FEDERAL LABORATORY CONSORTIUM technology transfer news items

nsf

WANTED

CIRCUIT RIDING TECHNOLOGY AGENTS

for the

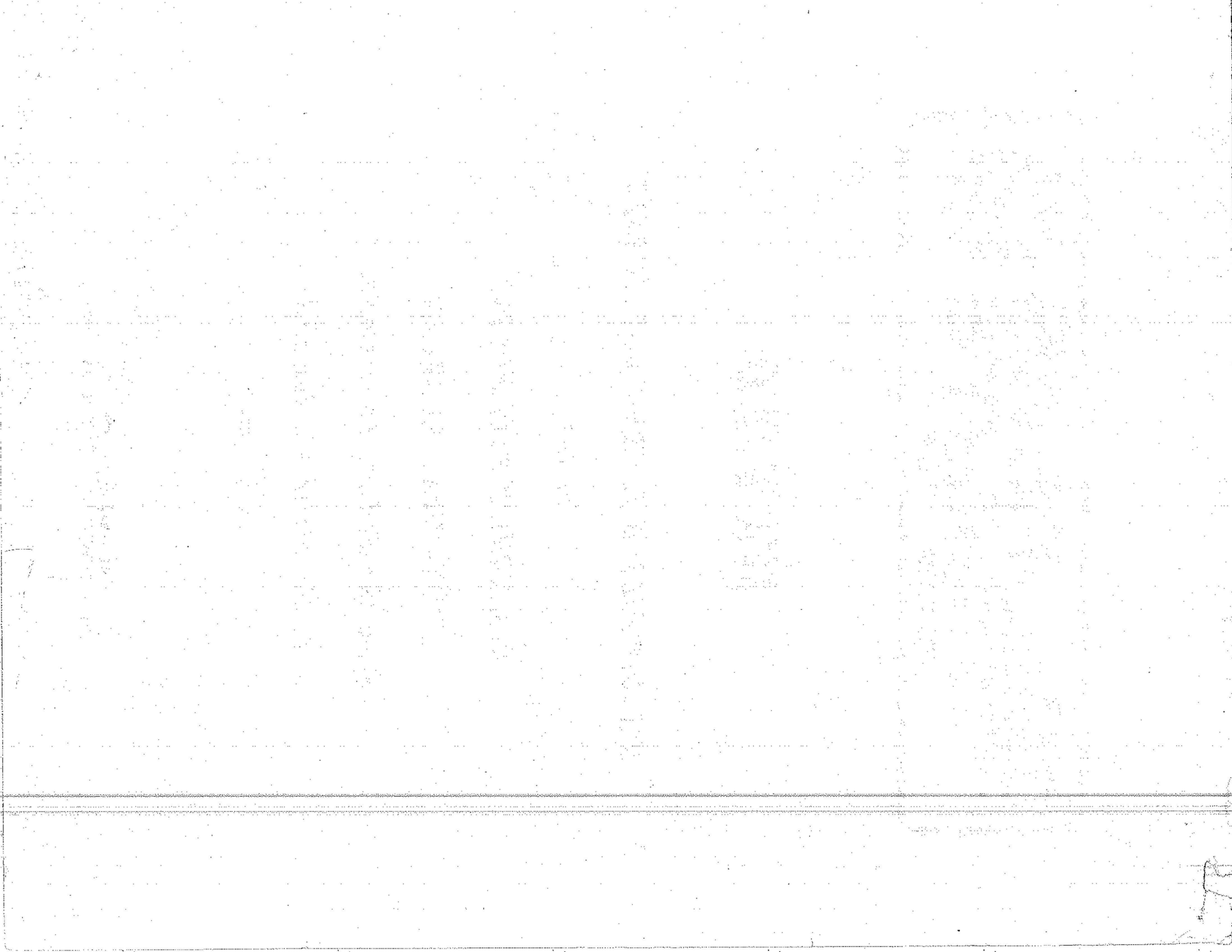
COMMUNITY TECHNOLOGY

INITIATIVES PROGRAM

From the Federal Laboratories

to the cities via the IPA

See page 27 for details



FEDERAL LABORATORY CONSORTIUM technology transfer news items

November 1977 Issue No 31

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This compilation of news items is an informal dissemination mechanism intended for individuals interested in Federal Laboratory utilization and technology transfer. It is anticipated that NEWS ITEMS will be issued at least once a month. Its contents are collected from the laboratories and agencies participating in the FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER and are organized into the following categories:

1. ACTIVITY HIGHLIGHTS: A summary of Federal Laboratory Program progress including a list of new technology contacts and items of interest.

2. CONSORTIUM NOTES: Notices of coming meetings, reports of previous meetings; mailing lists, agency personnel changes.

3. MEETINGS, CONFERENCES AND SYMPOSIA: Announcement of forthcoming professionsl meetings.

4. PROBLEM DEFINITION AND NEEDS ASSESSMENT: Problems requiring solution submitted by Federal, State/local government, private sector, and other Consortium representatives.

5. R&D SUMMARIES ON NEW TECHNOLOGIES: Abstracts of newly initiated research and development projects undertaken by agency staffs or under contract; newly patented items.

6. LEGISLATIVE ACTIVITIES: References to new laws, proposed bills, and hearings.

7. REGULATIONS AND POLICY: Proposed and adopted actions, either duplicated or referenced.

8. PUBLICATIONS: Notices of new reports, papers, computer programs, etc.; bibliographies of technology transfer related material.

9. CLIPPINGS AND REPRINTS: Reproduced newspaper, magazine, and other articles of potential interest; reproduced articles, drafts or statements that are not in print or not available and are particularly noteworthy.

10. BUDGET SUBMISSIONS AND AGENCY DESCRIPTIONS: Agency submissions to the Congress describing their program; information describing the function of new participants.

Please forward information to the attention of:

Mr. Nicholas Montanarelli
Federal Laboratory Program
National Science Foundation
ISPT, Room 1101-D
1800 G Street, N.W.
Washington, D.C. 20550
Tele: (202) 634-7996/7997/7998/799

3ND-NUSC-5216/1 (REV. 8-70)

NEW LONDON LABORATORY
NAVAL UNDERWATER SYSTEMS CENTER
NEW LONDON, CONNECTICUT 06320

AREA CODE 203
442-0771
AUTOVON 636 + EXT.2908

IN REPLY REFER TO:
0702:GCC:rab
3920
Ser:70702-89
September 23, 1977

Mr. Nicholas Montanarelli
Program Manager, Federal Laboratory Consortium
Division of Intergovernmental Science
and Public Technology
National Science Foundation
1800 "G" Street, N.W.
Washington, D.C. 20550

Dear Nick:

As you know, I am leaving the Naval Underwater Systems Center (NUSC) on September 26, 1977 to join the Office of Naval Research (ONR) for a three-year assignment at the NATO SACLANT Antisubmarine Warfare Research Center in LaSpezia, Italy. Before I leave, however, I want to tell you, Joe Antinucci, George Linsteadt and the rest of our colleagues in the Federal Laboratory Consortium how much I have enjoyed and profited from our association for the past three years.

I am looking forward to new and challenging opportunities in my assignment but I am not leaving without some regrets. We have expanded our Technology Transfer programs here at the Center at the Federal, State, and local level and initiated several programs with industry. It appears the IPA program will continue to expand and some exciting biomedical projects are on the horizon. The work has been personally rewarding and I intend to keep track of what is happening in the Technology Transfer field both at NUSC and in the Consortium.

The NUSC program will be in the very capable hands of Dr. James E. Atkinson. I know that you and Jim will enjoy working together.

I hope you will keep me informed on the progress of the Consortium. Please express my appreciation to the members for their support on numerous occasions. I hope to hear from you and the other members of the Consortium from time to time. My address will be:

George C. Connolly, Jr. 048-30-1506
NATO SACLANT ASW Research Center
APO New York, New York 09019.

Buona fortuna!

Sincerely,

George

UNIVERSITY OF DENVER
An Independent University
University Park, Denver, Colorado 80208

Denver Research Institute
Laboratories for Applied Mechanics / 303•753-2616

7 October 1977

Mr. Cecil Yates
FBI Laboratory
Department of Justice
J. Edgar Hoover Bldg.
9th and Pennsylvania Ave., NW
Washington, D.C. 20535

Dear Cecil:

I received the six documents you sent on gunshot residue. I have forwarded these to the Greeley, Colorado, Police Dept. I certainly appreciate your rapid response to my inquiry. The material you sent has, however, raised a different problem in my mind, and that is -- how many P.D.'s across the country could also use the same package you sent me? I would think that any subscribers to Forensic Sciences, FBI Bulletins, etc., would accrue this data. I was contemplating citing the references you sent and shooting this list statewide and through the rest of the urban innovation groups. The impact might be that you would get 100's of requests which you might not be set up to handle. I would appreciate your thoughts on this matter. Also, are all of the documents you sent cited in the Criminal Justice Reference Service?

I will be in Washington the week of the 17th and would like to talk with you about this and see if I can get a tour of your new building.

Again, sincere appreciation for your rapid turn-around time.

Very truly yours,

Ralph E. Williams
Associate Head

REW:gm

cc: George Linsteadt, NWC
Nick Montanarelli

THE UNIVERSITY OF DENVER IS AN AFFIRMATIVE ACTION INSTITUTION

RCA | Somerville, New Jersey 08876 | Telephone (201) 685-7051

Colonel Bernard C. Hughes
Commander, MERADCOM
Fort Belvoir, Virginia 22060

RCA

Dear Colonel Hughes: October 13, 1977

Vonderschmitt
President and
ral Manager
State Division

I want to thank you for sending Drs. Steinbach and Eaton as your representatives at our press conference yesterday at which we announced commercial availability of transcalent devices. Their presence added an extra dimension to the press conference and was a strong reminder to the press representatives of the many non-military benefits the American taxpayer derives from military expenditures.

Incidentally, we are pleased with the initial response to the press conference. Seventeen trade publications were represented at the session, and three others picked up press kits earlier in the day because of early deadlines. Between the press conference and our mailing to various media lists, we are distributing more than 200 kits. Additionally, we sent out a "laymen's" version of the story to the general news media. Dow Jones wireservice picked up the story yesterday afternoon, and as a result, we should see brief write-ups on many business pages of daily newspapers across the country. A copy of the DJ story is attached.

Again, my grateful appreciation for your support, and we look forward to a continuation of our excellent relations with your Command.

Sincerely,

B.V. Vonderschmitt

B. V. Vonderschmitt

BVV:nw

Encl

-RCA INTRODUCES GROUP OF
SOLID STATE POWER DEVICES

N Y -DJ- RCA CORP ANNOUNCED A NEW GROUP OF SOLID STATE POWER DEVICES WHICH IT SAID CAN HANDLE HIGHER ELECTRICAL CURRENTS IN A MORE COMPACT AND EFFICIENT FORM THAN CONVENTIONAL SEMICONDUCTOR DEVICES USED IN MANY TYPES OF INDUSTRIAL APPLICATIONS.

THE NEW DEVICES ARE THE FIRST IN THE ELECTRONICS INDUSTRY TO HAVE A HEAT PIPE BONDED DIRECTLY TO THE SILICON WAFER WITHIN THE UNIT ACCORDING TO DR RALPH E SIMON DIVISION VICE PRESIDENT RCA ELECTRO-OPTICS AND DEVICES.

SIMON EXPLAINED THAT THIS HEAT PIPE COOLING TECHNIQUE PERMITS THE PRODUCTION OF DEVICES WHICH ARE CAPABLE OF HANDLING HUNDREDS OF WATTS OF POWER YET ARE 75 PC SMALLER AND 85 PC LIGHTER THAN EXISTING SOLID STATE DEVICES WITH CONVENTIONAL HEAT-DISSIPATION FINS THAT ARE NOT INTEGRAL TO THE WAFERS.

THIS COOLING TECHNIQUE STEMS FROM WORK DONE BY RCA FOR THE U.S. ARMY MOBILITY EQUIPMENT RESEARCH DEVELOPMENT COMMAND FORT BELVOIR VA.
-- 4 03 PM EDT OCT 12-77

-KODAK 3RD QTR NET

DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORY
P.O. BOX 4005
CHAMPAIGN, ILLINOIS 61820

CERL-ZP

3 October 1977

Mr. Nicholas Montanarelli
National Science Foundation
Room 1101
1800 G Street, N. W.
Washington, D. C. 20550

Dear Mr. Montanarelli:

You recently passed on a query from the Science and Technology Utilization Council of the City of Milwaukee about instrumentation and techniques for accurately determining the thickness of concrete pavements.

While the Construction Engineering Research Laboratory has been deeply involved in research on structural concretes, we have not worked directly in the referenced area. Our staff suggests that the Council make direct contact with Mr. Bryant Mather, Chief of the Concrete Laboratory at the Corps of Engineers Waterways Experiment Station in Vicksburg, MS 39180. His laboratory has worked extensively with concrete pavements and might be able to answer the specific question or provide some references. His telephone number is (601)636-3111.

We also touched base with the Engineering Department at the University of Illinois. They suggested that the Council might consider making contact with Professor Charles Scholer at Purdue University, telephone (317)749-2587.

If we find any other resources, we will be glad to pass them on to you.

Sincerely,

SAM CAGLE
Public Affairs Officer

105

City of Flagstaff

P.O. Box 1
Flagstaff, Arizona 86
602-774-5

September 21, 1977

Commander
Naval Facilities Engineering Command
200 Stovall Street
Alexandria, Virginia 22332

Dear Sir:

On Monday and Tuesday, September 19 and 20, 1977, Mr. Miles Gray and Mr. Harry Bradley gave a seminar in Flagstaff on Public Works Controlled Maintenance Management Systems. We learned a great deal at that seminar and are very impressed with your program.

These gentlemen indicated to us that the Navy together with the National Science Foundation through the Technology Transfer program is starting to look for a Model City in the Southwest in which to implement this program. Flagstaff is a growing town of some 33,000 residents, and the City staff is starting to develop some inventory controls, manpower scheduling and job costing techniques. Many of the broad concepts of your program had already been identified by us. It would take us five to ten years to do this on our own, and even then we would probably not completely develop the entire program as you have done.

We are very interested in being part of your Model City program. We will have John Welbourn be the project coordinator. In addition, Ian Braley will handle any work involving computer analysis. Marvin Murray, Utilities Director, and Gene Gilpin, Public Works Director, both support this program and each will assign one to three persons to work on this project full time or part time as needed.

Please consider this our formal request to become a Model City in the Public Works Controlled Maintenance Management Systems Program. We are really anxious and ready to start into this program.

Very truly yours,

Charles K. McClain
City Manager

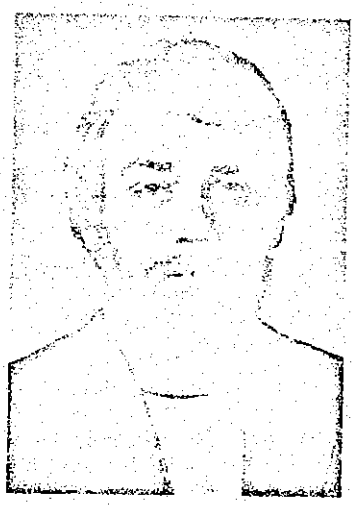
CKM/JTW/mae

CC Mr. Robert Brewer

N U S C O P E
Naval Underwater Systems Center
Friday, October 14, 1977

Dr. Atkinson Heads NUSC Special Programs

Dr. James E. Atkinson has been reassigned from the Sonar Information Processing Division, 315, to head the Office of Special Programs Development, 0702, at NUSC. The assignment was effective Sept. 26, 1977. Atkinson replaces George C. Connolly, Jr., who is presently on a three-year assignment at the NATO SACLANT ASW Research Centre, La Spezia, Italy.



DR. JAMES E. ATKINSON

In his new position, Dr. Atkinson will be responsible for the planning, coordination and implementation of the Center's Technology Transfer Program which encompasses over 70 projects involving Federal laboratories, state and local government, as well as private industry.

He holds a Bachelor of Science degree in Electrical Engineering from Northeastern University; a Master of Science degree in Electrical Engineering, also from Northeastern, and a Ph.D. in Linguistics from the University of Connecticut. Since joining the staff of NUSC in 1965 his technical experience has been in submarine sonar system design, underwater acoustic communications, channel simulation and computer modeling.

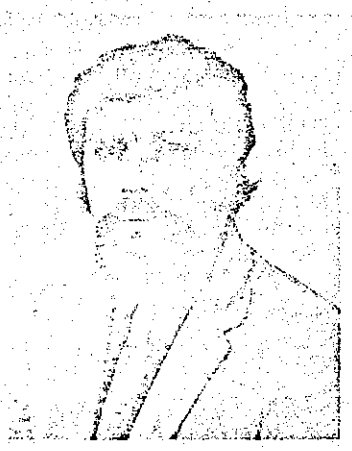
Dr. Atkinson has been involved in NUSC's Technology Transfer activities for some time, having been a consultant on speech scramblers for police communications, and assisting the Connecticut State Police on voiceprints for speaker identification. He also has a research appointment at Haskins Laboratories, Yale University, conducting physiological and psychological experiments on speech production and perception.

N U S C O P E
Naval Underwater Systems Center
Friday, October 14, 1977

Dr. Heroux Assigned Technology Transfer Post

Dr. Ronald G. Heroux, Head of User Services at NUSC's Newport Library, began a one-year assignment on September 19 as Executive Director of the Miami Valley (Ohio) Cable Television Council, under the mobility provisions of the Intergovernmental Personnel Act of 1970, which authorizes the exchange of personnel between Federal executive agencies and local governments. He will serve as advisor to the Council, the Council's Board of Trustees, and Government Technology Committee in their efforts to coordinate governmental, educational and community activities among the six cities in the Miami Valley, and to improve intercity cooperation via use of the cable television system.

Dr. Heroux will administer the cable television franchise for the system, which includes a separate 38-channel two-way institutional cable connecting the city buildings, schools, hospitals, libraries and other public institutions. The system will provide an opportunity for intergovernmental service delivery of activities such as computer services, coordinated fire and police training, and labor negotiation information, in order to eliminate duplication and save money.



DR. RONALD G. HEROUX

Dr. Heroux holds a doctor of arts degree in library science from Simmons College in Boston. He first joined NUSC in September 1966 and served in the Technical Library at the New London Laboratory until December 1967. He returned to NUSC in November 1971 and has held his present position since that time.

Technology Transfer At NUSC

by Margaret Kulos, 07C2

Technology Transfer is the process developed to increase the effective use of science and technology in dealing with national problems. It is the program that serves as a link between military research programs and the development, demonstration and operational programs of federal mission agencies, state and local government, and industry.

At the Center, technology transfer is continually expanding to provide technical support in areas where NUSC has unique expertise and facilities to support programs of national interest for a multitude of civil agencies, and in meeting the public needs of state and local government involved under the technology transfer program. The following are just a few of the projects that are typical of areas in which NUSC has become involved under the technology transfer program:

TRANSPORTATION

During the past year, the Urban Mass Transportation Administration (UMTA) Office of Technology Development and Deployment has been sponsoring research to evaluate life cycle costing (a DOD developed technique to facilitate the identification and definition of all costs associated with each phase of a project) and the extent to which it can be utilized in urban mass transit systems. The project is being administered by NUSC, which has been assisting UMTA in a broad range of research and development projects for the past four years, with Nicholas Parris, 3262, serving as project manager.

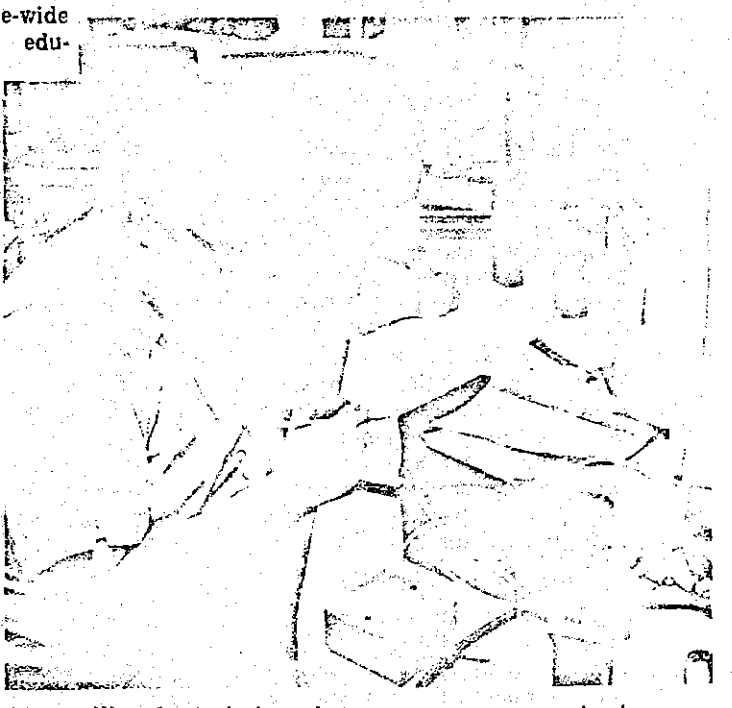
The value of life cycle costing has been established, and based on the work to date. UMTA has decided to expand the project. Emphasis is being placed on identification of activities where life cycle costing may be applied; possible implications of the application of life cycle costing on UMTA programs; estimates of adverse and beneficial consequences of its application; the development of life cycle costing methology for the purchase of rail cars; and the development of an implementation plan for UMTA life cycle costing.

