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## Volume 3, Number 10 (October 1979)

The Solar Ocean Energy Liaison

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# Solar OCEAN ENERGY Liaison

INCORPORATING  
The OTEC Liaison

VOLUME 3 NUMBER 10  
October 1979

## CONGRATULATIONS, OTEC ENTHUSIASTS: OUR FIELD IS BOOMING! YOU ARE GETTING THE JOB DONE!...

... and this publication is proud to be a part of it; part of the unbridled enthusiasm that so many of you have had for years despite the voices of the always-present naysayers, the doubters, and the negative "objective" reports and assessments of the promise of Ocean Thermal Energy Conversion.

Yes, OTEC is booming... so much so, in fact, that there is such an abundance of activity to report that we've done two back-to-back issues to provide as much information as possible. Thus we're mailing the October and November issues together.

The headline above may be viewed by some as unprofessional and/or undignified. But that is an option open to an editor... one can take liberties. It also provides an opportunity to acknowledge the dogged and persistent efforts of so many in the OTEC field that are finally bearing fruit. We have all believed in the great potential of the extraction of solar energy from the sea without harm to the environment, and we are finally being heard.

Again—CONGRATULATIONS!

Cordially,

Richard Arlen Meyer

*Postscript:* It would be naive to believe that all or even most of the barriers to OTEC implementation have been surmounted. Many are described in these two issues, and inevitably there will be more around the corner—including some, no doubt, that have not yet been considered or conceived. But—tremendous strides have been made in the last six months. Let us utilize our successes as springboards and as a base for the inevitable obstacles remaining to be faced.



### IN THIS DUAL MAILING OF THE OCTOBER AND NOVEMBER ISSUES:

The Senate OTEC Bill

The House OTEC Bill

DOE's Dissension With Congress

Cousteau's Strong Statement

Japan's Demonstration Plant

Three Cost-Sharing Proposals

Wave-Energy Assessment

Jamaica's OTEC Involvement

Mini-OTEC Today

WHO Originated OTEC?

**MAJORITY LEADER IMPRESSED BY OTEC BREAKTHROUGH:** Senator Robert C. Byrd (D-West Virginia), the Senate majority leader (center), listens closely as Dillingham's Lloyd Jones (right) explains how OTEC works following hearings on Senator Spark Matsunaga's (D-Hawaii) Bill S. 1830. Senator Matsunaga is on the left, having just presented a flashlight charged with electricity produced by Mini-OTEC to Senator Byrd. Senator Matsunaga's bill was introduced September 27th. This photograph was taken at the reception following hearings on the bill October 15th.

Solar  
**OCEAN ENERGY**  
Liaison

INCORPORATING  
**The OTEC Liaison**

AN INTERNATIONAL NEWSLETTER  
ENGAGED AS LIAISON FOR ALL  
FORMS OF SOLAR ENERGY FROM  
THE SEA, INCLUDING:

OTEC  
(OCEAN THERMAL  
ENERGY CONVERSION)  
WAVE - TIDAL - CURRENT  
OFFSHORE WIND - BIOMASS  
SALINITY GRADIENTS

VOLUME 3 NUMBER 10  
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Richard Arlen Meyer

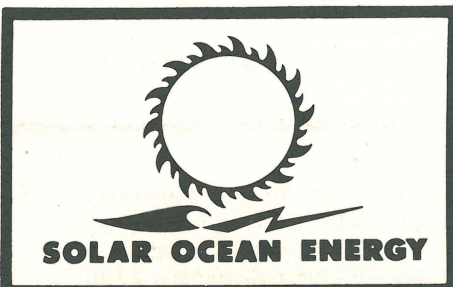
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THE COUSTEAU SOCIETY ISSUES STRONG STATEMENT  
ON OTEC/OCEAN ENERGY IN LETTER TO PRESIDENT CARTER  
SAYING IT IS "PAINFULLY SURPRISED THAT SUCH A POTENTIAL  
RESOURCE... BE SYSTEMATICALLY OMITTED FROM  
FEDERAL OR PRESIDENTIAL PLANS"

[Editor's note: The following excerpts are from a letter over the signature of Edward Wenk Jr., Chairman of The Cousteau Society, to President Carter dated July 27th, 1979. President Carter acknowledged this letter on August 3rd. Only portions are reproduced herewith.

