstacles do occur. Furthermore, risk events may be set aside from the plan and not used to create more realistic durations and cost. A focus on obstacles creates inclusion of those obstacles in the activity, yielding a more realistic output.

Obstacle identification, though quite simple in practice, is quite significant in changing the outcome of the project. When we identify the obstacle, we are identifying things that do stand in the way of activity completion, whereas identifying risk only calls out those elements that may stand in the way of activity completion. Furthermore, identifying an obstacle gives an opportunity to create an activity in the schedule to represent that obstacle, if the obstacle is significant enough.

Obstacle identification is also significant from a cognitive perspective. Identifying obstacles prior to estimating resources or durations changes the cognitive perspective and results in more realistic plans. However, just like unpacking activities, identifying obstacles is more taxing on the brain because it takes cognitive energy to imagine the various obstacles in an activity. Obstacle identification is impacted by *cognitive load and decision fatigue* (learn about these from the "Cognitive Moderators" article in this *Practitioner*), so it's likely that identifying obstacles in a planning session that's held earlier in the day will be most beneficial.

Note that identifying obstacles should be done before creating any estimates of resources or durations. If obstacles are identified after estimates are created, the estimate creates an anchor and obstacle identification will no longer serve its intended purpose.

Next up: breaking down behavioral project planning, including step 15.

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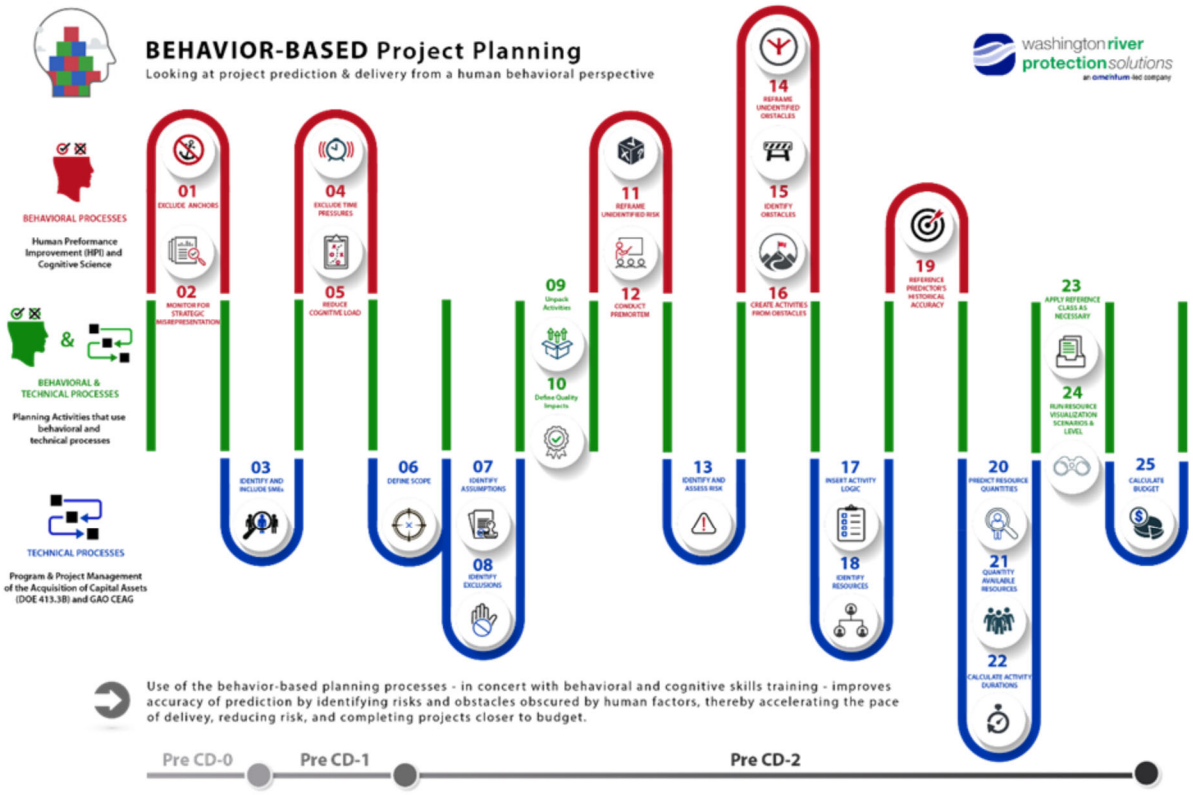
Breakdown of the Behavior-Based Project Planning Diagram



While we just covered step 15 in a little more depth, below is a summary of each of the steps with a brief explanation to provide context. Note that the sequence of the following process is paramount because of the *anchoring effect* (the brain's tendency to anchor back to information previously heard or seen). For the processes to be effective, planners should pay attention to the sequence and not do the steps out of order.

