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Meeting on Nuclear Waste Transmutation to be Held July 22-24

An International Conference on Nuclear Waste Transmutation will be held July 22–24 at The University of Texas at Austin, and a call for papers has been issued.

The conference will draw researchers from around the world to exchange information about current transmutation research, said the conference coordinators, Dr. Dale Klein, Nuclear Studies Division director, and Dr. J. Wiley Davidson, research scientist-engineer.

Nuclear waste transmutation is being studied as a possible method for eliminating the toxic, radioactive substances contained in nuclear waste, said Dr. Davidson. The process involves chemically separating out the radioactive substances and bombarding them with neutrons. The bombardment causes the radioactive elements to be changed (i.e., transmuted) into shorter lived or stable forms.

Transmutation could be accomplished in fission reactors, fusion reactors, and accelerators, each device having different potential advantages and disadvantages. To transmute the longer lived elements (predominant after 1,000 years) is easier than transmuting intermediate elements (predominant from 10 to 1,000 years). On the other hand the intermediates are far larger in quantity.

Nuclear waste transmutation has at least two disadvantages, said Dr. Davidson. It would be significantly more expensive than the alternative of geologic isolation of waste. And, as an extra step in the fuel cycle, it would expose more workers to industrial hazards. On the other hand, if transmutation doubled the cost of nuclear fuel, it would increase by only 10 percent the cost of nuclear-generated electricity. And although worker hazard would be increased in the near term, the future hazard to the general public would be dramatically reduced in the long term.

Dr. Davidson said that transmutation research is being pursued in the United States, Europe, and Japan. The purpose of the July conference will be to provide a broad perspective on transmutation as a waste management alternative for the long-term future. In the near term there is no alternative to geological isolation.

The conference will cover transmutation-related topics such as

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CES Update

Office of Director

Dr. Herbert H. Woodson, director of the Center for Energy Studies, and Dr. John Howell, professor of mechanical engineering, have been appointed to two state-level **energy advisory groups.**

Dr. Woodson, who is also chairman of the UT Department of Electrical Engineering, was appointed to the newly formed Advisory Committee on Industrial and Electrical Fuel Use Policy of the Texas Energy and Natural Resources Advisory Council (TENRAC).

Dr. Howell, a solar researcher, was appointed to the TENRAC Advisory Committee on Solar Energy.

A cost-effective program for enhancing the **operation of electric power plants** was presented December 3 at a one-day seminar at the LBJ Library.

Participants included representatives of ten major Texas electric utilities, the Texas Energy and Natural Resources Advisory Council, the Electric Power Research Institute, the Mexican Instituto de Investigaciones Electricas and the Comision Federal de Electricidad, and UT engineering students and faculty.

The seminar was held to share with the utility industry the recent results of ongoing research of the Performance Assurance Group, a power plant research group within the UT College of Engineering supported in part by the Center for Energy Studies. Much of the work has been carried out with the cooperation of the City of Austin Electric Department and Southwestern Public Service Company, said Dr. William H. Hartwig, professor of electrical engineering and director of the group.

Five methods of improving power plant performance were discussed at the seminar: (1) new and convenient testing methods, (2) improved measurement techniques, (3) complete dynamic performance analysis, (4) diagnosis of unit instrumentation and controls, and (5) dynamic generation models.

Dr. Hartwig said the Performance Assurance Group is seeking further utility participation in the form of research sponsorship, continuing education for practicing engineers, internships, and demonstration projects.

Dr. Herbert H. Woodson, director of the Center for Energy Studies, has been appointed by the UT System Board of Regents to a **new endowed professorship,** the Texas Atomic Energy Research Foundation Professorship in the College of Engineering.

Conservation Studies

The Conservation Division of the Center for Energy Studies has been chosen to help develop the **Texas Residential Conservation Service (RCS),** a program that will help homeowners to reduce their energy bills.

As required by a new federal law, beginning in mid-1981 all major Texas utilities will offer an energy audit service to their residential customers. Homeowners will be able to obtain audits of their homes and recommendations on cost-effective ways to save energy. The audits will also cover renewable energy alternatives such as solar and wind equipment.

Development of the audit and the auditor training materials will be carried out by the Center for Energy Studies, said the principal investigator of the project, Dr. Jerold Jones, director of the Conservation Division. He and other researchers also will evaluate the audit by running test cases in a computer simulation model.