The postscript, over the signature of the Society's founder, Captain Jacques-Yves Cousteau, is reproduced in its entirety.

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President Jimmy Carter  
The White House  
Washington DC 20500

Dear Mr. President:

We, the Advisory Council of The Cousteau Society, are writing you on behalf of the Society and its founder, Jacques Cousteau, in response to your request that citizens share their views regarding recent policy statements on energy....

.... To find exits to our current dilemmas, we must reassess our purposes, our challenges, and ourselves, especially in terms of sacrificing immediate benefits for the longer term....

.... There is a vast and deep uneasiness about governments.... It is essential to reflect with equal candor that no sector should operate from such narrow self-interest as to defeat the broader goals we seek....

.... In our view, the most important and the most immediate action that must be taken relates to conservation.... The solar route offers bright prospects for the future, and we enthusiastically endorse support for all forms of relevant solar research. *We especially feel that untapped sources of energy from the ocean, which went unmentioned in your addresses, deserve priority research and development.* And we must examine the infrastructure of the energy supply system to determine if alternatives, including more sensitive regulation, might produce more socially satisfactory outcomes....

.... When we refer to a policy for conservation, ... for example, we propose a *massive* undertaking of urban transit in 20 of our largest cities, and a vigorous rebuilding of passenger railroads....

.... We would also urge a moratorium for five years on any further licensing of nuclear power plants....

.... One further point we wish to make is the need to balance energy development and protection of the environment....

.... Thus, as concerned as we are for the environment... our first ethical and moral obligation is to set those goals and take those actions which will leave the world a better place for those ahead.... We must thus commit ourselves to deal with threats to both....

.... Mr. President, during these months ahead of grave decisions, we urge that you build the future into the continuing political decision process with far greater alacrity than has been true before. People need to understand that they will need to make sacrifices and consider the treasures of living as a loan from our progeny as much as an inheritance from our forefathers.

Sincerely,

Edward Wenk Jr.  
Chairman

*Postscript: Jacques Constans, our Vice-President for Science and Technology, has gathered abundant documentation about the various sources of energy that people could find and develop in and from the sea: OTEC (Ocean Thermal Energy Conversion), Wind (mainly from the constant trade winds), Tides (in a few preferred areas), Currents, Swell (and particularly the "wave lenses"), Salinity Gradients (at the estuaries of rivers), Bio-conversion (open ocean kelp farms), Solar Ponds, etc.... Many of these techniques could be naturally associated with various forms of Aquaculture to produce food as a by-product of energy.*

*In short, the main handicap in harnessing solar energy is that it is thinly spread over immense areas and that it is difficult and costly to concentrate in order to exploit it. Not so in the sea, because the ocean is a natural concentrator of the enormous solar energy poured over 70 per cent of the planet, thanks to permanent tropical and equatorial currents, and to evaporation. We at The Cousteau Society are painfully surprised that such a potential resource (literally equivalent to millions of nuclear plants) be systematically omitted from federal or presidential plans, and we will endeavor to promote all forms of energy from the sea.*

Jacques-Yves Cousteau

## TWO OTEC BILLS IN CONGRESS, ONE IN THE SENATE AND A COMPANION IN THE HOUSE, ENTHUSIASTICALLY RECEIVED

### Flashlights and Water Bottles

A giant step toward the rapid implementation of OTEC as a major alternative energy source for the world took place on September 27th, 1979 when Senator Spark Matsunaga (D-Hawaii) and 20 other Senators introduced Bill S. 1830.

Senator Matsunaga was joined by the following Senators: Jackson (Washington), Church (Idaho), Inouye (Hawaii), Ford (Kentucky), Bumpers (Arkansas), Metzenbaum (Ohio), Melcher (Montana), Tsongas (Massachusetts), Hatfield (Oregon), McClure (Idaho), Weicker (Connecticut), Domenici (New Mexico), Stevens (Alaska), Bellmon (Oklahoma), Wallop (Wyoming), Chiles (Florida), Stone (Florida), Randolph (West Virginia), and Bradley (New Jersey).

