

insight99

APRIL 1999

- ▶ Reasons to support nuclear waste reform grow.....**3**
- ▶ DOE awards contract to convert weapons to electricity.....**5**
- ▶ Nuclear industry, NRC follow comprehensive road map to Y2K readiness.....**8**

Protectors of the Planet Support Emission-Free Nuclear Energy

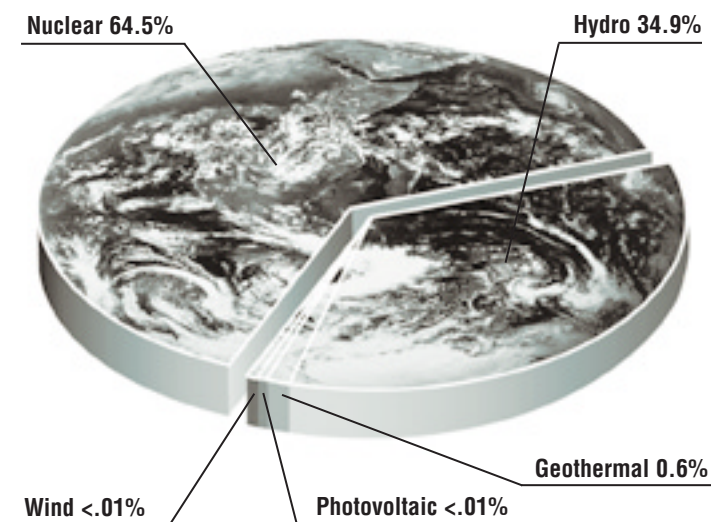
On Earth Day '99, here's an inescapable fact: If you want a clean planet—and plentiful electricity—America must continue to rely on its nuclear power plants.

In observance of the 30th annual Earth Day, here's a little quiz: What form of generation supplies the greatest amount of U.S. electricity without emitting greenhouse gases or air pollutants?

If—like many fervent “friends of the Earth” who are touting the virtues of renewable energy sources during mid-April—you guessed wind or solar power, guess again.

If you answered nuclear energy, go to the head of the class.

Nuclear energy provides a host of environmental benefits. In 1998, U.S. nuclear power plants generated 678 billion kilowatt-hours of electricity, meeting almost 20 percent of the nation's demand without emitting any carbon dioxide, sulfur dioxide



Emission-free generating sources supply about 31 percent of America's electricity. Of that, nuclear energy provides the lion's share—more than 64 percent.

or nitrogen oxides to the atmosphere.
On the other hand, despite receiving a good portion of

the \$5 billion allocated by Congress for renewables research and development since 1976, wind power sup-

plies just 0.0002 percent of America's electricity. That's 2 ten-thousandths of one percent. Photovoltaics provide even less bang for the R&D buck, contributing 0.0001 percent of U.S. electricity.

While supplying far more of America's electricity than all but one fuel source, nuclear generation also avoided the emission of 81.5 million tons of sulfur dioxide (SO₂) and more than 37 million tons of nitrogen oxides (NO_x) that would have been emitted had other fuel sources been used instead during 1973-97. Those contributions to clean air have gone a long way toward helping states and utilities comply with increasingly stringent Clean Air Act requirements.

Until recently, though, the

Continued on page 2

EMISSION-FREE from page 1
clean air contributions of nuclear power plants went unrecognized.

Today, as policymakers increase their focus on curbing air pollutants and greenhouse gases, they are becoming acutely aware that the only way to meet Clean Air Act standards and the proposed Kyoto Protocol requirements for reducing carbon emissions is by maintaining—if not increasing—America's reliance on non-emitting sources of electricity generation.

MAXIMIZING NUCLEAR'S ROLE IN PROTECTING THE PLANET

Apart from international efforts, U.S. policymakers have begun to recognize a wide range of nuclear energy's environmental benefits.

