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## Volume 3, Number 1 (January 1979)

The OTEC Liaison

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# DOE's OTEC Integration Meeting Held in Washington

The OTEC Integration Meeting called by the Department of Energy and hosted by the Johns Hopkins Applied Physics Lab January 23rd through 25th in Washington seemed to serve its purpose well.

For the first time ever—and in what may turn into an annual event—each of the contractors involved in government-funded work on Ocean Thermal Energy Conversion was able to tell and hear of the scientific, engineering, and institutional research projects that, when integrated, will make OTEC work in a commercial sense.

The value of the meeting was perhaps best stated by C. R. Schaeffner of Global Marine Development, Project Manager for the OTEC-1 program. Schaeffner told *The OTEC Liaison* that the chance to hear of all the work is particularly valuable to him at this time because, unless things are incorporated into the design of OTEC-1 within the next six months, they'll be lost to the first ocean tests that are intended to demonstrate the feasibility of the OTEC concept. "When we get that platform in the water," Schaeffner explained, "all eyes will be on us—and we can't afford to miss anything."

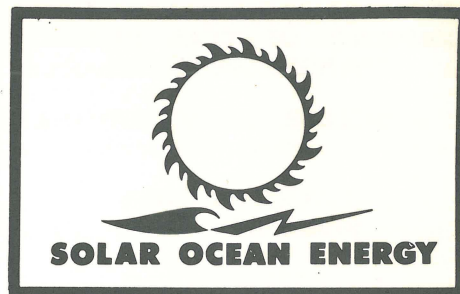
For Bill Richards, new chief of DOE's Ocean Systems Branch, who called the meeting, it was a good short course on OTEC and a chance to tell OTEC contractors of his management strategy (see the Richards interview in this issue). And, it gave OTEC contractors a chance to press the flesh and get in a word or two with Richards in the hallways, keeping him literally spinning from one conversation to another.

Some 60 presentations of a hardware and software nature were given by as many people to a larger audience that included at least one representative of an interested utility. All DOE program managers were present and participated to some extent.

While many of the speakers indicated that there are no apparent scientific barriers to OTEC, and that the highest hurdles will probably be institutional and economic, some progress is being made there as well.

For instance Byron Washom reported that Fairchild Industries' attempts to work with Hawaii and Florida utilities to realize market potential for OTEC may soon be

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## USSR INITIATES RESEARCH IN OCEAN ENERGY AND OTEC

It has been known for some time that Russia has been watching the development of ocean energy in general and OTEC in particular, and rumored that some studies are underway. Now a letter received by the editor of TOL advises that the Laboratory of Ocean Phase and Energy Conversion has been established as part of the Pacific Oceanological Institute in Vladivostok headed by Dr. Victor A. Akulichev, Deputy Director of the Institute.

Dr. Akulichev also advises TOL that he is a convener of the Symposium "on the study of the thermal and hydrodynamic energy resources of the ocean" to be held September 5th, 1979 as part of the XIVth Pacific Science Congress in Khabarovsk, USSR.

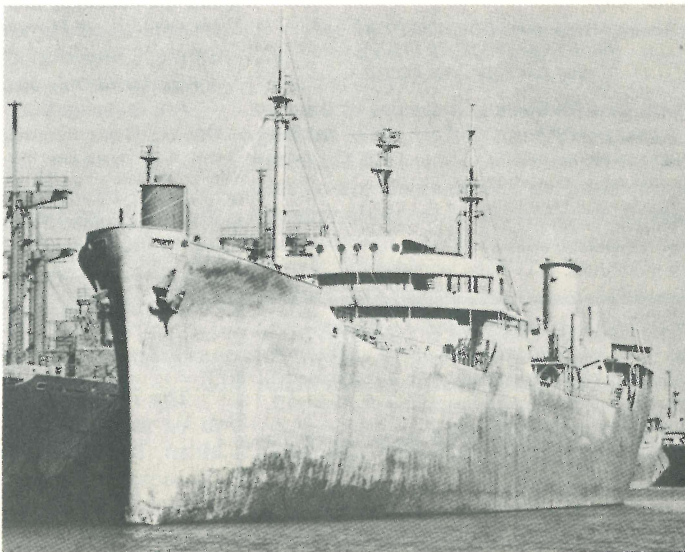
TOL will bring readers more details of OTEC research in the USSR as it becomes available.

