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Labor Day is always the first Monday in September, and it was the idea of Peter J. Maguire (although recent research has shown that it might have been his Brother Matthew's idea), a labor union leader who in 1882 proposed a celebration honoring the American worker. The date chosen was simply "convenient," according to Maguire, because it was midway between July 4th and Thanksgiving. Although the day's focus on organized labor has diminished over the years, the holiday has become a way to mark the end of the summer season and the start of the school year.



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Construction Activities are Abandoned at V.C. Summer 2 & 3



“SCE&G and Santee Cooper announced their pull out of construction activities at V.C. Summer 2&3. They have spent \$9B on this project, considered to be ~64% completed. José Emeterio Gutierrez, Westinghouse president and chief executive officer, said, “The South Carolina economy is sure to feel the negative impact of losing over five thousand high-paying, long-term jobs, as well as not having available the reliable, clean, safe and affordable energy these units would provide. Also, at a time when other nuclear plants are being retired, the US energy sector is sure to feel the stunting impact of walking away from these two nuclear units.”

On July 31, 2017 SCE&G and Santee Cooper announced a pull out of their construction activities at V.C. Summer 2&3.

The reason was based on rising costs, falling demand for energy, construction delays, and the Westinghouse bankruptcy.

SCE&G and Santee Cooper have already spent \$9B on this project, considered to be ~64% completed, and customers have already paid about \$1.4B, through higher utility bills, to build these nuclear units.

Under the Base Load Review Act, SCE&G was allowed to charge customers for the project before it was completed, which led to nine rate increases since 2009.

Utility officials said they arrived at this very difficult but necessary decision following months of project evaluation.

Kevin Marsh, Chairman and CEO of SCANA, said, “Ceasing work on the project was our least desired option, but this is the right thing to do at this time.” He went on to say that several factors beyond the company’s control had changed since the construction project began, including the Westinghouse bankruptcy.

SCE&G had considered completing just one of the two units but rejected that

option after Santee Cooper, which owns 45% of the project, withdrew from the construction effort. The project was behind schedule and over budget, and Santee-Cooper’s board said stopping construction, which began in 2012, would save customers ~\$7B. Santee Cooper said they had already spent ~\$4.7B in construction and interest costs to date. “The analysis shows the project would not be finished until 2024, four years after the most recent completion date provided by Westinghouse, and would end up costing Santee Cooper customers a total of \$11.4B,” it said in a statement.

Santee Cooper blamed Westinghouse for most of the project’s troubles, which had contributed to the project costing 75% more than the original estimates. Santee Cooper also noted that falling electricity demand and the current political landscape have reduced the urgency for emissions-free baseload generation.

This decision came just a few days after Toshiba had agreed to pay the two project owners nearly \$2.2B to cap its liabilities from the unfinished nuclear project. However, Santee Cooper executives said they fear Toshiba, which is facing financial difficulties, will be unable to make good on this pledge.

Toshiba reached a similar

\$3.7B agreement with Southern Company in June, also building two new generation AP1000 units at the Vogtle Nuclear Site. This project is also facing similar difficulties but Southern Company says they will complete the project under their leadership.

SCANA Corporate officials said a four-month-long cost and schedule evaluation forecast showed that the units would not be completed until 2022 and 2024, and the units needed to be online before the end of 2020 in order to qualify for production tax credits.

In addition, the evaluation revealed that SCANA, 55% owner, could expect its share of the costs to reach \$9.9B, far beyond South Carolina Public Service Commission’s approved fixed price option of \$7.7B. Even if Toshiba’s guarantee of \$1.1B were taken into account, the cost would still be \$8.8B. And completing just one unit was out of the question since the evaluation determined that completing one unit would cost \$7.1B.

Scrapping the project will cost ~\$4.9B, and SCANA said it will seek to recover this cost. The abandoned assets should be amortized over 60 years, officials said.