This program is a classic example of the adaptability of military technology to civilian programs.

EDUCATION

A working, dynamic model of the vocational education system of the state of Rhode Island has been developed by Dr. Stanley Erickson, 211, to be used by planners and administrators in the Rhode Island Department of Education to develop a unified state-wide policy for vocational education.

The Rhode Island Model is capable of showing the interactions between the state's vocational education programs and critical factors such as industrial growth, school graduation rates, unemployment, and state welfare costs. It can provide long-range forecasts of future training requirements and of the consequences of training programs in effect today. Further, it will allow planners to assess the impact of alternate vocational education policies and structures. This program can be used as a prototype for modeling the vocational educational systems of other states. Resulting from publication of "The Rhode Island Model" as a technical document, considerable interest in this program has been generated in other parts of the country.



Aiding Waterford during the emergency communication test conducted by the American Radio Relay League (ARRL) was Dan Brochu, 342, at left, with Dorian DiMarco, ARRL.

COMMUNICATIONS

Studies have been conducted and are continuing under the provisions of the Intergovernmental Cooperation Act, on a cost reimbursable basis, for the town of Waterford to determine adequate means by which the town can comply with federal requirements for civil preparedness. Coordinating the program is Harrison A. Fortier Sr., 3163, with assistance from Dr. Michael C. Karamargin, 312, John H. Visneuski, Jr., 411, Henry C. Turko, 411, Robert L. Warenda, 4331, and Daniel G. Brouchu, 342.

The program has included an evaluation of the acoustic coverage of the emergency alert systems located at the town's fire stations which was accomplished by measuring the sound level as a function of range from each station. As a result of these efforts, the town of Waterford was awarded additional federal funds to be used during FY-77 to implement the warning system plan.

NUSC provided technical service and consultation to enable the successful completion of the annual Simulated Emergency Test (SET), which is necessary for recognition by the American Radio Relay League (ARRL).

A survey was also conducted resulting in refurbishment of and recommendations concerning emergency communication equipment.

Technical consultation and guidance were provided for the installation of a major communications tower, antenna, and specifications for a multi-recording system for the Emergency Communications Center to serve both the police and fire departments of Waterford.

Consultation has been provided and technical service rendered for the establishment of a new fire base communications unit, and an antenna survey of the complete town of Waterford is scheduled to be conducted in the near future.

LAW ENFORCEMENT

Sparked by the CB radio epidemic sweeping the country, policeband receivers and scanners have become readily available to the public. As a result, police radio communications are continually being intercepted both by casual observers and by law breakers. In many cases, mission and human lives are jeopardized by the lack of voice privacy. Commercially available speech scramblers are either too expensive, or offer too little privacy and do not meet today's police requirements.

Techniques originally developed by NUSC for underwater communications are being considered as a possible solution to the problem posed by the bandwidth of the public safety channels. A SEARCH GROUP, Inc. (a non-profit corporation funded by the U.S. Department of Justice Law Enforcement Assistance Administration (LEAA)) study was assisted by Dr. James Atkinson, 315.

The study consisted of two major parts. The first surveyed many police departments to determine the need for scramblers and current problems in the area of voice privacy. The second surveyed existing commercially available speech scramblers from a technical standpoint in terms of privacy level, system performance, and cost.



Tim Mulrooney, 3631, at the controls of the NOVA 1200 Computer which is used to develop MK 48 microprocessor implementation on the Homing Control Project.

The survey of police departments showed a definite and increasing need for speech scramblers. The technical survey showed that no presently available speech scrambler meets the criteria for privacy, performance and cost. As a result, a recommendation is being made to LEAA to fund a two year program to develop a new type of scrambler (employing time division techniques) that shows good potential for increased privacy, and lower system cost.

If funded, SEARCH GROUP Inc., has expressed a strong interest in NUSC staying involved as a technical consultant and assisting in the program management.

MEDICAL

Studies are being conducted within the Office of Special Programs Development by Robert Levine (a graduate engineer who has been a summer aid for five years at NUSC and is entering medical school) to explore the possibilities associated with applications of the Center's expertise in signal processing and acoustics to medical fields.

NUSC's knowledge of sonar transducers and acoustics is being utilized in an investigation with research personnel from Beth Israel Hospital in Boston. The possibility of using ultrasonics to warm the heart as a non-invasive aid to cardiac pacing is being explored by William Konrad, 3164.

James Archer, 4331, Charles King, 338, and James Clark, 4123, have provided technical assistance to the Diagnostic Ultrasound Department at Lawrence & Memorial Hospital in New London, and explored means for improving the ultrasonic imaging of internal body structures.

SOFTWARE

A computer program to facilitate the use of microprogramming to the general user has been developed by Timothy J. Mulrooney, 3631, as part of a research project at the University of Rhode Island, sponsored by the NUSC long term training program.

The program, TRACE, is an interactive simulation that runs on any Data General minicomputer. Its purpose is to simulate an Eclipse Computer, including the microprogramming feature of the Eclipse.

TRACE has the ability to merge with any existing program and become part of that program to aid in debugging and optimizing. The program includes features to list or change all the important parameters in the computer, including registers, memory, and microcode. It can also produce complete execution maps to assist the novice and/or expert in writing computer programs. Requests have been received for documentation of this program from systems designers at Data General Corporation. A documentation package has been prepared for public distribution to users throughout the country.

ENVIRONMENT

The U.S. Coast Guard has awarded a contract to NUSC's Special Projects Department to make observations of turbulence and orbital motion velocities associated with wind waves as they relate to wind speed and sea-state. The Deep Water Ports Act (1974) requires the development and application of the best available technology to protect marine and coastal environments from accidental oil spills. These data serve as inputs used to identify the threshold sea-state conditions beyond which oil spill containment and recovery techniques become impractical in the open sea.

Dr. David H. Shonting, 311, plans to use the NUSC-developed 20 m. long AESOP spar buoy system as the platform from which to mount variously configured arrays of fast response ducted impellor sensors. These sensors, developed at the University of Washington, can detect scales of motion down to 10 cm and fluctuations up to 11 Hz.

Experiments are planned for this fall in conjunction with the Department of Ocean Engineering at the University of Rhode Island.

Measurements using the wave follower buoy system will be made of the Free Surface Fluctuations in order to estimate wave spectra. Supplementary white cap data will represent a large source of turbulence that will be obtained by aerial photographs taken from a light aircraft of the sea surface over 100 meter square area at the side of the AESOP Buoy measurements. This turbulence and wave motion data will supply parameters to the Coast Guard to estimate the amounts of oil diffusion and spreading from a potential oil spill disaster.

Also, this data will be useful to estimate acoustic scattering from the sea surface.

LICENSING

In the past two years, the Naval Material Command has been placing increased emphasis on the transfer of technology to industry. Several NUSC inventions have been exhibited at national trade shows and in June of this year a request was received from the Henschel Corporation, a unit of General Signal, to explore the manufacture under license of an Acoustic Ship Speed Indicator invented by Dr. Lewis Stallworth, 314, and Robert Hartley, 411.

IPA ASSIGNMENTS

Recently NUSC has expanded the Center's Technology Transfer Program by utilizing the mobility provisions of the Intergovernmental Personnel Act (IPA) of 1970 to facilitate assignment of employes to directly assist state and local government. Personnel on such assignments remain Federal employes, but do not count against the Center's personnel ceiling if at least 50% of the employe's salary is reimbursed by the organization to which the assignment is made.

In November 1976, Robert B. MacDonald, 0702, a physicist, began a full time assignment as a technology transfer agent with the Connecticut Conference of Municipalities (CCM). This represents the first time a NUSC staff member was assigned under the mobility provisions of the IPA. MacDonald, whose assignment is in conjunction with the New England Innovation Group, which is funded by the office of Intergovernmental Science and Public Technology of the National Science Foundation, will serve as a link between public sector needs of the 169 towns in Connecticut, and the technology resources that can meet those needs.

In the past nine months, MacDonald has handled 75-100 requests for assistance from local governments in diverse areas including chemical analysis, public works, fire alarm systems, solar energy, computer technology, cost evaluation, aerial photography, photography equipment, snow and ice control, records management, energy conservation,

ultrasonic level detectors, soil mechanics, infrared scans, and reference materials.

One of his major accomplishments has been the coordination of workshops for municipal officials. To date, three programs have been held with speakers from various resource agencies on police technology, energy conservation and solid waste managment.

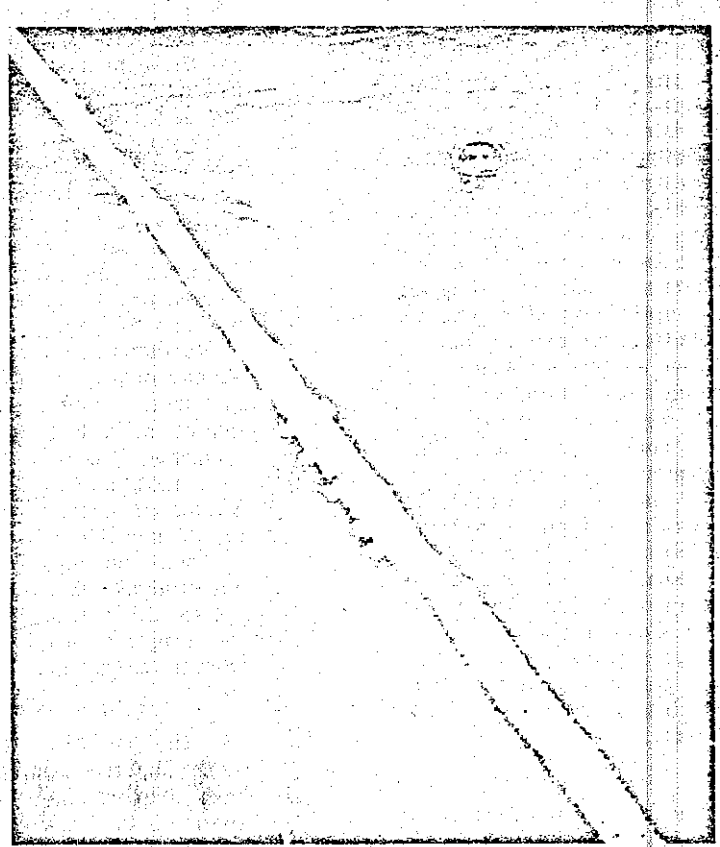
Field tests of a computer program designed to improve snow removal techniques are presently being conducted through the technology agent at CCM. This program is a unique example of technology transfer to local governments, because it involves the cooperation of several levels of government. Sponsored by NSF funding, technical personnel from both the Army Cold Regions Research and Engineering Laboratory and NUSC are working closely with representatives of 21 universities in Connecticut to examine and attempt to optimize snow removal and routing systems. Additional programming and implementation of the system for the town of East Lyme as well as research for optimizing routing procedures is being carried out at NUSC by Margaret Kulos, 0702. Thirty-two municipalities in Connecticut have already expressed an interest in the program and the first phase of the project, data collection, has been initiated in these towns.

Gordon Preiss, 4123, a mechanical engineer, has been assigned to the State of Connecticut Department of Planning and Energy Policy to assist in the fields of solar energy and energy conservation. In one of the major projects, Preiss, in cooperation with NUSC and the State Department of Planning and Energy Policy, is assisting the Thames Science Center of New London in the installation of a solar energy demonstration project, and will be conducting workshops at the Thames Science Center on energy conservation and use of solar energy for private citizens. He has also been involved with the New England Regional Commission in the program formulation of a solar energy information center, and a hot water initiative program with HUD.

William J. McGrath, 07, a computer systems analyst, is on assignment to the New York City Police Department Motor Transport Division, to analyze the department's fuel dispensing system and evaluate the cost/benefit potential of automating, semiautomating, and revising existing manual procedures related to the dispensing of vehicle fuel. Phase I of the project, a study of the system presently in use, has been completed and a cost evaluation of an automated, on-line fuel dispensing system is being conducted. Recommendations for design revisions to yield greater efficiencies in department operations and fuel economies are scheduled to be presented to city officials this month.

A civil engineer, Vincent A. Mannion, 0702, has been detailed to the Rhode Island League of Cities & Towns (RILCT), to coordinate the efforts of the New England Innovation Group, Massachusetts League of Cities & Towns and RILCT in the formulation of a public works management program for Massachusetts and Rhode Island.

Mannion has also been providing assistance to state and local governments in areas such as energy, water leakage, and emergency communication systems and equipment.



AESOP (Another Experimental Stable Oceanographic Platform) is a long hollow stemmed spar made of aluminum alloy. It is simple in construction and has dimensions and dynamic characteristics in moderate sea states that meet many of the needs of a stable platform for mounting small instrument sensors above and below the naviface.

NUSCOPE
NAVAL UNDERWATER SYSTEMS CENTER
Newport • New London • AUTEC — Andros Island, West Palm Beach • Bermuda
Vol. 7 — No. 17 The Principal Navy RDT&E Center For Submarine Warfare and Submarine Weapon Systems Friday, August 19, 1977

Weapons Technology Transfer Seminar Conducted At Newport Laboratory

A total of 130 representatives from 43 U.S. industrial firms met with high-ranking government officials from seven Naval activities at the Newport Laboratory on August 2-3 to attend a Weapons Technology Transfer seminar. Sponsored by NUSC and the Naval Sea Systems Command, the prime purpose of the talks were to provide an orderly and timely transfer to industry in the areas of weapon silencing and advanced torpedo homing array design.

Papers were presented on two important programs ongoing at NUSC, which are the Undersea Weapons Silencing, Hydrodynamics and Structures Block Program and the Improved Performance Undersea Vehicle Block Program.

Attendees were welcomed to NUSC by Capt. William E. Trueblood, Newport Laboratory Officer in Charge, and Dr. C. Nicholas Pryor, the Center's Technical Director, followed by greetings from the Naval Sea Systems Command by Dr. Edward Liszka, Acoustics and Electromagnetics Branch, who represented Stan Marcus, Assistant Deputy Commander and Technical Director, NAVSEA Research and Technology Directorate.

Technical presentations were given by the following NUSC staffers: Robert Trainor, Dr. Thomas Davis, both 3634, Fred Nussbaum, 3631, Domenic Quadrini, 3634, Giovanni Silvestri, 3602, Dr. Bruce Sandman, 3634, Thomas Black, 3642, Jan Linberg, 3162, Richard Nadolink, 3635, and Richard Schmidt, 3631, James Kelly, 36302, G. Barclay de Tolly, 3631, and David Goodrich, 3635.

Industrial officials making presentations included Dr. Neal Brown and Richard Brown of Bolt, Beranek and Newman; and Dr. William Thompson, and Dr. Robert Marciniak of Applied Research Laboratories, Pennsylvania State University.

Coordinators for the seminar were: Robert Trainor, Supervisory Physicist, and Robert Kittredge, 3634.

New York Employe Joins Center Under IPA

Ms. Margaret M. McNamara, a research and administrative associate for the New York State Assembly Scientific Staff in Albany, N.Y., has been assigned to the Office of Special Programs Development, 0702, at NUSC.

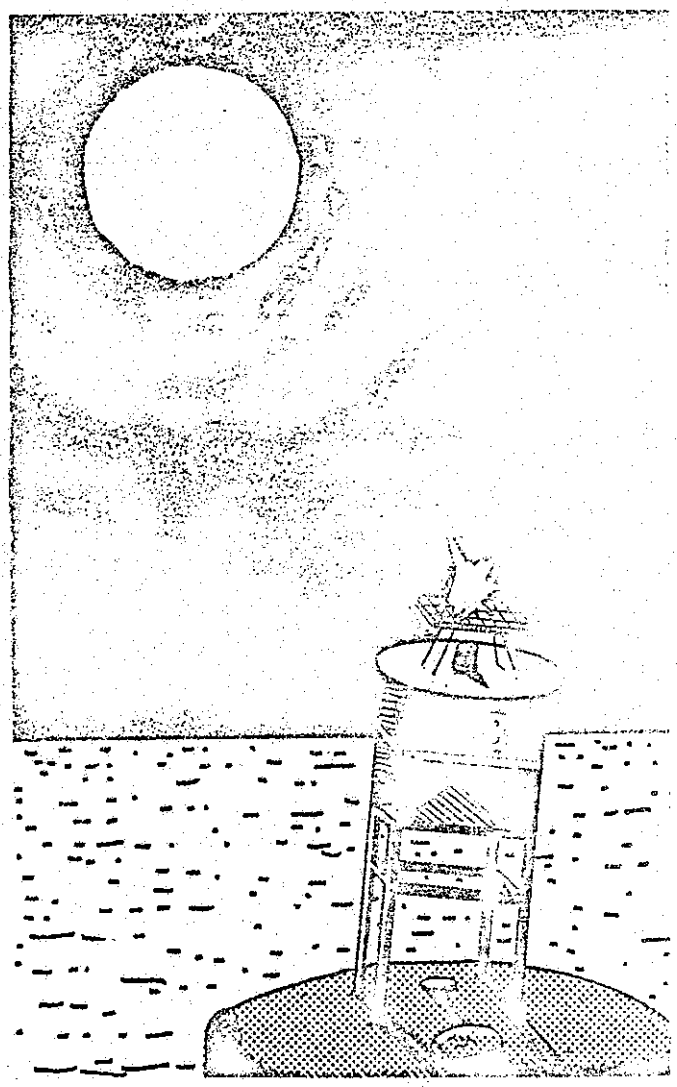
The two-year assignment was initiated on August 15, 1977 under the mobility provisions of the Intergovernmental Personnel Act of 1970 which authorizes the exchange of personnel between Federal exeeutive agencies and local governments. This represents the first time an assignment of this type has been made at the Center.

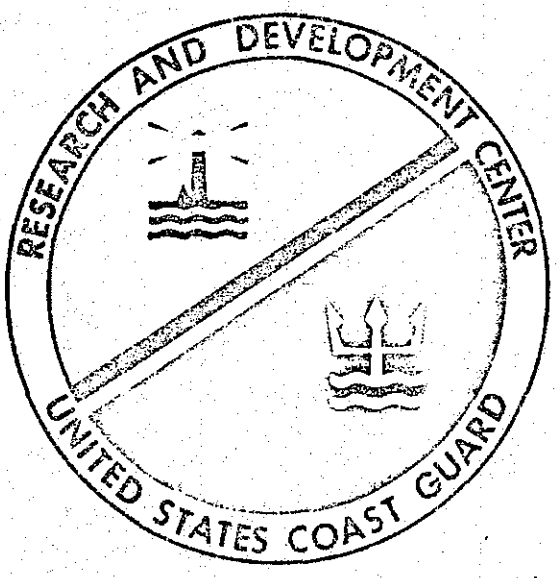
Ms. McNamara will serve as the assistant for state and local government programs under the NUSC Technology Transfer program. Her duties will include the conducting of experiments to study the effectiveness of existing intergovernmental projects at the Center and techniques utilized for implementing additional projects.

Ms. McNamara holds the B. A. degree from Empire State College, State University of New York, and has previously been employed at the Cornell Aeronautical Laboratory and the Federal Bureau of Investigation.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

The Coast Guard and SOLAR ENERGY





GROTON, CONNECTICUT

As a result of rapidly escalating energy costs the United States Coast Guard instituted a plan beginning in 1974 to investigate the feasibility of using solar photovoltaic energy to power the more than 14,000 lighted aids-to-navigation presently part of the Coast Guard inventory. Photovoltaics is the process of converting solar energy directly to electrical energy. Lighted aids-to-navigation are the backbone of the nighttime system of visual aids provided for the mariner. Lighted aids-to-navigation are presently powered by primary (non-rechargeable) batteries. The current plan calls for replacing these with long-lived secondary batteries that generally are much smaller, less expensive and do not create a disposal problem.

The plan is three-fold:

1. To evaluate solar energy conversion as a potential energy source to power aids.
2. To establish the design criteria for a reliable solar energy conversion and storage system.
3. To develop specifications for procurement of equipment.