While the introduction took place in September accompanied by testimony, the principal hearings took place on October 15th. The witnesses providing testimony on that date were the Honorable Baltasar Corrado, Resident Commissioner of the Commonwealth of Puerto Rico; Bennett Miller, of the US Department of Energy; Richard Bell, Vice-President for Engineering of the Hawaiian Electric Company and Chairman of the Hawaii Task Force on Ocean Thermal Energy Conversion; Julio Hernandez Fragoso, Vice-Executive Director of the Puerto Rico Water Resources Authority; J. G. Wenzel, Vice-President of the Ocean Systems Research and Development Division of Lockheed Missiles and Space Company; A. F. Butler, Manager of Hardware and Integration Systems Operations of TRW Incorporated; J. F. Babbitt, President of DEVCO International Incorporated; M. H. Nordquist, Partner of Nosaman, Krueger, and Marsh; and B. J. Washom, Manager of Technology and Policy of Advanced Projects for the Stratos Division of Fairchild Industries.

In addition, written statements have already been submitted for the hearing record by the Dillingham Corporation of Hawaii, the General Electric Company, Westinghouse, the Hawaii State Department of Planning and Economic Development, and various other agencies and organizations.

The hearings were held before the Energy Research and Development Subcommittee of the Senate Energy and Natural Resources Committee. Every member of the Subcommittee except one co-sponsored the bill.

S. 1830 is described officially as a *bill to provide for a research, development, and demonstration program to achieve the early commercialization of Ocean Thermal Energy Conversion systems, and for other purposes*. This, together with the companion bill in the House, is primarily intended to establish specific goals to reach for, and a specific program to achieve them. It would also accelerate the acceptance of

OTEC by industry and the general public as a viable alternative source of energy in the United States, as well as the exporting of the technology and hardware to other nations.

Some of the highlights of Senator Matsunaga's bill are:

- To demonstrate by 1986 at least 100 megawatts of OTEC-produced energy.

- To demonstrate by 1989 at least 500 megawatts.

- To establish as a national goal 10,000 megawatts by the year 1939.

- To require DOE to prepare a comprehensive plan to achieve these goals for Congress within three years of the bill's enactment. (This time period may be drastically reduced in the final terminology of the bill.)

- To establish an Ocean Thermal Energy Conversion Advisory Committee to review and supervise the directives of the bill.

- Authorizes an appropriation of \$25 million for operating expenses incurred in carrying out the bill's purposes for the fiscal year ending September 30th, 1980.

- Authorizes an appropriation of an additional \$15 million for plant and capital equipment for demonstration plants.

### Flashlights and Water Bottles

Following the full day of hearings on S. 1830 on October 15th, a reception was held in the Senate Office Building, hosted by Senator Matsunaga and the State of Hawaii. Refreshments and a small Hawaiian band added to the festivities.

Many have sought a simple method to convey both the technology and the potential of solar ocean energy/OTEC to the uninformed, and the sponsors of the bill, together with the hosts of the reception, came up with two winners: (1) small flashlights were on hand that had been charged with electricity from Mini-OTEC, and (2) small bottles of water brought up from the depths of the sea by the Mini-OTEC cold-water pipe were on hand, labeled "The Fuel for Mini-OTEC Power". An abundance of literature and photographs describing Ocean Thermal Energy Conversion was also present.

At the same time the reception was being held, in mid-evening, several roll calls were pending in the Senate chamber. An unusually high number of Senators were therefore present in the building—tired, hungry, and anxious for their day to end. Hawaiian music, refreshments, and pretty girls attending the reception were an appealing incentive for Senator Matsu-



**THE FUEL OF THE FUTURE:** Senator Jennings Randolph (D-West Virginia), left, and Senator Matsunaga examine small bottles of water from the deep ocean and packages of OTEC-powered flashlights which were presented to the members of Congress who attended the Matsunaga reception following hearings on OTEC Bill S. 1830.

naga as he made numerous round trips to the Senate floor, bringing back with him many Senators eager for a bit of rest and recreation. Obviously they were quickly educated about OTEC, and each was presented with an OTEC-charged flashlight. Some of the visiting Senators are shown enjoying the reception throughout this issue of OCEAN ENERGY (OE).

Coming as no great shock was the testimony of DOE's Bennett Miller on Bill S. 1830, saying in effect that DOE did *not* want the program accelerated. Full details of his statement and the resultant reaction are detailed in the November issue of OE.