22 States Consider Options Impacting Nuclear Plant Operations



“Pennsylvania law makers are considering options that would give nuclear power the kind of treatment extended to renewable forms of energy, such as wind and solar. Such action has already been taken in Illinois and New York, but they are seeing resistance from rival energy companies, manufacturers, and consumer advocates due to their belief it will result in higher electricity prices. However, nuclear power can help fight climate change better than gas or coal, and in addition nuclear plants are sources of tremendous tax revenue and hundreds of good paying jobs.”

It looks like two more states may be taking action to keep their nuclear power plants operating; Connecticut and Ohio.

Both legislatures are expected to revive nuclear bills, which could benefit Davis-Besse (*pictured above*) and Perry Nuclear Plants in Ohio, and the Millstone Nuclear Plant in Connecticut, when they return this fall.

These bills follow policies enacted by Illinois and New York, which implement ratepayer-financed subsidies to keep the plants on-line. These nuclear power plants provide zero-carbon emissions, grid stability, and relatively low-cost electricity; these benefits are beginning to be recognized in Ohio, Connecticut, and across the country.

The Ohio legislature held a hearing in May, introducing Senate Bill (S.B. 128) to grant nuclear-generator assistance through a “Zero Emission Nuclear Resource Program” or ZEN that would benefit Davis-Besse and Perry Nuclear Plants, and Akron, Ohio-based FirstEnergy Corp. before adjourning for their summer recess.

Also in May, the Connecticut state senate approved Senate Bill (S.B. 106) which would grant help to the Millstone Nuclear Plant, operated by Richmond, Va.-based Dominion Energy Inc., however, the House did not act on this bill before adjourning for summer recess, as well.

This activity comes as the Trump administration continues to encourage the development of the nuclear power industry. President Trump has pledged his administration will conduct a complete review of the U.S. nuclear energy policy to help find ways of revitalizing this crucial energy resource.

On June 27, 2017 Energy Secretary Rick Perry touted nuclear power as a low-emissions energy source and told reporters “no clean energy portfolio is truly complete without nuclear power.”

The nuclear connection to “carbon-free” energy production complicates things for the special interest groups. Some of the traditional nuclear-power foes, such as, environmental organizations find themselves favoring legislation for nuclear-plant subsidies, as long as as it is part of a comprehensive plan to move towards a longer-term use of renewables. However, some still cannot view nuclear power as a viable long-term solution to climate change, mainly because

of the unresolved issue of nuclear waste disposal.

However, legislators that represent constituents living near nuclear power plants, say their constituents favor nuclear power plants because they provide good-paying jobs and meaningful economic activity.

The Nuclear Energy Institute said in a 2014 study entitled *Nuclear Energy’s Economic Benefits – Current and Future* it was determined that the nuclear reactors across the nation generated \$40 - \$50 billion in annual electricity sales, with more than 100,000 workers contributing to the production.

While disagreement exists over the use of subsidies, John Shelk, the Electric Power Supply Association president and chief executive officer, says most energy specialists agree that this problem has surfaced because of the sustained low price of natural gas and a failure to establish a cost-related penalty for creating carbon emissions or in contrast, providing a benefit for limiting these emissions.

Based on data from the National Conference of State Legislatures - 22 states are considering bills, resolutions, and legal measures that will impact nuclear energy facilities in 2016-2017.



Advocates Oppose EPA's Delay of 2015 Power Plant Wastewater Rule



“Environmental advocates urged the EPA to reverse its course on a move to delay a 2015 ruling that would limit water pollution from power plants into rivers and streams.”

About 50 people spoke at a public hearing in Washington, D.C., to voice their opposition to the EPA's (Environmental Protection Agency) decision to delay the implementation of a 2015 rule that would set tighter guidelines for power plant wastewater piped into rivers and lakes.

The EPA estimated that this 2015 rule, if implemented, would reduce power plant pollution by ~1.4 billion pounds a year, requiring about 12% of the nation's steam electric power plants to make new investments in order to meet the higher standards.

The opposition argued that sometimes discharge of power plant wastewater is into rivers and streams that serve as sources of public drinking water, and specifically in the case of coal-fired power plants, the wastewater contains trace amounts of highly toxic heavy metals such as lead, arsenic, mercury and selenium.