"For more than three decades," says NEI Senior Vice President Angie Howard, "nuclear energy's practices and policies have helped protect our country's water, land, wildlife and their habitats—while helping keep the air clean. Nuclear energy has helped us avoid the emission of harmful pollutants while generating electricity."

That realization has given rise to the concept of an "emission-free portfolio standard" in shaping America's future electricity business. Proponents of that concept indicate that it captures greater environmental benefits than simply focusing on conventional "renewable" forms of electricity generation.

The concept is lost, however, in the Clinton administration's restructuring bill for the U.S. electricity industry, released April 15. The proposed bill mandates an increased reliance on generation from renewable sources,

but it does not recognize emission-free sources such as nuclear energy or hydroelectric power.

Sen. Frank Murkowski (R-Alaska), chairman of the Energy and Natural Resources Committee, has already embraced the emission-free portfolio concept, seeking to apply it to restructuring legislation. His plan calls for electricity providers to generate power from a wide variety of sources, including nuclear energy, hydroelectric power and renewables.

Other activities are in play to reshape how planners assess the real environmental impact of "non-emitting" energy sources. One such measure is a process to examine the complete "life cycle" of a generation source. The process takes into account all activities involved in producing power that could emit pollutants. The objective: to identify low-impact, or "eco-efficient" power sources.

"Our projections are that life-cycle analysis will reveal that nuclear energy's environmental impacts are indeed small," Howard explains. "In broader terms, life-cycle analysis offers real planning advantages as our country's restructured electricity marketplace evolves. Life-cycle analysis can help shape how we select our energy sources and how we label them. It can help us identify what 'green power' really is—in a scientifically valid way."

Lawmakers are also examining other concepts that favor emission-free power generation, with the goal of providing nuclear energy economic benefits that are consistent with its environmental contributions. These include an investment tax credit favoring extending the licenses of nuclear power plants. Another measure is the

extension of a production tax credit—which expires in June—that now favors sources such as wind power, to all emission-free sources.

In addition, consensus is growing to provide economic credit for emission-free sources like nuclear energy in keeping with their role in avoiding pollutants, as evidenced by congressional interest in the "early actions" companies are taking to reduce, as well as to avoid, greenhouse gas emissions.

"Notably, nuclear energy has been identified as the largest single component of industry's voluntary efforts to

avoid greenhouse gases," Howard says. "Without expanded means to provide incentives for these actions toward avoiding pollutants—whether it be nuclear energy or some other specialized power source—this country could lose some its greatest environmental assets. And I am gratified to see that there is movement by policymakers toward developing a quantifiable way of crediting such avoidance."

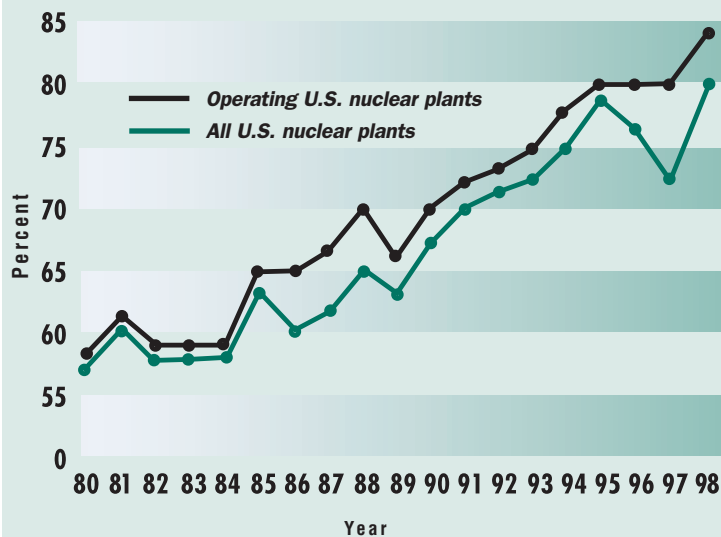
"Those measures are in keeping with the spirit and intent of Earth Day—to protect our planet, now and for generations," Howard says.