1. **Exclude Anchors:** Avoid providing an initial estimate of time or cost prior to going through the planning steps, as people's thinking then revolves around that number and the reliability is reduced.
2. **Monitor for Strategic Misrepresentation:** Strategic misrepresentation is the tendency for people to misrepresent (often optimistically) an activity duration because of an incentive or external pressure to 'come in' at a certain number. It may be helpful to mention this tendency prior to the planning session and ask if there may be any incentives to misrepresent predictions.
3. **Identify and Include SMEs:** Ensuring that you have all subject matter experts in the room when planning helps get more accurate information and reduces the overconfidence effect by bringing realism to the plan. This should always be done early in the planning phase (also see DOE 413.3b regarding the Integrated Project Team).
4. **Exclude Time-Pressure:** Time-pressure on the brain reduces cognitive (thinking) ability, increases risk-taking, reduces creativity, and usually results in more optimistic plans. To reduce time-pressure, start planning as early as possible and make sure adequate time is applied to any task associated with making a prediction.

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5. **Reduce Cognitive Load:** You can think of cognitive load like a computer's RAM. The more programs you have open all at once, the less efficient your computer will run. Try to have your planning sessions earlier in the day, as making predictions in planning requires more cognitive effort.
6. **Define Scope:** Once you have met the previous criteria, then start defining your scope. Not having gone through the previous steps, your scope is less likely to be defined well, having a material impact on the reliability of the schedule and cost baseline.
7. **Identify Assumptions:** Identify assumptions should come after defining scope, but prior to defining exclusions. This is because defining exclusions first may have unintended consequences of increasing the anchoring effect.
8. **Identify Exclusions:** Identify exclusions per DOE and/or industry standard process.
9. **Unpack Activities:** Activities should be broken down into smaller subcomponents prior to estimating durations. These subcomponents may be kept as lower-level activities, or may be repacked into a higher level activity after Step 22. Behavioral studies have shown that unpacking into smaller activity components helps reduce optimism bias. Do not estimate durations yet.
10. **Define Quality Impacts:** Because quality requirements can change the intensity or length of activity delivery, these impacts should be identified early in the process, and definitely before doing any estimates of effort or duration.
11. **Reframe Unidentified Risk:** Though there isn't enough time here to go into this in any depth, the simplest example of reframing is looking at something from a different perspective, reframing the issue to see it from another angle. For example, when people avoid talking about a risk because they're scared of thinking about the outcome, a reframe may have them look at the risk as an issue they get a chance to mitigate, thereby keeping them from having to deal with a major catastrophe. Unidentified risk is sometimes avoided due to the discomfort associated with discussing it. Reframing that unidentified risk is usually more successful when we identify what the PM, CAM, and others have to personally lose by not calling out potential risks. As an example, are there obscure risks that, if identified now, may keep the PM or CAM from losing valuable reputation with the client during execution, or losing schedule days that could have been avoided?
12. **Conduct Premortem:** The premortem is similar to a project postmortem, except that it comes before the project has started. Where a postmortem looks at went wrong during the project after it has completed, the premortem looks forward into the project to imagine that the project has already failed, asking SMEs to explain what they think went wrong. The premortem has been shown to reveal more project risks before execution starts, providing a chance to mitigate those risks before they become larger issues.
13. **Identify and Assess Risk:** This is a qualitative risk identification process, and may take place according to standard DOE orders, guides, and industry best practices on risk.
14. **Reframe Unidentified Obstacles:** Similar to the Reframe Unidentified Risk process, reframing should also take place for obstacle identification. An unidentified obstacle is a lost opportunity to mitigate the obstacle in advance.
15. **Identify Obstacles:** This process is identifying the obstacles associated with activity completion; those things that are expected to occur that are barriers to executing the work. This should always be done prior

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to estimating activity duration, as using this sequence results in more reliable predictions in the plan/forecast. Waiting to identify obstacles until after the activity duration is estimated has minimal impact on reducing forecast error. Note: obstacles are different than risks. Risk may or may not occur, obstacles are those issues that will occur.