The project was awarded to the CES Conservation Division by the Texas Energy and Natural Resources Advisory Council (TENRAC), which was designated by Gov. Bill Clements as the lead state agency for developing the Residential Conservation Service.

Janet Ellzey, center research associate, said that the RCS manual will be developed from a similar manual written for an earlier Conservation Division project, the Home Energy Analysis Training Program, also funded by TENRAC.

In addition to the audit, the utilities will be required to offer their customers approved lists of (1) lenders who will finance the recommended measures at reasonable interest rates, (2) suppliers who sell the equipment and materials, and (3) contractors who can install the recommended items. The utilities may also take on the financing, supplying, and installation themselves.

The audits will cover such energy conservation measures as:

—Ceiling, floor, and wall insulation

—Caulking and weatherstripping of doors and windows

—Replacing or modifying heating and air conditioning systems

—Storm and thermal windows and doors

—Insulating water heaters

—Low-cost and no-cost methods of saving energy (thermometer setback, for example)

Tom Wright, director of the TENRAC Energy Conservation Division, said the new service will be a good opportunity for customers to get information on how they can save energy from a source other than the manufacturers and installers of energy-saving items.

In Texas the following utilities are covered by the new law: Central Power & Light, Community Public Service, Dallas Power & Light, El Paso Electric, Gulf States Utilities, Houston Lighting & Power, Southwestern Electric Power, Southwestern Public Service, Texas Electric Service, Texas Power & Light, West Texas Utilities, Arkansas-Louisiana Gas, ENTEX, Lone Star Gas, Peoples Natural Gas Division of Northern Natural Gas, Pioneer Natural Gas, Southern Union Gas, Austin Electric Department, City Public Service Board of San Antonio, Garland Electric Department, and Lower Colorado River Authority.

Janet Ellzey has joined the Conservation Division staff as a research engineer-scientist and will work on the Home Energy Analysis Training Program and related research.

Environmental Studies

More than 300 people attended the **Second Conference on Air Quality Management** in the Electric Power Industry, held January 22–25 at the UT Thompson Conference Center.

The conference acquainted participants with state-of-the-art pollution control technologies and with what is happening in electric power environmental regulation today.

In his keynote address, Dr. Richard Balzhiser, vice-president of the Electric Power Research Institute, told the conference that at present the nation does have an excess of electric generating capacity because of effective system planning seven to ten years ago. However, the industry's present unstable condition, which involves widespread plant delays and cancellations and inhibiting regulations, is likely to mean capacity shortage in the mid- and late 1980s. "The system has tremendous inertia," he said.

With the national needs to shift away from oil and gas, to meet increasing demand, and to reduce our unstable foreign energy dependence, Dr. Balzhiser said, "Coal is important . . . . Synthetic fuels are important . . . . Nuclear energy is absolutely essential. And conservation is the most important option we have for the next four to five years."

Dr. Balzhiser was optimistic about the effects of the 1979 Three-Mile Island nuclear accident. He termed it "the watershed for nuclear power" and "an eye-opener" for utility executives, showing them, he said, that nuclear power plant safety cannot be taken for granted.

If the goal of tripling US coal production by the year 2000 must be met, Dr. Balzhiser said, then high priority must also be given to conducting extensive research on the real impact of coal's use on the environment and on human health.

"When it comes to energy, the lifeblood of the economy, you're an awful lot better off to overplan than underplan," he summarized.

Dr. Hal B. H. Cooper, Jr., coordinator of the conference and director of the center's Environmental Studies Division, said a proceedings of the conference is scheduled for publication in midsummer. The nearly 100 addresses, technical papers, and panel discussions are grouped under the following topics: state and federal viewpoints of air pollution control, particulate control, throwaway sulfur oxides control, siting considerations, sulfur dioxide dry removal processes, plant impacts, trace constituents, regenerative sulfur dioxide controls, coal cleaning, advanced combustion systems, solid waste disposal, coal gasification, coal liquefaction, nitrogen oxides control, health effects, and regulatory developments.

Sponsors of the conference were the Electric Reliability Council of Texas (through its member companies), the UT College of Engineering, the Center for Energy Studies, Radian Corporation, the Southwest Section of the Air Pollution Control Association, and the Texas Air Control Board.

Geothermal

The effectiveness of **incentives to encourage geothermal energy** is being investigated in a new study by the Geothermal Division.

