WESTINGHOUSE

World View

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OUR PERSPECTIVE

FEATURES

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Cover: The nuclear industry must prepare today for significant growth tomorrow... growth from the next generation of nuclear plants now, or soon to be, under construction. And growth in products and services for the more than 400 nuclear plants currently operating around the world. The challenge is to focus on immediate industry concerns and, at the same time, anticipate future technological and resources demands.

Our Perspective

Steve Tritch

Friends and Valued Customers,

There is a great line in the American film, *Paint Your Wagon*, when Lee Marvin's character reflects, in a rare moment of sobriety and motivation, that … "there's only two kinds of people in the world: Them going somewhere, and them going nowhere."

For a good part of the 1980s and 1990s, the second half of that quote was, to varying degrees, applicable to many segments of the commercial nuclear power industry.

Today, though, the pendulum is swinging in a better direction as power companies, suppliers, competitors and Westinghouse continue to make the decisions and investments necessary to ensure that the nuclear renaissance becomes, and then remains, a reality.

From a Westinghouse perspective, three recent actions show evidence of this movement.

First, on July 23, was the announcement of our intent to purchase IST Nuclear (ISTN) in the Republic of South Africa (see page 26). This acquisition, expected to close sometime this fall, brings another 100 highly experienced employees to Westinghouse, further enabling us to expand the range of services we provide to the operating plant segment of the worldwide nuclear industry. It also strengthens our participation in the development of the Pebble Bed Modular Reactor, as ISTN is an integral supplier to the PBMR development program.

On July 24, Westinghouse and our consortium partner, The Shaw Group, signed landmark contracts to provide four AP1000™ plants in China (see page 7). The nature of these contracts is mutually beneficial, as China will now have access to the most advanced nuclear power technology currently available. Westinghouse and our partners and suppliers will also benefit, as these contracts will hasten development of the infrastructure that will be necessary to support the worldwide new build renaissance.

As a result of current and anticipated growth, Westinghouse on August 14 broke ground on a new 800,000 square-foot headquarters and technology center just north of Pittsburgh (see page 8). This new facility will provide us with an environmentally friendly, economical and highly efficient workspace from where we can continue to move our company and our industry forward.

In closing, let me paraphrase Lee Marvin's character in *Paint Your Wagon*: Our industry is certainly moving in a positive direction at an increasing pace, and we are becoming increasingly well prepared for the journey.

Please enjoy this edition of ***World View***.

Steve Tritch

President and CEO
Westinghouse Electric Company

China's Energy Future

Zide Tang
Member of Advisory Group
State Nuclear Power Technology Company
People's Republic of China

In Brief: China must find environmentally and socially sustainable ways to power the country's ambitious plans for future economic development. Today's policies and actions will shape China's energy future, providing increased power while substantially decreasing the growth of greenhouse gas emissions.

The People's Republic of China is the second-largest consumer of energy in the world, behind only the United States. Therefore, China's path in achieving a sustainable energy policy has profound global economic and environmental consequences.

Five-Year Plan Addresses Energy Issues

The Chinese Government is adopting measures to enhance energy efficiency and improve the overall structure of the energy supply so that future economic growth may be supported by a relatively lower increase in energy consumption and a limited growth in emissions.

In March 2006, the People's Congress passed the 11th Five-Year Plan for National Economy and Society Development. The plan specifically addresses the optimization of energy development strategies, based on an analysis of the opportunities and challenges China will face in the future. Overall, the strategy is to: "Place energy savings as the single most important priority; rely most heavily on domestic energy resources with the goal of self-sufficiency; and diversify energy sources around a base of coal generation."

Furthermore, the goal is to: "Optimize the structure of both production and consumption; and build a stable, economical and safe energy supply system."

It is clear that sustainable growth in electricity generation will require the use of a range of resources and the adoption of new technologies, including advanced coal-fired generation, natural gas, hydropower, non-hydro renewables, and nuclear energy.

Tapping Available Resources

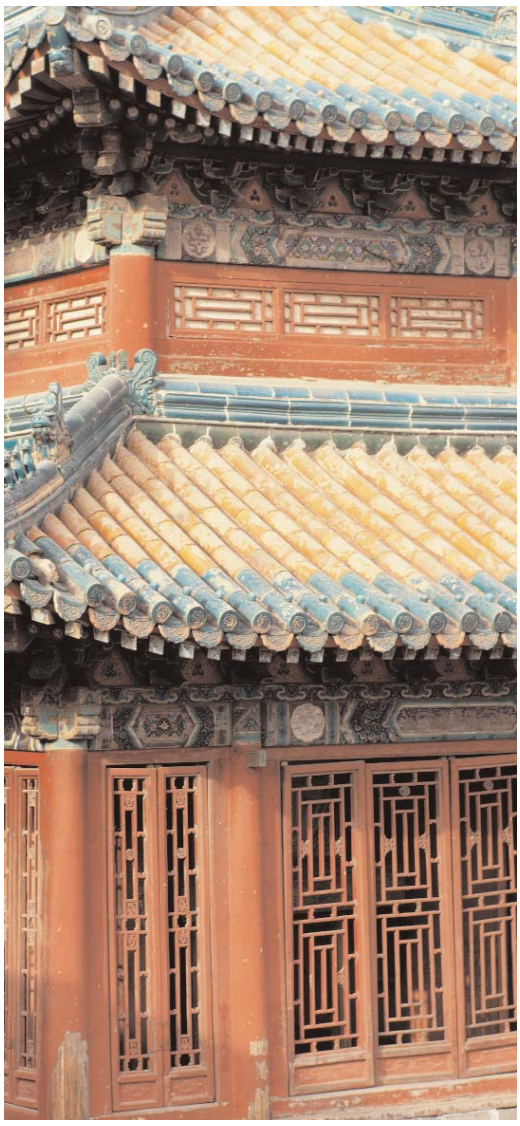
Coal is currently the dominant fuel used to generate electricity in China. Indeed, it is not anticipated that this reliance on coal will change in the coming decades. By 2020, China will still be mainly dependent on coal for its primary energy. This will be the situation even with the rapid growth of other fuels and substantial progress in raising the efficiency of coal-fueled generation.

Although China leads the world in coal production, the supply of coal cannot adequately meet even today's needs. There are several reasons for this. Among the difficulties are the absence of production planning, excessive exploitation, the waste of natural resources and a shortfall of transportation capacity. It is estimated that by 2020, the demand for coal will escalate to 3 billion tons, while future coal production is estimated only at most to be approximately 2.3 billion tons … a shortfall of some 0.7 billion tons.

A related problem is that burning coal can contaminate the environment. Therefore, coal-fired power plants must assume a major responsibility in limiting emissions. The burning of one ton of standard coal emits 0.308 tons of carbon dioxide (CO^2), 0.075 tons of sodium dioxide (SO^2), 0.037 tons of nitrogen oxide, and 0.68 tons of dust into the atmosphere.