# The OTEC Liaison

VOLUME 3, NUMBER 1  
January 1979



THE NAVY TANKER CHEPACHET will become the first floating test platform in DOE's ocean thermal energy conversion program. Signing papers for DOE to take custody of the ship from the mothball reserve fleet in Suisun Bay, California, are (l-r) George W. Phillips, Jr., Vice President of Global Marine Development, Inc. which will convert the vessel under a \$25 million DOE contract; Jack Blasy, Acting Deputy Manager for DOE's San Francisco Operations Office; Capt. M. H. Lasell, Navy Department, Military



Sealift Command; and John S. Pottinger, Fleet Superintendent, Department of Commerce, Maritime Administration. The revamped Chepachet will be anchored off the coast of Hawaii. Global Marine will take about 18 months to turn the vessel into a floating power plant. The Chepachet will carry a one-megawatt generator for testing and may later add a 40-megawatt generator. The project is headed by James Hartman, director of DOE's OTEC-1 (Ocean Thermal Energy Conversion) Project Office at Canoga, Park Calif. (LBL Photos)

# The OTEC Liaison

AN INTERNATIONAL NEWSLETTER  
ENGAGED AS LIAISON FOR THE  
COMMUNITY OF OCEAN THERMAL  
ENERGY CONVERSION

VOLUME 3, NUMBER 1  
January 1979

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## SUBSCRIPTION RATE INCREASE IN 1979

Due to inflationary increases in the cost of paper, printing, postage, and mailing, subscription rates for The OTEC Liaison will be raised to \$95 annually on all new subscription orders and renewals received after January 1st, 1979.

This issue of *The OTEC Liaison* is quite tardy, due partly to the holiday season and staff illnesses, but primarily to two major blizzards.

"January 1979 will be remembered as having the worst combination of snow and cold in Chicago's history," says a National Weather Service official. When this publication can manage moving its offices to Hawaii, we will no longer have any such reason for tardiness.

## DOE'S OTEC OBJECTIVES AND STATUS CONFERENCE HELD IN WASHINGTON

(continued from Page 1)

expanded to the Guam Power Authority and the Government of the Northern Marianas—by request of those governments.

While some pointed out that top-level management in utilities is beginning to listen more seriously to OTEC proponents, others warned that OTEC must make sense to the fuel planner to have any commercial future.

Cost and performance parameters will be coming in over the next few years, and in most cases OTEC will be competing with future energy sources that still have some scientific problems to be resolved. That may give it an edge. But, warned Mitre's W. Jacobsen, OTEC contractors need to take care at each step along the way to development. He fears that the OTEC community is going to have only one chance to prove the merits of the process. If something goes wrong, Jacobsen emphasized, "fusion could be a very serious competitor in the early 2000 time frame".

But, as Global Marine's Schaeffner and several of his colleagues pointed out, meetings such as this OTEC status conference should help keep everybody on the ball.

## TEN OTEC RESEARCHERS LOST AT SEA OFF HAWAII

In mid-December the research vessel *Holo Holo* disappeared off Hawaii. The 96-foot steel-hulled vessel, chartered by the University of Hawaii to conduct OTEC experiments, left no trace of wreckage, with the sole exception of a single small wooden instrument box.

Aboard were 10 people, including Norman Laird and Robert L. Charness of NOAA's Pacific Marine Environmental Laboratory of Seattle; Gary Neimeyer, Robert Harvey, and Michael Allen of the University of Hawaii; James Sanduski and Stephen Shannon of the Lawrence Berkeley Laboratory; and three crew members.

An investigation is being conducted by the US Coast Guard, which convened hearings on January 9th in the Federal Court Building in Honolulu. Further details of this tragic accident will be reported in the February issue of TOL.

## OTEC ARTICLE IN PREPARATION FOR COUSTEAU ENCYCLOPEDIA

*The Cousteau Encyclopedia of the Sea*, to be published by the Fabri Company in Milan, Italy, will contain 24 volumes and Cousteau's memoirs. One section, being prepared by Dr. Charles W. Finkl of *The Encyclopedia of Earth Science* of Fort Lauderdale, Florida and the Ocean Science Center of Nova University of Dania, Florida, deals with the limits of technology and will include color photos of OTEC plants and related data.

## TOL INTERVIEWS DOE'S BILL RICHARDS

Bill Richards, new chief of DOE's Ocean Systems Branch, describes himself as a "bug on management". Beyond that, he's out to end run US dependence on foreign fuels.

Just how might Richards' image of himself ultimately affect the community of OTEC contractors?

