



Industry Operations Updates

Advantages of ILT Throughput Assessment Screening (TAS)



Failures in initial operator license examinations and high license candidate drop out rates are impacting utility staffing needs and challenging the utility's confidence in the ability to prepare license candidates. Selection of candidates for the high ILT failure rate has been described as the primary initiating cause. The NWI Throughput Assessment Screening or TAS is a program that applies a rigorous and ob-

jective performance analyses for the evaluation of potential licensed operator (ILT) candidates. The TAS is a decision-making tool is designed using a multi-phase approach; 1) An entry level Basic Mathematics and Science Evaluation (BSE), 2) Reading Comprehension Evaluation (CE) including both retention measurement of numerical concepts and language, 3) Situational Awareness (SA) which assesses seven fundamental attribute performance, & 4) a psychometric evaluation. It is conducted as a one day assessment for each candidate resulting in a confidential per-

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THE U.S. NUCLEAR RENAISSANCE STARTS

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The nuclear renaissance is slated to begin in rural Georgia with new reactors being built over the next five years, and work is already underway to leap another generation ahead. The Nuclear Regulatory Commission (NRC) announced on February 9, 2012 that it has granted licenses to a consortium of utilities to erect two Westinghouse AP 1000 reactors at Southern Company's existing Vogtle site, clearing a path to end a decades long hiatus in new construction. Westinghouse's design incorporates passive cooling, which extends the duration under which a reactor can operate safely without outside intervention in the event of a disaster. The AP

1000 is classified as an EPR, or Evolutionary Power Reactor.

The EPR has more redundant systems than older reactor designs. Those include emergency cooling systems, a double containment system, and an ashtray like cooling area to capture molten fuel in the event of a meltdown.

Existing U.S. nuclear reactors require active cooling such as electric water pumps. Japan's Fukushima used active cooling, and its reactors melted down last spring when external power was unavailable. There are a total of 104 nuclear plants in the U.S today that rely upon active cooling.

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Palo Verde Surpasses Production Record

Palo Verde Nuclear Generating Station achieved its 20th consecutive year as the nation's largest power producer. The almost 31.3 million megawatt-hours produced in 2011 is the most ever generated by Palo Verde or by any other U.S. power plant of any kind. According to industry data, Unit 3 produced more electricity than any other reactor in the U.S. in 2011 and was the second most productive in the world. Despite a scheduled refueling outage in the spring of 2011, Unit 2 was the third most productive reactor in the U.S. and ranked 10th in the world. Unit 1, which had a scheduled refueling outage in the fall of 2011, ranked 14th in the U.S. and 30th in the world. Palo Verde's three reactors are part of 104 operating units in the U.S. and 435 in the world. "Our investment in equipment upgrades and our employees' efforts to continually improve safety and overall plant performance has resulted in many successes," said Randy Edington, Executive Vice President and Chief Nuclear Officer for Arizona Public Service Co., the operator and largest owner of Palo Verde. "We are proud of our accomplishments in enhancing plant operation and will continue to strive to improve our record. We will stay on our course to achieve our mission to 'SAFELY and efficiently generate electricity for the long term.'" From 2002 to 2010, Palo Verde installed new steam genera-

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THE U.S. NUCLEAR RENAISSANCE STARTS

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The meltdown risk associated with existing reactors and the high capital requirements of nuclear power are some of the reasons no new reactors have been built in the U.S since the late 1970's, when the 1979 Three Mile Island incident soured public sentiment. For now, anti-nuclear sentiment has been marginalized. The U.S. is energy hungry and nuclear power is receiving generous government subsidies. The Vogtle reactors would power up to 1 million homes at a cost of US\$14 billion, CNN reported (*New nuclear reactors set to be OK'd for Georgia, @CNNMoney February 9, 2012*). Efforts to set up the basemat rebar for the Unit 3 reactor of Southern Nuclear's Plant Vogtle in Georgia are under way. "This is one of the first major activities since receipt of the Combined Operating License," a company spokesman said. The reactor is scheduled to come online in 2016.