Record Productivity at U.S. Nuclear Plants

How efficient are America's 103 nuclear power plants? One way to find out is to check their average "capacity factors." That's the measure of a plant's actual electrical output vs. its potential output, expressed as a percentage.

From 1980, when the U.S. capacity factor stood at 57.6 percent, to 1998, when it reached a record 79.5 percent, plant efficiency has been on the rise.

What does increased efficiency mean for electricity producers? More competitive power plants for the emerging competitive marketplace. ■



Moving Used Nuclear Fuel a Consumer Issue, Senate Committee Told

Reasons to support waste legislation continue to grow

The Nuclear Waste Policy Act of 1999 moved quickly to its first Senate committee hearing last month, just nine days after it was introduced.

Two compelling—and consumer-friendly—reasons for moving used fuel from nuclear power plant sites to central temporary storage were presented March 24 to members of the Energy and Natural Resources Committee.

First, construction of a centralized storage facility must be authorized, as called for in S. 608, if utilities are not to be forced into building additional—and expensive—on-site storage capacity, said Erle Nye, chairman and CEO of Texas Utilities.

“Storing used nuclear fuel indefinitely at nuclear power plant sites drives up on-site storage costs that commercial plants and their electricity customers were never intended to bear,” Nye said.

For example, “due to continued Energy Department inaction on its fuel acceptance commitment,” Texas Utilities expects to spend more than \$10 million to expand the capacity of used fuel storage pools at its two-unit Comanche Peak site, Nye said.

Such costs will take on a new level of significance as the electric generating industry restructures for competition, testified John Strand, chairman of the

Michigan Public Service Commission.

In a competitive environment, the cost of expanding on-site storage could adversely

That missed deadline could cost the federal government \$35 billion in damages, according to some estimates.

Nuclear Regulatory Commission Chairman Shirley Ann Jackson in a March 30 letter to Rep. Joe Barton (R-Texas).

Whatever path it chooses to follow, Congress must recognize that “the U.S. high-level waste program needs both statutory and institutional stability to proceed in an orderly, efficient, timely and effective manner,” Jackson testified at the March 24 Senate hearing.

“The commission believes that, when coupled with sufficient resources to maintain progress in all phases, S. 608 can supply this necessary stability,” Jackson said.

Barton’s Subcommittee on Energy and Power approved the House version of the bill (H.R. 45) by a 25-0 vote April 14. The full Commerce Committee is expected to schedule a hearing for later this month. ■



Storing used nuclear fuel indefinitely... drives up on-site storage costs that commercial plants and their electricity customers were never intended to bear.

— Erle Nye, Chairman and CEO of Texas Utilities

ly affect the price of nuclear-generated electricity—“in some cases, denying consumers low-cost electricity,” Strand said.

Second, a centralized storage facility would enable more than a dozen shutdown nuclear power plants to complete the decommissioning process—either returning the sites to their communities or reusing them for industrial purposes.

“There are several plants that are closed and prepared to move fuel,” said Texas Utilities’ Nye.

The only thing that stands in their way is DOE’s delay in moving the used fuel off site. Every plant licensee has a contract with DOE that required the agency to begin accepting used fuel by Jan. 31, 1998.

The chief agency that regulates the nuclear industry agrees with the need for DOE to build a central temporary storage facility and has “noted [its] benefits and resource efficiencies,” said

NOW HEAR THIS...

“Common sense dictates that a centrally located, well-monitored [used fuel] facility is a far safer solution than dozens of sites scattered across country. ...[E]lectric rate payers nationwide, who have paid the federal government handsomely to address this important issue, also deserve to be heard—and to see some prompt action.”

—Editorial in the Chicago Tribune March 29, 1999

Who Will Save Medical Isotopes So They Can Keep Saving Lives?

Fifth in a Series

Nuclear technologies, such as radioisotopes, save and improve many thousands of lives each year.