Well, for starters, Richards seems intent on focusing his energies on developing a domestic fuel source that doesn't just promise, but delivers. His message to OTEC contractors is to prove the concept—from science through engineering to marketing—in a systematic way the political system can absorb.

In his attempt to give a badly-needed focus to the program, and to define a commercialization purpose for federal dollars spent, he is challenging federal OTEC contractors to the following tasks:

- Enumerate what is definitely known.
- Enumerate what is definitely not known.
- Prioritize the unknowns according to possible impact on the next decision.
- State the minimal essential knowledge required prior to making the next decision.
- Recommend how to go from what we know to the minimum-essential-knowledge point in terms of time, manpower resources, and dollars.

Richards says that once he has that input from OTEC contractors, he'll have the ammunition he needs to move the program up the priority-issues ladder. And, he'll have the basis for showing what the dollar costs of delivering the energy capability are.

One of the management techniques that Richards is exploring is to let government representatives and OTEC contractors interact through an Ocean Energy Systems Council. The Council, still in the idea stage, would have a government group, a working group, and an action group. The government group would serve as a forum for expressions of interest or concern by representatives from various federal agencies; the working group would perform tasks; and the action group would review the working group's efforts and attempt to insure that the concerns of the government group are met.

Richards comes across as being very enthusiastic about the efforts he is making to help put OTEC on a track that will take it to the threshold of an objective he has set for ocean systems: to become competitive for the US market in the 1990s.

But, Richards seems to stop short of being called an all-out proponent of a particular approach, such as OTEC. One gets the feeling that his primary interest is in seeing the US expand its sphere of capabilities to produce energy. And, if OTEC doesn't measure up to the management test—the commercial delivery—he'll most likely be putting his efforts behind something else that begs a chance to prove it can deliver.

## 1980 SOLAR BUDGET UP 24%

Amid what the Carter Administration calls a "leveling off" of obligations for energy research and development, the Fiscal Year 1980 budget request increases overall support for solar R&D by 24%. Longer-term solar-related technology development and applied research increases by 40%. The Department of Energy's obligations for all energy R&D are estimated at \$4.7 billion in the 1980 budget, just \$23 million above the 1979 obligations.

The increases for solar reflect the Administration's intention to focus its support on long-range R&D in areas of national interest "for which industry is not likely to provide adequate support".

Solar-energy technology is getting the "greatest emphasis and the largest budget increase" among energy R&D in the 1980 budget request, according to the Federal Government's special analysis of its budget. "This emphasis at a time of constrained budget growth reflects the Administration's belief that solar energy can, in time, make a significant contribution as an environmentally attractive, renewable energy supply", the budget documents say. Areas of solar technology receiving particular emphasis include photovoltaics and biochemical and photochemical conversion of organic wastes and crops to fuel. Recent estimates from the President's Solar Domestic Policy Review indicate that present solar-energy trends may supply as much as 13% of projected US energy demand by the turn of the century.

The Department of Energy's Fiscal Year 1980 budget provides \$597 million for the development and application of various solar technologies, a 13% increase over the amended Fiscal Year 1979 level. That breaks down as follows:

	Budget Authority (In Millions)	
	FY 1979	FY 1980
Solar Technology	\$315	\$383
Biomass	44	58
Solar Applications	169	156
Total DOE Direct Solar Funding	\$528	\$597

Or, breaking it down even more specifically, the budget documents provide this look at the Department of Energy request: (See "Federal Solar Program" in this issue.)

In addition, environmental aspects and basic research related to solar receive a request of \$49 million in Fiscal Year 1980, up from \$31 million in Fiscal Year 1979. With those crosscutting areas factored in, DOE solar funding totals \$559 million in Fiscal Year 1979 and \$646 million in Fiscal Year 1980.

Specific solar and biomass technology development activities identified as being funded in Fiscal Year 1980 include:

- \$37 million for continued construction of the 10-megawatt solar-thermal

FEDERAL SOLAR PROGRAM				
Solar Technology and Biomass (\$ In Tenths of Millions)				
	FY 1979		FY 1980	
	BA	BO	BA	BO
Solar Thermal Electric .....	\$102.1	\$ 95.3	\$121.0	\$133.5
Photovoltaic Energy Development .....	105.8	93.3	130.0	117.0
Wind Energy Conversion .....	61.9	54.6	67.0	66.5
Ocean Systems .....	38.9	42.7	35.0	39.0
Solar Energy Research Institute				
Building .....	3.0	2.0	27.0	22.0
Biomass .....	43.2	27.6	57.0	55.0
Program Direction & Support .....	3.5	3.6	4.0	4.0
TOTAL, SOLAR TECHNOLOGY AND BIOMASS	358.4	319.1	441.0	437.0
Solar Applications				
Systems Development .....	41.0	40.1	47.0	43.0
Demonstration: Agricultural and Industrial Process Heat .....	11.0	11.2	14.0	12.5
Demonstrations: Residential and Commercial Buildings .....	55.0	69.0	35.5	44.0
Demonstrations: Federal Buildings ..	25.7	15.5	23.5	25.0
Demonstrations: Federal Photo- voltaic Utilization Program .....	15.0	16.1	-	12.3
Commercialization .....	2.7	.9	5.0	3.1
Market Development and Training .....	16.6	12.1	27.0	20.1
Program Direction & Support .....	2.5	3.2	3.6	3.6
TOTAL, SOLAR APPLICATIONS .....	169.5	168.1	155.6	163.6
Other DOE Solar Related Funding .....	31.5	28.7	49.4	43.8
TOTAL DOE SOLAR FUNDING.....	559.4	515.9	646.0	644.4
Other Federal Solar Funding *				
Agency for International Development.	16.0	5.0	42.0	22.0
Department of Agriculture .....	22.0	22.0	27.0	27.0
Small Business Administration .....	5.0	3.0	14.0	11.0
Federal Buildings Investments .....	20.0	15.0	25.0	25.0
Tennessee Valley Authority .....	8.0	8.0	16.0	16.0
Tax credits .....	88.0	88.0	74.0	74.0
TOTAL, OTHER FEDERAL SOLAR FUNDING.	159.0	141.0	198.0	175.0
TOTAL FEDERAL SOLAR PROGRAMS.....	\$718.4	\$656.9	\$844.0	\$819.4

\* Includes tax Credits and TVA funding which are off budget.

central receiver at Barstow, California.

- \$47 million for advanced research in novel photovoltaic materials and systems with high-risk, high-potential payoff.

- \$17 million to test the MOD-1 wind machine and construct the MOD-2 megawatt scale machine.

- \$23 million to complete the Ocean Thermal Energy Conversion test platform and test related components.

- An unidentified amount for detailed design of an integrated biomass system which includes collection, transportation, and conversion of biomass into medium-fuel gas.

Ocean systems is the one area of "solar technology and biomass" to show a decline before inflation, as B/A is set to drop to \$35 million and B/O to \$39 million. Under this, DOE's budget request calls for project management to get \$5.1 million (\$4.9 million for operating expenses and \$0.2 million for capital equipment), definition planning to get \$1 million, technology development to get \$7.4 million, engineering testing to get \$15.4 million (\$4.5 million for operating expenses, \$10.7 mil-

lion for construction on the OTEC-1 platform using the T-2 tanker, and \$0.2 million for capital equipment), and advanced R&D to get \$6.1 million (\$5.8 million for operating expenses and \$0.3 million for capital equipment).

Looking at the solar-applications program, which deals primarily with the removal of economic and institutional barriers to near-term applications, major program elements in Fiscal Year 1980 include:

- \$47 million for systems development and engineering for passive solar applications, agricultural and industrial process heat, and active heating and cooling systems.

- \$73 million for demonstration activities in residential, commercial, and federal buildings, and agricultural and industrial process heat.

- \$32 million for solar commercialization activities including barrier assessment, market development, training programs, and the preparation of commercialization plans for solar hot water, passive solar, and wind.

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Tucked in with lump funding for "other technology programs" are dollars for integration of wind and solar photovoltaics into the electric grid system and development of aquifer storage and other thermal storage technologies for solar heating and cooling, solar thermal power, and industrial-waste heat recovery.

Overall, the charts in this issue show how the Carter Administration views the federal solar program, government-wide.

### UNDERSEA TURBINES STUDIED AS POSSIBLE ENERGY SOURCE

The feasibility of tapping energy from the Gulf Stream with gigantic turbines moored beneath the ocean's surface will be studied as part of a \$230,000 contract awarded by DOE to AeroVironment Inc. of Pasadena, California.

The concept envisions as many as 250 turbines, each 500 feet in diameter, positioned in a single array roughly 15 to 20 miles offshore. Set in motion by the steady five-to-six-knot undersea current, each ocean turbine would generate 75,000 kilowatts of electricity delivered onshore.