An \$8.3 billion conditional loan was granted by the Department of Energy to help ease the project's capital requirements. The Vogtle reactors may be completed as soon as 2015 and 2016; unless the project is stalled. Meanwhile, multiple AP 1000s are already operating in China, and the U.S. is playing catch up. The design is the latest reactor to have received the NRC's approval. However, that alone failed to satisfy NRC chairperson Gregory Jaczko. Jaczko withheld his support for Southern Company's license unless the NRC was given binding assurances by Southern Co. that the design would be updated to incorporate lessons the NRC learned post Fukushima. He was the lone vote in opposition. The NRC has taken action to advance domestic nuclear safety by establishing a Fukushima focused task force. It outlined its goals in two memos (*see SECY-11-0137 – PRIORITYIZATION OF RECOMMENDED ACTIONS TO BE TAKEN IN RESPONSE TO FUKUSHIMA LESSONS LEARNED, December 15, 2011 and STAFF REQUIREMENTS – SECY-11-0124 – RECOMMENDED ACTIONS TO BE TAKEN WITHOUT DELAY FROM THE NEAR TERM TASK FORCE REPORT*).

Despite renewed public concern over nuclear safety, it is clear that atomic power will continue to be a vital part of the U.S. energy mix for the foreseeable future. It accounts for nearly 20 percent of electricity generated

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NRC proposes first post-Fukushima safety orders

Wed Feb 22, 2012 7:30pm EST Feb 22 (Reuters) - The staff of the U.S. Nuclear Regulatory Commission has proposed the first three rules to address safety issues raised by Japan's Fukushima nuclear disaster, changes the staff said could be implemented by the end of 2016.

"Each of the orders is focused on enhancing defense in depth at nuclear power plants through increased capabilities to minimize the potential for core damage following a beyond design basis external event," the NRC said in a memo detailing the proposal. March 11 will mark the first anniversary of the world's worst nuclear disaster in 25 years when an earthquake and tsunami overwhelmed the Fukushima Daiichi plant on Japan's northeast coast, knocking out power and resulting in a nuclear meltdown and the release of radiation.

- ⇒ The first orders, subject to lengthy review and commission approval, call for all U.S. nuclear operators to develop plans to deal with extreme situations, such as earthquakes, floods and other natural disasters that could affect multiple reactors operating at a single site.
- ⇒ The NRC staff also proposed that all plants improve instrumentation in the pools used to store spent nuclear fuel.
- ⇒ A third proposal would address containment "vent" structures at plants similar in design to the crippled Daiichi nuclear plants, according to the NRC memo from R.W. Borchardt, the NRC's executive director of operations.

Modifications and operating changes based on lessons from the Fukushima disaster are expected to add millions of dollars in costs for nuclear operators, including Exelon Corp, Entergy Corp, Southern Co and others. Earlier this week, the Nuclear Energy Institute, a U.S. nuclear industry trade group, said plant owners had committed to purchase additional equipment to respond to emergencies that interrupt off-site power to reactors.

The NRC staff said the industry initiative, called FLEX, may satisfy the proposed order to mitigate certain safety challenges. The staff recommended that the commission issue the orders early next month before the first Fukushima anniversary. An implementation timeline proposed by the staff calls for all plants to submit a compliance plan to the agency by Feb. 28, 2013, and to incorporate all changes by Dec 31, 2016, at the latest. The proposed rules were among the most important changes identified by the NRC's Fukushima task force last year and viewed as upgrades that could move forward without significant delay. The task force made numerous other recommendations, but many will require more study of the Fukushima disaster and industry review.

It will take years for the agency to modify its regulations and implement changes outlined by the task force. NRC chairman Gregory Jaczko has called for the work to be completed in five years which, would be an accelerated time line for the NRC. The staff said the proposed Fukushima rules would affect the recently approved two-unit expansion at Southern Co's Vogtle plant the same as any existing reactor.

On Feb. 9, the NRC approved Southern's construction and operating license to build an advanced nuclear design over the objections of Jaczko. Southern officials have said the AP1000 reactor design they are building will meet most Fukushima-related safety upgrades to be ordered by the NRC.

The U.S. has 104 operating nuclear reactors in 31 states.