They also argued that this decision leaves EPA's guidelines from 1982 in effect, standards that were set when far less was known about the detrimental impacts of even tiny levels of heavy metals on human health and aquatic life.

Utilities say implementation of the 2015 rule would have required them to spend about \$480 million on new wastewater treatment systems, and the environmentalist say this would have resulted in about \$500 million in estimated public benefits, such as fewer incidents of cancer and childhood developmental defects.

Dominion Energy Continues Its Growth with Solar Generation



“Dominion Energy has acquired more solar facilities and now has more than 2,000MW of solar generating capacity.”

Dominion Energy has acquired two 5MW solar plant facilities (Fremont in Wayne County, NC and Moorings 2 in Lenior County, NC) and plans to purchase two other solar farms, also totaling 10MW (Clipperton in Sampson County, NC and Pikeville in Wayne County, NC)

later in the 3rd quarter from subsidiaries of Chapel Hill, N.C.- based Strata Solar.

Agreements are already in place for the sale of the power generated from these solar facilities.

Dominion Energy's solar portfolio in North Carolina

and Virginia now includes more than 600MW of capacity owned by one of the company's generation-holding subsidiaries and more than 500MW of solar capacity under contract. Together, these solar facilities could produce enough electricity, at maximum capability, to power 275,000 homes and businesses.

Dominion Energy now has more than 2,000MW of solar generating capacity – including company-owned assets and assets that are contracted by Dominion Energy utilities – in operation or under development in nine states.

Cyber Security – No U.S. Reactors have been affected by Hacking



“Although computer hackers have penetrated computer networks and affected companies and utilities that operate some of our nuclear power stations, the U.S. nuclear power plants are well protected. NO U.S. REACTORS have been AFFECTED BY HACKING. America’s nuclear plants are one of the best protected of all systems from cyber threats. They are truly operational islands wholly disconnected from the Internet, so hackers can’t affect plant operations, safety and control systems, or other vital plant components.”

Although computer hackers have penetrated computer networks across the country and affected companies and utilities that operate some of our nuclear power stations, the U.S. nuclear power plants are well protected. To date **NO REACTORS OPERATING IN THE UNITED STATES HAVE BEEN AFFECTED BY HACKING.**

These computer hackers may affect the company or utility business, personnel, and other non-essential files, which can become embarrassing and costly, but there is no danger to our nuclear plants. Our operating nuclear plants are still mostly analog and they are not connected to the Internet; on purpose.

Unlike other industries, the nuclear power industry conducts regular briefings, and receives quarterly classified briefings on both cyber and physical threats, with the FBI and the DHS. During these briefings they work together, discussing and strategizing the threat assessments, to maintain situational awareness.

Also, the nuclear industry does not use firewalls to

isolate their systems — that’s not good enough. Much of this is classified, but the plants use hardware-based data diode technologies developed for high assurance environments, like the Department of Defense. These data diodes allow information to be sent out, like operational and monitoring data, but they do not allow flow back into the process or system.

In addition, updating software and equipment using portable devices is very restricted and outside laptops and thumb drives cannot be used without serious scrubbing, if they are allowed at all.

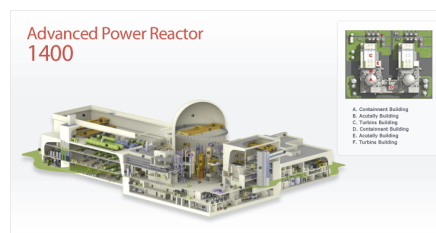
According to David Blee, executive director of the U.S. National Nuclear Infrastructure Council, “United States utilities with nuclear assets have very robust cyber security programs dating back to the days of Y2K”.

As a case in point, in 2014, an actual anti-nuclear group began releasing information that it had hacked from a South Korean company that operates several nuclear power plants, globally. They demanded that the

company take their nuclear plants offline by Christmas. Or else! However, nothing important was ever hacked and therefore, their threats were toothless.