Overall, the noxious emission of CO^2 and SO^2 from coal burning accounts for almost half of the total industrial emissions of those materials in China.

As to the difficulties of transportation, a 1,000 megawatt, coal-fired power plant consumes about 3 million tons of coal a year. In contrast, a similar-size nuclear power plant only needs 30 tons of fuel a year for refueling. To make matters worse, most of the country's coal resources are in western and middle regions of the country. This is a problem because most of the demand for electricity comes from the eastern part of the country where the economy is relatively more highly developed.



As the world's most populous country, China's energy future will have global consequences.

China's rapidly growing economy, estimated at nearly 10 percent a year, will be powered by an increased demand for electricity. Nuclear power will play a major role in meeting this new demand.

Natural gas supplies, including imported pipeline gas and liquid natural gas, will have to expand tremendously to meet demand from households, commercial buildings, and electric utilities. Obtaining sufficient supply is a crucial uncertainty.

Another important source of electricity in China is hydropower. However, the potential of hydropower is limited. The current capacity of hydropower is 108 million kilowatts. It is estimated that the total amount of hydropower that can potentially be developed in China is about 378 million kilowatts. It is likely that by 2020 the actual capacity will grow to 230 million kilowatts.

There are other features of hydropower that pose difficulties:

- Hydropower is not evenly distributed throughout China. Seventy-eight percent of China's hydropower is located in the western and middle regions of the country, including twenty-six 700-megawatt units of hydropower at Three Gorges. Yet, 60 percent of the demand for electricity is from eastern China.
- It is a fact of nature that water flow changes substantially throughout the year, and indeed, from year to year. Therefore, the generation of hydropower changes significantly with the seasons and is naturally unstable.

It is true that, in terms of total amounts, China has an abundant and rich supply of both coal and hydropower. However, this is somewhat misleading - the amount of these resources in China, on a per capita basis, is very limited. Coal resources in China, per capita, are only about 45 percent of the world average. Hydropower resources per capita are about 70 percent of the world average.

Nuclear's Role

The active development of nuclear power is a critical element in the national strategy for energy development envisioned in the 11th Five-Year Plan. Developing nuclear power is important in order to supplement China's natural power resources. Nuclear will also help in other ways: to protect the environment, mitigate transportation pressures, and enhance the stability of energy supplies and help ensure energy security.

The 11th Plan clearly states that: "China is to actively pursue construction of nuclear power, focus on building 1000 megawatt nuclear power plants, and gradually realize self-reliance in design, manufacturing, construction and operation."

In March 2006, China's State Council approved the Development Plan for Nuclear Power for Medium and Long Term (2005-2020). This plan states that the active development of nuclear power is an important energy strategy for China. It has great significance for meeting increased energy needs with the growth of the economy and society.

The Plan outlines the technological path for development of nuclear power in China. The program calls for the selection of international partners to introduce engineering technology and component manufacturing technology for 1,000-megawatt PWR nuclear power plants. It further states that, through a national-level organization, the country will absorb and master those technologies, realizing nuclear self-reliance. It is planned that by 2015, China will have developed its own capability to build nuclear power plants, with its own brand.

By 2020, the power generation capacity of operating nuclear power plants will be 40,000 megawatts, assuming as much as four percent of the total capacity of electricity generation in China. By the end of that year, there will also be an additional 18,000 megawatts of nuclear power capacity under construction; with reactors using Generation III advanced technology.

On December 16, 2006, the Chinese and United States governments signed a "Memorandum of Understanding for Building Advanced PWR Nuclear Power Program and Relevant Technology Transfer." At the same time, the Preparatory Office of State Nuclear Power Technology Corporation signed the Cooperation Memorandum for "the China Nuclear Power Self-reliance Program supporting projects" with the Westinghouse Consortium.

The first four AP1000 units will be built at Sanmen and Haiyang. China has entered a new era of sustainable, safe and ecologically sound energy development.

Article translated by Steven Liu

Three Gorges Dam is China's largest construction project since the building of the Grand Canal in the 10th century.

World's Largest Dam

Developing greater hydropower is a key strategy for the power sector in China's 11th Five-Year Plan. Hydropower is "clean," an important advantage in a country that relies on coal for 70 percent of its energy needs.

The Three Gorges reservoir, the world's largest hydroelectric project, was completed in May 2006. It will provide a huge source of hydropower to the 220 million people who live in the Yangtze River basin. The electricity generated is expected to be approximately 85 billion kilowatt-hours a year.

The Three Gorges Dam spans the Yangtze River. It is the largest hydroelectric river dam in the world, more than five times the size of Hoover Dam in the United States. The dam has a 600-foot-high wall that is more than a mile wide, to harness the world's third-longest river. The dam results in a 370 mile-long lake.

Westinghouse Ramps Up for Industry Growth

In Brief: Westinghouse's decision, announced this spring, to build a new 85-acre headquarters and technology center north of Pittsburgh, is a commitment to customers, employees and the worldwide nuclear power industry.

On August 14 of this year, groundbreaking for a new world headquarters facility ushered in the start of "a great new era" for Westinghouse, a company whose history dates back to 1886.

At the groundbreaking ceremony, Westinghouse President and CEO Steve Tritch noted that the need for a new, larger facility is based on the company's significant growth. Westinghouse has hired more than 3,500 employees in the past five years; will add 1,300 workers this year and expects to hire an additional 500 to 1,000 employees annually "for the foreseeable future." "Our challenge is to not only hire and train the right people, but to house them in facilities that will create a pleasant and productive environment."

The new facility, located in southwestern Pennsylvania, United States, (approximately 30 miles from the current headquarters) will fit this bill. Amenities at the new campus will include a significantly enhanced work environment for all employees, including improved work stations and offices; better lighting and heating/cooling capabilities; a larger cafeteria and fitness center; along with more conference rooms and meeting space.

The Westinghouse campus north of Pittsburgh, Pennsylvania, United States will offer ready access to the Pittsburgh International Airport.

In addition, a variety of restaurants, shops, hotels and a large training facility are all within walking distance for employees, customers and visitors. The new headquarters and technology center also has the flexibility to accommodate additional future expansion, if needed, and is convenient to the Pittsburgh International Airport.

The plan is for all employees working at the current Energy Center and Science and Technology sites to move to the new facility. The move will be accomplished in two phases. The initial group, consisting of the Nuclear Power Plants employees and related support organizations will relocate in the first half of 2009. The remaining employees will relocate in late 2010.

In addition to the new headquarters facility, Westinghouse has expanded space at the existing Waltz Mill site in nearby Madison, Pennsylvania. This expansion project was completed in June 2007 and resulted in an additional 11,250 square feet of office space.