Developing the Gulf Coast geopressured-geothermal energy resources will be a venture requiring millions of dollars of private investment—with no assurance of profit. Because of the scale of the endeavor and its riskiness, the federal government is considering providing incentives to industry such as a tax credit, price guarantee, or depletion allowance.

The $127,000 CES study of these and other incentives is funded by the Division of Geothermal Energy of the US Department of Energy. Directors of the project are David Frederick and Ken Roberts, both center research associates, and Dr. John Vanston, research scientist. Other participants are Donna Prestwood, JoAnn Duffy, Greg Ochs, B. N. Srikar, and Mike Stone.

The study has two main elements. One is development of a computer model designed to simulate various geothermal projects located on the Texas Gulf Coast. Variables that will be modeled include resource characteristics (the amount of methane in the geopressured water, for example), economic conditions (rate of inflation, for example), cost of equipment, and other factors that will significantly influence the profitability of such projects.

The model will then be used to evaluate different incentives and to determine how they are likely to affect (1) the expected profitability of a project and (2) the likelihood of that expected profit.

Mr. Frederick said that some components of the model will be adapted from existing similar models, such as the one developed at Louisiana State University by Drs. Adrain Johnson and Fred Wrighton and the model developed at the Center for Energy Studies by Drs. William Lesso and C. Dale Zinn.

In the second major part of the study, researchers will attempt to discover how certain noneconomic factors influence industry decision-makers in their views of geothermal energy. Four types of organizations will be studied: gas utilities and pipeline companies, electric utilities, energy production companies, and petrochemical firms.

Previous studies by the Geothermal Division have shown that different geothermal incentives have varying effects on the four organization types, Ms. Prestwood said. Research has found, as an illustration of a noneconomic factor, that incentives involving federal oversight are more disliked by energy production companies than by electric utilities.

By using social science assessment techniques, the center researchers will attempt to discover how an organization would make a decision about venturing into a geothermal energy project, and what noneconomic factors would come into play in the decision.

Dr. Myron Dorfman, director of the Geothermal Division, has been appointed by the UT System Board of Regents to an endowed professorship, the H. B. (Burt) Harkins, Jr., Professorship of Petroleum Engineering.

Nuclear Studies

The Nuclear Studies Division has begun a cooperative project with General Atomic Company to model the inner activity of a **gas-cooled fast breeder reactor** (GCFR).

This activity is termed a reactor's thermal-hydraulic response, and it can be either steady state (unchanging) or transient (changing). In this project the computer model COBRA 4, used by General Atomic, will be adapted to simulate a GCFR under transient conditions. Such a model can be used to analyze the safety and performance of GCFR design.

The work is being done principally by graduate students Sam Yang and Tom Sanders, under the supervision of Dr. Dale Klein.

C. Daniel Smith, center research assistant, has left the Nuclear Studies Division of the center to take a position as the nuclear issues policy analyst at the Texas Energy and Natural Resources Advisory Council.

Social Systems Analysis

The future of the Gulf Coast refinery/petrochemical complex is the object of a study initiated by the Social Systems Analysis Division.

The project will be carried out by Vicky Langston as work toward her Ph.D. under the supervision of Dr. James McKie, chairman of the UT Department of Economics.

Ms. Langston said the Gulf Coast complex, the largest refinery/petrochemical complex in the United States, has undergone changes in recent years.

—The petroleum inputs to the complex increasingly come from foreign sources instead of domestic; crude oil imports have grown from 9 percent in 1973 to 43 percent in 1977.

—The volume of inputs is also growing (26 percent increase from 1973 to 1977). Construction in progress with 1980–81 completion dates will increase the area's refinery capacity 7 percent over 1978 levels.

—Increased tanker traffic has created port congestion and generated a demand for oil storage facilities and offshore superports.

In the 1980s the Gulf Coast complex will face a declining regional resource base, distant markets located primarily in the eastern United States, and competition from a projected worldwide excess of refining and petrochemical capacity, Ms. Langston said.

The researchers will develop a computer model incorporating supply, demand, and production assumptions and will use it to derive optimal industry investment strategies. Different sets of assumptions will be examined for their effects on the investment strategies and for their consequences for the industry, for the Gulf Coast region, and for the consumers of the Gulf Coast output.

Energy Computer Game Workshops Offered by CES

Groups interested in learning about the World's energy situation can participate in a Citizen's Workshop on Energy and the Environment.