### THE HOUSE BILL

On November 2nd, 1979 Representative Don Fuqua (Florida) introduced Bill H. R. 5796, described as the "Ocean Thermal Energy Conversion Research and Development Act" to provide for an accelerated research and development program to achieve early applications of ocean thermal energy conversion systems, and for other purposes.

Along with Mr. Fuqua, 27 other Representatives introduced the bill, which was referred to the Committee on Science and Technology. Included were Representatives Roe, Fish, Dornan, Lloyd, Blanchard, Watkins, Flippo, Glickman, Nelson, Ertel, Pepper, Mineta, Studts, Moorhead, Corrada, Murphy, Lehman, Simon, Akaka, Heftel, Whitehurst, Bibbons, Carter, Byron, Lagomarsino, Beilenson, and Emery.

Among the highlights of Mr. Fuqua's bill are the following:

- To demonstrate by 1986 at least 100 megawatts of OTEC-produced energy.

- To demonstrate by 1989 at least 500 megawatts of OTEC-produced energy.

- To reduce by the end of Fiscal Year 1993 the average cost of electricity or energy-product equivalent produced by OTEC to a level competitive with conventional energy sources.

- To establish a national goal of 10,000 megawatts of OTEC power by the year 1999.

- To require DOE to transmit a comprehensive plan and program to Congress within nine months after the date of the enactment of this act.

- To establish an OTEC Advisory Committee of at least seven members within ninety days after enactment, the Committee to meet at least four times annually.

- Authorizes an appropriation of \$60 million for operating expenses for the fiscal year ending September 30th, 1981.

- Authorizes an appropriation of \$15 million for OTEC demonstration plants, for conceptual and preliminary design activities only.

Thus S. 1830 and H. R. 5796 are substantially the same, with the exception that the former authorizes less money, but in a one-year-earlier time frame. Also, the Senate version currently requires three years for DOE to present a concrete plan and program to Congress, but consensus



A photograph of Mini-OTEC received a lot of attention at the Matsunaga reception. Senator Dale Bumpers (D-Arkansas), left, and Senator Spark Matsunaga (D-Hawaii) admire the photograph. Bumpers is Chairman of the Energy Subcommittee on Parks, Recreation, and Renewable Resources.

in the OTEC industry suggests reducing this to three months. The House version currently indicates nine months.

### Outlook for Passage

The Senate version of the OTEC bill, S. 1830, is expected to be in for markup as this issue goes to press. This would be on the full Energy Committee level, then go to the Senate's Rules Committee, and finally go to the Senate floor—all expected to take place prior to the Christmas recess. The House bill, H. R. 5796, may not go the same route, since the House does not have an energy committee. However action is expected there also before the Christmas recess.

Compared to the approximately 900 various energy bills in Congress, the OTEC bills are considered *non-controversial* and therefore should achieve fast movement. If both sides of Congress agree, a combined bill would go to the Conference Committee with possible signing by the President in early January.

### Additional Congressional Activity

Other Congressional developments affecting OTEC's future are: H. R. 3919, the proposed windfall-profits tax and tax credit; S. 932, the synfuels program; S. 1308, the proposed Energy Mobilization Board; H. R. 5399, Representative Grassley's hydrogen bill; H. R. 3000, the DOE authorization bill (the President has signed H. R. 4388, which provides \$40 million for

OTEC in FY 1980); and S. 950 and 1844, the Durkin bills. These will be followed and reported on in future issues of OCEAN ENERGY.

Some major OTEC battles have been won. However the gains still have to be defended, with many hurdles to be cleared before the various bills become law.

### RUMOR, SCUTTLEBUTT AND LOOSE TALK

(Please note that we have labeled it as such.)

A wealthy Hawaiian is trying to arrange financing for a Japanese consortium to build closed-cycle OTEC plants in Japanese shipyards and tow them to the Marianas Trench to help supply East Asia with power.

A Floridian is considering the construction of an open-cycle OTEC plant off Key West, to supply the area with both fresh water and electric power.

There is renewed interest in building OTEC plants off the Ivory Coast to provide both power and nutrients for mariculture.

A German firm proposes an offshore facility combining solar collectors to provide heat and the ambient protected water to provide the temperature differential for hybrid OTEC plants in European harbors.

## WAVE ENERGY

The following article, which appeared in the *Wall Street Journal* August 22nd, 1979, is reproduced in its entirety due both to the requirements of that publication and to the thoroughness and depth of investigation into the field of wave energy. Reprinted with permission of the *Wall Street Journal*, Copyright 1979, Dow Jones & Company, Incorporated. All rights reserved.