"I truly believe that this change in our work environment, at this time of nuclear renaissance, will better position us to serve our nuclear customers around the world," said Tony Greco, senior vice president, human resources and corporate relations at Westinghouse.

With a new headquarters under construction, expansion at the Waltz Mill site and significant projected hiring new employees, Westinghouse is ramping up to meet the increased demand for clean, safe, reliable nuclear energy.

For more information, contact Della DeMaro at demarodj@westinghouse.com

Green Design for a Greener Future

The new Westinghouse Headquarters is being designed to obtain Leadership in Energy and Environmental Design certification from the U.S. Green Building Council.

The Leadership in Energy and Environmental Design green building rating system is the nationally accepted benchmark for the design, construction and operation of high-performance green buildings in the United States. Certification is based on such factors as a building's sustainability in human and environmental health, water savings, energy efficiency and conservation, materials selection and the use of natural resources, and indoor environmental quality.

"While designing a green building can add to the cost of construction and operation," says Tony Greco, senior vice president, human resources and corporate development, "our employees will be healthier and more productive; and we will save natural resources."

"It's the right thing to do. Right for our employees, right for the community, and right for the environment."

The Road to ZERO Fuel Failures

World View

Interview with: Meena Mutyala

Vice President of Nuclear Fuel Product Management and Engineering

In Brief: The nuclear industry has raised the bar significantly for fuel reliability. The industry's ambitious goal is for all plants in the United States to operate with zero fuel failures by the year 2010.

The nuclear industry has enjoyed an enviable history of increasingly high levels of performance and reduced costs. The fuel portion of those costs is around 25 percent, compared to as much as 90 percent for the cost of fuel for gas and other fossil-fuel plants. In an effort to achieve further performance and fuel cost reductions, there is a new industry focus on increasing fuel reliability by reducing fuel failures.

Operating in a Demanding Environment

Over the last decade, the efficiency of nuclear fuel has improved by increasing burnups and fuel utilization to reduce upfront fuel costs as well as the costs of fuel storage and eventual disposal. Methods have included higher enrichment, longer fuel cycles, higher burnup, core reload strategies, plant upratings and water chemistry changes to improve balance-of-plant component performance.

As a result of this very demanding environment, this same period was also marked by a negative trend in fuel reliability.

Operating regimes adopted to boost plant performance, coupled with emergent issues such as grid-to-rod fretting, challenged even advanced fuel designs to keep pace. The result was an increase in fuel failures and thus a reduction in overall fuel reliability.

In parallel with changing fuel designs and operating modes chosen by plant operators, industry regulators are substantially raising the bar on required levels of reliability. By their standards, the term reliability applies not only to avoiding fuel failures, but also avoiding any fuel-related operational or regulatory problems.

Zero by Ten

The Institute of Nuclear Power Operations (INPO) set a new and challenging goal in 2006 for the nuclear industry: To achieve operations with zero fuel failures for all plants in the United States by the year 2010. Currently, about 75 percent of the plants in the United States operate with failure-free fuel. While this particular goal is U.S.-based, fuel operators worldwide are focused on achieving zero fuel failures, or flawless fuel.

Meena Mutyala, Westinghouse vice president of nuclear fuel product management and Engineering discusses the road traveled thus far on the journey toward achieving zero fuel failures by 2010.

What does the term flawless fuel mean and how does it relate to the zero by 2010 challenge?

"Flawless fuel relates to fuel reliability as measured by the absence of leaking rods or fuel failures. That is the focus of the INPO 2010 target. However, the broader definition of flawless fuel includes fuel that performs as expected in the reactor (no operational surprises) and also maintains its integrity post-operations."

Why is the reduction of fuel failures so important?

"Fuel failures can jeopardize the competitive advantage of nuclear power's low production costs: fuel failures can result in the premature discharge of fuel, increase outage time, and can create downstream issues such as spent fuel storage and transportation and disposal issues. Fuel failures can also increase plant radiation, which can impact outage operations where minimizing worker exposure is a major objective. A single fuel failure can cost the industry approximately a million dollars.

"It's important to emphasize that current fuel failures do not pose a plant safety issue as the level has always remained within accepted safety and licensing limits. The primary impact is economic."

How long has Westinghouse been focused on flawless fuel?

"We have had this in our mission statement for 15 years - but in 2002 we launched a specific program with clearly articulated plans and projects to achieve zero leakers."

"The Challenge: To achieve operations with zero fuel failures for all plants in the United States by the year 2010."

How does the INPO Zero by 2010 Initiative affect Westinghouse?

"Plants operating with continuing fuel failures will not be able to achieve the highest INPO rating, which has financial consequences. Any fuel vendor that cannot produce positive results in this regard will be unable to sustain their competitive edge. Just as important, fuel failures breach the first of three engineered barriers designed to prevent environmental release of radioactive fission products – which has a significant bearing on nuclear's competitiveness as an electricity generation option. And that affects all of us."

How realistic is the 2010 goal? What are some of the challenges?

"Considering that a typical reactor contains more than half a million rods and with peak fuel temperatures higher than 1000°C, getting to and sustaining zero defects is a challenge. It is a challenge that requires industry-wide collaboration–among fuel manufacturers, fuel and core designers, reactor designers, reactor operators, outage personnel and plant chemistry personnel. It can be done and must be done to ensure the future viability of this industry."

What steps is Westinghouse taking to help utility operators reach this goal?

"We have embarked on what we refer to as a 'total systems approach' focused on meeting the challenge and breaking the curve (the recent plateau in fuel reliability) by focusing on four areas–fuel design (including materials), fuel fabrication processes, operating strategies and feedback from fuel examinations.

"We are investing in next generation designs–on many of our product lines, we have implemented designs and fabrication processes that provide margin to the failure mechanisms such as grid-to-rod fretting, pellet/clad interactions, and debris fretting.

The increased contact area of the Westinghouse PWR Next Generation Fuel significantly improves grid-to-rod fretting performance.

"We are investing in our fuel fabrication facilities to improve quality in critical production areas. Pellet manufacturing and inspection, and engineered controls to prevent hydrogenous contamination within the fuel rods are two recent areas we've focused on. We are working closely with our customers on water-chemistry modifications and on root-cause investigations, ranging from non-destructive examinations on site to destructive examinations at hot cell facilities.

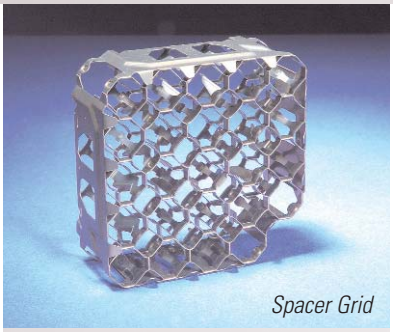
"We are also driving alignment across all of our engineering and manufacturing locations to ensure that everyone understands their responsibilities and how their actions and inactions affect fuel reliability and success for our customers."