The nationwide program is designed to bring together interested citizens and a knowledgeable scientist or engineer to explore energy and environmental policy by means of a computer game complete with blinking lights, countdowns, and warning buzzers. The Citizen's Workshop program in the Austin area is sponsored by the Center for Energy Studies.

To find out more about scheduling a free Citizen's Workshop on Energy and the Environment in the Austin area, contact the Coordinator of the program, Dr. Dale Klein, Department of Mechanical Engineering, TAY 167, The University of Texas at Austin, Austin, Texas 78712 (512/471-5136).

Elsewhere in the United States contact Mr. William Brown, American Museum of Science and Energy, P. O. Box 117, Oak Ridge, Tennessee 37830 (615/576-3222).

Solar Studies

Dr. Gary Vliet, director of the CES Solar Studies Division, has been elected chairman of the board of directors of the **Texas Solar Energy Society.**

The potential for **solar water heating in state parks** is good, preliminary research by Solar Studies Division researchers indicates.

"Solar water heating would be accepted by park users, and solar would compete with bottled gas and electricity, both of which are expensive," said Dr. Gary Vliet, Solar Division director. The purpose of the project is to determine the feasibility of using solar-heated water in park shower facilities.

The Texas Parks and Wildlife Department and the City of Austin are cooperating in the project. Since August Dr. Vliet and graduate student Janet Ellzey have been monitoring the use patterns of the shower facilities in McKinney Falls State Park and Buescher State Park, both located in Central Texas.

Meters recording the water and energy consumption show higher demand on weekends and in the summer.

The data will be used to develop an optimized solar water heating system and to conduct a computerized economic feasibility study of the system.

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reactor and accelerator technology, separation processes, systems analyses, and cross-section experiments and data.

Keynote speaker at the July conference will be Dr. Meyer Steinberg, head of the Process Sciences Division of Brookhaven National Laboratory, an expert on neutron accelerators, and a pioneer transmutation researcher.

For information about the conference, contact Dr. Davidson (Department of Mechanical Engineering, TAY 167, The University of Texas at Austin, Austin, Texas 78712). For registration, contact Continuing Engineering Studies, ECJ 2.102, The University of Texas at Austin, Austin, Texas 78712. The attendance fee, which includes a proceedings volume, will be $75.

The conference is sponsored by the College of Engineering, the Center for Energy Studies, the Texas Atomic Energy Research Foundation, the Texas Energy and Natural Resources Advisory Council, and the US Department of Energy.

Mexican Oil & the World Market

(Huge new oil finds announced in 1978 and 1979 by the nation of Mexico will have substantial effects on the world oil market. Two Center for Energy Studies researchers, James D. Creasey and Vicky C. Langston, have completed a one-year study of the potential impact of the Mexican oil. The two are Ph.D. candidates at The University of Texas at Austin, Mr. Creasey in international business and Ms. Langston in economics. The following article is based on an October 1979 report of their findings.

The report, The Impact of Mexican Oil on the World Oil Market *[UT/CES-PS-7, 180 pages] is available in limited supply at no cost from the Center for Energy Studies. The study was funded by a CES foundation grant.)*

Since the quadrupling of oil prices in 1973–74, much of the world's attention has been focused on the availability of petroleum resources, the price of those resources, and the viability of the Organization of Petroleum Exporting Countries (OPEC). Mexico has now surged to the forefront of these issues with announcement of proved reserves in excess of 30 billion barrels.

300 Billion Barrels

Oil and gas discoveries in southern Mexico and in the Bay of Campeche have catapulted Mexico into a position roughly equivalent to that of Saudi Arabia as a potential supplier of oil and gas. In 1976, Pemex (Petroleos Mexicanos) estimated Mexico's proved reserves to be 6.3 billion barrels. By March 1978, this figure had risen to 16 billion barrels, and it is expected to be at least 30 billion by 1982. In September 1978, Mexican President Jose Lopez Portillo, repeating a press release by Pemex, announced potential reserves to be 200 billion barrels.

By November 1978, Pemex spokesman Miguel Tomasini indicated that deposits found between Veracruz and Tampico had pushed the potential reserve figure to 300 billion barrels. It is this meteoric rise in proved and potential reserves that has drawn the attention of world energy planners, who see the Mexican find as an unexpected increase in world energy supplies with far-ranging implications.

This study weighed the impacts of Mexico's new role as a major supplier of petroleum resources on OPEC in particular and on world energy markets in general over the next twenty years. It examined low, moderate, and high increases in Mexican production, ranging from continuation at the present level, 1.085 million barrels per day (mbd), to more than 6 mbd by 1990.