AeroVironment, an energy and environmental consulting and manufacturing firm, has conducted environmental and hydrodynamic studies of the turbine concept since early 1977.

Under terms of the eight-month contract, the firm will analyze such factors as the elastic behavior of the large turbine blades in the ocean environment and the stability of the moored system.

### NEW DOE COMMITTEE FORMED

Assistant Secretary for Environment Ruth Clusen is organizing environmental co-ordination committees within DOE to track development of four major program areas: nuclear, fossil, solar/geothermal, and conservation. The committees will review and monitor current analyses being undertaken by DOE staffers for 32 separate energy-technology projects. The solar/geothermal committee will be concerned with solar heating and cooling, wind energy conversion, photovoltaics, fuels from biomass, agricultural and industrial process heat, Ocean Thermal Energy Conversion, solar thermal power systems, and geothermal.

### UNDERSEA CABLE REVIEW

An excellent article on undersea cables, an area which is being carefully researched by OTEC planners, appears in the October-November 1978 issue (Volume 12, Number 5) of the *Marine Technology Society Journal*. It is entitled "Structural Stresses in Undersea Cables: Their Effect on Reliability", and is authored by Robert Bridges, currently employed by the Bendix Corporation in California. Readers interested in this aspect of OTEC development will find this article worthwhile reading. Contact the Marine Technology Society, 1730 M Street Northwest, Suite 412, Washington DC 20036, (202) 659-3251.

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### CONTRACT FOR OTEC HEAT EXCHANGERS

DOE is negotiating a contract with the Westinghouse Electric Corporation for detailed design and construction of a heat exchanger for the Ocean Thermal Energy Conversion (OTEC) program. The shell-and-tube-design evaporator and condenser will be built by the Westinghouse Steam Turbine Division at Lester, Pennsylvania for approximately \$2.3 million. It will be tested aboard DOE's OTEC-1 ocean test platform, which is scheduled to begin operating near Hawaii in 1980.

The Westinghouse design was selected through competition that began in August 1977. The heat exchangers, the second to be tested aboard OTEC-1, are rated at .13 megawatts. The testing will provide data for the design of much larger units for use in future OTEC power plants.

The OTEC-1 test platform is being constructed for DOE by the Global Marine Development Company of Newport Beach, California.

● The Rand Corporation is undertaking a study of OTEC. Further details will be published in the February issue of TOL.

● Deep Oil Technology lost a section of pipe being tested under its cold-water-pipe contract with DOE. Full details will appear in our next issue.

● John A. (Jack) Blasy has been named Deputy Manager of DOE's San Francisco Operations Office, having served in an acting capacity since January 1978. Blasy was formerly with the Washington offices of ERDA and the Atomic Energy Commission, which he joined in 1965.

### SOLAR ENERGY AND CONSERVATION SYMPOSIUM HELD IN MIAMI IN DECEMBER

The Solar Energy and Conservation Symposium and Workshop, co-sponsored by DOE's Solar Energy Division and the School of Continuing Studies of the University of Miami, was held at the Konover Hotel in Miami December 11th through 13th. Attendance was low, running only about half of expectations.

A full day's session, chaired by Ms. Gay Heit Lavi of ERDI, Incorporated of Pittsburgh, was devoted to OTEC. Speakers included Bill Sherwood of DOE; Fred Dunning, Jr. of the Santa Fe Corporation of Alexandria, Virginia; R. J. Pont of Lockheed; Byron Washom of the Fairchild Stratos Division of Manhattan Beach, California; and David G. Jopling of the Florida Power and Light Company of Miami.

Jopling's presentation elicited a great deal of discussion as he expanded on the need to establish an interface between utilities, industry, and DOE. He felt that "private industry should take the lead from the Federal Government" and not vice-versa, as has usually been the case in the OTEC program to date.

While some of the listeners felt that Jopling's talk was "not negative, but realistic", this writer disagrees. Jopling's comments were all negative, with nothing positive brought out whatsoever. One of his comments was "everything isn't all black", while in speaking of potential faults of potential OTEC plants he even referred to the likelihood of "hotel wastes" from operating plants and the possibility of "leaving a screwdriver in the walls".

While it is certainly appreciated that Mr. Jopling took the time to attend and deliver a paper, some tendency toward positiveness would be welcome.



Byron Washom of the Fairchild Stratos Division addresses the Miami meeting. Session Chairman G. H. Lavi of ERDI, Incorporated looks on.