The original project tested two types of solar panels and three types of batteries, some on buoys in Long Island Sound, Boston Harbor, Florida and Alaska, with most of the systems located in a fully instrumented roof-top test at the Coast Guard's Research and Development Center in Groton, Connecticut. The present test has expanded to eight solar array types and seven battery types. There is also an extensive accelerated life test program underway for the arrays.

The basic power system is simple. During the daylight hours the solar array charges the battery. During the nighttime hours, the battery provides current to the light thereby aiding the mariner in his nighttime navigation.

As a result of these efforts, the Coast Guard has converted 50 aids in the Miami, Florida area. This is the first real life test for solar powered aids-to-navigation. A second test proposed for early in 1978 in the Boston vicinity is presently in planning.

Chicago (November 9-10) Los Angeles (December 6-7) Atlanta (January 23-24) Boston (March 6-7)

Battelle

Announces

THE FIRST COMPREHENSIVE TWO DAY EXECUTIVE BRIEFING ON:

ATTAINING SELF-SUFFICIENCY IN AN ERA OF DWINDLING SUPPLY

INTEGRATED COMMUNITY ENERGY SYSTEMS PLANNING

A TESTED APPROACH FOR INDUSTRY AND GOVERNMENT

for
- industrial energy users
- urban and regional planners
- city managers
- mayors and other elected officials
- utility executives
- environmental and energy experts
- public utility supervisors
- city engineers
- representatives of medical and educational institutions
- and all other government and industry executives affected by the increasing energy shortage

A "State-of-the-Art Report" based on this research will be available. To reserve a copy, please see page eight.

The Fallacies of a National Energy Program

Richard J. Anderson
Consultant
Battelle-Columbus

"One of the fallacies abroad in this land is that there is a single national solution to the energy problem. In actuality, there is no one formula that is going to fit the needs of all the regions of this vast country."

The case for a single national energy policy has been repeated endlessly — by government officials, by the media, and even by the executives of energy companies. But in this provocative and controversial discussion, Richard J. Anderson, a Battelle consultant and nationally recognized energy authority, will shatter the myth that a single national policy can solve the country's energy problems. In the Northeast, for example, points out Mr. Anderson, there is virtually no prospect for solar energy, while in the West solar power can one day play a significant role. Likewise hydroelectric energy plays a critical role in the Northwest but is of virtually no importance in Ohio, Indiana, Illinois and other Mid-Western states. "One formula is not going to solve our problems," says Mr. Anderson. "What we need is not one national energy policy but a series of community and regional energy plans."

Energy Planning: The Community Must Take Charge

C. M. ("Mal") Allen
Executive Briefing Chairman
Senior Research Scientist
Energy Systems and Environmental Research
Battelle-Columbus

"The severe economic shocks to which so many communities were exposed during the 1976-77 winter were not the consequence of inadequate federal programs. Rather they were caused by the failure of local community administrators and planners."

While most look to Washington, D.C. to "solve" the energy crisis, the real solution must be found by community leaders, both governmental and business, says C. M. ("Mal") Allen, a senior Battelle scientist who, as Program Manager for its Community Energy Systems Planning Research, has directed Battelle projects in Virginia and California and regional plan developments in the Southeastern, Mountain, East North Central States and Canada. Mr. Allen will explain why the community, rather than the federal government, is the key to energy planning, describe the critical elements of Integrated Community Energy Systems Planning and explore the principal options that confront community officials. "Either the community must make some hard decisions now," says Mr. Allen, "or they will be made for it when its back is against the wall in a few years."

Managing the Energy Audit

G. Christopher P. Crall
Research Engineer
Owens-Corning Fiberglas Corp. Tech. Center
Granville, Ohio

Sherwood G. Talbert
Research Engineer
Fluid and Thermal Technology
Battelle-Columbus

"You have to design for what the total energy demand of the community will be two years from now, ... ten years, indeed for the remainder of the century."

Too often, analyzing a community's energy consumption consists of little more than a simple calculation of current monthly consumption. Two engineers who for years have specialized in the application of energy estimation techniques will show how an audit must answer: (1) How much energy is used by fixed facilities? (2) What is the energy flow? (3) How does energy consumption vary by time and season? and, (4) What are the best estimates of the community's energy requirements?

THE PR

Corporate Problems and Priorities

J. Steve Anderson (Chicago, November 9-10)
Director of Energy Planning, Major Appliance Business Group
General Electric Company

Richard B. Pool (Los Angeles, December 6-7)
Corporate Energy Coordinator
Kaiser Aluminum & Chemical Corporation

Jack Entwistle (Atlanta, January 23-24)
Engineering Associate, Energy Management
Fiber Industries, Inc.

Bruce A. Melaas (Boston, March 6-7)
Director, Energy Affairs
Celanese Chemical Company

In most communities, industry is the biggest consumer of energy and the key to energy stability. What steps are key corporations taking to conserve energy? And how are they ensuring adequate fresh sources of supply? What are the social responsibilities of heavy energy consumers? Citing actual experiences and focusing on particular energy problems in each region of the country, four energy experts from the nation's leading corporations will answer these fundamental questions. They will disclose the kinds of corporate energy programs that worked — as well as those that didn't. They will consider what role corporations should play in shaping community energy policies. And they will discuss the unique problems of their particular industries.

The Silent Gluttons

Thomas Martineau
Research Architect
Housing Research, Community,
Regional and Environmental Planning
Battelle-Columbus

"The enormity of energy consumption by motor vehicles is readily apparent. But underneath the anonymous facade of a glass office tower or in the basement of unassuming suburban split-levels, the waste of British thermal units occurs with equal or greater abandon."

While the automobile gets the chief blame for the nation's ravenous energy appetite, perhaps the chief opportunity for communities to actually reduce energy consumption is its housing stock. Thomas Martineau, an architect and community planning specialist who, as early as the mid-1960's, was recommending that lighting levels be reduced in new buildings and that architects be required to design buildings with minimal heating and cooling loads, will show how incentives can be created for designing energy efficient buildings; how human

OGRAM

productivity can be improved despite lower energy consumption; and how to calculate the dollar savings in improved lighting, heating, cooling and ventilation needs in both new and retrofit buildings.

Utilizing Wastes: Fact or Fantasy?

Richard B. Engdahl
Consultant
Battelle-Columbus

"In the past we've neglected many of the opportunities to turn waste into energy. Today, if anything, we are excessively optimistic."

For many communities, squeezed by a shortage of energy on the one hand and a lack of sites for waste disposal on the other, the idea of transforming costly waste and sludge into valuable fuel and power is one of the most alluring prospects of the late 1970's. But while these dreams are not total fantasy, the fact is, as Richard B. Engdahl, one the the world's leading experts on incineration systems, will demonstrate, the financial and environmental costs of turning trash into cash are far more formidable than often recognized. Still, says Mr. Engdahl, who has worked closely on highly advanced waste to energy plants in Germany, France, England and a dozen other European countries, municipalities will have to proceed. Says Mr. Engdahl: "They simply have no other choice."

Evaluating Alternative Energy Systems

David A. Ball
Researcher, Combustion and Alternate Fuels
Energy Systems and Environmental Research
Battelle-Columbus

"Most communities in this country developed on a very haphazard basis and have decentralized systems that have evolved around very large utility networks."

What new energy sources must communities develop to lessen the burden on existing systems? How can a community evaluate which particular systems are best for its particular needs? David A. Ball will analyze the pros and cons of all the major new systems that a sophisticated community energy plan must consider: coal gasification, fluidized-bed type boilers, integrated solar assisted heat pumps, waste fueled boilers, solar hot water and space heating. Then he will demonstrate how community and industrial planners can analyze each alternative taking into account their indigenous energy resources as well as geographical, climatic, and usage characteristics.

Applying "Life Cycle Budgeting" to Energy Problems

Donald Boyle, P. E.
Regional Engineer
Department of Health, Education and Welfare
Boston

"Too many organizations worry about the immediate costs of a new energy system and ignore the long term savings. Life cycle budgeting is a way to avoid that expensive error."

What financial tools can a community use to evaluate alternative energy systems? How can future cost savings be weighed against present cash outlays? What mistakes are many communities presently making in costing out energy expenditures? Drawing on extensive experience with communities throughout the nation, first as Chief of the Developmental Division, Office of Planning and Development, Office of Facilities, Engineering and Property Management, Department of Health, Education, and Welfare in Washington, D.C. and presently as Regional Engineer (Boston) for HEW, Donald Boyle, citing numerous actual case studies, will demonstrate how new energy projects can be properly costed — and the expensive consequences of faulty costing techniques.

Shaping Consumer Attitudes: The Overlooked Ingredient

Lawrence G. Welling
Staff Psychologist
Training and Human Performance
Battelle-Columbus

"As soon as the government starts creating artificial incentives and disincentives it must understand that psychology — as well as dollars — is at work in every consumer purchase decision."

What kinds of cost incentives (and disincentives) actually influence energy consumption? In this provocative discussion, psychologist Lawrence Welling explores why some increases in costs can sharply cut consumption — while others have virtually no effect; why rebates are frequently more powerful incentives to conserve than straight cost reductions; why any change in pricing must be accompanied by systematic and extensive publicity; and why consumers are far more influenced by differences in capital acquisition costs than by monthly operating expenses.

How Pollution Led One Community Toward a Solution

Robert M. Zweig, M.D.
Practicing Physician
President, Pollution Control Research Institute
Chairman, Environmental Health Committee
Riverside County Medical Association, Riverside, California

"There is no such thing as a non-polluting fuel — not even solar energy."

A few years ago, Riverside, California, in the heart of the highly polluted South Coast Air Basin area, was declared one of the nation's most pollution ridden communities. Today, as a result of efforts by practicing physician Robert Zweig and other community leaders, it has begun a major effort to reduce pollution levels significantly and, working closely with Battelle, has launched a program to make itself largely energy self-sufficient by 1985. Based on his many years of active involvement, Dr. Zweig will discuss the innovative Riverside experience, and offer suggestions for other communities on the environmental considerations in community energy planning.

ERDA and its Integrated Community Energy Systems (ICES) Program

Gerald S. Leighton
Assistant Director
Community and Buildings Energy Systems
Energy Research and Development Agency

"The ERDA program seeks to provide all segments of our society the means to use less energy to achieve the same output in goods and services and with minimum negative changes in lifestyles."

What is the federal view of community energy planning? How

Program continued on next page:

strongly is ERDA, through its Integrated Community Energy Systems (ICES) program, encouraging its development? Gerald S. Leighton, a central figure in Washington's support of community energy planning, will furnish a federal perspective on the objectives of the program. He will discuss actual test programs that ERDA is now funding around the nation. He will also address the policy and political obstacles confronting the development of community energy systems.

The Promise of Geothermal Energy (Los Angeles, December 6-7)

C. Richard Schuller
Director, Science and Government Study Center
Battelle's Human Affairs Research Centers, Seattle

Clarence H. Bloomster
Staff Engineer
Battelle-Northwest

"Geothermal energy has an excellent potential as a multi-purpose renewable resource which may be developed over the next 25 to 50 years."

For many Western areas, the proximity of geothermal energy resources is one of the most exciting potential solutions to their energy problems. Recent studies indicate that communities within 50 miles of a geothermal source may well be able to use geothermal energy for a wide variety of residential and industrial uses. And for purely electric power, communities at even greater distances may utilize geothermal sources. To do so, however, a community must overcome a substantial number of non-technical and economic problems. C. Richard Schuller, who has directed an analysis of the legal, institutional and political problems of producing electric power from geothermal resources in California, and Clarence H. Bloomster who, for the past four years, has specialized in the economics of geothermal energy uses in France and England as well as in the United States, will detail the obstacles that confront the development of geothermal energy in the West and suggest what can be done to overcome them.

From Anarchy to Order in Community Design

John R. Hagely
Program Manager; Housing Research, Community, Regional and Environmental Planning
Battelle-Columbus

"The traditional zoning and subdivision regulations have serious limitations for energy planning."

Traditionally, the community planning function has focused on land use. In the future, however, energy efficiency must become another goal of the planning process. John R. Hagely, an architect who has conducted numerous studies of building design and community planning, will explain why energy criteria should be included in the planning process. Carefully planned community clusters, Mr. Hagely believes, offer the best opportunity to reduce energy consumption by decreasing the necessity for transportation, increasing the usage of waste heat from industrial processes and, by intelligent siting, cutting overall residential heating requirements by as much as eight percent.

THE LEGISLATIVE ADDRESS

Technology is only part of the problem: planning is only one element of the solution. In order to implement prudent energy conservation policies and practical alternative energy programs, enormous institutional and cultural barriers must be overcome and difficult social choices must be made.

These changes necessarily involve significant political issues. At each of the executive briefings, a distinguished political leader who is familiar with both the national energy scene and the energy problems of that particular region of the country will examine these complex political issues. In particular, each will discuss the progress of President Carter's energy program and will consider the role that the federal government should play in assisting community energy planning.

At the Los Angeles executive briefing (December 6-7) the Honorable George E. Brown, Jr., United States Representative from the 36th District of California will address the group. Representative Brown is a member of the Agricultural Committee, the Science and Technology Committee, the Joint Committee on Atomic Energy, and the Technology Assessment Board. He is noted for his personal commitment to finding workable solutions to the energy problem and for his comprehensive understanding of the issues.

The Chicago, Atlanta, and Boston briefings will also be addressed by a distinguished state or federal official who will share with you his views on the difficult political decisions that lie ahead.

SPECIAL FEATURES OF THE BRIEFING:

Each participant will receive a bound copy of "Integrated Community Energy Systems Planning: The State-of-the-Art Report," which will be an invaluable reference tool for developing a community energy plan.

After each presentation as well as during a special reception at the end of the first day, attendees will have the opportunity to meet personally with members of the Battelle energy team to ask additional questions and to discuss their own community's energy problems.

After the conclusion of the formal sessions, Roundtables will be organized by subject area, at which you will be able to exchange views with other attendees as well as the Battelle professional staff on a variety of key energy issues. Each participant at the Roundtable will share your interest in that subject matter.

ATTAINING SELF-SUFFICIENCY IN AN ERA OF DWINDLING SUPPLY

INTEGRATED COMMUNITY ENERGY SYSTEMS PLANNING

A TESTED APPROACH FOR INDUSTRY ANC GOVERNMENT

Battelle

FIVE GOOD REASONS WHY YOU SHOULD ATTEND THIS SEMINAR

The quality of information and presentations at this seminar will provide you with considerable benefit. But don't just take our word for it. Here are four typical results from those who were there:

"INSTRUCTOR APPEARS EXTREMELY WELL VERSED AND CURRENT ON THE PRACTICAL APPLICATIONS OF ENGINEERING PRINCIPLES IN INTERFACING SOLAR ENERGY SOLUTIONS WITH OTHER SYSTEMS AND/OR ENERGY SOURCES FOR OPTIMUM ENERGY CONSERVATION."

[illegible]

[illegible]

[illegible]

[illegible] Florida

"[illegible] SOURCE FOR PROFESSIONALS DISCUSSION ON AN INDIVIDUAL BASIS ON HOW SOLAR PROBLEMS CAN BE SOLVED. A FEW WORDS FROM THE FORECASTER SAVES HOURS OF READING AND EXPERIMENTATION."

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"THE BEST SOLAR SEMINAR SO FAR."

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[illegible] University

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[illegible]

A three-day seminar

SOLAR ENERGY

FOR DOMESTIC HEATING AND AIR-CONDITIONING

- INDUSTRIAL
- MUNICIPAL
- RESIDENTIAL

[illegible]

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(Continued From Cover)

"THE PROGRAM REVIEWED PAST AND PRESENT SOLAR ENERGY DESIGN AND CONSTRUCTION."
Carl J. Ruder
Assistant Supervisor
Yellow Freight System
Overland Park, Kansas

"A SYNOPSIS OF THE "STATE OF THE ART IN SOLAR COLLECTORS."
Morris Klatskin
Senior Mechanical Engineer
Holmes & Narver
Anaheim, California

"AS AN ARCHITECT DESIGNING FOR THE CONSUMER AND CLIENT, THIS COURSE IS EXCELLENT FOR INFORMATION AND CONCEPT CONCERNING SOLAR ENERGY."
Gary K. Donaldson
Partner/Principal
Architects Goss, Drake, Donaldson
San Angelo, Texas

"THE SOLAR FIELD IS NEW — THE PROGRAM WAS AS SPECIFIC AS IT COULD BE AT PRESENT."
James O. Coupland
President
Coupland, Moran & Association
Albuquerque, New Mexico

"VERY FINE HONEST APPRAISAL OF ENTIRE INDUSTRY."
Edward B. Servov
McKeesport, Pennsylvania

"VERY GOOD TECHNICAL PRESENTATION."
Alex G. Douglas
General Manager
K.D. Engineering Ltd.
Vancouver, B.C. Canada

"THE SEMINAR IS VERY INFORMATIVE AND ANYONE WHO IS GOING TO BE WORKING IN THE SOLAR FIELD SHOULD CONSIDER IT."
Melvin G. Sutton
Special Projects Engineer
Nevada Power Company
Las Vegas, Nevada

The seminar is intended to provide heating and ventilating contractors with an understanding of the application of solar energy to meet household heating needs; to provide a practical summary and review package that should be of interest to professional engineers and architects; to appeal to management and planning functions in manufacturing concerns. Space heating, industrial process heating, and domestic hot water will be considered.

Sample problems and illustrative calculations will be offered in connection with each important technical topic. Abbreviated tables of data and summaries of certain calculated results will be provided in order to facilitate hand calculations and the preparation of preliminary estimates.

SEMINAR CONTENT

SOLAR ENERGY INPUT

Astronomical/geographical factors. Energy reaching the earth's location. Daily and seasonal variations due to rotation and motion in orbit. Solar position angles. Angles of incidence, importance in terms of interception and reflection/absorption characteristics

Effect on earth's atmosphere, climatological factors. Attenuation, variation of air mass with solar altitude. Total radiation received; unit surface, sea level, any orientation and tilt. Discussion, effect of elevation above sea level. Weather/cloud cover —Climatic Atlas of U.S., monthly and average values of possible sun, total hours of sun, mean radiation, mean sky cover. Tabulations, many cities. Maps, monthly values.

Energy input on whole building, influence of surface orientation. Building surface as heating/cooling load, longwave radiation, nocturnal radiation.

Possibilities for heating, limitations of solar energy. Consequences of low intensity, daily and seasonal variations, and unpredictable interruptions.

COLLECTORS FOR SPACE HEATING INDUSTRIAL PROCESS AIR CONDITIONING AND DOMESTIC HOT WATER

General design principles, solar spectrum, greenhouse effect. Solar spectrum as perceived on earth, and as calculated allowing for absorption bands, scattering, etc. Heat balance for whole earth, greenhouse effect, consequences of introducing various kinds of glass and plastics as glazing materials. General design requirements for flat plate collector. Comments on principal advantages and disadvantages of focusing, semi-focusing, and flat devices.

Consideration of working fluids. Air, water. Extension of temperature range using glycol-water mixtures, salt solutions, etc. Extra costs, added technical problems. Requirement of low temperature protection in northern climates, utility of higher temperatures for the operation of simple machines.

Selective surfaces. Spectral curves: sun, hot body. Explanation of how selective

New York University
School of Continuing Education
Division of Business and Management

SOLAR ENERGY

surface helps. Kinds of selective surfaces: quality, (stability), costs.

Performance comparisons. Cost effectiveness of selective surface as compared with extra layer of glazing.

DISCUSSION OF PRINCIPAL TYPES OF EVACUATED TUBE AND FLAT COLLECTORS OFFERED OR PROPOSED

Generalized illustrations. Leading design features. Consideration of factors such as weight, cost, (durability), and performance. Influence of collector design on auxilliary gear needed. Circulation systems. Natural convection.

APPLICATIONS FOR SOLAR HEATING: NEW BUILDINGS OF CONVENTIONAL DESIGN/ EXISTING BUILDING (RETROFIT)

Suitability of various collector types for new building and retrofit. Adaptability, weight, possible credit for sheathing when mass produced panels are used for new construction.

Collector orientation/area trade-off. Southerly exposure, elevation angle, verticle walls.

Addition of flat reflectors, semi-focusing devices. Influence of reflector on collector input, materials and techniques which may be useful.

STORAGE AND BACK UP SYSTEMS

Storage. Water, rock (sand foundation), phase change systems. Examples of buildings which have used these techniques: Lof, NSF Demonstrations. Thomason, Telkes. Problems: bulk cost—long term stability. General acceptability and attractiveness of water; possible advantages of other systems.

Back up systems. Old building; probably existing plant. New construction; consider comparison between electric resistance heat —cheapest possible original installation; and, heat pump—expensive, high efficiency heating plant. Numerical data for selected locations. Discussion.