OPEC Loses Revenue

In the first part of the study, trend forecasting analyses isolated three effects upon the world oil market from the increased Mexican production. (In the three demand scenarios created, Mexican production increases over its 1977 level, initially in constant prices.)

1. The residual suppliers within OPEC lose revenues at an increasing rate as a result of the decreased demand for their petroleum exports.
2. As a result of the production losses by the residual suppliers, the Mexican production delays by at least two years the peaking of OPEC capacity.
3. The rate of ascent of oil prices is less steep than it would have been if Mexico had not entered the market as a major producer.

Modeling World Oil

The second part of the study involved creation of a market simulation model of world oil supply and demand equilibrium that was developed in part from the Kennedy World Oil Market Model. The model generates regional equilibrium oil prices, production levels, and consumption levels, which are then used to calculate import costs or export revenues for the regions of interest: the United States, Mexico, and the Persian Gulf nations.

In the model, oil price increases are checked by a ceiling on the Persian Gulf price. The ceiling results from the entry of alternative energy sources that absorb the excess demand for oil. It is assumed that sufficient alternative energy supplies will be available at the price of $24 per barrel of oil equivalent (in constant 1975 dollars—approximately $32 per barrel in 1979 dollars). This price is referred to as the backstop price.

Two scenarios were studied. In the medium-demand scenario, annual economic growth rates (averaged over five years) are higher: US/Canada, Europe, 3.6 percent; Asia, 5.6 percent; other regions, 6.6 percent. In the other, the low-demand scenario, the growth rates are lower: US/Canada, Europe; 3.2 percent; Asia, 5.2 percent; other regions, 6.2 percent.

Tight Oil Market

The authors found that, in the medium-demand scenario, Mexico adds supply into a tight oil market, and the expected effects occur: price increases are delayed and the amount of oil substitutes needed in the 1990s is reduced. This price reduction, however, is not enough to adversely affect the economic development plans of OPEC. Surplus revenues that would have accrued to OPEC are merely siphoned off to Mexico. Furthermore, because it stimulates higher consumption, the price reduction increases the oil import bill for the United States.

Of equal importance is the finding that development of a backstop technology is less critically needed by the consuming nations as a result of Mexico's entrance into the world oil market. However, even with Mexican production occurring, by the year 2000 almost 25 percent of the total world oil consumption

must come from a backstop technology.

Potentially Adverse Effects

In the low-demand scenario, a different situation exists. The world oil market exhibits lower demand on world oil production, and Mexico is producing additional supply. This condition has potentially adverse effects on OPEC. Revenues that would have gone to OPEC are siphoned off to Mexico to the extent that economic development plans cannot be maintained without increases in oil prices. Thus from 1990 to 1995 Mexico has the effect of precipitating higher world prices. After this period, Mexico tends to lower the ascent in prices over the control case.

This reversal of effects on price paths tends to have offsetting impacts on the cumulative US import bill, leaving the total for the low-demand scenario the same as that for the control. In addition, as in the medium-demand scenario, development of oil substitutes becomes less critically needed.

The results from this simulation study have several policy implications for three major participants in the market: the Persian Gulf nations, Mexico, and the United States.

Persian Gulf Policy

Certain Persian Gulf suppliers, Saudi Arabia in particular, have stated they intend to limit future capacity expansions—a major concern to the United States. A central question facing the Persian Gulf policymakers is how to maintain economic health while gaining maximum revenue from a barrel of oil. One alternative is to produce and sell at a high rate, reinvesting the surplus revenue. The other alternative is to produce at a moderate rate, allowing more oil to remain in the ground and accrue in real value (up to the backstop price) as oil becomes more scarce and the demand continues growing. The Persian Gulf nations must decide which will be higher: the real rate of return on financial investment of the surplus funds generated by higher production levels—or the appreciation on oil that is not produced while the price of oil increases from the marginal price to the backstop price.

Calculations based on the modeling results indicate why production expansions probably will not be forthcoming: the real rate of return on production held off line in the Persian Gulf is greater than the real return generated by a benchmark investment.

Mexican Policy

As with the Persian Gulf, the major policy objective for Mexico is assumed to be to maintain some level of economic development. No attempt has been made to project either the rate of return for domestic investments or the capacity of the Mexican economy to absorb oil revenues.