Although the global Internet is still developing its immune system, companies like Google are working hard to find the right antidote. Nuclear is fine, because like sharks, nuclear has an immune system that dates back to the analog age. Even, today with the new plant designs that are digital, a protective approach of isolating the systems is still being required. For example: the new design nuclear plants utilize platforms with non-microprocessor systems — they do not use software and they are not vulnerable to Internet cyber-attacks.

America’s nuclear plants are one of the best protected of all systems from cyber threats. They are truly operational islands wholly disconnected from the Internet, so hackers can’t affect plant operations, safety and control systems, or other vital plant components.



Did You Know?



“That a 130-foot-tall steam generator is making its way down the Hudson River toward its new home at the Seawaren 7 Power Plant, located in Woodbridge, NJ on the Arthur Kill separating New Jersey and Staten Island? This \$195 million heat-recovery steam generator is just one component of the \$600 million power plant being built by PSE&G, targeted for operation in time for the summer of 2018. The 540MW plant is designed to run on natural gas, but can also run on ultra-low sulfur distillate fuel oil as a backup.”



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| <p>States are suing the EPA over emissions entering their state, from neighboring states.</p> | <p>That states are suing the EPA over emissions entering their state, from neighboring states? Because it makes it impossible for them to meet the ozone reduction goals set by the EPA to enforce the Clean Air Act. Maryland claims the EPA is failing to enforce the Clean Air Act over emissions from plants in Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia. And Connecticut officials claim the EPA is failing to stop Pennsylvania plants from sending emissions into their state.</p> |
| <p>EPA now plans a full repeal of the Clean Power Plan and the Clean Water Rule</p> | <p>That the EPA now plans a full repeal of the Clean Power Plan and the Clean Water Rule on the grounds that it exceeds the authority given to the agency in the Clean Air Act? The Trump Administration has released no timeline for the repeal but it did previously sign an order to review these plans, and at that time it was noted that undoing the plans could take years of work and regulation. In addition, the EPA has announced it will make final delays on standards for water pollution from power plants, methane limits for landfills, and methane limits for oil and gas drilling. All of these regulations are targeted to be repealed or revised.</p> |
| <p>Injections of natural gas, at Alison Canyon, have been approved by officials in California</p> | <p>That injection of natural gas, at Alison Canyon, has been approved by officials in California? Officials said this action will prevent an energy shortage in the area. However, the natural gas storage facility can only operate at 28% of its capacity, as more than half of the existing wells have been taken out of operation. You may recall that in 2015, a ruptured well at Alison Canyon spewed tens of thousands of tons of gas, which was the largest methane leak in U.S. history.</p> |
| <p>North Carolina ranks 2nd as a Solar Power State.</p> | <p>That the top ten solar power states are; 1. California – 18,292 MW; 2. North Carolina – 3,016 MW; 3. Arizona – 2,982 MW; 4. Nevada – 2,191 MW; 5. New Jersey – 1,991 MW; 6. Utah – 1,489 MW; 7. Massachusetts – 1,487 MW; 8. Georgia – 1,432 MW; 9. Texas – 1,215 MW; 10. New York - 927 MW?</p> |
| <p>August 21, 2017 solar eclipse will affect ~1,900 utility-scale solar photovoltaic (PV) power plants</p> | <p>That the August 21, 2017 solar eclipse will obscure sunlight needed to generate electricity at approximately 1,900 utility-scale solar photovoltaic (PV) power plants? The path of total obscurity will affect 17 utility-scale solar photovoltaic (PV) power plants in Oregon but hundreds of plants totaling ~4.0 gigawatts (GW) will be partially obscured – mostly in North Carolina and Georgia. However, the North American Electric Reliability Corporation (NERC) said the eclipse would not create any reliability issues for the bulk power system.</p> |
| <p>Coal royalty rule repealed and will take effect on September 6, 2017</p> | <p>That the coal royalty rule established by the Obama Administration and put on hold by the Trump Administration in February, when mining companies challenged it in federal court, has been repealed? The final repeal notice was published in the Federal Register in August and will take effect on September 6, 2017. The decision reinstates rules in place since the late 1980s.</p> |