**"CENSORED" CANADIAN ARCTIC  
OTEC PROPOSAL PAPER  
NOW AVAILABLE**

As mentioned earlier in TOL (see the "Newsbriefs" in the May 1978 issue), a paper investigating the possibilities of an OTEC-type power plant in the Canadian Arctic, using the great delta-T between ocean waters and surrounding air, was denied inclusion in the Fifth OTEC Conference held in Miami last February.

TOL tracked the paper down, and in January received permission from the University of Western Ontario to publish the abstract. The paper is authored by Ron Green and R. K. Swartman, and is entitled "An Ocean-Thermal-Difference Power Plant in the Canadian Arctic". The paper was given in August at the Annual Conference of the Solar Energy Society of Canada, Incorporated.

Repeated below is the abstract. Copies of the complete paper may be obtained from R. K. Swartman, Faculty of Engineering Science, University of Western Ontario, London, Canada N6A 5B9, or directly from TOL when requests are accompanied by a check for \$4 to cover copying and postage costs.

*The concept of using the temperature differences of ocean waters has attracted considerable attention. Between the Tropic of Cancer and the Tropic of Capricorn, where 90% of the earth's surface is water, the surface water never drops below 29°C. Cold waters from the Poles move toward the Equator, sliding under the warm surface layer. The cold waters, at depths of as little as 2,000 feet, are a nearly infinite heat sink at 2° to 3°C, located directly beneath a nearly infinite surface-heat reservoir at 27° to 29°C. The heat reservoir is continually replenished by solar energy. A heat engine operating across a 27°C temperature difference with a 29°C source would have a theoretical thermal efficiency of 9%.*

*A variation on the ocean-thermal-difference concept for producing power in the Canadian Arctic is one which uses the cold atmosphere as the heat sink and the ocean water as the heat source. The average temperature of the ocean water offshore from Resolute, NWT is -1°C. The average monthly air temperature is below -12°C for about eight months of the year, varying from -34°C upward. A heat engine operating across a 33°C temperature difference with a -1°C source would have a theoretical thermal efficiency of 12%. It is proposed that propylene be used as the working fluid due to its desirable thermodynamic and physical properties under the design conditions. The feasibility of the concept lies in developing economic heat exchangers for this extremely rigorous application.*

DEPARTMENT OF ENERGY  
FY 1980 BUDGET  
(\$ IN MILLIONS)

ENERGY SUPPLY RESEARCH AND DEVELOPMENT APPROPRIATIONS

	FY 1979 ESTIMATE		FY 1980 ESTIMATE	
	BA	BO	BA	BO
<u>SOLAR APPLICATIONS</u>				
Systems Development .....	\$ 41.0	\$ 40.0	\$ 47.0	\$ 43.0
Demonstrations				
Buildings .....	55.0	69.0	35.5	44.0
Agricultural and Industrial Process Heat .....	11.0	11.2	14.0	12.5
Federal Photovoltaics .....	15.0	16.1	0	12.3
Market Development and Training .....	16.6	12.1	27.0	20.1
Program Direction .....	2.0	2.5	2.9	2.9
TOTAL SOLAR APPLICATIONS ..	140.6	150.9	126.4	134.8
<u>SOLAR TECHNOLOGY</u>				
Technology Support and Utilization .....	6.7	4.6	0	0
Solar Thermal Systems .....	100.1	94.0	121.0	133.5
Photovoltaics .....	103.8	91.9	130.0	117.0
Wind Energy .....	60.7	53.8	67.0	66.5
Ocean Systems .....	38.2	42.2	35.0	39.0
Solar Energy Research Institute .....	3.0	2.0	27.0	22.0
Program Direction .....	2.9	3.0	3.1	3.1
TOTAL SOLAR TECHNOLOGY ....	315.4	291.5	383.1	381.1

● A group of architects and engineers based in the Virgin Islands, the site of Dr. Oswald Roel's mariculture studies with deep nutrient-rich water, are investigating the possibility of an "upwelling air-conditioning project". The same group organized a conference at the Sheraton St. Thomas December 8th on the subject of "Energy Self-Sufficiency and the Virgin Islands". Speakers included Richard Holt of DOE; Dr. Michael Canoy, Director of the Ecological Research Institute; and Professor Gifford Albright, of Penn State University's Department of Architectural Engineering.

● The January 6th issue of the *Saturday Review* contained a cover story and special section on oceans, and included an article by SR reporter Susan Schiefelbein entitled "Teaching Poseidon to Turn a Profit". A substantial portion of the article dealt with OTEC.