16. **Create Activities from Obstacles:** If an obstacle is found, schedule activities can be created to represent the work associated with removing or eliminating the obstacle. It is recommended to create activities from obstacles when possible.
17. **Insert Activity Logic:** After risk has been identified, activities unpacked, and obstacle activities created, then logic (predecessors and successors) can be inserted between activities, per DOE and/or industry standard.
18. **Identify Resources:** Identify all needed resources for the activities, such as labor, contracts, and materials.
19. **Reference Predictor's Historical Accuracy:** If there is historical planning or forecasting accuracy data available for the person (the predictor) who is providing estimates, reference those values prior to making any predictions of resource quantities. Prior accuracy feedback has been shown to help predictors make better plans and forecasts based on knowledge of how they have performed in the past.
20. **Predict Resource Quantities:** This is the first estimating process where actual predictions are made that determine schedule and cost. At this point only resource quantities should be estimated – no estimates of duration should be made yet. Furthermore, asking how much effort is required to accomplish an activity results in more realistic estimates.
21. **Quantify Available Resources:** Once resource quantities have been defined, resource availability can be identified across resource types.
22. **Calculate Activity Durations:** Activity durations are calculated once resource estimates are complete and resource availability established. Durations are an output of total resource quantity (units or hours) divided by the number of resources (e.g., number of personnel) divided by resource availability (e.g., hours of available personnel per day). Activity durations should not be guessed, they should be an output of the resource calculation. Durations should be estimated without resource quantities only if these data are not available.
23. **Apply Reference Class as Necessary:** Reference class is checking estimates against a benchmark of similar work performed in the past. Benchmarks should be brought in toward the end of the process to check the realism of the plan. It's recommended to not use the reference class at the beginning of the planning process, as this could mentally anchor the estimate.
24. **Run Resource Visualization Scenarios and Level:** Behavioral studies have shown that visualization can reduce thinking errors and improve plan/forecast accuracy. When running resource levelling, histograms, and other scenarios to check plan realism, use graphical visualizations instead of data sheets. This will improve decision-making around the plan.
25. **Calculate Budget:** Calculate budget by multiplying total resource quantities by the resource rate, and based on final outcome of the schedule. DOE and/or industry-standard budget calculation processes may be used here, as long as they are not predictive in nature. All predictions of quantities should have been

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made by the time the Calculate Budget process is used. When presenting the plan to stakeholders, present risks and obstacles before presenting final schedule and cost. This creates an anchor to reality first and may prevent some unsubstantiated plan adjustments (see *anchoring effect*). The finalized plan and corresponding schedule and budget may shock stakeholders or plan approvers and not be what they expected. Caution should be exercised at this point to prevent wholesale marginal cuts based on discomfort and cognitive dissonance with the final plan (e.g., trimming the schedule or budget by 10%, etc.). Trimming of the schedule or budget should be done only by reducing scope, advance mitigation of risks, or finding resource efficiencies.

While this issue provided a summary of each of the steps, future issues will cover some of these in more depth. Because of the human behavior aspects of the Environmental Factors (EF) in the IP2M METRR, following these evidence-based steps should be supportive in nature to help meet the EF attributes, thus reducing reduce risk and improving plan reliability. Upcoming issues will deep dive into these processes, as well as other behavioral project management tips that not only address EF goals, but also help accelerate project work and complete on time.

— Dr. Josh Ramirez, PhD, PMP, is a project manager in the Washington River Protection Solutions' Earned Value Management System Compliance and Reporting organization

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It Is Not One World

2020 PMI Project of the Year Winner

Fueling Change: Building One of the World's Longest Natural Gas Pipelines in Turkey Could Boost Europe's Energy Security

— PM Network; Parsi, Novid | Wilkinson, Amy

For decades, Europe has relied heavily on one nation, Russia, to supply its natural gas. Almost 40 percent of the European Union's natural gas comes from Russia. A new pipeline could change that.