How much input do the utilities have in this process?

"We have worked hard to strengthen our partnerships with our customers because collaboration is crucial to reaching overall and sustainable solutions. We're focused on creating their success."

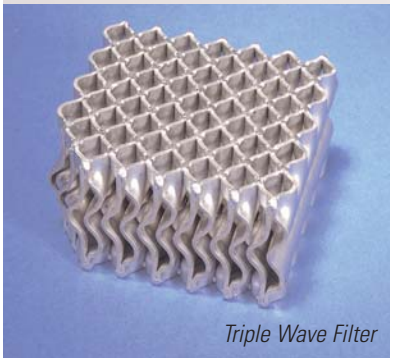
What progress can be noted to-date?

"On our major product line (17x17 fuel, which represents two-thirds of our PWR business), we have not had any grid-to-rod fretting failures except for legacy V5H fuel, the last of which will be discharged this fall. This is a step-change improvement as grid-to-rod fretting is the major failure mechanism in PWR fuel.



Spacer Grid

Together, the triple wave filter and spacer grids, standard on the Optima3 BWR fuel, guard against debris related fuel failures from both large- and small-size debris.



Triple Wave Filter

We are now working on eliminating this failure mechanism on all our product lines.

"Debris is the next major fuel-failure mechanism. We have product improvements that are being implemented and our customers are focused on foreign materials exclusion controls to reduce the probability of failure due to debris.

"I could discuss each failure mechanism, but let me just say that we are working on taking corrective and preventive actions for all failure mechanisms. In this business, there is no instant gratification. It takes up to seven years to understand a failure case, implement corrective actions and deliver new fuel, and to discharge all legacy fuel before the failure cause is completely eliminated."

Are reliability issues the same for both PWR and BWR fuel?

"Reliability issues present with PWR fuel (i.e., grid-to-rod fretting) have not been exhibited with Westinghouse BWR fuel. Debris is the key failure mechanism in our BWR fuel, which we are addressing with product enhancements and by working with our customers on controls to exclude foreign materials."

What will success look like for Westinghouse?

"True success will mean the achievement of zero fuel failures by every customer! We can't afford to settle for anything less."

For more information contact Meena Mutyala at: mutyalm@westinghouse.com

Improving Plant Reliability is Only One Click Away

In Brief: With today's wireless technology, plant engineers can monitor equipment performance remotely, and proactively implement preventive maintenance measures to keep the plant running. Early detection of anomalies combined with advice from world-class component specialists is a powerful combination that enables plant staff to make proactive equipment maintenance decisions.

The nuclear industry has experienced dramatic changes in recent years. The focus on preventive maintenance comes at a time of high demand and increased expectations for reliable performance. Many plants have mature systems with components nearing the end of their design lives. At the same time, experienced engineers who have accumulated extensive knowledge of their systems are nearing retirement and are increasingly harder to replace.

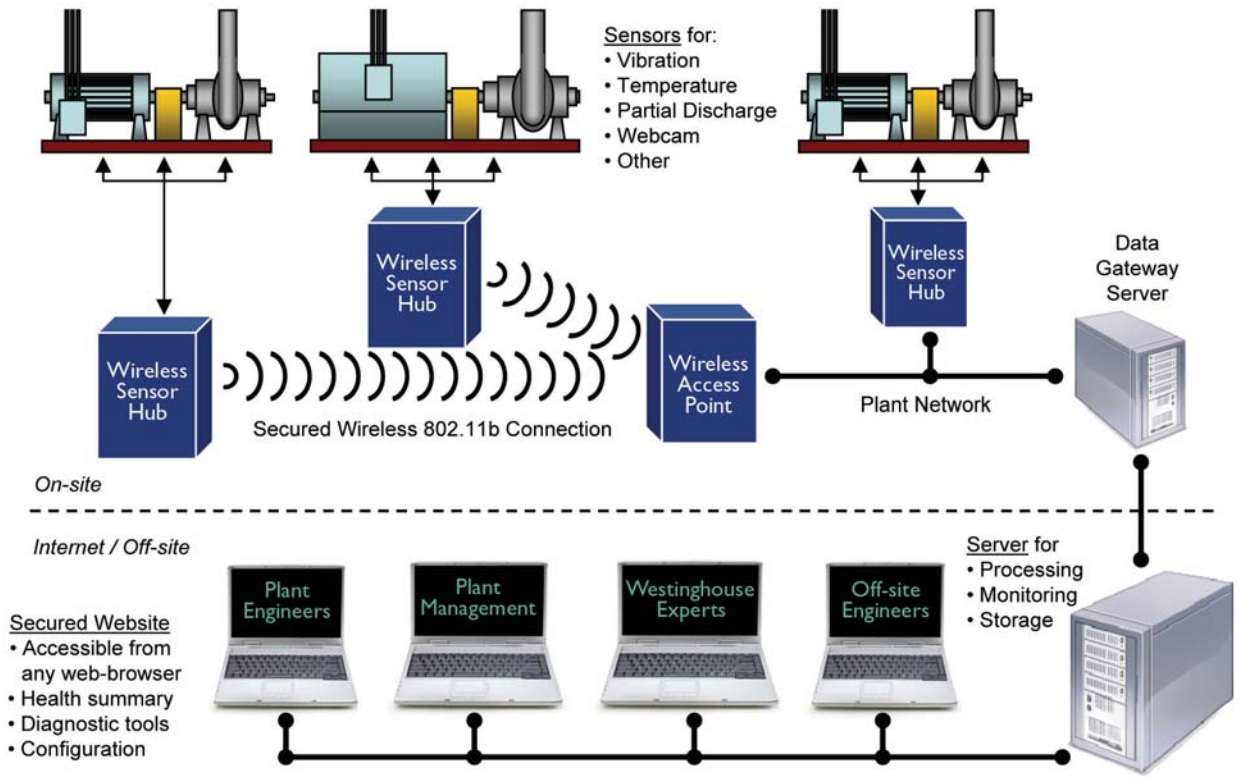
Reliability Optimization Center

The Westinghouse Reliability Optimization Center combines unmatched component reliability expertise with advanced wireless monitoring technology and remote diagnostic tools to improve plant equipment performance. This allows utilities to proactively address equipment reliability issues in accordance with INPO AP-913.

The Center focuses primarily on rotating equipment such as pumps and motors, but the expertise, technology and diagnostics are well fitted to include most components critical to power generation. The role of the Center is to provide facts and technical advice to key plant personnel, allowing them to make informed decision on how to prevent equipment issues.