U.S. Nuclear Renaissance Watch Update



| <i>License Applicant</i> | <i>Reactor(s)</i> | <i>Location</i> | <i>Model</i> | <i>Startup Target</i> | <i>Licensing Status</i> | <i>Commercial Status</i> |
|--------------------------|--------------------|------------------|--------------|-----------------------|---------------------------------------|--------------------------|
| Dominion | North Anna 3 | Mineral, VA | ESBWR | Indefinite | FEIS, FSER Issued; COL Issued 5.31.17 | Term sheet with vendor |
| DTE Electric | Fermi 3 | Monroe, MI | ESBWR | Indefinite | COL Issued 5.1.15 | Vendor negotiations |
| Duke-Energy | Harris 2 & 3 | New Hill, NC | AP1000 | Indefinite | Suspended at applicants request | Vendor negotiations |
| | Lee 1 & 2 | Gaffney, SC | AP1000 | 2024, 2026 | COL's Issued 12.19.16 | Vendor negotiations |
| | Levy 1 & 2 | Levy County, FL | AP1000 | 2024, 2025-2026 | COL's Issued 10.29.16 | EPC contracts canceled |
| FPL Energy | Turkey Point 6 & 7 | Florida City, FL | AP1000 | 2022, 2023 | FEIS, FSER Issued; COL pending | Vendor negotiations |
| Luminant (Vistra) | Comanche Peak 3& 4 | Glen Rose, TX | US-APWR | Indefinite | Slowed at applicants request | Term sheet with vendor |
| NINA / STPNOC | South Texas 3 & 4 | Palacios, TX | ABWR | Indefinite | COL's issued 2.12.16 | EPC contracts signed |
| SCANA / Santee Cooper | V.C. Summer 2 & 3 | Parr, SC | AP1000 | 2019, 2020 | COL's issued 3.30.12 | Project Abandoned |
| Southern Nuclear | Vogtle 3 & 4 | Waynesboro, GA | AP1000 | 2019, 2020 | COL's issued 2.10.12 | EPC contracts signed |

The ABWR is a Boiling Water Reactor design that is available from either GE Hitachi Nuclear Energy or Toshiba; Toshiba Advanced Boiling Water Reactor design was certified by the NRC in 2012.

The AP1000 is a Pressurized Water Reactor design that is available from Westinghouse; certified by the NRC in 2011.

The ESBWR is a Boiling Water Reactor design that is available from GE Hitachi Nuclear Energy; certified by the NRC in 2014.

The US-APWR is Pressurized Water Reactor design that is available from Mitsubishi; design certification application is under review by the NRC.

The US EPR is a Pressurized Water Reactor design that is available from Areva; design certification application is under review by the NRC.

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Supercritical CO2 Turbine – Rival for Energy Storage



GE Global Research is testing a desk-size turbine that could power a small town of about 10,000 homes. This turbine is not driven by steam it is driven by “supercritical carbon dioxide”. Carbon dioxide in a supercritical state is neither a liquid nor a gas; existing only at very high pressure and temperatures. Don’t let its small size fool you; it can deliver an electrical output ten times larger than steam turbines of comparable size.

The GE prototype is 10 MW but the company hopes to scale it up to 33 MW; it offers ~50% efficiency, while steam-based systems at best are in the mid-40% range. This improvement is achieved due to better heat-transfer properties and the reduced need for compression in a system that uses supercritical CO2 compared to steam.

In addition to its higher efficiency, this technology could be integrated with solar power, waste heat, nuclear and geothermal to rival battery energy storage by storing the heat within a molten salt and then sometime later, using the heat stored within the molten salt to create steam and drive a turbine to produce electricity.

Other reasons for interest in this technology:

- near zero – emissions cycle
- footprints one hundredth of traditional turbo-machinery for the same power output due to the high density of working fluid
- extraction of “pipeline ready” CO2 for sequestration or enhanced oil recovery, without both CO2 capture facilities and compression systems
- applications with severe volume constraints such as ship propulsion

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