The Trans Anatolian Natural Gas Pipeline (TANAP) is the centerpiece of the Southern Gas Corridor— a series of pipelines that, when completed this year, will supply natural gas from the Caspian Sea region of Azerbaijan to Southern Europe. The 1,835-kilometer (1,140-mile) TANAP portion spans the width of Turkey, from its border with Georgia to Greece. Investors from across Europe funded the megaproject, including the European Commission.

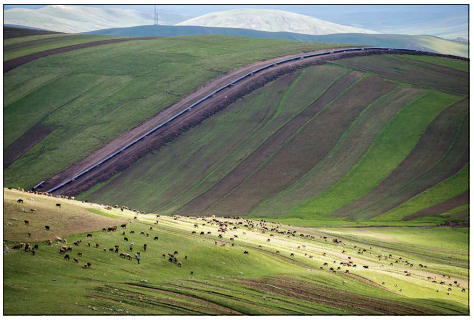

Photo courtesy of TANAP Natural Gas Transmission Co.

TIMING THE LINE

Stakeholders set a firm deadline for the project. The first phase—delivery of gas to Turkey—had to be

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completed by mid-2018. The second phase—constructing the line to the Greek border—had to be delivered by mid-2019. With the project agreement signed at the end of 2013, and the official groundbreaking ceremony held in March 2015, the team had no time to waste.

"The biggest challenge was the project's schedule," says Mustafa Ayan, former project CTO and current COO, TANAP Natural Gas Transmission Co.

In close collaboration with the project's four shareholders—three state-owned companies (two from Azerbaijan, one from Turkey) and one global oil company (BP)—the TANAP team proactively secured governmental approvals so that it could get a head start on the work. That included consent for acquiring land and building camp sites for construction crews.

The scope was staggering and complexity was high. The team also needed to provide detailed environmental, health and safety reports for each site for the 20 Turkish provinces and 600 villages through which the pipeline would travel. The first third of the line, about 600 kilometers (373 miles), also crossed a mountainous region with an altitude of up to 2,760 meters (1.7 miles)—where the weather allowed construction for only 110 days of the year.

Even with an intricate planning phase, the team couldn't wait for the final engineering design before bidding out the procurement and construction contracts. The engineering design was only half finished when the team began signing on major contractors in 2014. That required the contractors to update their bids once they received the final design.

With just three construction seasons to deliver the first phase, team members knew they couldn't expect one contractor to deliver the entire line on time. So instead they divided the line into four sections, awarding each to a different contractor, all of whom would perform their work simultaneously.

Although this helped address the scheduling challenge, it introduced a huge management risk. "Now we had to deal with four major contractors all building the pipeline," says Polad Rustamov, project director and current CTO, TANAP Natural Gas Transmission Co.

To manage the contractors, the TANAP team assembled a team in 2014 to provide special services such as engineering, procurement, construction and management. But the TANAP team soon realized that the new arrangement threatened to throw the project off course. It was taking up to a week for the special services team to discuss issues and get permission from TANAP before it could give instructions to any other contractor.

The project management team: From left, Mustafa Ayan, H. Saltuk Düzyol and Polad Rustamov (Photo courtesy of TANAP Natural Gas Transmission Co.)

In the Flow

December 2013: Shareholders launch Trans Anatolian Natural Gas Pipeline (TANAP).
May 2014: TANAP team hires external vendor to manage the contractors.
March 2015: TANAP breaks ground.
2017: First phase of construction is completed.
June 2018: TANAP delivers first gas supply to Turkey.
June 2019: Second phase is completed, with gas to be delivered to Europe after completion of a connecting pipeline from Greece to Italy.

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"The [special services] team was losing time by consulting us and getting our approval before going to the contractor," Rustamov says.

To speed up the approval process, the TANAP team brought the special services team contractor under its purview, creating a single, integrated project management team. That led to fewer meetings and more efficient decision making. "Now we all had one goal of finishing the project on time," Rustamov says.

After consolidation, TANAP and special services team members shared the same office. And TANAP team members joined monthly meetings held at various construction sites to help with field reports.

"When you're at the site, you can see what the team needs," Rustamov says. For instance, when the TANAP team saw firsthand that a river crossing could pose a delay, it spoke directly with the relevant contractor about pulling in resources from a site that didn't need them at the time. "The most important factor for success on this project was changing from a client-engineering procurement and construction management structure to an integrated project management team," he says. "Instead of two organizational structures, we had one."