COST EFFECTIVENESS OF SOLAR HEATING & AIR CONDITIONING

Trade-offs. Collector costs, fuel savings, provision for storage.

Energy conservation. Advantages of extra insulation, weather stripping, provision for minimum required ventilation. Need for improved thermal efficiency in connection with solar heating/cooling designs.

DESIGN PROCEDURE AND CALCULATION

Procedure/required data. Interaction of factors such as collector size, efficiency with latitude, building size, U value, climate, and storage system.

Iterative nature of calculations. Conceptual system, consideration of variations in operating parameters, performance of subsystems, preliminary design.

Evaluation of complete system performance. Data on steady operation, response to expected daily and seasonal fluctuations. "Worst case" results based on extremes of weather, other conditions.

Approximate computational methods. Daily average values previously established for a variety of systems and subsystems, can be used for initial estimates of performance. Description of standard form for convenience in calculation.

ENERGY DEMAND AND SOLAR CONTRIBUTION COMPUTER PROGRAM

Heat/cool requirement. Location, U value and other gain/loss factors, extremes of weather, occupancy, etc.

Energy demand. Weather information for location—giving analysis throughout entire year.

Solar contribution. Input throughout year. Collector design/performance parameters. Characteristics of energy storage system.

Back-up system. Heating/cooling method. Overall system characteristics. Control logic.

GENERAL REVIEW

Principles.

Discussion/analysis. Detailed examination of currently available solar heating gear.

IN-COMPANY PROGRAM

The program described in this brochure can be offered on an "in-company" basis. In addition, this program can be modified and tailored to your specific needs. In evaluating the possibility of using "in-company" training, you should consider costs, scheduling, workloads, interaction, environment, program content and a host of other factors. We would be delighted to provide you with an immediate response to your request for proposal, questions, problems, etc.

Just write or call: Heidi E. Kaplan, Information Services Manager, New York Conference Management Center, 360 Lexington Avenue, New York, N.Y. 10017 — Tel: (212) 953-7262.

DOUGLAS A. WILKE, Professional Engineer, Licensed Architect



Douglas A. Wilke is a licensed architect and a professional engineer. He has designed residential, municipal and process buildings incorporating the use of solar energy through both fluid and air systems. His recent design of a solar energized Wastewater Treatment Plant received the Owens Corning 1975 Energy Conservation Award of the year. Currently his consulting work includes the integration of solar engineering, architecture and construction engineering in municipal and residential projects requiring heating and air-conditioning. Additional research of his includes Biowaste Conversion processes and the economics of industrial applications using solar energy. Mr. Wilke received a B.A. in Engineering from New England College and his advance degree in Architecture from the Columbia School of Architecture. He is an active member of the International Solar Energy Society. He has lectured on the subject of solar energy widely in the United States and abroad.

THE NEXT BILLION DOLLAR INDUSTRY . . .

Solar energy for domestic heating will be the single most significant breakthrough in the building and industrial process field in the next ten years . . . and it's started already. The technology is here now! The materials are available! The economic climate is accelerating acceptance. And the government is committed to its development! This practical seminar will provide you with complete insight into practices, problems and solutions.

CERTIFICATES OF PARTICIPATION

New York University's School of Continuing Education will award certificates to all who attend.

WORKBOOK

Each participant will receive a comprehensive reference manual of the curriculum for this seminar which will serve as a valuable source in the future.



- ☐ Industrial Cryogenic Technology
- ☐ Energy Conservation in Industrial Plants
- ☐ Energy Management in Buildings
- ☐ Financing Oil and Gas Ventures
- ☐ Managerial Skills for the Developing Manager
- ☐ Selection Interviewing: Strategies, Tactics and Skills Practice
- ☐ Automation of Manufacturing Operations
- ☐ Understanding Finance for Manufacturing and Production Management
- ☐ Manufacturing Management for Multi-Plant Operations
- ☐ Estimating and Controlling Manufacturing Costs
- ☐ Starting, Developing and Marketing a Successful Franchise Program
- ☐ Modern Alternatives to Franchise Marketing
- ☐ New Products: A Systematic Approach
- ☐ How to Work Out Problem Real Estate Loans
- ☐ Negotiating Techniques in Real Estate
- ☐ Real Estate Financial and Economic Feasibility
- ☐ Tax Considerations Affecting Real Estate Investment
- ☐ Increasing Productivity in Manufacturing
- ☐ Metals Technology
- ☐ Packaging Practices
- ☐ Plastics Technology
- ☐ Financial Planning for the Closely Held Corporation
- ☐ How to Select and Start Your Own Business for Women
- ☐ Project Management for Engineers
- ☐ Successful Research and Development Management
- ☐ Shock and Vibration
- ☐ Understanding and Obtaining Federal Grants
- ☐ Budgeting and Effective Cost Analysis
- ☐ Government Project Management

For locations, dates and descriptive brochures on these nationally held two-day to five-day seminars, please contact Ms. Heidi Kaplan, Information Services Manager, Toll Free at 800/223-7450 (New York State call collect 212/953-7262), or check the subjects of interest to you or your organization for details by return mail without obligation.

GENERAL INFORMATION

EARLY REGISTRATION IS ADVISED: To register, phone the Registrar Toll Free at 800/223-7450 from anywhere in the U.S. (New York State please call collect 212/953-7266). You may also register by completing the mail registration form below. All phone and mail registrations are confirmed by the Registrar. Last-minute on-site registration is not encouraged.

SCHEDULE: Seminar hours are from 9:00 A.M. to 5:00 P.M. with a luncheon break from 1:00 P.M. to 2:15 P.M.

LOCATIONS: The seminars are held in comfortably arranged meeting rooms in conveniently located hotels. For exact hotel information and your room reservations, please either call Toll Free at 800/223-7450 from anywhere in the U.S. (New York State please call collect (212) 953-7266) or you will receive hotel information in the mail when you register.

TRAVEL ARRANGEMENTS: We may be able to provide airline group discounts, if available, to attendees of this program. Early reservations are required to possibly obtain these benefits. Please call Toll Free at 800/223-7450 from anywhere in the U.S. (New York State please call collect 212/953-7266).

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MONDAY, OCTOBER 10

MORNING

SESSION M1: "MULTI-DISCIPLINARY TOPICS"
9:00 a.m. – 12:00 Noon – Pittsburgh Room
Chairmen: Dr. Mahmoud A. Moustafa; Alex Primak

"Forced Oscillations of Nonlinear Nonsymmetrical Damped Systems Having Two Degrees of Freedom"
Dr. Mahmoud A. Moustafa
Ahmed M. Sharif
Riyadh University, Riyadh, SAUDI ARABIA

"Stresses at the Junction of Conical Pressure Vessel Head and Cylindrical Outlet Caused by Asymmetric Loadings"
A. Primak, Senior Mechanical Engineer
Energy Consultants, Incorporated, Pittsburgh, Pennsylvania

"A Distribution Free Algorithm for Pattern Recognition"
Dr. Nurul Ula, Associate Professor
Department of Electrical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Interfacial Reactions in Multi-Level Metalliziation Systems"
Dr. Ram Kossowsky
Westinghouse Electric Corporation, R & D Center, Pittsburgh, Pennsylvania
Formerly: Technion, Haifa, ISRAEL

"Metric Training in Industry"
Dr. Kalman Mecs, Professor
Chairman, Department of Mathematics, Community College of Allegheny County, Allegheny Campus, Pittsburgh, Pennsylvania

"The Effects of Pressure on the Ignition Delay of Coal Particles"
Nelson Buitrago, Industrial and Mechanical Engineer
Cali, COLUMBIA

AFTERNOON

SESSION M2: "MATERIAL SCIENCES"
2:00 p.m. – 5:00 p.m. – Pittsburgh Room
Chairmen: Dr. M. A. Kadeem; D. L. McKown

"The Role of Carbides in the Accelerated Attack of Superalloys"
Dr. M. E. El-Dahshan, Professor
Department of Chemical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Grain Refinement of Copper Base Alloys by Ultrasonic Vibrations"
Dr. Mohamed A. Kadeem, Head
Department of Mechanical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Use of Ferrosilicon for Brass Castings"
Dr. Monir Arafa, Professor
Saudi Arabian Organization for Standardization and Metrology, Riyadh, SAUDI ARABIA

"Multiplicity, Hysterisis and Instability in Chemically Reactive Systems"
Dr. S. S. E. H. ElNashaie, Associate Professor
Department of Chemical Engineering, Cairo University, Cairo, EGYPT

"Coal Gasification: New Energy From An Old Idea"
David L. McKown, P. E., Free-Lance Technical Writer
Monroeville, Pennsylvania

SESSION M3: "COMPUTERS AND ANALYSIS"
2:00 p.m. – 5:00 p.m. – Parkview Room
Chairmen: Alan J. Rose; Wally B. Wright

"Technological Advance, Computers, The Engineer and the Compression of Time"
Wally B. Wright
Arthur D. Little, Incorporated, Cambridge, Massachusetts

"Techniques to Reduce Analysis Costs"
Harold H. Waite, P. E., Vice President
Basic Technology Incorporated, Pittsburgh, Pennsylvania

SEMINAR: "An Overview of APL"
Alan J. Rose
Scientific Time-Sharing Corporation, White Plains, New York

TUESDAY, OCTOBER 11

MORNING

SESSION T1: "SHARING NUCLEAR TECHNOLOGY – PROLIFERATION OR CONTROL"?
9:00 a.m. – 12:00 Noon – Pittsburgh Room
Chairman: Dr. Iain LeMay
Panel Session:

"The United States Nonproliferation Policy and the Reactions of the Technical Community"
Melvin J. Feldman
Oakridge National Laboratories, Oakridge, Tennessee

"Viewpoint of a Major U. S. Supplier Concerning Proliferation and the Viability of Nuclear Industry"
P. M. French
R. J. Ranellone
Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

"The Need for Cooperation and The Sharing of Technology in the Nuclear Field
Dr. Iain LeMay, Professor
University of Saskatchewan, Saskatoon, Saskatchewan, CANADA

Open Forum

SESSION T2: "[illegible]"
[illegible]

"Evaluation of Energy Conservation Technologies – The Life Cycle Costing Approach"
Dr. William C. Peters, Associate Professor
Mayer L. Benowitz
Environmental Systems Engineering Program, Pittsburgh Research Center, ERDA, Pittsburgh, Pennsylvania

"Carnegie-Mellon Institute of Research – Energy Program"
Dr. J. C. Purcupile, Director
Energy Conservation and Utilization, Carnegie-Mellon Institute of Research – Also: Associate Professor, Mechanical Engineering, Carnegie-Mellon University, Pittsburgh, Pennsylvania

"An Automatic Controller to Limit Maximum Electricity Demand"
Dr. Nurul Ula, Associate Professor
Department of Electrical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"American Chemical Society – Pittsburgh Section – Environmental Group, An Overview"
Ralph L. Scott
Pittsburgh Energy Research Center, ERDA, Pittsburgh, Pennsylvania

"Ultimate Brine Disposal Energy Considerations"
Charles E. McKnight, P. E., Consultor
U. S. Army Armament R & D Command, Chemical Systems Laboratory, Aberdeen Proving Ground, Maryland

WEDNESDAY, OCTOBER 12

MORNING

SESSION W1: "INTERNATIONAL BUSINESS" and "OPEN FORUM"
9:00 a.m. – 12:00 Noon – Pittsburgh Room
Chairmen: Newton Heston; Dr. I. S. Tuba; I. Kerenyi

"Workshop I: An Introduction to Conducting International Business"
Methods
Sources of Information
The Role of The Banks

Panel:
Newton Heston, Director
Pittsburgh District Office, U. S. Department of Commerce
Gerrit Butter, Assistant Vice President
International Department, Mellon Bank, N. A.
George L. Kappes, Manager
Export Department, Flow Control Division, International

...the representatives of
...its to state their goals in international

AFTERNOON

SESSION W2: "ECONOMIC HISTORY, POLICY AND LAW"

2:00 p.m. – 5:00 p.m. – Pittsburgh Room
Chairmen: B. A. Karlowitz, Esquire and John F. Bradley, Esquire

"International Financing, Trade and Capital Formation"
Christopher White
Economic Historian and Author, New York, New York

"National Policy and Its Role in Future Technology Creativity"
F. E. Schuchman, Sr., President
Investors' Haven, Incorporated, Pittsburgh, Pennsylvania

Victor A. Peckham, Esquire
Patent Attorney, Pittsburgh, Pennsylvania

"Workshop II: The Legal Aspects of International Business Transactions, Licensing, Financing and Patents"

Panel of Attorneys at Law:
Ray Brown, Esquire
C. Robert McCall, Esquire
Michael Fox, Esquire
B. A. Karlowitz, Esquire

THURSDAY, OCTOBER 13
MORNING

SESSION H1: "ENERGY, NATURAL RESOURCES AND INTERNATIONAL COOPERATION"

9:00 a.m. – 12:00 Noon – Pittsburgh Room
Chairmen: John F. Bradley; C. J. Barton

"Energy and Natural Resources"
Dr. Morris Levitt, Executive Director
Fusion Energy Foundation, New York, New York

"International Corporation in Fostering Scientific Collaboration in Development and Transfer of Technological Knowledge"
Laura M. Horton, Esquire
Pittsburgh, Pennsylvania

"The International Boundary Spanner"
C. J. Barton, Regional Manager – Systems
Taylor-Sybron Corporation, Beaumont, Texas

Dr. David W. E. Cabell, Assistant Professor
Lamar University, Beaumont, Texas

"The Development and Utilization of a Financial Planning System for a Long-Term Technology Assessment and Forecast"
Dr. Samandar M. Hai, President
Hai and Associates, Tempe, Arizona

"International Energy Complexity: The Interdependence of Fossil Fuels"
C. J. Barton, Regional Manager – Systems
Taylor-Sybron Corporation, Beaumont, Texas

Dr. David W. E. Cabell, Assistant Professor
Lamar University, Beaumont, Texas

"The Transfer and Implementation of the United States Health Care Management Science in Mexico"
Dr. Samandar M. Hai, President
Hai and Associates, Tempe, Arizona

Dorothy M. Hai, Ed.D., Assistant Professor
Arizona State University, Tempe, Arizona

AFTERNOON

SESSION H2: "EQUIPMENT AND SYSTEMS"

2:00 p.m. – 5:00 p.m. – Pittsburgh Room
Chairmen: Dr. Mohamed Damir; Peter Gaal

"MOD III: The New Perspective in Advanced Control Systems"
C. J. Barton, Regional Manager – Systems
Taylor-Sybron Corporation, Beaumont, Texas

"A New Apparatus for Determining the Adsorption Isotherms of Carbon Dioxide and Methane on Kaolinite Clay"
Dr. Ayad Alzaydi, Professor
Department of Civil Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Speed Fluctuation in Machine Drives"
Dr. Ahmed Ezzat, Professor
Department of Mechanical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Accuracy of Measurement of The Diameter of Thin Rings"
Dr. Mohamed Damir
King Abdulaziz University, College of Engineering, Jeddah, SAUDI ARABIA

"Appropriate Technology for Third World Housing Needs"
Charles Goodspeed, Assistant Professor
Department of Civil Engineering, Carnegie-Mellon University, Pittsburgh, Pennsylvania

"Microprocessor Controlled Physical Properties Testing System"
Peter Gaal, President
Thomas Pattantyus, Manager Electronics
Anter Laboratories, Pittsburgh, Pennsylvania

SESSION H3: "SOLAR ENERGY"

9:00 a.m. – 12:00 Noon – [illegible]
Chairmen: Dr. A. [illegible]

"Solar Energy Technology: Problems and Prospects"
Dr. William C. Peters, [illegible]
Yousef Amin
Environment & Conservation Division, Pittsburgh Energy Research Center, ERDA, [illegible]

"Technology Development for Utilization of Solar Energy"
N. J. Shend'ge, Director of Technology
Soloman Fineblum, Consulting Engineer
Solar Development Group, Morristown, New Jersey

"The Effect of Boundary Layer Control on Curved Diffusers"
Dr. A. M. Shibl, Professor
Department of Mechanical Engineering, Riyadh University, Riyadh, SAUDI ARABIA

"Passive Solar Systems are Next"
Ron Gramm, President
Sunwall, Incorporated, Pittsburgh, Pennsylvania

"Application of Finite Element Techniques to Design Analysis of a Surface Condenser Water Box"
N. J. Shend'ge, Director of Technology
Solar Development Group, Morristown, New Jersey

A. Rangwala
R. Boyer
Ingersoll-Rand Company, Phillipsburg, New Jersey

For Additional Information Contact:

INTERNATIONAL TECHNOLOGY INSTITUTE
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Phone: (412) 795-5300

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Pittsburgh, Pennsylvania

Circuit Riding Technology Agent

Position Description

One of 7 Intergovermental Personnel Act Assignments as circuit riding technology agent under the Community Technology Initiatives Program (CTIP). Public Technology, Inc. (PTI), a non-profit R&D institution based in Washington D.C. is secretariat and provides program management for CTIP which consists of 31 local governments across the country. The National Science Foundation, which is providing financial support for this program, has a Congressional mandate to apply scientific and technological resources to problems facing state and local jurisdictions. CTIP is a new institutional device designed to carry out that mandate. The Federal Laboratory Consortium has endorsed CTIP and has agreed to participate in program activities as appropriate. The CTIP mission includes development of an agenda of R&D priorities and a search for solution to those priorities for participating communities. Candidates selected will furnish technical assistance and evaluation for 3 to 5 local goverments in the CTIP program each of which is under 50,000 in population. Agent will provide assistance to public officials in defining and solving technical problems drawing on federal laboratories for back-up support. Agent will reside in a host city on the circuit. Extensive travel required.

Duties

To assist communities in developing needs assessment and priority setting as they relate to scientific and technical issues on the CTIP R&D agenda.

Gather and organize and disseminate scientific and technical information to local goverment participants in response to specific problems facing their departments.

Maintain close working relationships with other technology agents in local goverments in the U.S. Prepare problem descriptions and distribute to other cities. Respond to requests for assistance from technical advisors in other communities by locating sources of assistance or information. Develop sources of technical data useful to communities on the circuit from within federal laboratories, agencies of other local goverments, and Public Technology, Inc.

Prepare and distribute to other localities, National Science Foundation, and PTI reports on special projects that may be of interest to local goverment agencies. Prepare monthly activity reports to PTI and to local officials on the circuit.

Develop evaluation criteria to determine if an innovation is cost effective for local goverment. Select, plan and direct special projects in areas such as solid waste management, energy conservation and others.

Identify technical personnel in federal laboratories, universities and industry whose technical expertise can be applied to local goverment problems in an advisory capacity.

As arranged by local chief executives, appear before city council or other local goverment bodies to testify on matters of scientific and technological interest to the communities on the circuit.

Qualifications

Previous experience in local goverment is desirable. Prior participation in a technology transfer network etween federal and local goverment agencies would be helpful. Working knowledge of the types of science and technology available for solving local goverment problems is required. Must have ability to express oneself clearly and concisely in speech and writing. Must have the ability to establish and maintain effective working relationships with public officials. Previous experience in the application or transfer of new technologies is required. Degree in engineering is desirable.

Position Location

Circuit riding technology agents will work on the staff of the city manager in the host jurisdiction's designated area.

Salary

IGPA assignment- see "enclosure A"

Term of Employment

The position is for an initial two year period with the possibility of a two year extension.

Contact

Mr. Nick Montanarelli
Program Manager, Federal Labs Intergovermental Programs
National Science Foundation
Room 1101
1800 G St. N.W.
Washington, D.C. 20550

Mr. G.F. Linsteadt
Chairman, Federal Laboratory Consortium
Department of the Navy
Naval Weapons Center
China Lake, Ca. 93555

Mr. Ted Maher
CTIP Program Director
Public Technology Inc.
1140 Conn. Ave. N.W.
Washington, D.C. 20036

Your response or resume should be forwarded to one of the above by Nov. 20, 1977.

C.T.I.P. Circuit Rider Regions

Region I
- *Brea, Ca.
- Carson City, Nev.
- Cache County, Utah
- Santa Fe, N.M.

Region II
- Cottage Grove, Ore.
- *Vancouver, Wash.
- Lewiston, Id.
- Helena, Mont.
- Casper, Wyoming

Region III
- Grand Island, Neb.
- Brookings, S.D.
- Bemidji, Minn.
- Iowa City, Iowa
- *Galesburg, Ill.

Region IV
- Bryan, Texas
- *Stillwater, Okla.
- Clayton, Mo.
- Ottawa, Kansas

Region V
- Natchez, Miss.
- Prichard, Ala.
- *Spartanburg, S.C.
- Hempstead County, Ark.