### BRITAIN SEEKS ELECTRICITY FROM THE SEA BY USE OF "DUCK", "CLAM", "RAFT"

by Jonathan Spivak  
Staff Reporter for the  
*Wall Street Journal*

Edinburgh: While the oil under its offshore waters is helping the United Kingdom meet its present energy needs, Britain now is looking seaward again and aggressively seeking to exploit a new and truly inexhaustible supply of offshore energy: the ocean's waves.

At a dozen government-financed wave-power laboratories here and at other places around the British Isles, scientists are busy building and testing machines to convert the ocean's motion into useful electric power. The devices go by such picturesque names as "The Duck", "The Clam", and "The Raft" because of their distinctive shapes.

All, however, rely on the simple idea of using the force of waves to operate an electrical turbine or generator. Floating power plants, several miles off the coast and extending several miles wide, would tap a vast expanse of the ocean's wave energy and send this power by underwater cables directly to electricity grids ashore.

"Although we don't have the final solution, we are well on the way to developing it," asserts Ken Major, a British Government wave-power expert.

#### Other Regions Suitable

Wave power holds promise not only for the British Isles, but for any area where winds blow strongly and steadily shoreward across a broad reach of open ocean. These regions, researchers say, include the coasts of four American states—Alaska, Hawaii, Oregon, and Washington—as well as Japan, Norway, and the western portion of South America.

By most calculations, wave power is at least twice as expensive as conventional oil, coal, or nuclear energy. Not only must the plants be far more massive, but they must be built to survive an extraordinarily hostile environment: corrosive sea water, which damages seals and working parts; fiercely battering winds; powerful tidal waves; and barnacles.

Barnacles present a serious problem because wave-power plants must remain just afloat, and an accumulation of barnacles on the bottom of the plants could sink

them. The experts haven't yet found any effective method of dealing with the maddening mollusks.

#### Cost of Plant Estimated

But here at the University of Edinburgh wave-power researchers are convinced that answers can be found to this and other problems. For example Stephen Salter, the mechanical engineer who heads the University project, predicts that costs can be cut by developing more efficient methods of power conversion, lighter structures, and cheaper construction techniques. Right now, he estimates, an operational wave-power plant would cost \$2.25 billion, or more than double the cost of most nuclear power plants of similar capacity.

"The capital cost is high, but once you get out there the ocean is free," notes Mr. Salter.

Each unit of the Edinburgh "duck" would in effect be a self-contained power plant, 30 feet long and 10 feet in diameter, and linked with other units on each side. As the waves rocked each "duck" back and forth, gyroscopes inside would transmit the energy to an electrical generator, producing 2,200 kilowatts of electricity. The Edinburgh system has the advantage of extracting more power from energetic winter waves than other proposals—power that can be stored for later use.

Edinburgh researchers envision a wave-power plant stretching for several miles, with underwater cables every mile carrying power ashore. While the project may sound Buck Rogerish, a scale model was tested last winter in Scotland's Loch Ness, and showed the concept to be feasible. Now most of the remaining development work will be done in a new \$225,000 wave tank, the most sophisticated in Britain.

So far, British scientists have demonstrated with scale models in indoor laboratories that up to 90% of the ocean's wave energy can be captured by wave-power plants, and much of that converted to electrical power. They've also had two tests with small models on open water, and their next goal is prototype testing at sea.

In a recent demonstration to local industrialists, wave-power experts at the University of Edinburgh generated enough electricity to light a small bulb with a model power plant floating in an electronically-controlled wave tank. The executives were impressed. "There is bound to be business in wave power," comments R. F. Ewen, technical manager of Munro and Miller Fittings Ltd., which makes expansion joints and huge bellows—items that could be required in some types of wave-power plants.

Already John Laing & Son Ltd., one of Britain's largest construction companies, has assigned a team of six engineers to work with the Edinburgh researchers on their "Duck", so called because it bobs up and down on the waves. The Edinburgh design is one of seven wave-power proposals financed by the British Government.