CARROTS AND STICKS

When finished, the TANAP project's final US$6.5- billion cost came in at an astounding US$5.2 billion under budget. Some of those cost savings came from lower-than-expected contractor bids, but others were from carefully planned cost-savings measures.

For example, the TANAP contracts included a financial penalty for contractors who didn't meet the project milestones. Still, team members understood that penalties alone would not be enough to fully motivate the contractors. "During the project, we said, 'Okay, we're penalizing these contractors if they don't meet the milestone targets, but how are we going to incentivize them so they complete the activities before the target dates?'" Rustamov says.

The solution was a bonus structure. Each contractor had three major milestones: construction, testing and mechanical completion. If it successfully met all three milestones, a contractor would earn a 3 percent bonus.

Pipeline installation (Photo courtesy of TANAP Natural Gas Transmission Co.)

"The stick was the penalties, but the carrot was the reward if the contractors met the milestones on time," Rustamov says.

Another way the TANAP team kept contractors on pace: reducing the scope. For instance, in 2016, one contractor couldn't start laying pipe on time due to a lack of resources. In response, the TANAP team eased the workload by awarding 79 kilometers (49 miles) of its line to another contractor. By splitting the task, it reduced the risk of having to stop work altogether or take the contractor to court, Rustamov says.

"We developed a solution that benefited everyone, without penalizing anyone," he says.

Everyone understood that one unfinished stretch of line would jeopardize the entire endeavor. "If you cannot complete just 20 kilometers (12 miles) of the pipeline, then you cannot complete the project," Ayan says.

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CRITICAL PATH

As one of the longest gas pipelines ever built, the project required more than 160,000 pieces of pipe. But beyond its sheer magnitude, the line also traveled through an area that was culturally diverse, archeologically rich and geographically challenging.

When planning the route's path, the team identified over 100 new sites of archeological value. During construction, they uncovered nearly 50 more, discovering archeological finds that ranged from graves to cooking items. Where possible, the team rerouted the line to avoid these locations. But when that wasn't possible, they engaged an archeological contractor and collaborated with museum specialists to excavate and preserve the findings. Many of these artifacts are now on display in Turkish museums.

One excavation revealed that a town believed to be around 2,000 years old was actually closer to 3,000 years old. "The findings we discovered on that site were invaluable," Rustamov says.

Whenever the team faced potential delays stemming from cultural or environmental concerns, such as bird species migrating through the line's sites, work didn't stop. Instead, the team leapfrogged down the line and returned to work on the previous site when conditions allowed.

The goal went further than cause no harm. The team also wanted to improve lives. With that in mind, it awarded US$84 million for more than 1,000 local projects from school repairs to water improvements for communities impacted by the route.

"We didn't have any resistance from the communities because we went to them and talked about the project, and we actually delivered what we promised," Rustamov says. "That might seem like a soft aspect of project management, but it actually has a significant impact on delivering a project on time."

In the end, the team delivered the pipeline on time and under budget. All work earned public support and met high safety, environmental, social and quality standards. "That's not very common for megaprojects," says H. Saltuk Düzyol, CEO, TANAP Natural Gas Transmission Co., Ankara, Turkey.

"The project's success means a lot for Turkey," he adds. Specifically, the TANAP project has helped make Turkey a regional gas hub, lowered its gas prices by introducing market competition, and bolstered its energy security by diversifying the source and route of its gas.

With this year's completion of the Trans Adriatic Pipeline—which connects to TANAP and stretches from Greece to Italy—those benefits will extend all the way to Europe, Ayan says.

"As Turkey's and Europe's energy demands and investments grow, they will need this additional, diversified energy source," he says.

Parsi, N. & Wilkinson, A. (2020). 2020 PMI® Project of the Year Winner: Fueling Change: Building One of the World's Longest Natural Gas Pipelines in Turkey Could Boost Europe's Energy Security. *PM Network, 34*(7), 30–35.