Region VI
- Isabella Co., Mich.
- Dunbar, West Va.
- *O'Hara Twp., Pa.
- Seaford, De.

Region VII
- Burlington, Vt.
- So. Portland, Maine
- Newburyport, Mass.
- * E. Providence, R.I.
- Plainfield, N.J.

* Regional host sites for technical agents

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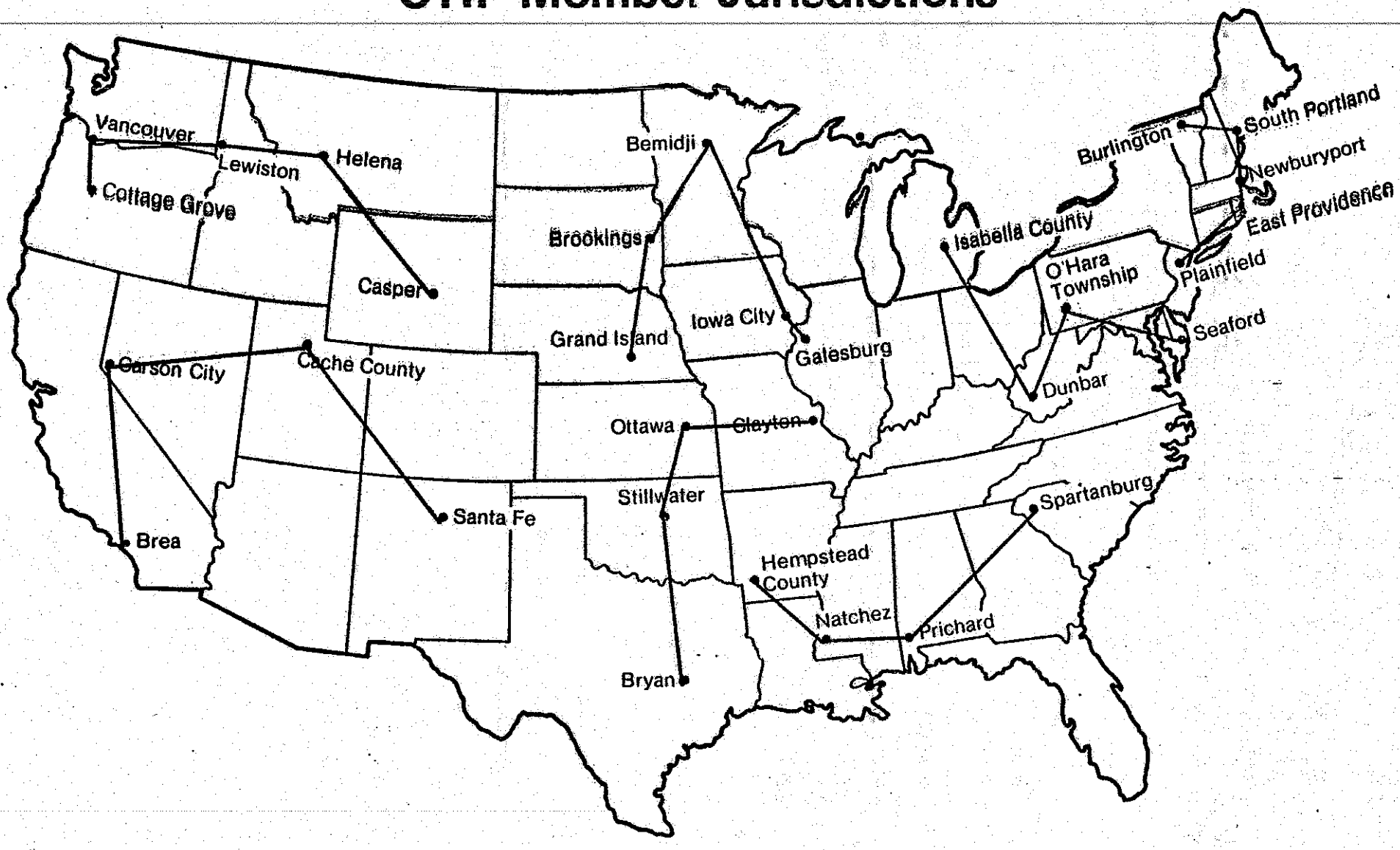

Community Technology Initiatives Program

Secretariat, Public Technology, Inc.

George: Can Joe help?

Forest Service Cooperative Fire Protection is interested in the following areas of technology transfer from the Federal Laboratory Consortium:

1. Techniques for evaluating the effectiveness of rural firefighting forces in the prevention and suppression of structural and wildland fires.

2. Suppression techniques which may be adapted for use in rural areas.

3. We would like to get a briefing on new equipment development projects in the military which may have application to fire prevention and suppression (structural and wildland).

4. A list of ongoing research projects which the Consortium is involved in.

Val

RMBowman:cb

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ARMY ELECTRONICS COMMAND FORT MONMOUTH, NJ

REMOTELY CONTROLLED BALLOONS FOR BORDER SURVEILLANCE - A FEASIBILITY STUDY (U)
Technical Report
by W.J. Mills May 77 153p Rept. no. ECOM-4499
Proj. 1H763725DK61

Unclassified report

Distribution limited to U.S. Government agencies only; Test and Evaulation; May 77. Other requests for this document must be referred to Commander, Army Electronics Command and Fort Monmouth, Attn: DRSEL-CT-A, Fort Monmouth, NJ 07703

Descriptors: *Intrusion detectors, *Personnel detectors, *Balloons, *Radar tracking, Remotely piloted vehicles, Boundaries, Crossings, Mexico, Patrolling, Arizona, California, Infiltration (Personnel), Foreign, Forward looking infrared systems, Low light levels, Television equipment, Remote detectors, Airborne, Tethering, Free flight, Remote control, Data links, Area coverage, Survival (General), Terrain, Mobility, Weather, Helium, Aviation safety, Costs, Military applications, Feasibility studies, Aerial reconnaissance, Deployment, Coastal regions, Deserts

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NAVAL UNDERWATER SYSTEMS CENTER

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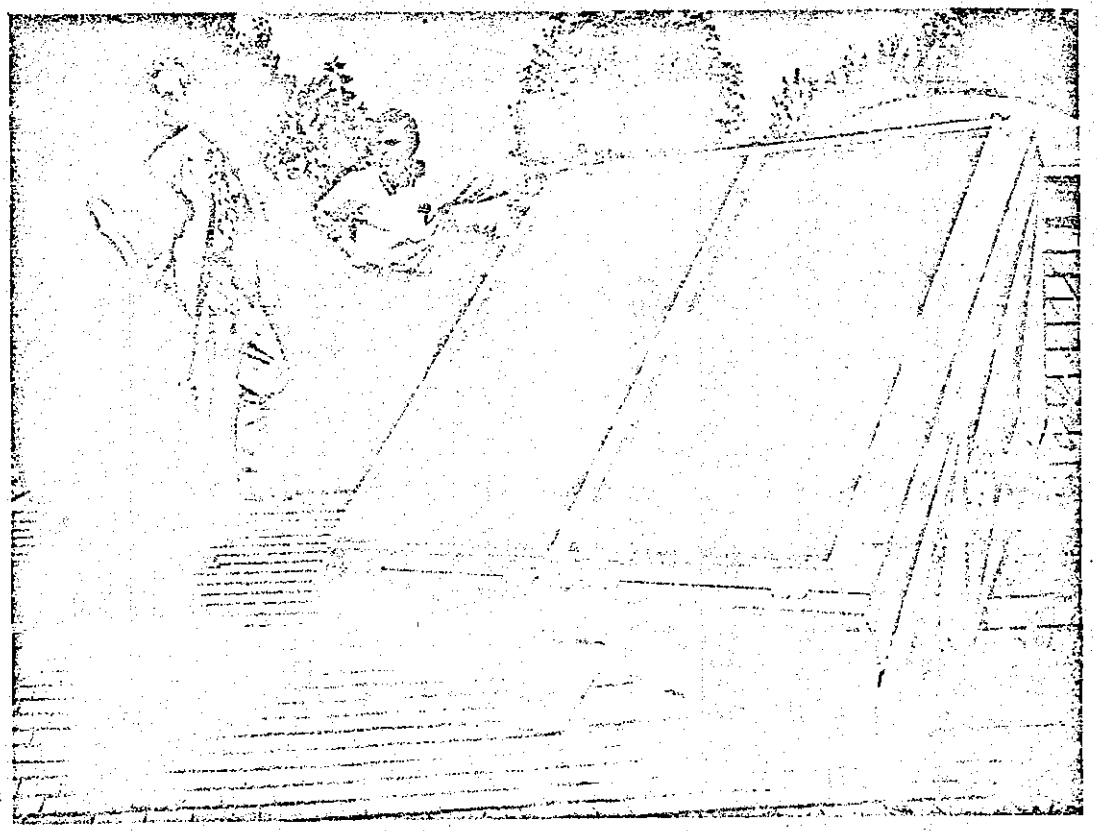
Vol. 7 — No. 20 *The Principal Navy RDT&E Center For Submarine Warfare and Submarine Weapon Systems* Friday, September 30, 1977



Solar Heating Installation — Thames Science Center

NUSC Technology Transfer personnel were instrumental in arranging for the solar water heating installation shown above at the Thames Science Center in New London. The device was used for demonstration purposes at a homeowners seminar on Saturday, Sept. 17. Examining the solar panel installation, clockwise from bottom, Capt. Frank W. Victor, OIC, New London; Harrison Fortier, 316, who coordinated the project; Dr. William Niering of Connecticut College and the Thames Science Center; and Ron Judkoff of Brookhaven National Laboratories on Long Island, a solar energy consultant. The panel support structure will be shingled later to blend better with the roof.

(Story on page 4-5)

NUSCOPE

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Newport • New London • AUTEC — Andros Island, West Palm Beach • Bermuda

Vol. 7 — No. 19 *The Principal Navy RDT&E Center For Submarine Warfare and Submarine Weapon Systems* Friday, September 16, 1977

NUSC Staff Members Assist In Solar Installation

Southeastern Connecticut homeowners will soon have a small working solar water heater installation available for examination to assist them in understanding the principles and applications of solar hot water and space heating for their homes.

The Thames Science Center in New London, assisted by several staff members from NUSC New London is planning a solar heating installation to provide hot water for their needs. The design and installation of the system is under the supervision of Gordon Preiss, a solar heating expert who was formerly with NUSC and is now a consultant for the solar energy technology transfer program at Brookhaven National Laboratories on Long Island. Prior to joining Brookhaven, Preiss was on loan from NUSC to the State of Connecticut as an energy consultant.

NUSC involvement is being coordinated by Harrison Fortier, Sr., 3163, and Margaret Kulos, 0702, through the Office of Special Program Development and its director George C. Connolly, Jr. Other NUSC staff members assisting during the design and installation of the system are Henry Turko, 411, and Augustus Frausini, 5231.

The system at the Thames Science Center will consist of two 3-by-7 foot solar panels mounted on the roof and connected to an 80-gallon collecting tank. Preiss has expressed the opinion that the arrangement could provide much of the building's hot water needs during the summer months. The system will be connected to an electric hot water heater which will provide back-up capabilities on demand during cloudy periods.

The Science Center will conduct seminars for interested homeowners and contractors who will be able to examine a working system and gain insight into the principles and effectiveness of solar space and water heating.

Connecticut
Town
&
City

SEPTEMBER, 1977

CONNECTICUT CONFERENCE
OF MUNICIPALITIES

956 CHAPEL STREET, NEW HAVEN,
CONNECTICUT 06510 PHONE 772-2168

CCM's technical brief service in big demand

A total of 772 technical briefs, each reporting on the successful applications of technology across the country, have been supplied to cities and towns by a new service provided in conjunction with CCM's technology program.

Robert MacDonald, CCM's technology agent, said new requests for information are coming in every day, often in the form of requests from several different departments of a local government.

The technical briefs cover a wide variety of subjects, including admin-

Continued on page 2

Technical briefs in great demand

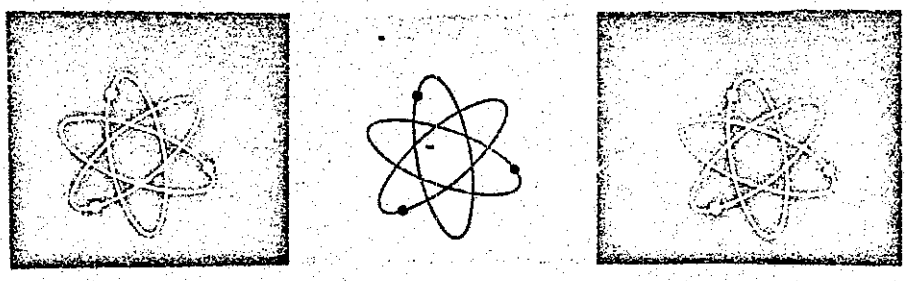
Continued from page 1

istration and finance, energy, conservation, parks, recreation, libraries, planning, public safety, public works, utilities, and roads and traffic.

Each brief is a short synopsis of a problem experienced by a particular community and how it was solved. Briefs on 242 subjects are now available. The list will steadily expand as new sources of information are found and new solutions developed.

Sources of briefs include the Urban Technology System, the California Innovation Group, the Oregon State Office of Technology Transfer, Oklahoma State University, and CCM's own technology program.

CCM members may obtain order forms for the briefs by contacting MacDonald.



Technology notes

Problem: A Connecticut town wants to obtain aerial photos of its area with contours for engineering evaluation applications. The photo must be true to scale so measurements can be made directly from the photos, which would be accurate to within the 1"=100' scaling factor of the prints. A private firm will do the aerial survey and contouring for $70,000. A municipal official asked me to determine if aerial photos already exist which could be adapted with contours for the purpose.

Solution: High-flying aircraft photos of Connecticut are available from the National Oceanic and Atmospheric Administration and the photo bank at the University of Wisconsin's Remote Sensing Laboratory, but their quality is questionable for the purpose.

The State Dept. of Environmental Protection contracted for aerial photos of the entire state, and they are of high quality and available for purchase. But the photos are unusable for the purpose because of the natural distortion which occurs from the center to the outer edges of each print. The required alterations could be provided by the contractor for the flyovers along with contouring, but at greatly increased price.

Conclusion: No pre-existing photos can be used for the intended purpose. It might be possible to save on costs by obtaining the corrected photos and applying the contouring inhouse, since the town requires minimal contouring.

– Robert B. MacDonald

Detecting utility leads quickly

An easy and quick method of locating leaks in buried utility lines (containing air, natural gas, oxygen, steam, etc.) has been investigated by the Naval Civil Engineering Laboratory as part of CEL's energy conservation program.

This leak-detection method requires the injection of a sulfur hexafluoride (SF6) tracer gas into the utility system and the use of commercially available equipment to detect the presence of SF6 escaping from the leaks.

The method requires no shutdown of the system and is easy to implement. The equipment is portage, and the results are obtained expeditiously.

Further information may be obtained from Robert MacDonald, CCM's technology agent.

Kit facilitates paint classification

It is often difficult to classify paints in the field, particularly when they are weathered. Obtaining such information is necessary to determine topcoat compatibility or cause of premature failure, or to verify that a specific coat was actually used.

To meet these needs, the Naval Civil Engineering Laboratory has developed a portable test kit and identification procedure that can be used by personnel with no formal training in chemistry.

The procedure should not, however, be used to gather data for use in legal proceedings. This requires more definitive analytical tests in a chemistry laboratory.

Further information is available from MacDonald.

SEPTEMBER 1977

NPRDC TECHNICAL BRIEFS

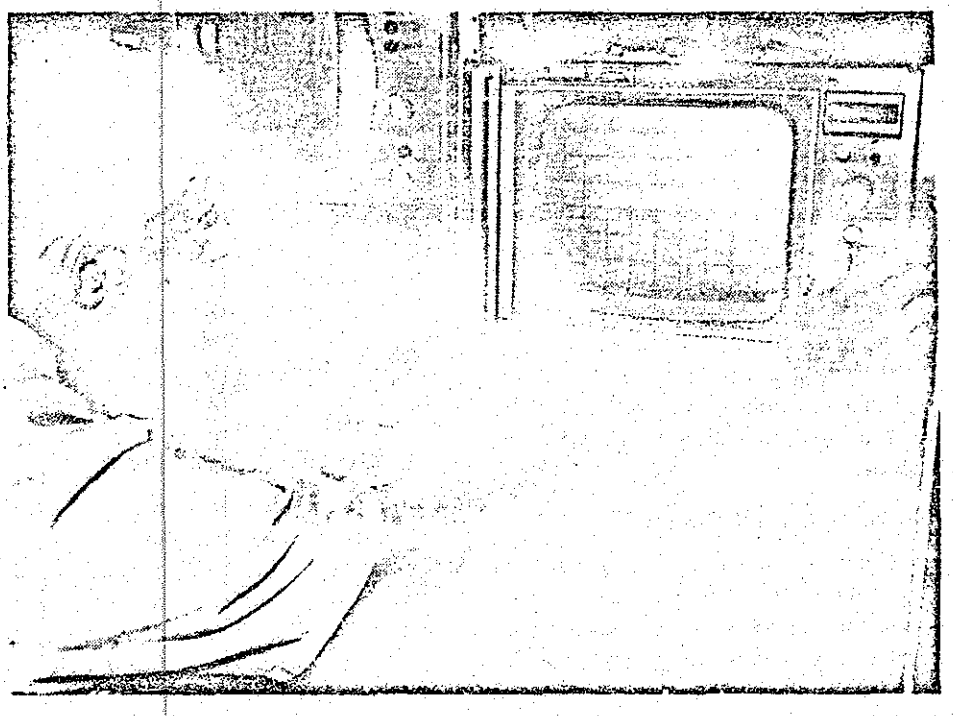
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF. 92152

Experimental Navy testing/training system remedies skill deficiencies

A consistent finding in performance testing of Fleet personnel is that significant numbers are not adequately proficient in key aspects of their jobs. Even when supervisors are aware of such deficiencies (which often is not the case), they have no readily available means of correcting them. To address this problem, the Navy Personnel Research and Development Center initiated the Personnel Readiness Training (PRT) program in 1973. The purpose of this program is to identify critical skill deficiencies through diagnostic tests and to remedy them by prescribed training.

To increase the likelihood that the results of the PRT evaluations could be generalized to other Navy technical ratings, three areas of application were selected for study: the submarine Sonar Technician (ST) operating the AN/BQR-20A frequency analyzer, the submarine Missile Technician (MT) maintaining the Missile Test and Readiness Equipment (MTRE Mk 7 Mod 2), and the Boiler Technician (BT) operating and maintaining the 1200 psi steam propulsion plant.

The experimental design called for three groups of subjects for each area of application: a control group, a diagnostic feedback group, and a diagnostic feedback plus training group. All three were given a diagnostic pretest and, after about 5 months, were given the same test again as a posttest.



NPRDC's Personnel Readiness Training program used diagnostic tests to identify critical skill deficiencies and individually prescribed shipboard training packages to correct them. Among the tasks chosen to assess the feasibility of the testing/training system were operator tasks performed by submarine Sonar Technicians on the AN/BQR-20A passive, real-time frequency analyzer.

In all three areas, pretesting revealed substantial performance deficiencies. Some minimal performance changes were related to receiving feedback but even where these were statistically significant, they were not large enough to be of any practical significance. Training materials produced substantial performance gains for the STs, but MTs and BTs showed little evidence of improved performance due to training. The ineffectiveness of the training materials for the MTs and BTs appeared to be due to these groups' failure to use the materials assigned.

The PRT study's findings led to the following conclusions: that significant performance deficiencies are present in all three applications, that performance deficiencies can be identified through properly designed testing procedures and can be corrected through remedial training if materials and procedures are appropriately used, and that there is a need to determine specific shipboard training needs and to identify the skills that are best learned aboard ship and in shore installations.