Yet, “nuclear medicine remains the best kept secret” in the practice of medicine,” says Henry Wagner, a professor of radiation health sciences at Johns Hopkins University.

The result of this anomaly

Nuclear Medicine, and the Department of Energy—grappling with a core issue: The United States currently finds itself in the position of relying on foreign sources for radioisotopes. And manufacturers don’t have the financial resources to build new production facilities or conduct research on potentially new radioisotopes, said Roy Brown of Mallinckrodt Inc.

closely with the National Institutes of Health—as well as industry—to explore exciting new nuclear medicine diagnostic and therapeutic techniques.

The federal government, in fact, has a long history of involvement in the field of nuclear medicine.

Since the early days of nuclear research, the government has taken the lead in producing and distributing radioisotopes for medical, industrial and research applications. Beginning in 1946, DOE and its predecessor organizations pioneered the diagnostic and therapeutic uses of radiation in medicine.

Now DOE is poised to continue that tradition and proposed at the conference an Advanced Nuclear Medicine Initiative, which would:

- provide competitive, peer-reviewed research grants and affordable research isotopes
- encourage training in nuclear medicine technologies through scholarships, fellowships and internships
- initiate a program to apply alpha-emitting isotopes to fight malignant diseases, as well as a variety of immune disorders and degenerating joint diseases.

While DOE has an important role to play, funding constraints and the increasing federal emphasis on privatization call for innovative and collaborative approaches to medical isotope production, said Owen Lowe, the agency’s associate director for isotope

production and distribution.

What will DOE’s role be in the future? Richard Reba, chairman of DOE’s nuclear energy research committee, reported the conclusions of a panel of experts convened by DOE to recommend how best to allocate limited government and industry resources.

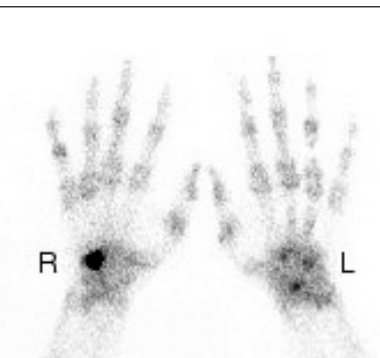
The panel recommends:

- setting priorities for a list of key isotopes
- government development of the ability to produce large quantities of radioisotopes for a wide variety of scientific, industrial and medical processes
- greater collaboration between the National Institutes of Health, DOE and industry
- assessment of production facilities and recommendations for new facilities.

Federal support for new facilities is questionable, Lowe said, adding that the government is more likely to close some production facilities and place others in cold shutdown.

Lowe emphasized the need for industry and international collaboration on medical isotope production. For the long term, he raised the possibility of building a dedicated isotope production facility, provided adequate funding is available.

For nuclear medicine patients, a public-private collaboration on funding offers reassurance that medical isotopes will be available when the need arises. ■



A 39-year-old golfer complained of right wrist pain. Subsequent x-rays (right) indicted minor degenerative disease, but no fracture. Because of persistent and severe pain, a nuclear medicine bone scan was ordered. The result of the scan (left) revealed a stress fracture of the hamate bone, enabling the patient to receive proper treatment.

is that the federal government—which has supported medical isotope production since 1946—finds itself in a financial crunch stemming from the increased emphasis on privatization. And resolving issues related to that anomaly was the intent of a March conference held in Washington, D.C.

The conference—sponsored by the Nuclear Energy Institute, the Society of

Nonetheless, nuclear medicine is a growth industry. Companies that produce radioisotopes and related diagnostic equipment expect nuclear medicine to grow at a healthy 5 percent to 10 percent a year.

The solution is for government and industry to jointly finance new facilities, Brown explained at the conference.