Westinghouse has a worldwide service organization that has been built over many years of resolving operability issues. The effectiveness of diagnostics is multiplied when experts have access to current and historical monitoring data, supplemented by original drawings, design calculations, and baseline test data. This information allows engineers to compare past and current operating parameters to resolve problems or improve performance.

Westinghouse is currently working with Azima Inc., a leading provider of web-based, wireless monitoring and diagnostic services to power plants and industrial facilities. Azima has completed the first plant-wide wireless monitoring application in a nuclear power plant at TXU's Comanche Peak units.



Westinghouse Reliability Optimization Center:

- *Early Warning Sensors and Wireless Monitoring: Sensors on critical equipment provide performance measures and early detection of impending failures. Wireless sensor hubs simplify design changes, installation and future expansion.*
- *Smart Monitoring and Component Expertise: Westinghouse component experts assist plant engineers. Equipment diagnostics, prognostics and alert notification are available over the Internet.*

Advanced Wireless Monitoring

Equipment operating conditions monitored can include: vibration, temperature, current, deflection, visual and partial discharge. Other application specific sensors are also available. Wireless technology minimizes the expensive installation of cables, but also ensures future flexibility and scalability. Plant personnel can access the Reliability Optimization Center via computer to consult on the latest equipment trends, set alert thresholds, and perform diagnostic evaluation even from home.

The Bottom Line …

- Early detection of equipment degradation prevents catastrophic failure, enables proactive maintenance and provides advanced warning to reduce the impact of a failure.
- Access to experts helps plant operators detect and resolve emerging issues early and effectively.
- Automated data collection reduces the frequency of walk-downs. Up-to-the-minute conditions are available on the Internet, making it easy to consult from anywhere and to share with support teams regardless of their location.
- Online monitoring identifies inefficiencies and maximizes energy production. It also provides key information to limit spares inventory and optimize budget allocation.

For more information on the Reliability Optimization Center, contact Laurent Houssay at: houssal@westinghouse.com

Growth Leaders Focus on the Future

In Brief: Last fall, the Westinghouse Engineering Services department began to focus on its business growth with the establishment of nine high-importance growth initiatives. Each initiative has its own dedicated leader to ensure alignment with industry needs and spur growth in the coming years. An overall six-point growth strategy includes executing flawlessly on current projects and leveraging Toshiba products and services.

The nuclear power renaissance is happening worldwide. Now that Toshiba and Westinghouse have joined forces, Westinghouse has a broader scope of technologies, products and services to offer this rapidly expanding marketplace.

Westinghouse Nuclear Services has created new positions in strategic management focused solely on growth in specific areas. These strategic managers include Wayne Bentley for boiling water reactor services; Mark Salerno for turbine generators; and Gary Urquhart for pressurized water reactor services in Japan. These strategic managers are responsible for coordinating the overall Nuclear Services strategy and working closely with growth leaders in the Field Services, Engineering Services, and Repair, Replacement and Automation business segments.

Within Engineering Services ...
Strategic Project Development managers are responsible for developing a growth strategy business plan, implementing that plan to drive opportunities to grow business, and coordinating their approaches both within Westinghouse and with its customers.

How will these growth initiatives benefit customers and the nuclear industry? **World View** *talked to four Strategic Project Development growth leaders:*

Expansion of Uprating Activities

Jim Sechrist is responsible for expanding uprating activities. This initiative is currently focused on power uprates in the United States and Europe.

Westinghouse has been involved in power uprate programs for more than 30 years. The Westinghouse work scope had been limited to addressing the impact of the uprate on the fuel, safety analyses and the nuclear steam supply system and components.

This experience, combined with a new project management capability, now provides Westinghouse with the experience, resources and comprehensive structure in place to provide a complete "one-stop" shop for uprates.

Jim explains, "Some utility customers are asking the supplier to take on a larger role in power uprate programs. By growing our capabilities internally and utilizing the capabilities of Toshiba, and by our willingness to take on more work and risk, we can better meet the needs of these customers."

Jim is doing a number of things. "First, I am working closely with the other growth leaders to incorporate their growth areas into the uprate programs," he says. "Second, we are using Customer 1st tools and techniques to develop and guide our business plans. Third, we are selectively hiring and teaming to provide the needed expertise."

Jim is also spending more time with outside firms, such as Shaw, Sargent & Lundy and Siemens which will be teammates or subcontractors on large uprate programs. "Toshiba will be an important supplier," he says. "With such large components as feedwater heaters, moisture separator reheaters, turbines, generators and transformers, Toshiba can supply many of the key components required for large power uprates."

Power uprate programs are often performed in conjunction with other plant improvements. Many plants are reaching that point in life where they need to replace major portions of their equipment (e.g., turbines and generators) in order to extend the life of plants.

Jim concludes, "It only makes sense to increase the power output of the plant if you are going to pay large amounts of money for new turbines and generators. Power uprates help pay for and justify improvements to plant equipment–or provide an opportunity to incorporate the latest component and analysis technology into the plant design basis."

For more information, contact Jim Sechrist at sechrijp@westinghouse.com

BOP Equipment and Engineering

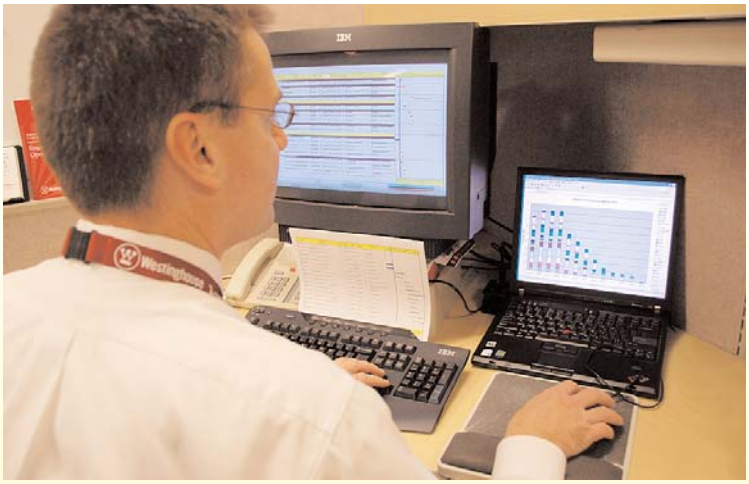
Rick Lee is the Engineering Services leader working with Mark Salerno to grow Westinghouse and Toshiba's business in the BOP area. Westinghouse is more than a nuclear island supplier.

Toshiba is an integral part of Westinghouse's BOP growth strategy. Toshiba will provide the engineering and fabrication of BOP components, such as generator step-up transformers, moisture separator reheaters and feedwater heaters.

"Until we were acquired by Toshiba, we did not have a supplier for BOP component engineering and fabrication," says Rick. "Toshiba has great capabilities and experience in this area. Our customers now have a fully integrated supplier capable of providing true turnkey packages of BOP services that include components, installation, engineering and project management."