Based on these conclusions, three recommendations were made:

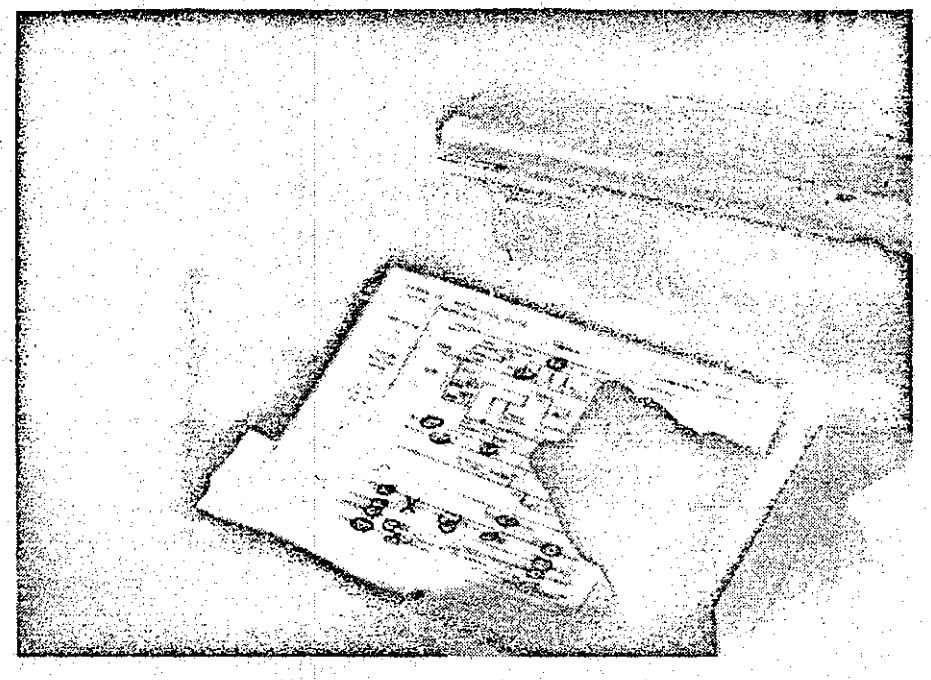
1. Where personnel performance deficiencies exist with respect to important requirements, the procedures used in the PRT investigation should be considered for use.

2. The Navy should support studies to determine which skills should be developed aboard ship and which can be acquired more economically ashore.

3. To systematically identify significant performance deficiencies, the Navy should proceed with the development of a comprehensive job proficiency assessment system.

Cost reductions tied to Job Performance Aids

The Navy and other services face growing personnel costs accompanied by decreasing force levels and declining entry-level skills. Maintaining operational readiness under the current strict budget limitations is thus increasingly difficult.



Job Performance Aids (JPAs), such as the Engineering Operational Sequencing System job guide used by Boiler Technicians, can be employed to enhance the performance of lesser-trained or lesser-skilled personnel, to reduce the costs of training and maintenance, and to improve productivity. NPRDC is conducting a major effort in the test and evaluation of JPAs and their integration with current Navy personnel and training systems.

One approach to alleviating these problems is through the use of Job Performance Aids (JPAs)—devices, documents, guides, or tools used on the job to assist performance and to avoid costs where actual learning is not the primary objective. Examples of JPAs are pilot check lists, hand-held computers, and job guide manuals, which serve to facilitate information transfer and short-term memory.

Data collected over the past 20 years by all of the services suggest that JPAs can be employed to enhance the performance of lesser-trained or lesser-skilled individuals, to reduce the costs of training and maintenance, to accelerate on-the-job training, to improve manpower utilization, to reduce equipment downtime, and to improve job satisfaction and productivity. For example, a 1975 study showed that the use of JPAs could yield savings of almost $1.7 billion each year in the Army's expenditures for personnel, training, and maintenance. Although such payoffs appear readily available, JPAs have been implemented only piecemeal by the military.

The Navy Personnel Research and

Cont'd on page 4

Lost-time study focuses on pregnancy

The time that is lost through illness, unauthorized absence, or other causes is a problem common to all of the services. Recently, the Department of Defense asked for detailed information on how much time is lost every year. Each service is to collect information (separately for men and women) on time that is lost due to alcohol and drug abuse, unauthorized absence, illness and injury, disciplinary actions, pregnancy, and family obligations.

SPECIAL PROBLEMS

Even before this request was made, however, the Navy Personnel Research and Development Center had begun a study of the time lost due to pregnancy and its effect on work group morale.

It appears that the time lost due to pregnancy may present some special problems that the Navy has not confronted in the past. The problems may be particularly acute where women are working in strenuous or hazardous jobs and must be given alternate duty.

NPRDC was tasked by the Chief of Naval Personnel to examine the effect of pregnancy on work group morale among shore-based personnel. The study will gather factual data from existing records and attitudinal information through direct interviews and questionnaires. The factual data will be compared with data for similar age groups in the private sector, and the attitudinal information will be used in analyzing pregnancy's effect on morale.

EFFECTS ON WORKERS

Structured interviews will gather data from about 100–150 men and women (including supervisors) from activities on each coast. Interviewees will estimate how much unrecorded time is lost by both sexes and what effect it has on others in the work group (including women who are not pregnant).

Questionnaires will be sent to a cross-sectional sample of 750 men and 750 women who entered the Navy in 1975. Respondents will indicate the reasons for which they take time off and will answer questions regarding their attitudes toward pregnant women in the work force, toward the time they take off during the pre- and postpartum periods of their pregnancies, toward the way such absences are handled, and toward women in nontraditional roles.

BETTER UNDERSTANDING

What should result from this study is an improved understanding of the time that is lost due to pregnancy and for other reasons, and an idea of pregnancy's impact on the work group in traditionally male occupations. After the study is completed in December, it is expected to lead to policy statements regarding time off for pregnancy, transfer from strenuous jobs, replacement in the work group, and other guidance for commanding officers.

Motivation study surveys semiskilled workers

Job factors that motivate semiskilled blue collar workers are the focus of an ongoing study by the Navy Personnel Research and Development Center.

Last year, NPRDC research phychologists applied a relatively new technique, called ECHO, to solicit information from warehousemen at the Naval Supply Center, San Diego regarding what positive and negative factors affect their motivation.

ECHO is a technique for learning something about the values, attitudes, and opinions of a population with which the investigator is not particularly familiar. Developed for research on foreign populations, ECHO is designed to minimize the extent to which the investigator's assumptions and stereotypes can filter or distort the information obtained from the sample.

DEVISE OWN ANSWERS

ECHO uses an open-ended survey technique instead of the more common multiple-choice method, thus allowing respondents to devise their own answers. For the NSC study, the questions were phrased both positively and negatively, asking what motivates or demotivates workers. Respondents were also asked to provide certain demographic information. All responses were categorized by two teams of warehousemen, one handling responses to the positive question and one handling responses to the negative question.

POSITIVE AND NEGATIVE

Overall, the warehousemen had more negative than positive things to say about the motivational aspects of their jobs. The large number of categories generated suggests that the warehousemen perceive their world of work to be multifaceted.

The categories with the most responses to the positive question were as follows (starting with the largest): nothing/none, taking pride/self-satisfaction in work, liking the job, working with others, the challenge of getting the work out, pay/fringe benefits, accomplishing a good day's work, and recognition/feedback. The categories with the most responses to the negative motivation question were as follows: poor supervision; coworkers who are lazy, inefficient, goof-off; safety/work conditions; nothing/none; unfair labor practices; and top management.

The negative responses were primarily associated with supervision and personnel administration practices; the positive responses, with personal satisfaction in getting the job done. The only factor of motivation that appears salient in both its positive and negative aspects pertains to coworker relationships, which can motivate or demotivate.

CHALLENGE IMPORTANT

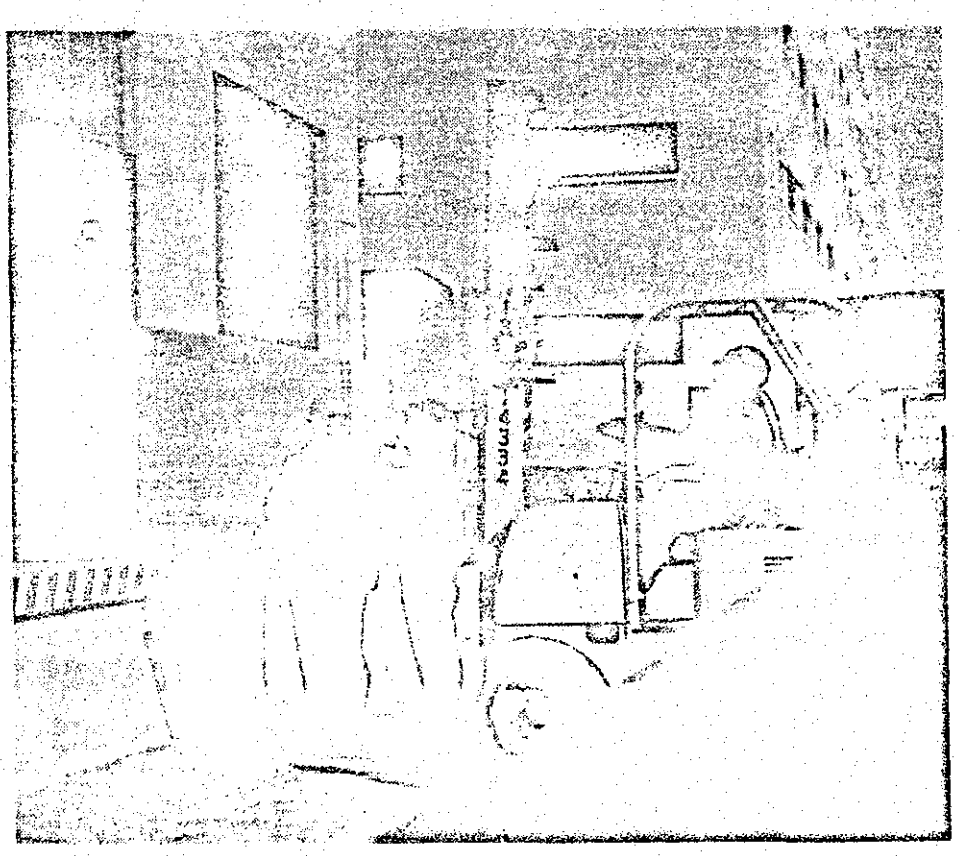
The data contained some interesting outcomes: (1) the pay factor's apparent lack of salience, (2) the diverse nature of factors associated with motivation in a job whose content is relatively undifferentiated, and (3) the importance of factors such as job challenge and accomplishment.

The data also suggest that motivation could be enhanced by (1) specifically assigning warehousemen to work together who are compatible and who respect one another, (2) ensuring that rewards and punishment are administered equitably, and (3) giving formal and informal recognition for good performance.

CHANGES INITIATED

At the survey's conclusion, a report was drafted for the Naval Supply Center's Executive Officer, who gave it wide distribution and initiated various organizational and procedural changes based on its findings. NPRDC investigators are continuing to monitor the impact of those changes on productivity and will do so for another year.

Although the changes are not expected to necessarily result in immediate improvement, they are expected eventually to result in stronger civilian leadership for the warehouse and in improved performance throughout the Naval Supply Center.



A study being conducted by NPRDC focuses on the job factors that motivate semiskilled blue collar workers. Warehousemen at the Naval Supply Center, San Diego recently were surveyed regarding these factors. The recommendations that resulted from the survey are expected to improve performance throughout the organization.

Cost reductions tied to Job Performance Aids

cont'd from page 2

Development Center is conducting a major effort in the test and evaluation of JPAs and their integration with current Navy personnel and training systems. The program's objectives are to define the state-of-the-art in JPA technology, to develop a conceptual model for an integrated JPA-based personnel system, to test the integrated personnel system concept, to quantify cost benefits obtainable for various applications, and to develop a user quide.

Based on the findings of NPRDC's studies, existing personnel systems may be modified to upgrade system readiness, to reduce maintenance and personnel costs, and to improve the use of limited personnel and training resources.

Earlier this year, NPRDC hosted a conference on the state-of-the-art in JPA technology. That meeting's results included recommendations for JPA technology applications, methodological studies, and future R&D, all directed toward integrating JPA technology with the Navy personnel system of the 1980s.

Unclassified technical reports distributed

J. F. BROCK
Instructional Decision Making in the Design of Operator Training: An Eclectic Model, NPRDC TR 77-31, May 1977 (AD-A039 800)

J. R. CALLAN, L. E. CURRAN, J. L. LANE
Visual Search Times for Navy Tactical Information Displays, NPRDC TR 77-32, May 1977 (AD-A040 543)

H. R. BOOHER (Editor)
Symposium Preceedings: Invitational Conference on Status of Job Performance Aids Technology, NPRDC TR 77-33, May 1977 (AD-A040 540)

W. A. SANDS
Screening Male Applicants for Navy Enlistment, NPRDC TR 77-34, June 1977 (AD-A040 534)

D. W. ROBERTSON, S. W. WARD, M. H. ROYLE
Evaluation and Prediction of Navy Career Counselor Effectiveness, NPRDC TR 77-35, June 1977 (AD-A042 032)

G. J. LABBS, H. HARRIS, E. PICKERING
A Personnel Readiness Training Program: Operation and Maintenance of the 1200 PSI Steam Propulsion Plant, NPRDC TR 77-36, June 1977 (AD-042 033)

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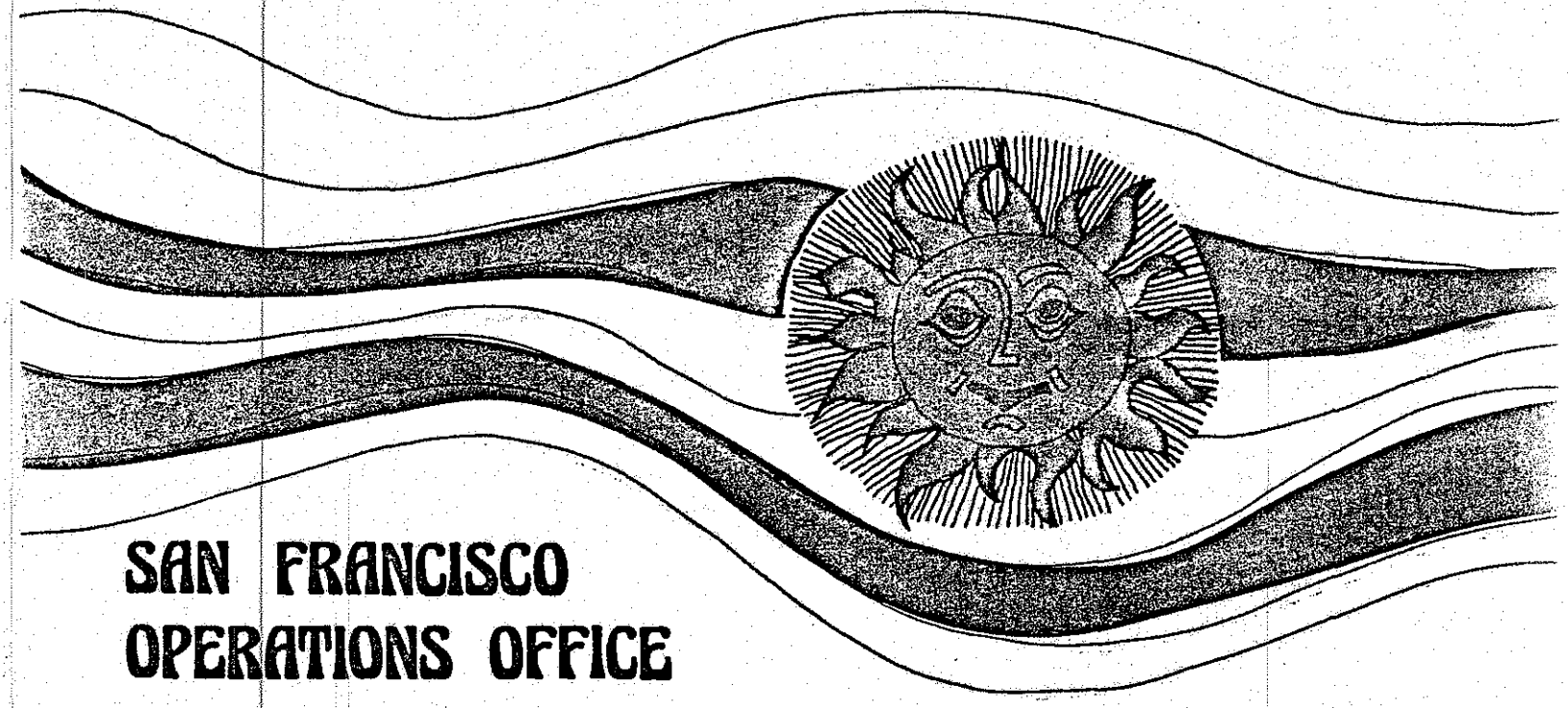

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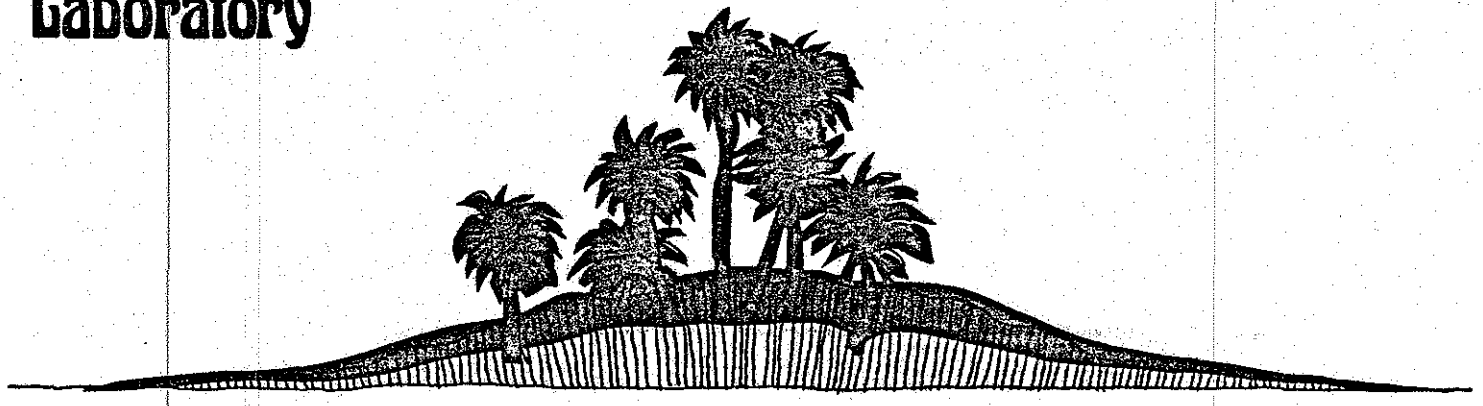
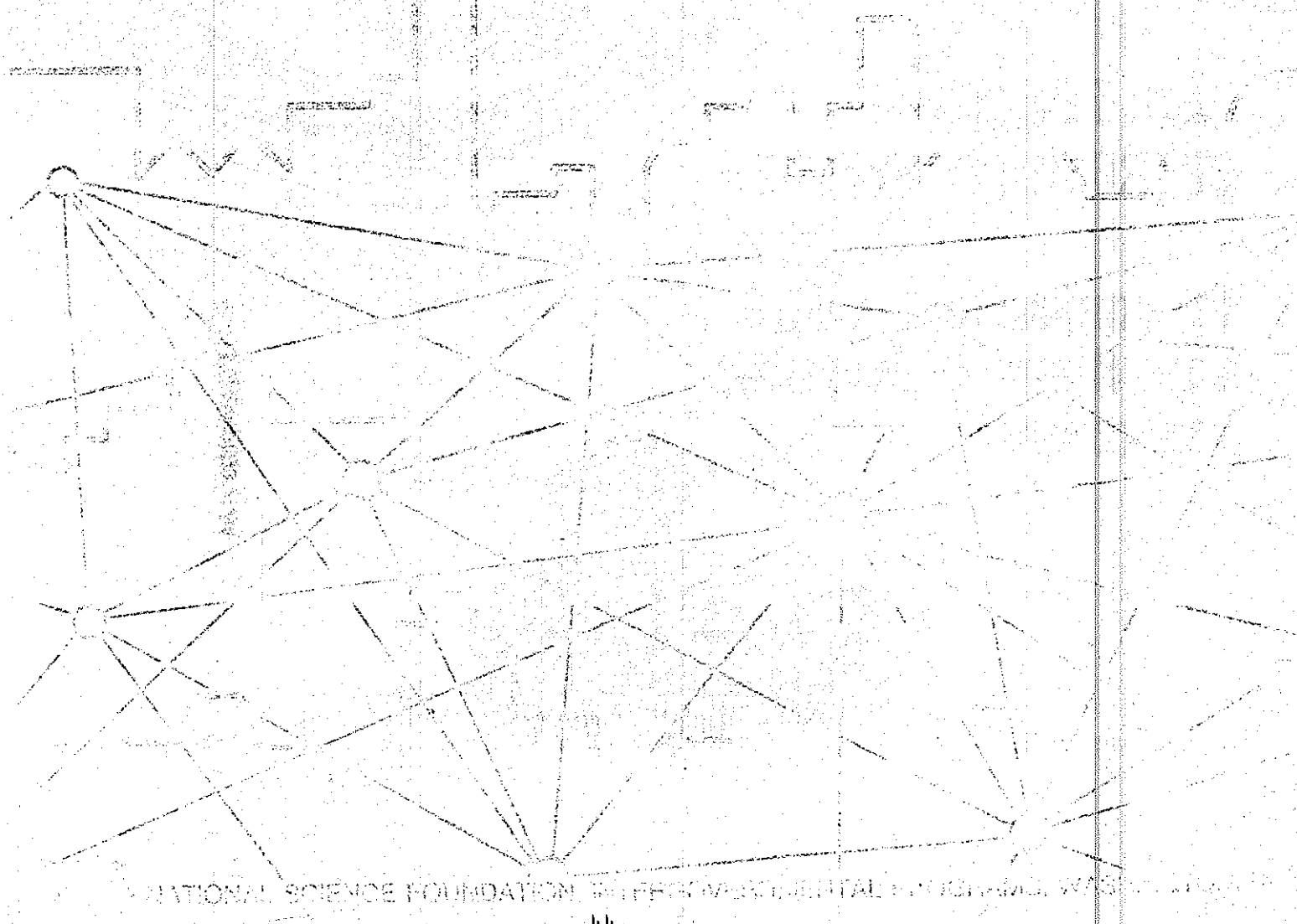


NETWORKING FOR SCIENCE & TECHNOLOGY IN LOCAL GOVERNMENT

Proceedings of the First Annual Innovation Group Conference March 1977



Proceedings of the
Third National Conference on
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Printed August 1977

TECH TRAN

SEPT. 1977

VOL. 2, NO. 3

U.S. ARMY CORPS OF ENGINEERS INFORMATION EXCHANGE BULLETIN

TECHNOLOGY TRANSFER AND ETL

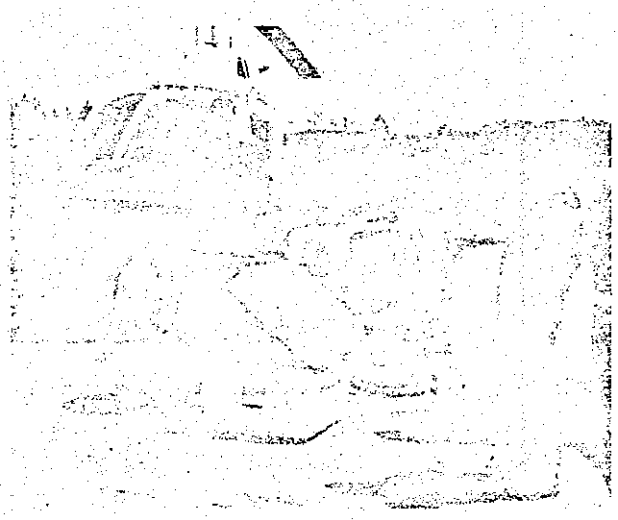
With the recent emphasis and increased activity in Technology Transfer, there is an inherent danger that the phrase or the process will be regarded as some mystical "black box" that can perform miracles. TECH-TRAN is intended to inform you, but also to illustrate clearly, that technology transfer is most often a logical and common sense application of what technology has to offer.