The analysis centers instead on how various levels of Mexican production will affect world petroleum markets and thus in turn influence the price path of Mexican oil. In the model Mexico's 1990 peak production levels are varied from 6.0 to 8.0 mbd and then are held constant through the year 2000. The resulting price paths indicate that Mexico should increase output to the 8.0 mbd level—as long as the resulting revenues can be invested at real rates of return higher than appreciation on withheld production. Beyond that level, higher Mexican production might precipitate severe negative impacts in the Persian Gulf, depending on the level of world demand. These impacts could impair the Persian Gulf's price-setting ability in the short term and result in lower prices and lower revenues for Mexico.

US Policy

The authors have assumed that the United States is unable to influence the setting of foreign oil production levels. The United States does have control, however, over two other aspects of the situation: development of oil substitutes and reduction of domestic demand for foreign oil.

The more important of the two, the study showed, is development of the backstop substitutes. This measure has the potential for not only reducing the level of oil imports, but also creating an upper limit on the price of oil, the backstop price. Simulations in which a backstop is absent show phenomenal price increases after 1995.

In order for a backstop price to emerge and function as modeled, a substantial R&D effort in the United States is critical. Because of the tremendous lead times involved in research and development of such technologies (estimates run from eight to twelve years), US efforts must be initiated soon to achieve production in time to limit the price increases to some acceptable ceiling. Market prices will not be sufficient in the next five to ten years to induce the private sector to develop backstop technologies quickly. To achieve backstop technologies within a decade, the efforts must occur as a result of government-sponsored incentives or direct government research and development.

Update

In the year that has passed since the data for this study were gathered and the model formulated, much has happened in the world oil market that has both compromised and supported this research effort. Decreases in Iranian production and the predicted unwillingness of Saudi Arabia to significantly expand capacity beyond its current limits have shifted market power to smaller nations within OPEC, primarily those of Africa and South America. These smaller producers, motivated by high revenue needs and low production capacities, have been successful in their insistence on dramatic increases in OPEC oil prices.

The authors examined a price increase scenario (included in the appendix of the report) to determine if the conclusions drawn from other scenarios were sensitive to a major price increase by 1980. The scenarios showed very little sensitivity to a 50 percent increase in the price of oil; the actual increase has been about 300 percent, however. Thus the mainstream of the report discusses price paths that are much lower in the short run than what has occurred.

The recent changes in the world oil market do not significantly affect the policy implications for Mexico and the Persian Gulf countries. They have had a strong effect on the United States' outlook: the ten-year period in which oil prices were expected to reach the backstop price ceiling has been reduced. For this reason the development of a backstop is more necessary than ever. Oil prices are likely to rise well beyond the backstop price used in the model and to continue to rise until backstop technologies are developed and commercialized.

UT Austin Energy

UT Students Enthusiastic about New Solar Society

About one hundred University of Texas students attended the February 12 organizational meeting of the **University Solar Energy Society** (U–SES), and the group's president said the response has been enthusiastic.

"Students today are far more energy conscious. They are aware of the fact that we cannot exploit our fossil fuel resources indefinitely," said Patrick Flynn, U–SES president. Dr. Gary Vliet, director of the CES Solar Division, is the organization's faculty sponsor.

A goal of the club is to teach members more about solar energy. As its first project U–SES sponsored a series of free informal evening lectures. Solar pioneers Aden and Majorie Meinel gave the first lecture in the series. The group has also heard David Smith, Michael Garrison, and Francisco Arumi, all advocates and practitioners of energy-conscious design in architecture. Speakers in March and April included UT faculty members Drs. John Howell, Gary Vliet, and Rizer Everett, as well as Jim Broughton, former CES researcher. Hands-on workshops, tours, and public information projects are planned.

UT-Austin to Host New Fusion Institute

The US Department of Energy (DOE) announced March 24 that it has selected The University of Texas at Austin as the site for a new national institute for theoretical fusion research.

"The new Institute for Fusion Studies will provide a strong program in fusion theory to complement our existing experimental program," said UT President Peter T. Flawn. "With this new commitment, UT Austin has the opportunity to become one of the world's leading centers for basic fusion research."

Prominent physicist Dr. Marshall Rosenbluth will head the institute.

The Institute for Fusion Studies will be staffed with twenty to twenty-five senior scientists and researchers; this staff is expected eventually to increase to about forty. The institute is scheduled to begin operation by September, and DOE and the university each will provide $5 million as funding support over the next five years.