Johns Hopkins’ Wagner called on DOE to work more



CONSTRUCTION PERMITS OK'D FOR TAIWAN'S FOURTH NUCLEAR PLANT

Taiwan's Atomic Energy Council issued construction permits March 16 for two Advanced Boiling Water Reactor units at Taiwan Power Co.'s Lungmen site. Taiwan Power started preparing for construction at the Lungmen site three years ago. The construction permits clear the way for formal construction to begin.

The two units—with a combined capacity of 2,700 megawatts—are scheduled to start commercial operation in



2004 and 2005, and will become Taiwan's fourth nuclear power plant.

General Electric Co. will provide the nuclear portion of the plant—including the principal buildings and equipment—and the nuclear fuel under a \$1.8 billion contract.

JAPAN ANNOUNCES PLANS FOR MORE, ADVANCED NUCLEAR PLANTS

Japan's Nuclear Safety Commission March 29 approved the construction of a second nuclear unit at Hokuriku Electric Power Co.'s



Shika plant in Ishikawa Prefecture.

The five-member commission, which had been investigating the safety of the proposed 1,300-megawatt unit, concluded that it can "ensure safety" at the plant.

Meanwhile, Tokyo Electric Power Co. and Tohoku Electric Power Co. announced that three of the four units planned for the Higashidori site will be 1,385-megawatt Advanced Boiling Water Reactors, and not 1,100-

megawatt boiling water reactors as initially planned.

Upgrading the units will delay their start-up two to three years, the utilities said. The units are expected to begin operating in the 2005-2012 time frame. ■

Consortium Wins Contract To Convert Cold War Weapons to Electricity

The Department of Energy took a significant step last month toward turning swords of the Cold War into plowshares.

The agency awarded a \$130 million contract March 22 to an industry group for the first phase of converting surplus weapons plutonium into mixed-oxide fuel for use in U.S. nuclear power plants.

Consortium members include Duke Engineering & Services, Cogema Inc., Stone and Webster, Framatome Cogema Fuels, Belgonucleaire and Nuclear Fuel Services.

The consortium will design and license a mixed oxide fuel fabrication facility, and expects to submit the design to DOE in 2002. The government will then decide whether to proceed

with construction.

That decision depends on a variety of factors, not least of which is parallel progress by the Russians to dispose of their surplus weapons plutonium. Last September, Presidents Clinton and Yeltsin committed their countries to a "swords-to-plowshares" bilateral agreement to dispose of 50 metric tons of plutonium from decommissioned weapons. The primary stumbling block was how to finance Russian disposition efforts.

"It is critical that the United States and Russia dispose of surplus weapons-grade plutonium so that it will never again be used in nuclear weapons," said Energy Secretary Bill Richardson.

"This partnership with private sector companies sets the stage for Russia and

the United States to work together to eliminate tons of excess plutonium," he said.

Although Congress last year appropriated \$200 million in start-up funds for the Russian disposition program, it made disbursement contingent on Russia's making significant progress to develop a program of its own. Congress also called for a bilateral agreement between the United States and Russia on the particulars of plutonium disposition.

The Russian position is that progress depends on an assurance of long-term funding from the United States.

Assuming the two governments resolve funding issues, the consortium has an option on the next two contract

Continued on page 6

AMERGEN POISED TO EXPAND NUCLEAR FLEET

Last July, AmerGen Energy made history by becoming the first company to commit to purchase an operating U.S. nuclear power plant—Three Mile Island 1 in Pennsylvania, owned by GPU Inc.

AmerGen—a joint venture between Philadelphia-based PECO Energy and British Energy—is not standing idle while it awaits regulatory approval of the acquisition.

On March 31, PECO Energy's Corbin McNeill announced that AmerGen is engaged in due diligence with three other nuclear plants—Vermont Yankee, Clinton in Illinois, and Nine Mile Point in New York.

AmerGen expects to issue letters of intent on the three plants in the coming months, according to McNeill, PECO's chairman, president and CEO.

PILGRIM PLANT PURCHASE MOVES FORWARD

The purchase of Boston Edison's Pilgrim nuclear plant by Entergy Nuclear moved a step closer to reality with the Massachusetts Department of Telecommunications and Energy's March 22 approval.