A common reaction to successful technology transfer is: "Gee, why didn't I think of that?" That is, the solution or application is so logical and obvious that we wonder why it wasn't done before. Of course this does not mean that we shouldn't actively promote the transfer. It does mean that both the potential user and the innovator should be on the alert for ways of applying available technology to solve everyday problems as well as the more obvious "big" problems.

PORTLAND CIVIL WORKS DISTRICT USES ARTILLERY SURVEY SPINOFF

Our hats-off to those in the Portland District Engineer's office responsible for the planning and execution of a flood plain control survey using automatic inertial surveying equipment! Preliminary results are very encouraging; in fact, it appears that a real breakthrough has been achieved in survey technology that will have wide-reaching effects for the Corps' Civil Works program. The heart of the system is an instrument called the Auto Surveyor, but the key to the success of the program was the manner in which District personnel prepared for the survey. The combination of careful planning and professional execution has resulted in acquiring mapping control a year earlier and at one-third the cost, compared to conventional survey methods.

The Auto Surveyor is the commercial version of inertial positioning systems developed by ETL for the Army artillery units and for the Defense Mapping Agency. It is a self-contained unit that can easily fit into a jeep, a commercial van, or a helicopter. It can be moved from point to point at any safe speed, and the horizontal and vertical location of new points can be read or recorded on tape immediately. The Portland project team found that the inertial equipment did a fast, accurate, low-cost job on two very dissimilar projects, one a flood plain control survey in Washington County, OR, and the other a boundary control survey along the rugged course of the Columbia River.



INERTIAL SYSTEM GOES AIRBORNE — Contractor personnel install inertial survey system components in helicopter for aerial traverse of a rugged stretch of the Columbia River. Portland District Project Manager Roger Campbell, second from left, observes.

—Photos by Wayne Buchanan, Portland District

In both surveys the Auto-Surveyor produced real-time coordinate readings with the required degree of precision for both projects. (Requirements were 1:40,000 ±0.1m to the nearest basic control.) The purpose of the Washington County survey was to establish horizontal and vertical control to be used for a flood plain mapping project with maps to be published at a scale of 1:4,800. A van-mounted system was used to survey 550 selected points. The purpose of the Columbia River survey was to establish state plane coordinates for section corners on both banks of the John Day Reservoir. Inaccessible by van, 175 points were obtained by helicopter with a speed impossible for conventional field survey crews. A total of 725 points were surveyed over 560 square miles between June 6 and July 19.

Asked about cost comparison between inertial survey and conventional methods, Portland District Project Manager Roger Campbell replied, "There is no comparison!" The system is very cost effective with an occasional bonus payoff, he noted. "In the Washington County flood plain mapping project, we would have been satisfied with elevations only for most of the

Continued on page 3.

Prepared IAW AR 310-2

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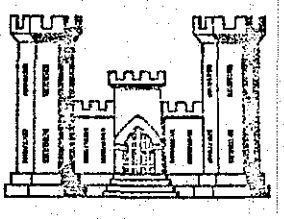
- Guest Speaker — Ramifications of the Use of State Coordinate System



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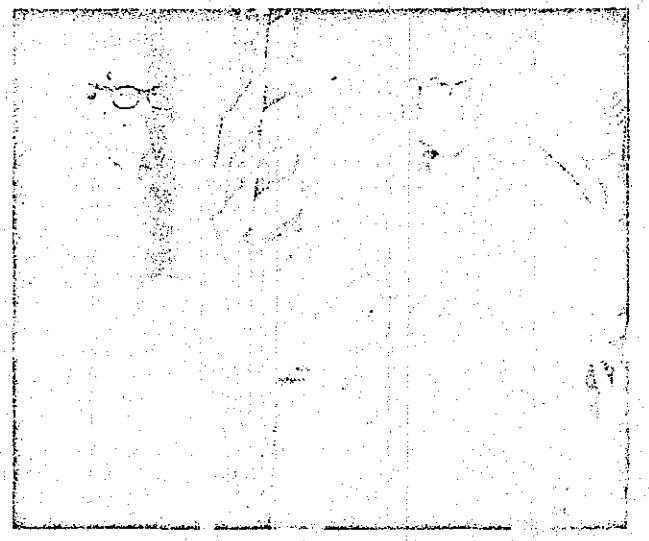

COL Philip R. Hoge, right, accepts the symbolic Commander's Plaque from COL Maurice K. Kurtz, Jr., in a brief change-of-command ceremony at ETL, 28 July.

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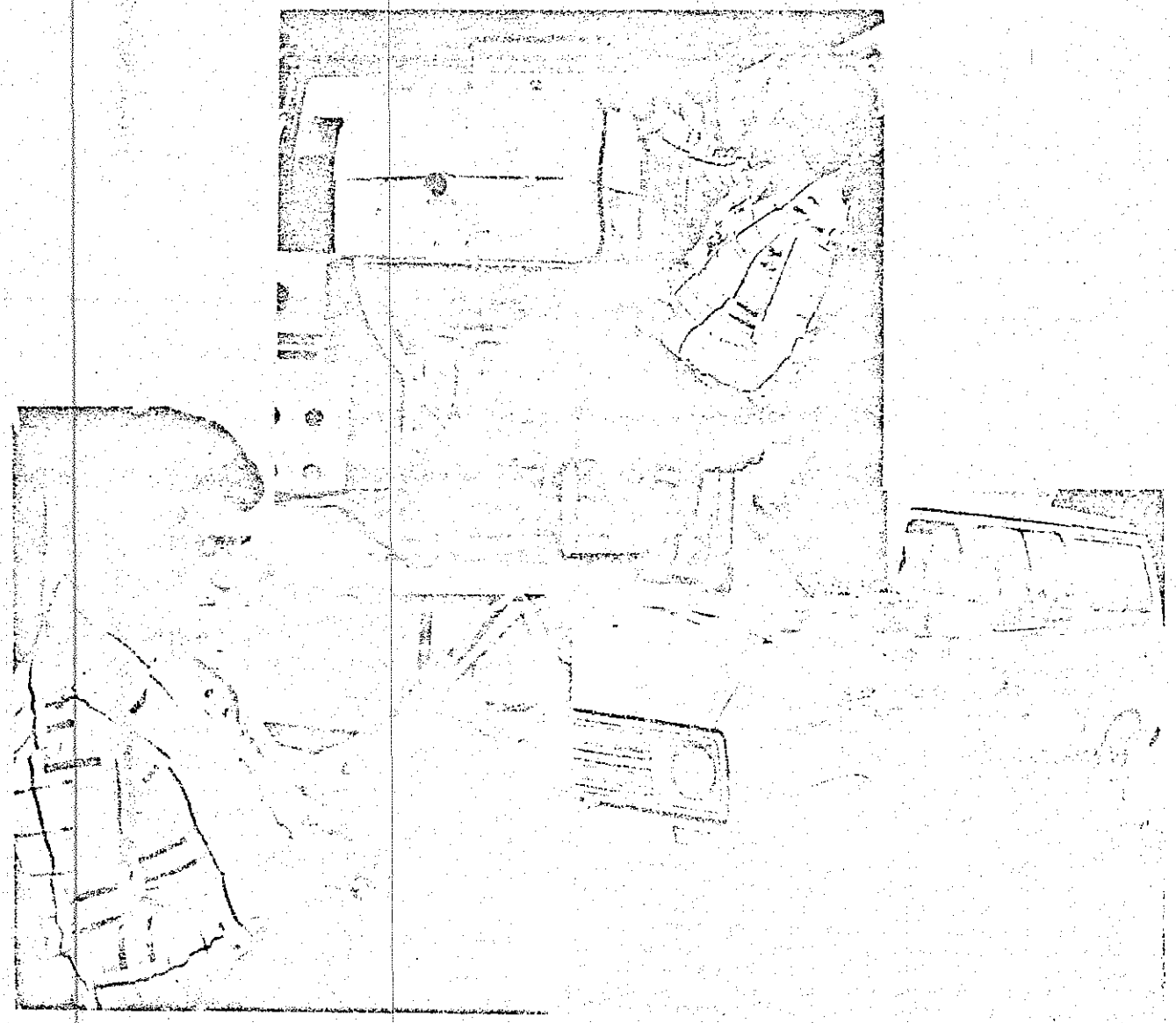
PORTLAND CIVIL WORKS continued from page 1.

points, but we got horizontal positions also at no extra cost. This will enable us to have fully controlled stereo models; in most cases eliminating the need for extensive amounts of analytical triangulation," he said.

On the score of accuracy Mr. Campbell commented, "We're pretty pleased. The most impressive thing was one position check where we traversed about 10 miles in the middle of the Washington County project and came out within centimeters of the National Geodetic Survey's values for the survey monument at Rove 2 Station." The position readout was only 3 cm (1.2 in) off the official recorded latitude and 17 cm (6.8 in) off the official longitude. Although impressive, the system's accuracy over the entire mission remains to be determined by detailed evaluation of the total results. One observer, who reviewed one day's output, estimated the system achieved root-mean-square accuracies better than .5 m (20 in) for horizontal positions and .2 m (7 in) for elevations.

Properly used, this system should produce results as accurate as it did in Portland, where thorough preparations by the highly professional District Survey Branch contributed greatly to the successful use of the inertial system. The Portland experience strongly suggests that inertial survey can yield substantial savings in time and money for a variety of precise survey tasks.

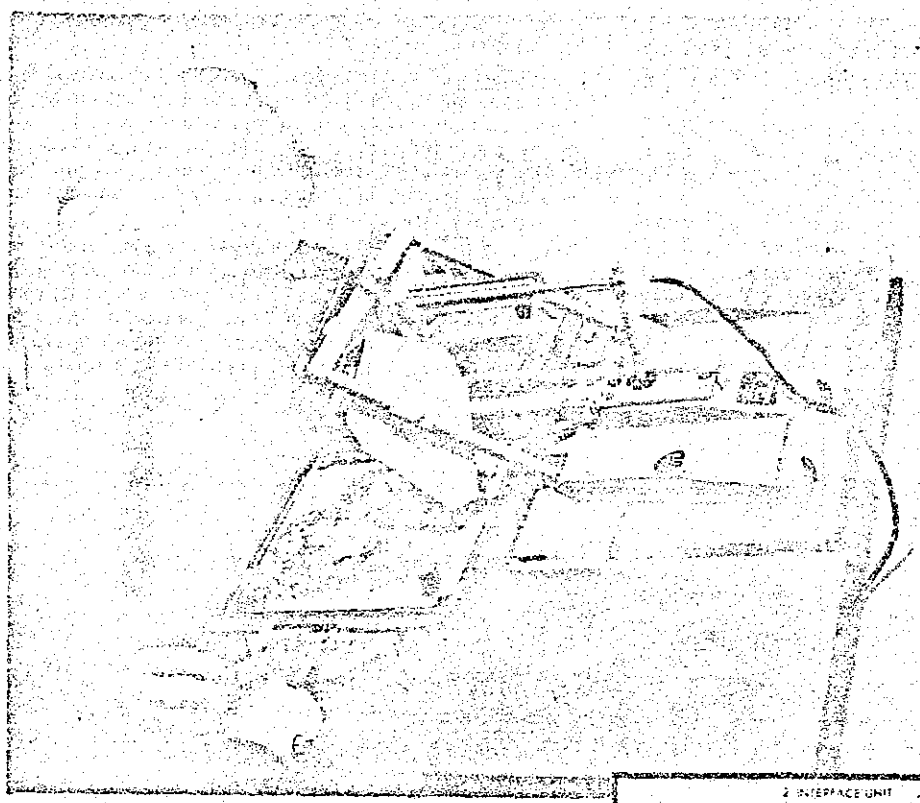
As this issue of TECH-TRAN went to press, the Huntington District Survey Branch, which pioneered an early automated inertial survey demonstration for Ohio River Division and others (TECH-TRAN, Dec. 76), was completing the evaluation of a recent 2-week survey operation in West Virginia and Ohio, using the same system. Look for details in a future issue.

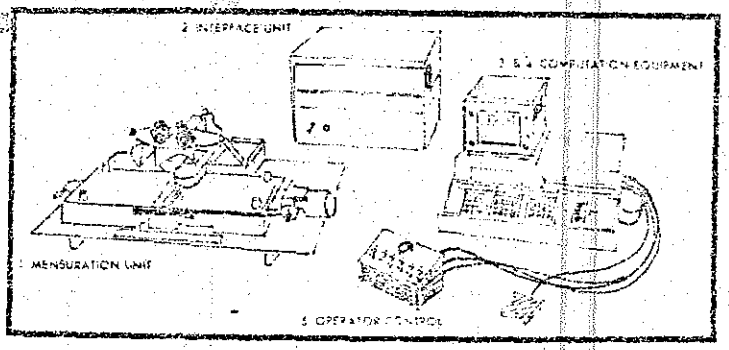


Left, operator enters instructions on command display unit. Center, operator adjusts inertial measuring unit mounted atop electronic distance measuring equipment in rear of van. Right, driver measures elevation difference between control point and sighting device on van.

—Photos by Wayne Buchanan, Portland District and Ed Root, ETL

A NEW TOOL FOR RAPID DETERMINATION OF GROUND POINTS





Of interest to mappers and surveyors is the Analytical Photogrammetric Positioning Systems (APPS) developed by ETL for rapidly determining horizontal coordinates and elevation of points on the ground from aerial photographs. The APPS has gained popularity among the Armed Services because of its simplicity and mobility. Recently, in the civilian area, the Department of Interior's U.S. Fish and Wildlife Service has discovered it can use this versatile tool for certain applications associated with wetland mapping.

WHAT IS IT?

The APPS is basically the integration of viewing, measuring, and computing components. (See diagram) It allows an operator to review, stereoscopically, an overlapping pair of aerial photographs, to place reference marks over a point of interest, and to compute the X, Y, and h of that point by merely depressing the foot switch. In its current configuration the APPS requires a photographic data base of the areas of operation. The data base is made up of two components: a file of cartographic photographs which have been marked, measured, and triangulated so the position and orientation of each stereopair are known, and a data tape on which it is recorded sufficient information for each stereopair to permit computation of the ground positions. Measurements on the photographs are made with an accuracy of 0.001 inch. Ground position accuracies are related to the scale of the photographs being measured.

A modified version of the APPS (APPS-1) was used by the Fish and Wildlife Service to demonstrate the utility of this kind of instrument for its wetlands program. A second-generation APPS of higher accuracy and utility is being readied for delivery to the same agency. This instrument will allow an operator to compute the position and orientation of a pair of photographs — or a strip of photography — by using three or more identifiable ground control points. He can then measure the location and area of a wetland by traversing the APPS' reference mark around the perimeter. The system has an edit capability, a polygon closure verification capability, and a data base management capability. It will have a graphic CRT terminal and a graphic plotter (for proofing purposes). The data management capability will permit the operator to interact with the computer. For example, if he wants to know which wetlands in a certain region have one or more specific types of growth, the system will search out and print the information.

ETL will provide upon request further information on this system and on a second generation APPS being developed for the military.

ORD APPLIES INTERDISCIPLINARY PHOTO ANALYSIS APPROACH TO EROSION PROBLEMS

Recently the Ohio River Division (ORD) requested ETL to assemble a photo analysis study team to join three other groups in studying the erosion problems along the banks of the Ohio River. The objective of the effort was to determine when erosion occurred, to trace its rate and extent, and to pinpoint its likely causes.

The team comprised an interdisciplinary mix of representatives from the Pittsburgh, Huntington, and Louisville Districts within ORD, personnel from other districts (Kansas City, Vicksburg, Memphis, Rock Island, and St. Louis), universities (Purdue and Dartmouth College), and ETL.

For the study the team obtained air photos spanning the last 47 years. At least eight periods of time were studied in which bank line changes were recorded and illustrated on map overlays. The information portrayed on an aerial image is a pattern of the landscape. The pattern is composed of physical (landforms, soils, topography, rocks, hydologic systems), biological (plants and animals), and cultural (land use and transportation) characteristics. Specialists in each of those areas are required to provide a comprehensive and thorough understanding of the dynamics of a particular area.

In this case the team brought together a variety of disciplines: civil engineering, botany, geology, geography, hydrology, forestry, archaeology, landscape architecture, law, urban planning, and economics. The design or arrangement of the pattern features in two and three dimensional aspects gives the clues needed to determine their identity, properties, areal extent, distribution, and interaction. Examination of the photo coverage in different time periods by such an interdisciplinary group then provides the basis for deriving information on the dynamics of landscape change or development.

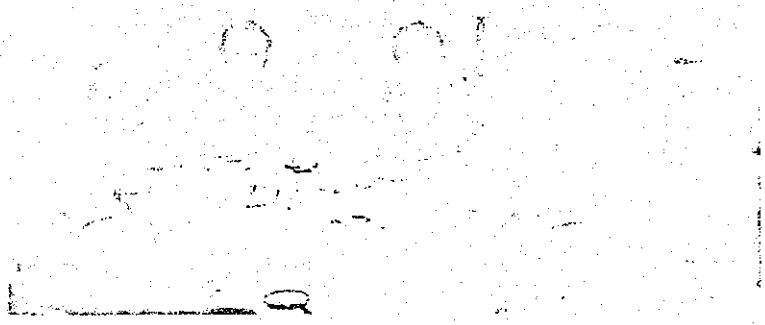
Bill Browne, Chief of ORD's Erosion Study Teams, felt that the information derived from the aerial photos was espicially useful as an aid in the analysis of the erosion problems. It allowed the members of the teams to get a grasp of features they couldn't get from the ground such as the landslide areas, and by studying photos from different time periods the teams were able to compare changes in slide areas and the overall topography, vegetation coverage, and particularly the bank configuration.

The ORD utilized the interdisciplinary photo analysis approach in studying its erosion problems, but the approach has many applications. In the near future the methods will be used to assist the facilities engineer in determining the impact of military maneuvers on the desert landscape at Fort Bliss and to assist the Albuquerque District in studying a seepage problem at Cochiti Dam in New Mexico.