**US GOVERNMENT  
PROCUREMENT INVITATIONS  
AND CONTRACT AWARDS**

Listed below are procurement invitations and contract awards 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.

**Dec 14: Public Energy Education:** Contract EBLA-79-NPI-004, 26 Feb 78. Contracting Officer (Program Contact) Richard Stone, Education Programs Division, (202) 376-9180. Programs must be national in scope. Both energy issues and options and consumer/homeowner options may be addressed in project content. US Department of Energy, Office of Procurement Operations, 400 1st St. NW, Washington DC 20545.

**Dec 15: Completion of TARPS Development, Test, and Evaluation and Establishment of the Requirements for TARPS Limited Production and Fleet Introduction:** A contract is being negotiated exclusively with the DCS Corporation, Arlington VA.

**Dec 15: Logistics Support for the Domestic Policy Review of Solar Energy Document:** Negotiations are being considered with the OAO Corporation, Beltsville MD 20705, for Contract ET-78-C-01-3423. The Contract Specialist is Denise Byrd.

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**Dec 18: Oceanographic Research to Include Physical, Chemical, and Biological Oceanography, Environmental Acoustics, Marine Geophysics, and Ocean Engineering:** Contract N00014-79-C-0004, 9 Nov 78 (no RFP), \$1,449,363, awarded to Oregon State University, Corvallis OR 97351.

**Dec 22: Developing Country Energy Assessment:** The work will be performed for the DOE Division of International Affairs. For each country selected under this program, an overall energy assessment will be performed to present an integrated picture of current and future energy demand, indigenous energy resources, capital and manpower requirements of energy, development, environmental effects, and the potential contribution of new technologies. The assessment activity will be carried out in two phases. The first phase will be a preliminary energy assessment based on information and data available in the US from different sources. The second phase will consist of in-country activity interlacing with energy and economic development agencies of the country concerned, leading to a more complete overall assistance activity in the area. The following are candidate countries: Argentina, Colombia, Indonesia, Mexico, Nigeria, Pakistan, and Portugal. It is anticipated that only two or three candidate countries will be selected for energy assessments and, generally, it is DOE's intent to award only one assessment to each proposer. Joint ventures are encouraged. The average level of professional effort for each assessment is expected to be six man-years or the equivalent over a period not to exceed 18 months. However the level of effort for a specific assessment may vary in the range of 1 to 15 man-years. RFP EW 79-R-02-0001 will be issued shortly. Only written requests for the RFP will be accepted. Please submit your requests to the following address: Allen Askew, Secretary, Proposal Evaluation Panel for RFP EW-79-R-02-0001, US Department of Energy, 9800 S. Cass Ave., Building 2, Room 1-123, Argonne IL 60439.

**Dec 28: Further Research on Oceanography, Boundary Layer, and Current Studies:** Contract N00014-76-C-0004, 12 Dec 78 (no RFP), \$315,606, awarded to the Trustees of Columbia University, Box 20, Low Memorial Library, New York NY 10027.

**Dec 28: Further Research on Ocean Circulation and Physical-Chemical Processes in the Ocean:** Contract N00014-76-C-0226, 11 Dec 78 (no RFP), \$565,625, awarded to the University of Rhode Island, Kingston RI 02881.

**Dec 29: Support Services for National Energy Analysis:** RFPEJ-78-R-01-6641. Requests must be in writing. No telephone requests will be honored. US Department of Energy, Office of Procurement Operations, PO Box 2500, Washington DC. Attn: Document Control Specialist.

**Dec 29: Studies in Research and Development for the Division of Energy Storage:** Award will result from (Unsolicited Proposal) Contract DE-AC-01-79ET-26303. Negotiations with Battelle Memorial in anticipation of award of \$999,000. US Department of Energy, Office of Procurement Operations, 400 1st Street NW, Washington DC.

**Jan 3: Multisite Sound Ocean Monitoring:** Negotiations are to be conducted with the Palisades Geophysical Institute, 615 SW 2nd Avenue, Miami FL 33130.

● **Jan 4: Further Development of an Airborne Subsurface Temperature Ocean Profiler P00002:** Contract N00173-77-C-0268 (RFP N00173-79-R-FM04), for \$77,486, awarded to Computer Genetics Corp., 18 Lakeside Office Park, Wakefield MA 01880.

**Jan 12: Further Research on Advanced Diving and the Development of Equipment for Man's Protection, Survival, and Work in the Marine Environment:** Negotiations are to be conducted with Battelle Columbus Laboratories, 505 King Ave., Columbus OH 43201.