At one time, Westinghouse supplied BOP equipment, but over the years, those parts of Westinghouse involved with such equipment were divested. One of the largest challenges for Rick is to re-introduce Westinghouse's BOP capabilities to the industry.

Rick wants our customers to know that Westinghouse will design BOP components for improved thermal performance and maximum generation of electricity-and such components will get a plant to the end of a 60-year life. He says, "By the end of 2008, Westinghouse will be a major supplier in the BOP area."



Westinghouse has successfully implemented over 70 plant upratings, providing more than 2900 MWe of additional power generation with three types of uprating programs:

- *Measurement uncertainty recapture uprates;*
- *Stretch power uprates that raise power within a plant's design capacity; and*
- *Extended power uprates, typically 7% to 20%, that require plant modification to the balance-of-plant equipment.*

For more information, contact Rick Lee at leerh@westinghouse.com.

Turbine Generators

The turbine generator business is a completely new business for Westinghouse, and David Bevilacqua is responsible for working with Mark Salerno in expanding Westinghouse's capabilities and integrating Toshiba's products.

"Toshiba has a great turbine and generator product line and has made state-of-the-art advances in technology to address long-standing issues in the industry," says David. "When Westinghouse offers a traditional uprate of the nuclear steam supply system, we can also provide the turbine and generator equipment. By integrating turbines and generators with other growth areas, Westinghouse is also able to offer other services such as BOP engineering and equipment."

David plans to integrate his growth area with Westinghouse Field Services. He says, "We are currently developing the resources and facilities to support after-market service and maintenance. The initial target would be to develop shop services, first for Toshiba equipment and later for other OEM equipment. Second is the development of field services for the customer such that we could support turbine generator maintenance or forced outages in the field."

His plans include extending plant life from 40 to 60 years. David states, "Replacement of a turbine generator component can mean extension of the life of the plant overall. It can also provide improvements in efficiency, which means better performance and a lower cost of production."

For more information, contact David Bevilacqua at: beviladj@westinghouse.com

Alloy 600 Services

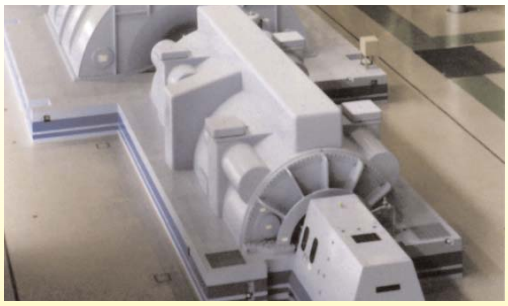
Greg Turley and Cindy Pezze are responsible for the implementation and growth of Alloy 600 services, respectively.

Recently, PWR industry focus in the U.S. has been on the mitigation of pressurizers, primarily with structural weld overlays. "Competition for this market has been fierce," says Greg. "Customers expect high-quality mitigation services with the lowest possible dose and shortest schedule impact to their outage."

Lessons learned from pressurizer weld overlay projects are being applied to the next phase of the PWR domestic market, which will be the inspection and mitigation of reactor coolant system nozzles and reactor vessel inlet and outlet nozzles. Mitigation techniques will vary.

"Developing the market and being able to project this work for the future is a challenge," says Cindy. "Planning includes knowing how many jobs we can handle in an outage season, training crews, having sufficient equipment and having skilled resources. It involves integrating resources from Alloy 600 team members representing Westinghouse Engineering Services, WesDyne, PCI and other partner suppliers, such as NuVision Engineering."

Over the last four months, the Alloy 600 team visited many utilities with Westinghouse-designed units. "These utilities are thinking about and planning mitigation strategies for their reactor vessel nozzles," says Cindy. The team discussed the status of industry activities related to inspection guidelines: what other utilities are planning and the mitigation options that Westinghouse offers.



Toshiba has years of generator experience and a product line that covers the complete range from 100 MVA to 1500 MVA.

Cindy is initiating activities to work with Combustion Engineering (CE) and Babcock & Wilcox (B&W)-designed units. The nozzle components impacted are not the same design as those in Westinghouse-designed plants. "We want to mitigate the Alloy 600 welds on their components and avoid continuous monitoring and future inspections," she says. "We are adapting current technology to see how it can be applied. We are just now learning and investigating options for the CE units. We know the least about the B&W design because we are not the OEM. As it turns out, they have nozzle configurations very similar to the CE units."

Rigging mockup for typical Mechanical Stress Improvement Process reactor vessel nozzle sandbox configuration.

Cindy also plans to continue exploring advanced technology, such as cold spray, underwater laser peening and underwater laser welding, to complement current options. "These technologies actually offer a number of benefits in terms of implementation cost," she says. "We will continue to invest in technologies that will reduce radiation exposure, outage time and prove to be reliable mitigations that can be applied to Alloy 600 components."

For more information, contact Cindy Pezze at pezze1cm@westinghouse.com or Greg Turley at turleygm@westinghouse.com

Pressurized Water Reactor Owners Group: A Fleet-Wide Voice

In Brief: In 2006, the Westinghouse Owners Group became the Pressurized Water Reactor Owners Group (or PWR Owners Group). The name change reflects the integration of the eight Babcock and Wilcox units in the U.S. The Group now represents all PWR owners in the U.S., as well as a significant number of PWR owners in Europe and Asia.

The PWR Owners Group works to create solutions to industry problems, coordinating its efforts with that of other industry groups and providing representation of member concerns by regularly interfacing with the U.S. Nuclear Regulatory Commission (NRC). The PWR Owners Group currently has approximately 180 active programs. This article provides a sampling of just a few of the ongoing and completed programs of interest to PWR owners.

Risk-Informed Extension of In-Service Inspection Intervals

In-service inspections (ISIs) are required by the American Society of Mechanical Engineers' Boiler and Pressure Vessel Code, and are implemented by the NRC's Code of Federal Regulations. They may entail significant outage time, expense, and radiation exposure.

While ISIs are clearly valuable, for some components, plant experience has shown that these inspections have rarely, if ever, uncovered a problem. When this is the case, advanced probabilistic risk assessment and probabilistic fracture mechanics techniques can be used to reduce the number of ISIs over a plant's lifetime.

For example, through a current program, the PWR Owners Group has shown that risk-informed assessments could justify extending ISIs of reactor vessel (RV) pressure-containing welds from every 10 years to every 20 years.

The existing 10-year inspection interval requirement for these welds is based on the "wear-out" rate experienced by the pre-nuclear utility and petro-chemical processing industries. Because today's nuclear utilities have experienced no service-induced flaws in these welds, the PWR Owners Group conducted analyses with the participation of three pilot plants, one of each U.S. nuclear steam supply system design, and demonstrated that any change in risk associated from extending the ISI from 10 to 20 years meets the governing regulatory change in risk evaluation guidelines.