One obvious reason for Laing's enthusiasm—and the interest of such other construction companies as Ready Mixed Concrete Ltd.—is that wave power would produce plenty of construction work. A fully-operating Edinburgh "duck", for example, would require almost five million pounds of concrete, five times as much as a conventional power plant. The huge size is needed because wave power must be gathered over a large area: Researchers figure it will take waves 22 yards wide to produce 1,000 kilowatts of electricity, enough for 100 homes.

The British Government began its wave-power program in 1976 as part of an Energy Department effort to develop solar, wind, and other alternative energy sources.

Annual outlays on the wave program have risen to \$6.8 million from \$1.1 million for basic research and the development of prototype wave-power plants. Spending will rise still more sharply when wave-power prototypes are taken to sea. Among all forms of alternative energy, "wave energy is the favored method at the moment", a government expert says.

The "clam", which is in a very early stage of development, would use the force of waves to compress a huge bag whose outer surface resembles a clam shell. As the bag is compressed, air is forced through an electric turbine.

The "raft" consists of a series of floating pontoons whose motion drives water through a turbine. Still another wave-power approach would place power plants on the seabed, where they would be less susceptible to damage—but where wave power is less. Vickers Ltd. is examining a seabed design that would make use of the changes in pressure as surface waves pass over the submerged power plant.

All of these devices are being subjected to careful Energy Department scrutiny. "There are two things we want to know," says Clive Grove-Palmer, who heads the British Government's wave-power work. "How much power can you get? And what storm conditions can you survive?"



### MINI-OTEC FINALLY MAKES APPEARANCE ON NETWORK TV

Although almost a full four months after the official announcement on August 3rd, word of the Mini-OTEC demonstration of Ocean Thermal Energy Conversion reached a nationwide TV audience on Walter Cronkite's CBS News November 26th.

Following a newscast full of the Iranian situation and related crises, Cronkite prefaced the Mini-OTEC coverage by saying there was at least "some good news" that evening. The two-to-three-minute newsclip included film of Mini-OTEC on station off the coast of Hawaii plus an interview with Hank White of the Natural Energy Laboratory of Hawaii.

Better late than never!

## BETTER MEDIA COVERAGE IS SEMINAR'S MESSAGE

Many involved in OTEC/ocean energy are tired of being virtually ignored in the nation's press and other mass media—and are banding together to DO something about it—finally!

As announced in the August issue of SOEL, the Solar Energy Research Institute (SERI) is sponsoring an Ocean Energy Communication and Information Workshop at SERI's headquarters in Golden, Colorado December 6th and 7th with the aim of *getting the word out* on OTEC/ocean energy.

Despite the attention that energy in general gets continuously in the media, little or nothing is appearing about the world's greatest solar battery—the oceans. Even the successful operation of Mini-OTEC has received relatively little attention in the mass media.

The workshop has been organized by Don Petty, head of the Ocean Systems Branch of the Technical Information Division of SERI, aided by the editor of SOEL. The meeting will bring together those in industry and government to design methods for marketing OTEC information. Full details and an agenda, including a list of speakers, can be obtained from Don Petty, Ocean Systems Project Leader, TID, Solar Energy Research Institute, 1536 Cole Boulevard, Golden, Colorado 80401, (303) 231-1000.

As DOE's Bennett Miller said at the Sixth Annual OTEC Meeting in June, it is imperative that we "get the word out".

**HERE'S THE OPPORTUNITY TO DO JUST THAT!**

### US GOVERNMENT PROCUREMENT INVITATIONS AND CONTRACT AWARDS

Listed below are contract awards and procurement invitations related to OTEC in particular and ocean resources in general culled from the Commerce Business Daily. This is not to be construed, however, as a complete list.

**Oct 1: Study of Corrosion Species and Inhibitors on Aluminum by Inelastic Electron Tunneling Spectroscopy:** Contract DA-AG-29-79-C-0152, 10 Sep 79, for \$52,945, awarded to the Curators of the University of Missouri, Columbia, Missouri 65211.

**Oct 1: Research on In-Situ-Formed Condensation Polymers for Reverse Osmosis Membranes:** Contract 14-34-0001-9449, for \$91,427, awarded to the Midwest Research Institute, Kansas City, Missouri.

**Oct 1: Deep Ocean Recovery System Cable Dynamics Tests:** Contract N-68-305-79-C-0044, Srp 79 (Reference 79-0044), for \$41,370, awarded to Battelle-Columbus Laboratories, Columbus, Ohio. Civil Engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, California 93043.