FLEX: The Strategy Developed to Increase Safety, Address NRC's Post-Fukushima Recommendations

FLEX is a strategy developed by the nuclear energy industry to implement the Nuclear Regulatory Commission (NRC)'s Fukushima task force recommendations quickly and effectively. FLEX addresses the main safety challenges at Fukushima—the loss of cooling capability and electrical power resulting from a severe natural event—to make U.S. facilities even safer. The strategy is “flexible” in that it relies on portable equipment to protect against even the most unlikely events — events that go beyond the plant’s design basis. FLEX is also site-specific to take into account the differences in the designs and the most likely risks at each nuclear energy facility. A flexible approach ensures that each plant can focus on planning for extreme events that have a greater probability of occurring locally. For example, the risk of floods is more likely in the Midwest, while earthquake risks are greater on the West Coast.

The concept is based on the industry’s response after 9/11. Although the terrorist attacks had nothing to do with nuclear power, it led to a series of safety enhancements to guard against any type of extreme event. FLEX will provide reliable backup electrical power and cooling capability if an extreme event disables multiple power and cooling systems at each reactor. One of the key lessons the industry has learned from previous events is that extreme natural disasters can damage and/or obstruct access to emergency equipment. Dispersing additional pumps, generators, battery banks, chargers, compressors and hoses among various locations will provide multiple redundancies to obtain power and water for the key safety functions of reactor cooling and used fuel pool cooling. To provide another layer of safety and ensure prolonged reliable operation, additional emergency equipment will be stationed in secure offsite support centers.

As Adrian Heymer, NEI’s executive director for Fukushima regulatory response, explained to the media on January 11, “there needs to be more than one set of equipment at diverse locations that can be quickly deployed and connected to provide power supplies for instrumentation.” FLEX addresses the key lessons from Fukushima on the need to maintain consistent supplies of electricity and water, even in the aftermath of unexpected natural events. The FLEX approach will also allow the industry to make post-Fukushima safety enhancements while the NRC develops regulations to codify them to ensure continued regulatory oversight. By working in tandem, NRC and the nuclear industry will ensure the maximum safety benefit in the shortest period of time. On January 11, the NRC’s blog said, “NRC staff believes this approach is a reasonable starting point” to implementing the agency’s post-Fukushima guidelines. The commission “believes these combined developments may enhance the agency’s approach to implementing the recommendations.”

The Fukushima Response Steering Committee, a leadership structure formed to integrate and coordinate the industry’s ongoing response to the Fukushima Daiichi event, developed the FLEX concept. The committee—senior electric utility executives, reactor owners groups, the Nuclear Energy Institute, the Institute of Nuclear Power Operations (INPO) and the Electric Power Research Institute—spent the year following Fukushima ensuring that its lessons are fully understood and integrated into plans to enhance safety.

Both the industry and the NRC have systematically reviewed the events for lessons and independently assessed areas to develop safety improvements at nuclear energy facilities. As part of these reviews, the U.S. nuclear industry: has verified that all critical systems to mitigate potential damage are in place and functioning; completed inspections of systems that protect plants against extreme events; and is enhancing the protection of used fuel storage pools.

FLEX is just one part of a larger industry response that began almost immediately after the March 11, 2011, earthquake and tsunami in Japan. Within days of the events at Fukushima, the nuclear energy industry launched inspections and reviews of safety equipment and procedures at every U.S. nuclear energy facility.

FLEX: The Strategy Developed to Increase Safety, Address NRC's Post-Fukushima Recommendations

The industry's self-evaluation and separate independent inspections by the NRC reaffirmed the safety of U.S. nuclear plants. Any issues identified during that process were quickly addressed.

FLEX builds on those earlier steps by providing a swift, effective and efficient way to deploy additional plant emergency response and mitigation capability from the lessons learned from Japan's experience. These additional safety enhancements are in keeping with the industry's culture of safety, which includes on-going inspections, regular safety and emergency drills, intensive employee training and cooperation with government law enforcement and emergency agencies, as well as the independent NRC.

Palo Verde Surpasses Production Record

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tors, high-efficiency turbine rotors, new reactor vessel heads and rapid refueling machines in all three units. These large investments resulted in increased output by about 200 megawatts and reduced down time for refueling and maintenance.