The subsequent application of the methodology to non-pilot lead plants demonstrated the process and requirements for implementing the methodology across the U.S. PWR fleet.

To maintain consistency in continued surveillance inspections as requested by the NRC, the PWR Owners Group also submitted a future PWR

inspection schedule on behalf of the industry. The NRC is expected to issue a final Safety Evaluation Report by the end of 2007; the Topical Report can then be applied by plants that are bound by the pilot parameters to justify plant-specific extensions for the applicable RV welds. While benefits may vary, a reduction of 72 hours in critical path outage time is achievable, yielding significant economic savings and a quicker return to service.

The PWR Owners Group has funded many other cost-saving programs that extend the years between ISIs through risk-informed analyses by showing that safety is maintained or improved through the extention.

For example:

- The extension of reactor coolant pump flywheel ISIs from every 40 months to a maximum of every 20 years can save plants approximately $500,000 to $1,000,000 over the remaining plant life, not including savings from reduced man-rems.

- A one-time, five-year extension of the containment integrated leak rate test (for very small containment leaks), results in a per plant savings of $800,000 to $1,000,000.

Extensions to Repair Times and Changed End-State Modes During Repair

The PWR Owners Group has also reduced plant costs and increased safety using risk-informed analyses to extend the allowed outage time or completion time for certain repairs and to show that transitioning to Cold Shutdown mode, which is the most common mode of operation required when a repair cannot be made in the allowed outage time, often puts the plant at more, rather than less, operational risk. Two examples of the approximate 30 Technical Specification changes achieved as a result of such analyses are:

- Extension of allowed outage time for repairs of containment isolation valves from four hours to 168 hours, depending on the number of valves and the penetration size, saving plants an estimated $750,000 every three to four years.

- Extension of allowed outage times, when combined with changes in the required end-state mode to perform a repair while remaining At Power or transitioning to either the Hot Standby or Hot Shutdown mode, rather than to Cold Shutdown, saving plants an estimated $1,000,000 to $2,000,000 over the remaining plant life.

Methodology for Coolant System Leak-Rate Measurement and Response

Through two recent programs, the PWR Owners Group proactively provided an industry response to NRC concerns about inconsistencies in methods used to determine small, unidentified reactor coolant system (RCS) leak rate, and the actions utilities take if a low-level change in such leaks is observed. The Group provided the NRC with a standardized RCS leak rate methodology, action levels, and response guidelines for information purposes. Recently, the PWR Owners Group Executive Committee voted to exercise the Nuclear Energy Institute (NEI) 03-08 "Guideline for the Management of Materials Issues" by mandating that Owners Group members implement certain portions of each of the methodologies. By implem enting these programs, members may:

- Detect small increases in RCS leakage sooner;

- Repair leaks earlier;

- Reduce the potential for unplanned plant shutdowns;

- Enable accurate comparisons of results between plants and across the PWR fleet;

- Reduce regulatory, administrative, and financial burdens; and

- Face fewer complications from possible future changes in RCS leakage regulatory requirements and performance indicators.

The strength of the PWR Owners Group lies in the guidance of dedicated utility executives and participation of utility management and technical personnel. These men and women contribute their time and expertise by leading or serving on committees and subcommittees. Through the PWR Owners Group, their leadership, plant experience, best practices, technological expertise, and coordination with other industry organizations come together to benefit all member utilities.

Bridging Gaps between Utilities' Practices and Outdated Regulatory Requirements

The PWR Owners Group has conducted several programs to update the NRC requirements for licensing examinations for reactor operators and senior reactor operators, and to replace the labor intensive methods used to generate exam outlines and questions

NRC regulations regarding the content of these exams were published in 1985 and updated only once, in 1996. While plants are required to base their operator exams on these regulations, the regulations do not necessarily reflect best practices implemented at the plants. Plants' training programs incorporate changes in plant equipment, operating experience, and industry lessons learned.

The PWR Owners Group recommended revisions to the NRC regulations that more accurately reflect operating realities. The Group also: developed a Written Exam Random Outline Generator software package; is currently updating software to reflect NRC operator exam regulations; and will enter the updated software into the Westinghouse software configuration control process. This last item will facilitate exam generation for all vendor designs with just one package and provide consistent software support. When completed, the software will allow exam writers to develop an examination outline in about 10 seconds, saving utilities about 40 man-hours per test, while providing exams that are more relevant to the current operating environment.

For additional program information, go to http://pwrog.westinghousenuclear.com. Utility members, log in for full access. For an ID, click "Request an ID." Non-members, access the web site to read the newsletters and view the calendar of upcoming meetings.

AROUND THE WORLD VIEW

WESTINGHOUSE MANAGES SPRINGFIELDS FUEL FACILITY

AGR fuel rod inspection at Springfields.

Westinghouse has been granted an extension to its contract to manage and operate the Springfields plant, the only commercial nuclear fuel manufacturing facility in the United Kingdom. The Nuclear Decommissioning Authority, which owns the 20 commercial nuclear sites in the United Kingdom, including Springfields, has extended the management and operating contract for the site until 2010.

Springfields provides nuclear fuel for the U.K.'s nuclear power program, as well as fuel products for customers worldwide. "The contract extension also allows us to explore the possibility of new business opportunities arising from the world-wide nuclear renaissance," said Mike Tynan, Springfields Fuels Limited managing director.

For more information, contact Alan Beauchamp at alan.beauchamp@springfieldsfuels.com

PROGRESS ENERGY CHOOSES WESTINGHOUSE TECHNOLOGY

Progress Energy has selected the Westinghouse AP1000 for potential new nuclear plant construction at its Levy County Florida site in the United States. Progress Energy previously chose the AP1000 for possible new plant construction for its Harris Nuclear Plant site near New Hill, North Carolina.

In addition to Progress Energy, Duke Energy, SCANA and Santee Cooper, and the team of Southern Company and Georgia Power have selected the AP1000 design for possible future expansion of their nuclear capability. The AP1000 will now be the technology basis for 12 construction and operating license applications with the U.S. Nuclear Regulatory Commission (NRC).

The AP1000 is the only Generation III+ nuclear power plant to have received Design Certification from the NRC. Additionally, the AP1000 recently passed all the steps of analysis for compliance with European Utility Requirements, clearing the way for the AP1000 to be licensed in Europe.

For more information about the Westinghouse AP1000, visit www.westinghousenuclear.com/ap1000. To download the AP1000 brochure, visit www.westinghousenuclear.com/docs/AP1000_brochure.pdf.

MODIFICATIONS TO BE MADE TO SOUTH AFRICAN NUCLEAR PLANT

Westinghouse will perform 13 safety backfitting modifications at ESKOM's Koeberg Units 1 and 2 in South Africa. The modifications will be made from December 2008 through 2010.