A Nobel-Prize-winning physicist, Harvard professor Steven Weinberg, has accepted a visiting professorship in the UT Department of Physics and is expected to contribute to the fusion research program.

A second important development is on the way for the Fusion Research Center, already one of the major university programs in experimental fusion research in the country.

Start-up is planned this summer for the Texas Experimental Torus (TEXT), a medium-scale fusion facility to be located on The University of Texas at Austin campus. Other fusion devices are operated principally by single laboratories for their own specific program objectives. TEXT will be the first research device operated in a different way: as a national facility for users from all fusion laboratories for a variety of basic fusion experiments.

The fifteen-year-old Fusion Research Center is funded by DOE and by Texas utilities through the Texas Atomic Energy Research Foundation. Director of the center is Dr. William Drummond.

Art Professor Designs Energy-Saving Kiln

An art faculty member has designed and built a ceramics kiln which cuts energy consumption nearly in half.

Ceramic pieces must be fired several hours at temperatures of 900 to 1350°F, a process that substantially increases the energy bills of the UT Department of Art, which has several ceramics classes.

To counter the problem, Dr. Donald D. Herron, assistant professor of art and ceramics, designed a kiln that was inexpensive to build and to operate. Seven of the kilns are in use.

The improved aspects of the Herron kiln are:

—An arrangement of the bricks supporting the interior shelves that maximizes gas flow and venting

—Creation of ports in the bagwall (the brick wall that blocks flame from directly heating the ceramic ware) so as to evenly distribute heat high and low

—Application of 1600°F Castable Block Mix in an insulating layer over the arched brick roof of the kiln

—Use of an inexpensive burner made from standard pipe hardware that allows increased heat output and shorter firing times

(An article describing the Herron kiln appeared in the September 1979 issue of *Discovery,* published by the Office of the Vice-President for Research, MAI 303, The University of Texas at Austin, Austin, Texas 78712.)

CES Publications

Energy, Inflation, and Citizen Discontents: A Report on Public Reasoning about Electric Utility Policies and Nuclear Energy

by Wm. Michael Denney and J. Stephen Hendricks, December 1979, 107 pages, Policy Study No. 9 (UT/CES-PS-9).

How do public attitudes on energy and inflation come about? Do people reason on the basis of what is good for society in general—"sociotropic policy reasoning"—or on the basis of personal experience and self-interest—"egocentric policy reasoning"?

The study reported here examined attitudes on two topics related to energy and inflation; the final results indicate that, for these two topic areas, what is good for society overshadows what is good for oneself in the mind of the public.

The topics examined were (1) public experiences of and sentiments toward the local electric utility, and (2) public reasoning about nuclear energy. Data obtained in telephone surveys in Aus-

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tin, Texas, were used and compared with similar data collected on a national basis by the Survey Research Center at the University of Michigan. The Austin survey was carried out before and during the Three-Mile Island nuclear accident and up to April 7, 1979, the date of an Austin bond election on a nuclear power project.

Among the findings:

—Austin citizens gave high marks for the quality of service rendered by the city-operated electric utility, but were critical of specific rate-related policies.

—Objections to electric rate policies suggested a strong undercurrent of price sensitivity, likely a reaction to the rapid escalation of Austin's electricity prices in the mid-1970s; one might expect price sensitivity to be correlated with personal economic stress, but the study did not confirm this.

—Without denying that many Austin residents are seriously and adversely affected by rising electric rates, the study nevertheless suggested that dissatisfaction with the local utilities does not stem mainly from such pressures. Rather, respondents make such policy evaluations primarily on the basis of societal norms.

—Austinites resemble the rest of the country in being widely split over nuclear energy, and voter turnout for the nuclear bond election was substantially increased by the controversial Three-Mile Island incident occurring a week before.

—This intensification of interest in the nuclear bond issue did not produce a large and lasting antinuclear shift in opinion as expected: the study confirmed the rule that even dramatic news tends to reinforce rather than change existing public sentiments.

—News of Three-Mile Island created a short-lived, sharp increase in attitudes against the local nuclear bonds, but within one week opinions had returned to the previously existing balance.

—Reinterviews two months later indicated a mild, long-term shift toward negative evaluations of nuclear power. Although Three-Mile Island was predicted by many to be the death blow to nuclear power, the impact on public opinion actually fell far short.

(Drs. Denney and Hendricks are assistant professors in the Department of Government at The University of Texas at Austin.)

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