Boston Edison still must gain approval from the state for how it will finance its unrecovered investment in the nuclear plant, as well as resolve tax treatment by the Internal Revenue Service of the \$466 million decommissioning fund it will turn over to Entergy.

The sale also requires approval by the U.S. Nuclear Regulatory Commission and the Federal Energy Regulatory Commission, as well as a review of tax issues by the IRS.

Nonetheless, the companies expect to close the sale by midsummer.

BYRON OPERATING RECORD CONTINUES STRING OF ACHIEVEMENTS AT COMED

For the fourth time, ComEd's two-unit Byron Station holds a U.S. record for continuous dual operation of its two Westinghouse turbine-generator systems.

The latest record occurred in March, when the Illinois nuclear plant ran for a 297th straight day, surpassing Southern Nuclear Operating Co.'s two-unit Farley nuclear plant in Alabama.

No other U.S. plant has achieved this feat four times, according to Westinghouse records.

Gene Stanley, a vice president in ComEd's nuclear generation group, called the record another signal that ComEd's units are on the way to being a "top-performing nuclear fleet. ...[T]his is a direct result of consistent operations and a plant management team and work force that has focused on maintaining good material condition and is striving for excellence."

The dual-unit operating record continues a string of accomplishments

during recent months for the ComEd nuclear fleet, including a utility record 26-day refueling outage at Dresden Unit 3 in February, and a world record 70-day steam generator replacement and refueling outage at Braidwood Unit 1 last fall.

VOGTLER TOPS COMPANY'S REFUELING RECORD

Southern Nuclear's Vogtle Unit 1 improved by nearly a week the company's refueling outage record last month, and in the process helped the U.S. nuclear industry continue its trend toward shorter outages.

The Vogtle 1 outage ended March 26 after 26 days and 22 hours—significantly better than the 33-day, 14-hour mark held by Vogtle 2.

Across the industry, refueling outages have been getting shorter since 1990, when the median outage was 78 days. The industry median in 1998 was 48 days, according to *Nucleonics Week*, a trade publication.

With restructuring of the electricity-generating industry and competition on the horizon, shorter refueling outages will become increasingly important as nuclear plants look to hold down expenses.

Every day that planning and efficiency cuts from an outage saves a company about half a million dollars in replacement power costs and outage personnel expenses. ■

CONSORTIUM WINS *from page 5*

phases—fabricating MOX fuel and using that fuel in civilian power plants. Duke Energy and Virginia Power—also members of the consortium—own and operate the six units currently slated to use the MOX fuel. The Duke plants are its two-unit Catawba and McGuire nuclear stations. Virginia Power's two-unit North Anna nuclear plant also will use the fuel.

"We are pleased that our experience

and capabilities match this national imperative," said consortium President and CEO Bob Ihde. "Our team's collective strengths enable us to deliver to DOE an integrated design-to-disposition approach."

Said Mike Tuckman, Duke Power's executive vice president for nuclear generation: "This provides Duke Energy with the opportunity to assist the government in getting rid of surplus plutonium and to lower fuel costs for our

customers."

Only limited changes will be needed to Duke Power facilities for them to use the MOX fuel, a blend of plutonium and uranium, Tuckman said.

MOX fuel makes the plutonium "proliferation resistant," he noted. "It is a safe, economical and proven technology in use in Europe for many years." ■



Fresh Air

TO

Fresh Food

Nuclear makes it happen.

Chances are you know nuclear power generates about 20 percent of America's electricity without emitting greenhouse gases, but nuclear technology contributes to our lives in countless other ways. Through food irradiation, for example, harmful microbes such as E. coli can be virtually eliminated in meats, fruits, and vegetables. That means more peace of mind at the dinner table.