**Oct 1: State and Regulatory Impact on Aquaculture Development:** Contract 14-16-0009-79-095, 28 Sep 79, for \$67,671 awarded to Aspen Systems Corporation, 20010 Century Boulevard, Germantown, Maryland 20767. US Fish and Wildlife Service, Department of the Interior, Washington DC 20240.

**Oct 2: Study to Improve the Interactions Between the Biological and Materials Sciences:** Negotiations are being conducted with the National Academy of Sciences, Washington DC. Solicitation DE-AC-01-79-ER-10442.

**Oct 2: International Soft-Energy Project: Soft-Energy Data and Review:** Negotiations are being conducted with Friends of the Earth Foundation, San Francisco, California 94105. Solicitation Grant DE-FG-01-79-PE-70154.

**Oct 2: Support for the New England Energy Congress:** Contract EP-78-S-02-5076.A001, for \$195,480, awarded to Tufts University, New England Energy Congress, 6 Beacon Street, Suite 1111, Boston, Massachusetts 02108.

**Oct 2: Operation of the Southern Solar Energy Center:** Contract DE-AC-02-79-SC-30166.A000, for \$1,728,000, to the Southern Solar Energy Center Incorporated, 61 Perimeter Park, Atlanta, Georgia 30338.

● **Oct 2: Support Services in Ocean Engineering and for the OTEC Program:** Contract ET-78-C-02-4931.A004, \$489,432 awarded to the VSE Corporation, 2550 Huntington Avenue, Alexandria, Virginia 22303.

**Oct 9: Operation of the National Solar Data Network:** Solicitation DE-AC-01-79-CS-30027. Response date ASAP. US Department of Energy, Office of Procurement Operations, Washington DC 20585, (202) 376-9290.

**Oct 9: International Solar Energy Commercialization Study:** Unsolicited proposal. Contract DE-AC-01-79-CS-30028M002, for \$43,782, awarded to Systems Consultants Incorporated, 1054 31st Street NW, Washington DC 20007.

**Oct 10: Design, Fabrication, and Field Testing of an Energy Recovery System for Use in Reverse Osmoses Desalination Plants:** Contract 14-34-0001-9528, for \$133,170 awarded to Bechtel National Incorporated, po box 3965, San Francisco CA 94119. US Department of the Interior, Office of Water Research and Technology, 18th and C Streets NW, Washington DC 20240.

**Oct 16: Support of Solar Energy Research at Colleges and Universities:** Notice of Program Interest (NPI) OER-80-NPI-001. The Department of Energy (DOE) desires to receive proposals from colleges and universities for advanced research related to solar energy. The broad objectives of this program are: to add to the store of fundamental knowledge for advancing the use of solar energy; to stimulate new approaches to the conversion and utilization

of solar-derived energy; to support feasibility or "proof of concept" studies of these new approaches; and to stimulate the growth of a solar-related intellectual base in the nation's academic community. Proposals will be considered for basic and applied research projects in the biological, engineering, and physical sciences related to solar-energy conversion. Proposals involving development studies, extensive component testing programs, demonstration of systems, economic studies, marketing studies, instructional materials, or the establishment of solar-energy centers or institutes are inappropriate for this particular program and should not be submitted in response to this NPI. Proposals submitted in response to this NPI should be received no later than January 10th, 1980. Grants are planned to be used as the award instrument. Notification of grant awards is anticipated on or about March 15th, 1980. (285) Dr. Alex Kotch, Manager, University Programs Office, Solar Energy Research Institute, 1617 Cole Boulevard, Golden, Colorado 80401.

**Oct 22: Develop a Guide to Energy Technology Programs:** Contract DE-AC-01-79-ET-20614, for \$86,632, awarded to PRA Research, East Meadow, New Jersey 11554.

**Oct 22: Solar Cities:** Contract DE-AC-01-79-ET-20622, for \$461,010, awarded to the Center for Renewable Resources, Washington DC 20036.

**Oct 24: Development of Spirally Fluted Tubing for Advanced Exchanger Applications:** Contract DE-AC-05-79-ET-15210, for \$149,975, awarded to General Atomic Company, San Diego, California 92121. US Department of Energy, PO Box E, Oak Ridge, Tennessee 37830.