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

1 — The Julian calendar took effect (45 B.C.), patriot Paul Revere was born (1735), and the ball was first dropped at Times Square in New York City (1908)

2 — Georgia became a state (1788)

3 — King Tut's tomb was discovered (1924), the March of Dimes was founded (1938), actor Mel Gibson was born (1956), Alaska became a state (1959), and quarterback Eli Manning was born (1981)

4 — Sir Isaac Newton was born (1643), Utah became a state (1896), and **the euro made its debut** (1999)

5 — The Yankees purchased Babe Ruth from the Red Sox (1920), construction on the Golden Gate Bridge began (1933), and the space shuttle program was authorized (1972)

6 — Joan of Arc was born (1412), Samuel Morse demonstrated the telegraph (1838), New Mexico became a state (1912), Wheel of Fortune debuted on TV (1975), and quarterback Jameis Winston was born (1994)

7 — The first U.S. presidential elections were held (1789), TV personality Katie Couric (1957), and actors Nicolas Cage (1964) and Jeremy Renner (1971) were born, and President Clinton's impeachment trial began (1999)

8 — Singers Elvis Presley (1935) and David Bowie (1947) were born

9 — President Richard Nixon was born (1913), and Apple launched iTunes (2001) and the iPhone (2007)

10 — The world's first subway system opened in London (1863), singer Rod Stewart (1945) was born, **the United Nations met for the first time** (1946), and boxer George Foreman was born (1949)

11 — The Grand Canyon was declared a national monument (1908), American League baseball adopted the "designated hitter" rule (1973)

12 — Amazon founder Jeff Bezos was born (1964), *Batman* debuted on television (1966), and a magnitude 7.0 earthquake struck Haiti (2010)

14 — The Treaty of Paris officially ended the American Revolutionary War (1784), rapper LL Cool J (1968) and actor Jason Bateman (1969) were born, **the Miami Dolphins completed the only undefeated season in NFL history** (1973), the Simpsons debuted on TV (1990), and basketball legend Michael Jordan retired (1999)

15 — Civil Rights activist Dr. Martin Luther King Jr. was born (1929) and (1967)

16 — The PGA was formed (1916), Prohibition went into effect (1919), the Chevy Corvette was first unveiled (1953), and Operation Desert Storm began (1991)

17 — Statesman Benjamin Franklin was born (1706), Americans overthrew the Hawaiian monarchy (1893), and boxer Muhammad Ali (1942) and former first-lady Michelle Obama (1964) were born

18 — Actor Kevin Costner was born (1955)

19 — Writer Edgar Allen Poe (1809) and singer Dolly Parton (1936) were born

20 — **The "British Invasion" began when the Beatles released their first album in the U.S.** (1964), the Iran Hostage Crisis ended (1981), and quarterback Nick Foles was born (1989)

21 — The Kiwanis Club was formed (1915), golfer Jack Nicklaus was born (1930), and the first case of COVID-19 in the U.S. was confirmed (2020)

22 — Abortion was legalized in the U.S., and President Lyndon Johnson died (1973)

23 — The world's deadliest earthquake killed 830,000 in China (1556), statesman John Hancock was born (1737), and **the Frisbee was introduced** (1957)

24 — Singer Neil Diamond was born (1931), beer was first sold in cans (1935), actor John Belushi was born (1949), and British statesman Winston Churchill died (1965)

25 — Transcontinental phone service began in the U.S. (1915), the first Winter Olympics were held in Chamonix, France (1924), the first Emmy Awards were presented (1949), and singer Alicia Keys was born (1981)

26 — The dental drill was patented (1875), actor Paul Newman was born (1925), television was first demonstrated to the public (1926), and guitar god Eddie Van Halen (1955) and hockey legend Wayne Gretzky (1961) were born

27 — Composer Wolfgang Amadeus Mozart was born (1756), the National Geographic Society was founded (1888), and three astronauts died in a launch pad fire aboard Apollo 1 (1967)

28 — The space shuttle *Challenger* exploded (1986)

29 — President William McKinley was born (1843), Kansas became a state (1861), baseball's American League was founded (1900), **the first members of the Baseball Hall of Fame were elected** (1936), and TV personality Oprah Winfrey was born (1954)

30 — President Franklin D. Roosevelt was born (1882), Adolf Hitler was named chancellor of Germany (1933), Mohandas Gandhi was assassinated (1948), musician Phil Collins was born (1949), the Vietnam War's Tet Offensive began (1968), and actor Christian Bale (1974) was born

31 — Slavery was abolished in the U.S. (1865), baseball legends Jackie Robinson (1919) and Nolan Ryan (1938) were born, President Truman announced the development of the hydrogen bomb (1950), and singer Justin Timberlake was born (1981)

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