From medical miracles to space exploration, nuclear technology enhances our lives in many ways. It's the same technology that enables more than 100 nuclear power plants to produce valuable electricity and help keep our air clean. That's one reason why the majority of Americans believe nuclear power—one of our cleanest sources of electricity—should continue to play an important role in our energy future.

NUCLEAR. MORE THAN YOU EVER IMAGINED.



NUCLEAR ENERGY INSTITUTE

1776 I STREET, NW • WASHINGTON, DC 20006 • 202-739-8000
VISIT OUR WEBSITE AT WWW.NEI.ORG

Industry, NRC Follow Comprehensive Road Map To Y2K Readiness

America's nuclear energy industry is on track to meet the computer-related problems posed by the shift to the new millennium.

The U.S. nuclear energy industry has been proactive and aggressive in addressing the so-called Y2K problem since mid-1997. To date, nuclear plants have performed more than half of the necessary fixes, helping to ensure that their computer systems don't misinterpret "00" to mean the year 1900 rather than 2000.

"Anything affecting safety is our number one priority," Jim Davis, director of operations at the Nuclear Energy Institute, told congressional staffers at a March 18 meeting. "We are addressing all components essential to plant operations," he said, adding that "all 103 plants are committed."

The industry is following a standard, comprehensive

Y2K manual, a carefully constructed, rigorous inventory of date-sensitive systems, and a set of instructions on how to fix potential problems. "The manual does not merely say, 'you should do

systems, which plant operating staff purchased and installed. "This is an advantage," he said, "because they know how to work on them." In fact, the level of detail required to fix these systems

plants are going about the process in a very determined and thorough manner, identifying problems and taking remediation measures," NEI Senior Vice President and Chief Nuclear Officer Ralph Beedle told the congressional staff members.

The agency last month announced it will visit all 103 nuclear power plants to review their progress toward Y2K readiness. It also will assess Y2K contingency plans and, at six sites, conduct contingency plan audits. The reviews will allow the agency to determine whether any regulatory action is needed and will be used in conjunction with status reports licensees must provide by July 1.

Reviews will be conducted between April 1 and July 31 by specially trained inspectors. Inspection procedures, the Y2K review checklist and, eventually, results will be posted on the NRC Web site.

The agency said it selected plants for contingency plan audits based on their design, age and location on the nation's transmission line "grid" system. They are: Palo Verde (Arizona), Oconee (South Carolina), Duane Arnold (Iowa), Indian Point (New York), Turkey Point (Florida) and Diablo Canyon (California). ■

For more information on the nuclear energy industry's Y2K progress, visit NEI's Web site at www.nei.org.



To assure regulators and the public that America's nuclear power plants will operate safely on Jan. 1, the industry plans to demonstrate its Y2K readiness during the summer.

this," Davis said, "but also, 'this is how to do this.'"

Significantly, Davis explained that most Y2K vulnerable items are embedded

for Y2K readiness is the same as when the equipment was acquired.

Davis said that the testing is, in fact, more rigorous than is generally believed. Components are being tested to ensure continued operation after the Y2K rollover. For those components that are not Y2K ready, corrective action is taken and retesting is done.

While Jan. 1 is more than eight months away, the nuclear industry is leaving little to chance. Every plant's Y2K efforts have been audited either by a vendor, the plant itself, or the Nuclear Regulatory Commission.

"The NRC assures us that

NUCLEAR ENERGY

insight99

Editor
LESLIE LAMKIN

Managing Editor
ALAN CHAPPLE

Contributing Editors
ALICE CLAMP
LYNNE NEAL
WILLIAM SKAFF
RICHARD N. SMITH

Graphic Design
RAFY LEVY

NUCLEAR ENERGY INSTITUTE
1776 I Street, N.W., Suite 400
Washington, D.C. 20006-3708
202.739.8000 / www.nei.org

The Nuclear Energy Institute is the nuclear energy industry's Washington-based policy organization.

Nuclear Energy Insight is printed on paper manufactured from recycled fiber. 