Westinghouse's work represents approximately 50 percent of the modification packages; demonstrating the company's architectural engineering capabilities, OEM scope, and global reach. Westinghouse specialists from locations in Spain, Germany, Belgium and the United States will work in close cooperation with Nuclear Consultants International, a South Africa-based partner.

Koeberg nuclear power plant near Cape Town, South Africa

The modifications include technical activities, such as a fuel transfer system and polar crane upgrade; plant system upgrades, such as safety injection accumulator venting, steamline safety valve alarms and station black-out mitigation; and electrical and mechanical upgrades, such as residual heat removal valves qualification and addition of DC switchboards.

For more information, contact Luc Van Hulle at van-hulle-1@westinghouse.com or Derik Wolvaardt at wolvaaf@westinghouse.com

STEAM GENERATOR CHEMICAL CLEANING

Vogtle nuclear station

A variation of the Electric Power Research Institute/Steam Generator Owners Group chemical cleaning process was used by Westinghouse to remove iron and copper fractions from the steam generator at Alvin W. Vogtle Unit 2 plant in Georgia, United States.

The project was coordinated by Westinghouse and Southern Nuclear Company (SNC) personnel from equipment installation to application and waste disposal. The chemical cleaning and CECIL/sludge lancing activities removed a total of nearly 5,000 pounds of deposits from the four steam generators while exceeding SNC Safety, Quality, Schedule/Planning and ALARA goals and expectations.

For additional information on chemical cleaning services, contact Ron Morris at morrisr@westinghouse.com

WESTINGHOUSE WOMEN IN NUCLEAR

Women are playing a major role at Westinghouse as the business grows. Currently, 20 percent of its managerial and professional personnel are women. As the company adds to its workforce at a rapid rate, more women are joining the ranks of technical professionals. Last year -- of approximately 150 new graduate engineers hired -- 20 percent are women.

As an Example: Leadership

Michele DeWitt, vice president for Repair, Replacement and Automation Services, recently received the Patricia Bryant Leadership award from the U.S. Women in Nuclear organization. Michele leads more than 700 Westinghouse employees at several worldwide locations. She is the executive sponsor for Westinghouse Pittsburgh's Women in Nuclear (W-WIN) chapter

Michele was honored for her significant efforts supporting the three strategic objectives of the U.S. Women in Nuclear organization:

- *fostering environments in nuclear energy and nuclear technologies in which both women and men are able to succeed;*
- *providing a network through which women in this industry can further their professional development; and*
- *providing an association through which the public is informed about nuclear energy and nuclear technologies.*

High school girls receive hands-on experience working in the same training bays Westinghouse uses to train its field operations employees and customers.

Another Example: Introduce a Girl to Engineering

W-WIN brought nearly 70 students from 16 Pittsburgh area schools to the Westinghouse Waltz Mill site in Madison, Pennsylvania, United States. The event provided an opportunity for students interested in engineering careers to learn more about nuclear energy.

Michele said, "We are excited to provide this unique opportunity to high school students to gain practical information and hands-on experience regarding an engineering career path. The students worked on mechanical, material and chemical engineering activities and attended a presentation on pressurized water reactors.

High school teacher Hilary Domencic said, "I take students to dozens of career days every year, and this was definitely one of the most interesting, informative and inspirational. The four girls I brought along were very enthusiastic about their experience at Waltz Mill and are now more seriously considering careers in engineering."

For more information on W-WIN, contact Darlene Polk at polkdg@westinghouse.com

WESTINGHOUSE ACQUIRES IST NUCLEAR OF SOUTH AFRICA

Westinghouse has signed an agreement to purchase IST Nuclear (ISTN), a leading provider of services and systems for the Pebble Bed Modular Reactor (PBMR). ISTN will operate under the name Westinghouse Electric South Africa (Pty) Ltd.

Westinghouse has long been a proponent of the PBMR, and this acquisition allows the company to become even more involved as the PBMR moves toward commercialization. Also, ISTN will help service light water reactors in South Africa and elsewhere.

ISTN was instrumental in the early development of the PBMR, working with the South African utility Eskom and U.S.-based investors, including Westinghouse. Most recently, ISTN supplied the helium test facility for the PBMR. The company is also designing systems for a PBMR demonstration unit to be built at the Koeberg site by 2011.

For more information, contact Rita Bowser at bowserrc@westinghouse.com

SCALEBUSTER CLEANS STEAM GENERATORS

The Scalebuster™ hydraulically cleans the tubesheet in the secondary side of steam generators during the sludge lancing process.

Corrosion products and other solids may deposit in the form of sludge on the tube sheet of steam generators. The sludge affects performance of the steam generator and could diminish its operating life. The Scalebuster nozzle removes corrosion buildup such as sludge and loose scale, as well as other small foreign objects such as wires and gasket material.

For more information on the Scalebuster, contact Jerod Rudish at RudishJJ@westinghouse.com

WORLD RECORD STEAM GENERATOR/REACTOR VESSEL HEAD REPLACEMENT OUTAGE

Westinghouse and subsidiary PCI Energy Services completed a world-record steam generator and reactor vessel head replacement outage at Lumiant's (formerly TXU Power) Comanche Peak Unit 1. The outage's breaker-to-breaker duration was 55 days, two hours, and 19 minutes - almost 10 days ahead of schedule and shattering earlier world records by almost 10 days.

This is the second of 15 outages to be performed under an alliance arrangement between Lumiant and Westinghouse.

Replacement Steam Generator at Comanche Peak

For more information, contact Mike Kaveney at kavenemd@westinghouse.com

WESTINGHOUSE HAS SOME

simple ideas,

TO ACCOMPLISH

great things.

IVAN GENOV
Executive Director
Kozloduy Nuclear Power Plant (Bulgaria)

DIANE FISHER
Westinghouse Program Manager
(Kozloduy & Eastern Europe)

Customer 1st

Committed to customer success.

"Westinghouse listened to our needs, and by working closely with us, helped us achieve our goals of improved plant safety, reliability and cost-effectiveness."

— IVAN GENOV

Customer 1st was created to help you with the challenges you face in operating nuclear power plants. It is a simple idea and a powerful tool to make doing business with Westinghouse a terrific experience.

When officials of Kozloduy Nuclear Power Plant (KNPP) undertook a major modernization project at Units 5 & 6, they called upon Westinghouse to assist. Working closely as a team, KNPP and Westinghouse collaborated to successfully design and install one of the largest Ovation® instrumentation and control systems in the world — and the first such system installed in a VVER plant.

By aligning with KNPP needs, Westinghouse enhanced the Kozloduy team's knowledge of the new system and prepared KNPP to maintain and operate the equipment safely and effectively. As a result of these collaborative efforts, safety and reliability has improved at Kozloduy Units 5 & 6.

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