Other 2011 accomplishments include:

- After a two-year in-depth technical audit, inspection and scrutiny of the plant's operation, equipment and safety performance, the U.S. Nuclear Regulatory Commission approved extending the operating licenses for all three Palo Verde units an additional 20 years beyond the original 40-year licenses, allowing Unit 1 to operate through 2045, Unit 2 through 2046 and Unit 3 through 2047.
- Palo Verde set a record for lowest outage radiation exposure in the nuclear industry. Palo Verde's Unit 1 refueling outage completed in November recorded the lowest ever 20.6 rem. Prior to 2011, the best refueling outage recorded for a U.S. commercial plant was 28.2 rem in 2006. The record low exposure included 106,424 man-hours accumulated by more than a thousand nuclear professionals who worked in the tightly controlled areas of the plant where radiological exposure is possible. Current industry median for station-best is 59 rem. Rem is an abbreviation for *roentgen equivalent man*, a measurement of ionizing radiation. One rem is equivalent to receiving one upper gastrointestinal (GI) computerized tomography (CT) scan.
- Palo Verde opened a new Energy Education Center in Buckeye, Ariz. The new building includes state-of-the-art equipment needed to respond to an emergency and provide the public with the most complete, timely and accurate information. It also will be used for other business purposes including employee training, industry conferences, offsite meetings and community outreach activities. The U.S. Green Building Council awarded the facility its second-highest rating under the Leadership in Energy and Environmental Design program, known as LEED.

Palo Verde is the largest nuclear power plant in the nation. Its three units can generate more than 4 million kilowatts of safe, clean, reliable, low-cost electricity every hour – enough to serve about 4 million people.

Palo Verde is operated by APS and jointly owned by APS, Salt River Project, Southern California Edison Co., El Paso Electric Co., Public Service Co. of New Mexico, Southern California Public Power Authority and the Los Angeles Department of Water & Power.

APS, Arizona's largest and longest-serving electricity utility, serves more than 1.1 million customers in 11 of the state's 15 counties. With headquarters in Phoenix, APS is the principal subsidiary of Pinnacle West Capital Corp. (NYSE: PNW).

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nationwide, and household electricity consumption is projected to steadily increase with economic growth and broader consumer electronics adoption and use.

Eventually, future reactors will push the safety bar even further. Those include small modular nuclear reactors (SMRs) and a transition away from uranium to a safer thorium fuel cycle. Proponents want SMR designs out for deployment by 2022. SMRs cluster together compact passively cooled reactors to match the output of obsolete coal or nuclear facilities. Steam output from many modules would power a common generator to produce electricity. The SMR concept was brought closer toward reality last month when the U.S. Department of Energy outlined how it intends to support the design and licensing of SMRs. The NRC recently certified a Westinghouse SMR design that is based upon the AP 1000.

Advantages of *ILT* Throughput Assessment Screening (TAS)

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formance profile identifying testing outcomes including recommendations for operator license class entry. In addition, developmental areas are highlighted with remediation recommendations provided as part of the TAS summary report. TAS includes the following highlights and benefits;

- ⇒ Proprietary Analysis and confidential report to client containing Candidate Analysis results (all phases), rollup and individual remediation recommendations.
- ⇒ Evaluation of *ILT* candidate's strengths and weaknesses by employing an evaluated timed evaluations; BSE, CE, SA & psychometrics.
- ⇒ The site's Operations representative along with the NWI evaluation team observes/evaluates the candidates' performance in a realistic simulation (SA Phase) ranking performance of 7 key attributes including multi-tasking, priority setting, resources utilization, emotion/stress control, distractions, short-term memory, and communications.
- ⇒ The candidates' demonstration of command and control is observable over the course of the simulation. Observable strengths and weaknesses are identified during a scenario which has been designed to parallel, in a simplified way, the control room operations environment. However, no prior technical knowledge is needed because the pertinent background information and data are provided.
- ⇒ During the SA simulation, various scenario require verbalizing thoughts, seeking information, and asking questions. This allows the candidates' questioning approach to be observed and evaluated. For example, their questioning technique, direction, conciseness, and information integration (connection of key data/events (e.g. 2-3 questions deep vs. 4-5 questions deep).is evaluated during the course of the scenario.
- ⇒ Candidates demonstrate their innate behaviors while evaluators observe key attributes and success principles during multiple simulations.
- ⇒ The TAS helps identify the strongest candidate from the same Department when only one is permitted to attend *ILT* class (e.g., Trainers and Design Engineers).