● **Jan 12: Design, Development, Test, and Evaluation of Candidate Riser Cables for Application to the 10-40MW Modular Experiment Plant:** DOE is negotiating with the Simplex Wire and Cable Company, PO Box 479, Portsmouth NH 03801. US Department of Energy, Oak Ridge Operations Office, Contract Division, Attn: Stuart Phillips, PO Box E, Oak Ridge TN 37820.

**Jan 15: Further Oceanographic Research With Emphasis on Numerical Modeling, Ocean Circulation, Air-Sea Interactions, the Dynamics Biology, and Acoustic Structure of Gulf Stream Rings:** Contract N00014-75-C-0537, 29 Dec 78 (no RFP), \$661,760, awarded to Texas A&M Research Foundation, College Station TX 77843.

**Jan 15: Investigation of Ocean-Floor Processes and Acoustic Profiling of Upper-Ocean-Currents Effort:** Contract N00014-75-C-0152, 29 Dec 78 (no RFP), for \$107,795, awarded to the University of California at San Diego, La Jolla CA 92093.

**Jan 16: Thermoregulation of Fish and Turtles in Thermally Stressed Habitats:** Modification A002, Contract EY-76-S-02-2502, \$38,680, awarded to the Research Foundation of the State University of New York, Albany NY 12201. US Department of Energy, 9800 South Cass Ave., Argonne IL 60439.

● **Jan 17: Study for Identification and Creation of Concepts for a Wide Variety of Candidate Industrial-Plant Vessels Which Could Become New Business Ventures for US Shipbuilding Yards:** It should be emphasized that these sources must be capable of multidisciplinary analyses in market surveys, large capital financing of waterborne or offshore systems, economics and technologies of industrial processes or services, environmental and safety regulations, taxes and tariffs, international commerce, and shipbuilding capabilities in the US. Capabilities information should in-

clude description of organization, key staff member resumes, available facilities, previous management contracts (by title, date, amount, funding source, and brief description of activity), and other pertinent brochures or descriptive material. This material will not be returned to the senders and should not contain any proprietary or classified information. Responses should be addressed to Program Manager, Industrial Plant Vessels, US Department of Commerce, Room 4610, Maritime Administration, Code M-920, 14th and E Sts. NW, Washington DC 20230. This is not a solicitation for proposals, and there may not be a request for proposals resulting from this source request. In the event that a future request for proposals is forthcoming, first priority will be given to sources responding to this request for information. Responses should be received by COB by 9 Feb 79, however late responses may also be considered.

**Jan 18: Imaging Sensor for Ocean Surface Waves:** Negotiations will be conducted with the Riverside Research Institute, 80 West End Avenue, New York NY 10023, for two months' effort.

**Jan 22: Fuel-Cell/Metal-Gas Battery Technology:** Exploratory Development Area PMS 79-99. Perform exploratory development on electro-chemical energy conversion fuel cells and metal-gas batteries, components, and subsystems. Main interests are in secondary nickel-hydrogen batteries in both single-cell-per-pressure vessel and multiple-cell-per-pressure vessel configurations. Goals for nickel-hydrogen cells are 20 watt-hours per pound and up to 2,000 cycles in synchronous orbit, and 10 watt-hours per pound up to 30,000 cycles in low orbit. There is interest but no current work in nickel-hydrogen batteries for non-space use, in silver-hydrogen batteries for space use, and in hydrogen-oxygen fuel cells for space and non-space use. See notes, 31, 11 and the first paragraph of 68. This is a resynopsis and correction of PMS 79-23. Also cancellation of PMS 79-98. Firms responding to this announcement should indicate whether they are or are not a Minority Business Enterprise. Potential offerors that responded to the previous notification, PMS 79-23, need only indicate whether they are still interested in receiving the RFP. Closing date for submission of responses is 20 days from publication of this notice. Sponsor: AFAPL/POE-1, Don Warnock, (513) 255-6235. Directorate of R&D Contracting, Attn: ASD/PMR-1, WP AFB, OH 45433.

**Jan 22: Research Study of Advanced Sea-Based Alternative Concepts of Design for Post-1990 Period:** Contract N00019-79-C-0163, 29 Dec 78 (no formal RFQ), for \$69,542, awarded to Northrop Corp., Aircraft Group, Hawthorne CA. Contract N00019-79-C-0157, \$69,994, awarded to McDonnell Douglas Corp., St. Louis MO.