Advantages of ILT Throughput Assessment Screening (TAS)

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- ⇒ Written evaluation of basic mathematics knowledge and general science to determine entry level competency (100 multiple choice questions with plausible distracters takes about 2 hours).
- ⇒ Candidate's reading comprehension and short term memory is evaluated by several reading passages that they need to understand and retain.
- ⇒ A confidential report is provided on each candidate containing individual TAS phase scores, analysis, and potential remediation recommendations, to supplement the client's standard HR process (e.g., interviews).
- ⇒ For those internal candidates that are not chosen, TAS results readily supports their Individual Development Plan (IDP).
- ⇒ The TAS supports identification of "ready now" candidates for advancement within an organization for leadership/management positions inside and outside of the operations department.



NWI Associate News

- ⇒ Bill Cheever continues to supporting EPU by providing engineering and project management support.
- ⇒ Ernie Harkness has been supporting Entergy's Nuclear Safety Review Board.
- ⇒ Richard Miller supported PPL Susquehanna's CAP training/program enhancements.
- ⇒ Larry Searle, Dan Paxton, Ken Payne and Jim Sollis are supporting CENG's Calvert Cliffs Maintenance & Technical Training improvement efforts.
- ⇒ Bill McNeill and Frank Tsakeres are assisting Point Beach Nuclear Plant in ILT TAS evaluations.
- ⇒ Ken Davidson and Dan Eason have been assisting Fitzpatrick plant in the area of training.
- ⇒ Steve Pettinger continues to support AEP's DC Cook training NRC ILT exam development.
- ⇒ Tim Bostwick, Mike Gettle and Terry Johnson have been supporting Progress Energy's Robinson.
- ⇒ David Hendrickson has been supporting administration and marketing improvement initiatives for NWI.
- ⇒ Paul Kirker provided Outage Management Support at Grand Gulf.
- ⇒ Rick Westcott and Keith Deck are supporting recovery at Ft. Calhoun station.
- ⇒ Tim Bostwick is slated to support Browns Ferry CAP improvement project.
- ⇒ Rick Westcott supported Wolf Creek's RCA corrective actions review self assessment.

NWI Products And Services

Check out our Products & Services



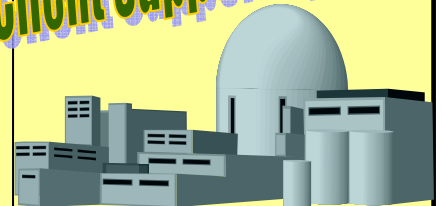
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NWI Consulting, LLC is a professional consulting firm specializing in power generation performance improvement services, specialized learning interventions, computer-based training, organizational development, accreditation renewal/recovery, and professional staff augmentation. NWI has a broad portfolio of U.S. and international clients in the electric generation industry and is headquartered in Knoxville, TN. NWI's power plant services includes supporting such areas as Operations, Training, Outage Management, Nuclear Oversight, Maintenance, Radiation Protection, Chemistry, and Emergency Preparedness. NWI has assisted clients in other, more specialized efforts including Leadership/Management Development, Executive Coaching, Conflict Resolution, Multi-Discipline Assessments, Root Cause Analyses, Performance Improvement, NRC 95-002 & 95-003 and Preparations and specialized Safety Analysis (50.59).

The following key activities are being conducted by NWI professionals...

- Robinson Training, and Performance Improvement Program support
- CENG Calvert Cliffs Training.
- DC Cook Training Support
- TVA Nuclear Power Group—Performance Imp. Support
- Xcel's Monticello EPU Project Support
- Entergy—Nuclear Oversight/Safety Review/Outage Management
- Ft. Calhoun's Improvement Initiatives

Client Support Update



Thank You

We wish to express special thanks to the following clients for making NWI a preferred consulting company.

- AEP's D.C. Cook Nuclear Power Plant
- APS's Palo Verde Nuclear Station
- Exelon Nuclear Partners
- Entergy Nuclear Operations
- Wolf Creek Generating Station
- Xcel Energy's Monticello Plant
- Progress Energy's Robinson Plant
- CENG's Calvert Cliffs Power Station
- OPPD's Ft. Calhoun
- PPL Susquehanna Steam Electric Station
- NextEra Energy's Point Beach Station



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