The use of an interdisciplinary team trained in the study of aerial photography to study problems can be cost effective and efficient. If we can help you solve any of your problems, contact ETL.



Members of the interdisciplinary photo analysis team examine archaeological artifacts washed out of the stream bank as part of their field check. Left to right, Dr. Richard Birnie, Dartmouth College, Dr. P. T. Yeh, Civil Engineer, Purdue University, Wallace Walters, Hydraulics Engineer, Vicksburg District, Robert Maslowski, Archaeologist, Huntington District.



Members of the interdisciplinary team prepare map overlays for tracing the erosion patterns of the Ohio River. Left to right, Dr. P. T. Yeh, Civil Engineer, Purdue University, Alfred Whitehouse, Geologist, Pittsburgh District, Richard Lenning, Biologist, Kansas City District, Charles Stevenson, Civil Engineer, Pittsburgh District, and Steven Smith, Attorney, Louisville District.

ETL REPORTS

Below is a list of technical reports published by and for ETL during the second quarter of 1977. These reports may be obtained from the National Technical Information Service (NTIS), Springfield, Virginia 22161 or the Defense Documentation Center by citing the AD number.

AUTOMATED CARTOGRAPHY

Digital Cartographic Study and Benchmark, First Interim Technical Report. D. J. Panton and M. E. Murphy. ETL-0090, Oct. 75, AD-A035 155.

Digital Cartographic Study and Benchmark, Second Interim Technical Report. D. J. Panton and M. E. Murphy. ETL-0091, Dec 75, AD-A035 156.

Digital Cartographic Study and Benchmark, Third Interim Technical Report. D. J. Panton and M. E. Murphy. ETL-0092, Sep 76, AD-A035 157.

Digital Cartographic Study and Benchmark, Fourth Interim Technical Report. D. J. Panton. ETL-0093, Jul 77.

COMPUTER PROGRAMMING

Digital Terrain Data Compaction Using Array Algebra. Urho Rauhala and Stephen Gerig. ETL-0108, Nov. 76, AD-A041 039.

The Use of Array Algebra in Terrain Modeling Procedures. CPT Ronald L. Magee. ETL-0094, Oct 76, AD-A040 619.

MAPPING AND SURVEYING

Design of a Map Update Capability for Engineer Topographic Units. ETL-0107, May 77, AD-A041-038.

Platform Orientation System Test Program. Glenn W. Schmeidel. ETL-0100, Nov 76, AD-A040 599.

REMOTE SENSING

An Analysis of LANDSAT Systems for Cartographic and Terrain Information. Theodore C. Vogel. ETL-0103, June 77.

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Tours of ETL are available upon request. Comments relating to articles published in TECH-TRAN or requests for further information should be forwarded to:

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TECHNOLOGY APPLICATION CENTER
A DIVISION OF THE INSTITUTE
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THE UNIVERSITY OF NEW MEXICO

REMOTE SENSING-NATURAL RESOURCES PROGRAM

New Developments

- New Projects
- Hydrology By Satellite
- Remote Sensing Demonstration Project
- NCIC Photo Service
- Exhibits & Meetings

NASA
National Aeronautics and Space Administration

New Projects . . .

Middle Rio Grande Council of Governments

TAC has signed a four-month agreement with the Middle Rio Grande COG to perform a series of mapping tasks. For Bernalillo, Sandoval, Torrance, and Valencia counties we are preparing a 1:250,000 base map compiled from Landsat false color composite prints. A series of transparent overlays will be made showing township and range, land ownership, slope (using the US Army TOPAZ system), precipitation distribution, vegetation, mineral deposits and leases, land use (six categories), transmission lines and pipelines, and water resources (ground water depth, water quality, and well pumping capacity). Another task will be to compile historic land use overlays for this four-county area. These historical maps will be compiled from aerial photography obtained in the mid-1930's, the 1950's, and current Landsat imagery.

US Bureau of Mines

Dr. Robert A. Frosch, new administrator of NASA, stated in *Goals for America* that a unique application using satellites will be to "monitor and inventory surface mining by 1981." TAC is an integral part of this effort. Through a grant from the US Bureau of Mines we are exploring the implementation and utilization of Landsat data for monitoring coal surface mining in New Mexico. We are utilizing an automatic classification technique to map several stages of mining activity at the Navajo coal mine near Farmington (see photo at bottom). The land cover categories under examination are: active coal seams, graded and ungraded overburden, revegetated overburden, mine roads, and standing water. The image processing facilities at the EROS Data Center in Sioux Falls, South Dakota and Stanford University, Palo Alto, California are being used for the data analysis. In light of the many man hours presently required for mine surveys and the number of new mines soon to be opened in the area, Landsat monitoring methods could save considerable labor and expense. We are working closely with Mr. Herman Sheffer, the US Bureau of Mines liaison officer in Santa Fe.

Energy Resources Board— UNM Energy Institute

The New Mexico Energy Resources Board, through the University of New Mexico Energy Institute, has awarded our program a one-year contract to conduct an airborne thermal scan of Farmington, New Mexico. The thermal flights will be conducted in late winter and possibly early spring. Through close cooperation with the Energy Institute, state and local agencies, private firms, and homeowners, the objective is to evaluate heat loss or energy conservation efficiency in homes and public buildings. Selected Farmington neighborhoods representing a wide range of architectural styles, ages, construction materials, and heating systems will be analyzed in this study. Examination of the thermal imagery, together with energy use and other data collected on the ground, will be made to determine patterns of heat loss during winter. Schools and large buildings will also be studied to detect roof insulation damaged by moisture. Project personnel are now designing a public awareness campaign and will be exploring alternative approaches to information dissemination.

NASA Earth Resources Laboratory

In August of this year the University of New Mexico undertook a project to assess the desire for training in satellite image processing. NASA's Office of Applications, through its Regional Applications Program, has asked UNM to evaluate the level and nature of interest in the development of short course, seminar, and user service activities in automatic classification of satellite data. The Geography Department, working with TAC, has designed a questionnaire as our initial instrument for this assessment. The three-month survey is being directed to earth resource departments in universities and colleges throughout New Mexico and nearby states. Responses to the questionnaire will help us determine the course length, subject matter, and classroom aids.

Water Resource Research Institute (WRRI)

This one-year project has two basic objectives: to investigate the accuracies of reservoir surface area measurements taken from Landsat imagery by various analog, digital, and manual measuring methods; and to identify the data accuracies for lake area and reservoir volume presently required by water resource agencies. All measurement data derived from the measuring methods will be compared to USGS surface area field data for accuracy. This procedure should lead to a determination of measurement accuracy heretofore missing in the published literature. Equipment and techniques being used for area measurements are: a fine mesh dot grid (1 dot = 2500 acres); an electronic planimeter; an image density slicer; and Landsat computer tapes. The Landsat tapes will be analyzed at the EROS Data Center in Sioux Falls, South Dakota. We are surveying water management agencies in New Mexico to evaluate the accuracy and utility of present water inventorying techniques. We hope to answer such questions as: What area measuring techniques are most accurate? What image scales can best be measured? Does reservoir basin morphology affect accuracy?

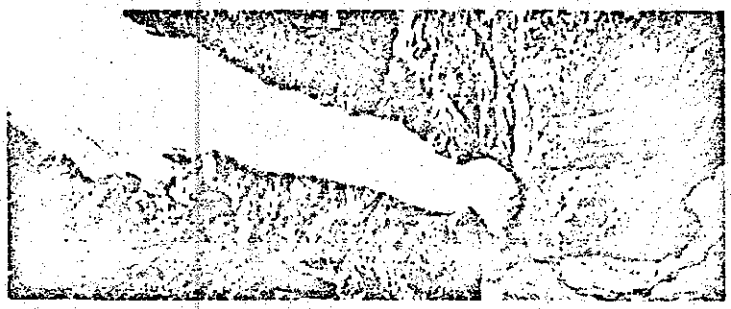
National Park Service— UNM Chaco Center

As a follow-on to an earlier project, the National Park Service has contracted with us for an analysis of multispectral data of Bandelier National Monument. The project involves a comparison of scanner data with soil and vegetation information. We are looking for indications of old agricultural sites, ancient road networks, and Anasazi Indian ruins. The Bandelier study has the same basic objectives as a previous project performed for the Park Service at Chaco Canyon. The airborne scanner data was flown by Bendix Aerospace Corporation of Ann Arbor, Michigan and consists of eleven channels spanning the ultraviolet, visible, reflective and thermal infrared regions. The data are scheduled to be analyzed either on the IDIMS system at the EROS Data Center or on the MDAS system at Bendix.

Navajo Coal Mine, NW New Mexico Landsat Band 4

Hydrology By Satellite

Our newest tape-slide presentation in the remote sensing series is *R400 Hydrology By Satellite: Managing the Watery Planet.* This presentation shows how the capabilities of remote sensing apply and are being applied to water resource management. It employs images from Landsat and other satellites, high- and low-altitude aircraft, and ground platforms. Infrared and color photography, thermal and reflective infrared scanning and multispectral scanning are illustrated, along with processed images, composites and maps. The package consists of 52 35mm slides, an audio cassette with professional narration, a printed script, bibliography, and a separate outline and summary for key discussion points.



Outwash from Tustamena Glacier, Alaska U-2 Photo

Our other presentations are . . . *R300 Prospecting By Satellite, R200 Food Watch By Satellite,* and *R100 Remote Sensing: Tool for Managing Earth Resources.* Over 500 copies are in use in universities, government, and private research facilities in both the United States and Canada. They have been translated into French and Spanish and have gone overseas to every continent except Antarctica.

New presentations on remote sensing in forestry and colonies in space are being developed.

Exhibits & Meetings



TAC Exhibit at AAG Meeting, Salt Lake City, Utah

In November TAC will again exhibit its very popular Gemini, Apollo, and Skylab earth-oriented photography. The display will be at the Geological Society of America (GSA) meeting in Seattle, November 7-9, and the National Council for Geographic Education (NCGE) annual conference in St. Louis, November 23-25. The exhibit also includes maps, quarterly publications and brochures on our other Remote Sensing-Natural Resources products.

TAC Is New Mexico's NCIC State Affiliate

TAC has been officially designated by Governor Jerry Apodaca as the New Mexico State Affiliate for the National Cartographic Information Center (NCIC). Our responsibilities are two-fold: to locate private photography and maps and submit them for inclusion in the NCIC system; and process user requests. In this second responsibility we provide a complete search service for locating, ordering, and analyzing photography and maps requested by the user.

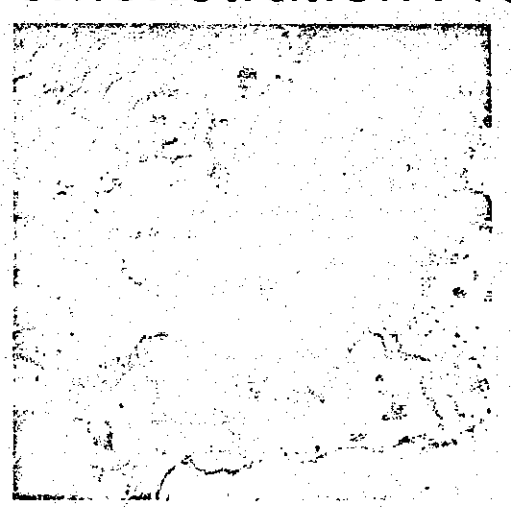
We also maintain an archive of New Mexico black-and-white aerial photography of varying scales and dates. This unique collection has been contributed by USGS, SCS, ASCS, and the UNM Geology Department.

New Mexico Remote Sensing Demonstration Project

In our last issue of TAC NEWS we announced the initiation of a remote sensing demonstration project involving Landsat satellite imagery and natural resource inventories in New Mexico. The project is a cooperative effort between several state resource management agencies, NASA's Earth Resources Laboratory (ERL) in Slidell, Louisiana, and TAC. The state agencies actively involved in the project at the present time are Game and Fish, Forestry, State Engineer's Office, Natural Resource Conservation Commission, and the Environmental Improvement Agency. The project is progressing on schedule according to the tasks outlined during several organizational meetings held in June and July.

The objective of the project is to classify and map a number of vegetation types and soil conditions in central New Mexico using Landsat digital analysis techniques. Extensive ground truth data will be collected for several test sites such as Mt. Taylor, the San Acacia area north of Socorro, and the Albuquerque metro-Rio Puerco drainage-way. State agency representatives will be traveling to the image processing center at Slidell to make digital resource classifications using Landsat tapes and ground truth data. If the test categories meet accuracy requirements, the analysis will be extended to include the entire Landsat image, an area of over 13,000 square miles.

During the week of July 25 a survey team from ERL conducted a preliminary examination of the three test sites. The ERL team members were Roy Estess, Tom Austin, Willis Bounds, and R. H. Griffin. They were accompanied in the field by Gary Blackwell and Jim Freeman of the State Forestry Department,



Landsat Image of Mt. Taylor Test Site

Tom Budge from TAC, Bob Bishop of the Natural Resource Conservation Commission, Forrest Barron of the State Engineer's Office, and John Turnbull from the Environmental Improvement Agency. The primary ground data collection trip is planned for late September or early October.

If the demonstration proves successful, we hope to see the installment of an image processing facility in New Mexico. An in-state facility would greatly aid resource managers in preparing timely resource inventories and updates.

TAC News is designed and edited by Amelia Komarek, Assistant to the Director, TAC.

Information Center News . . .

TAC has recently added the following files to its 130 files already available.

GEOARCHIVES (1970-present) includes *Geotitles Weekly, Geocom Bulletin, Geoscience Documentation,* and *Bibliography of Vertebrate Paleontology.* The file contains over 500,000 citations and is updated at the rate of 9,000 per month.

TOXIC SUBSTANCES CONTROL ACT CANDIDATE LIST OF CHEMICAL SUBSTANCES contains chemical abstracts, index names, CAS registry numbers, EPA reporting numbers (R series), Molecular Formula, and synonyms (trade names, author names). Additional information includes element counts and periodic index terms from molecular formulas and segmentation of CA index names.

PUBLIC AFFAIRS INFORMATION SERVICE (PAIS) contains a selective subject list of the latest books, pamphlets, government publications, reports of public and private agencies and periodical articles relating to economic and social conditions, public administration and international relations.

FEDERAL INDEX WEEKLY contains the latest weekly updates for *Federal Index.* Each time there is a monthly update, the contents of the weekly file are moved to the entire Federal Index file.

FEDERAL INDEX contains information on federal government activities, abstracted from *Congressional Record, Federal Register, Commerce Business Daily, Presidential Documents,* and the *Washington Post,* with citations to the *Code of Federal Regulations, US Code,* House and Senate Bills and other sources. The file corresponds to the hard copy of the *Federal Index.*

DEFENSE MARKET MEASURES SYSTEM covers the Department of Defense contract awards. DMMS is useful for long-range planning, market trends, share-of-the-market studies, and new product ideas. Receiving contractor, awarding agency, and amount of contract are included in the file records.

NATIONAL INFORMATION CENTER FOR EDUCATIONAL MEDIA (NICEM) covers non-print educational material from pre-school to professional and graduate school levels. All types of educational media are included: 16mm films, 35mm filmstrips, overhead transparencies, audio tapes, video tapes, phonograph records, motion pictures, cartridges, and slides.

For information on how to access these new data files, contact Margie Hlava, Manager of Information Services.

TECHNOLOGY APPLICATION CENTER
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A Non-Profit NASA-Sponsored Industrial Applications Center

Whenever major changes occur in living patterns, inventors go back to their drawing boards. Innovation provides wealth to some and frustration to others, but persons with the "knack of inventing" continue to draw, construct, and band together all types of new "money saving," or in new vernacular, "energy saving" devices. To those of you who continue to try and try again, here are some suggestions:

An invention must be marketable to succeed. How can you get an answer to this question? Try the National Bureau of Standards (NBS). The Bureau is authorized to evaluate a proposal and recommend promising inventions to the Energy Research and Development Administration (ERDA). NBS personnel evaluate invention proposals submitted by individuals and small businesses so that no significant energy-related idea is overlooked. Thousands of inventions are being sent in while only 2 of every 100 are forwarded to ERDA.

If ERDA accepts the NBS recommendation (to date, 80% have been accepted), they will determine the nature and extent of support for the invention based on the individual case. Support could consist of financial or other forms of assistance for developing or testing a prototype.

The service from NBS is free. It is designed to save inventors time and money. Secrecy is protected and an unbiased evaluation is provided. Best of all, it is "paper processed."

Models of inventions need not be submitted — only a written description. Tests are not conducted. Patenting is not necessary, but many inventions are when submitted. Currently, NBS reports that half of the proposals received are energy related while one in five are concerned with solar energy.

Major emphasis placed on inventions by two assigned engineers or scientists are:

(1) Will the invention operate as the inventor claims?
(2) What are the chances that its transfer to the marketplace is economically feasible?

How about it *innovators,* technology enthusiasts, or dreamers? Many "gadgets" will become tomorrow's household equipment. If interested, write to the Office of Energy-Related Inventions, National Bureau of Standards, Washington, D. C. 20234, or call (301) 921-3694. Ask for the evaluation request form (NBS FORM 1019), and call or write TAU to let us know your results.

TAU report

Volume 1 September 1977 Number 6

Building Professionals Affected By Energy Management

An Energy Management Workshop, conducted in July at VPI, Blacksburg, Va., brought together energy management consultants, engineers, building code analysts, heating, ventilator and air conditioning specialists, and U. S. Department of Commerce personnel from the Office of Energy Programs, co-sponsors of the workshop with the Extension Division of VPI. Tom Rienerth, TAU director attended and was impressed by the excellent speakers and content of their subject matter.

"There is too much energy *conversation* and not enough energy *conservation,*" stated one of the speakers. Each speaker gave statistics of good and bad lighting, heating, air conditioning, building design (interior and exterior) and recommended ways in which architects and engineers can improve upon buildings in our energy crisis: Building techniques, designs and materials will change dramatically in years to come. Such things as glass exterior walls, cathedral ceilings, and incandescent bulbs may become obsolete in new building design.

Throughout the seminar, a major principle of energy conservation kept being repeated. Every speaker emphasized that ENERGY AUDITS should be conducted on existing buildings and operating machinery. Cost benefits come *after* the audit when top management decides to *correct* the errors or losses. Money has to be spent to save future energy and many dollars. Energy waste exists everywhere in industry. Future energy cost will force many businesses to close if they do not seek out and correct poor energy consuming practices.

Don Hilliard, Energy Conservation Coordinator of Johns-Manville, described a very elaborate on-going energy survey-summary conducted as a model in conjunction with the Federal Energy Administration. He suggested that each industrial plant assign a plant manager or engineer to maintain energy audits. Many good systems are available (tested and proven) through major industries.

TAU Supplies Technological Solutions To Area Problems

TAU welcomes its new field, that of Human Resources, a program of the Delmarva Advisory Council (DAC) which is concerned with all phases of economic development. Jon Lantz, newly appointed Regional Human Resources Coordinator, will work with Delmarva's Community Action Agencies to assist them in their programs for the low-income population.

TAU can provide a great deal of support to this program by matching appropriate technological solutions to area problems. By working with the Human Resources Coordinator, TAU can expand the number of individuals who will benefit from federally developed technology. For instance, the weatherization program, a federal project that helps low income people conserve precious and expensive fuel, can be enhanced by using more efficient and easily installed insulation materials.

Technology can also provide help in data collection and retrieval. To help all agencies on the peninsula, a central *data bank* could be instituted using existing hardware and establishing terminals that would allow each agency to have access to regional and national information.

This would increase the area's ability

(continued on page six)

Revival Of The Electric Car

Researchers in the United States and several other nations are taking a new look at the *electrocar*. It is felt that current drawbacks can be remedied and that an efficient battery-powered auto can be available within a decade. Space technology is playing a big part in the electrocar staging a comeback.

Being clean and quiet and burning no gasoline, it offers a potential environmental boon and will, in the long run, help reduce petroleum imports of the nation.

Invented in 1887, the electrocar was noiseless and safer. Its battery needed recharging every 20 miles, but in those days it did not matter as auto travel was mostly local.

Somehow, after 1910, the "petrocar" (a name given to gasoline driven vehicles) became more popular than the electrocar due to the lack of range in the latter, and this led to the downhill trend in electric vehicles till they gradually faded from view.

Researchers found that the key to the electrocar's possible comeback as a passenger vehicle is its battery. Field tests showed that the battery requires changes in design, controls and drive trains. Studies show that a car which averages 82 miles a day on a single battery would meet 95 percent of the need for a full-service vehicle.

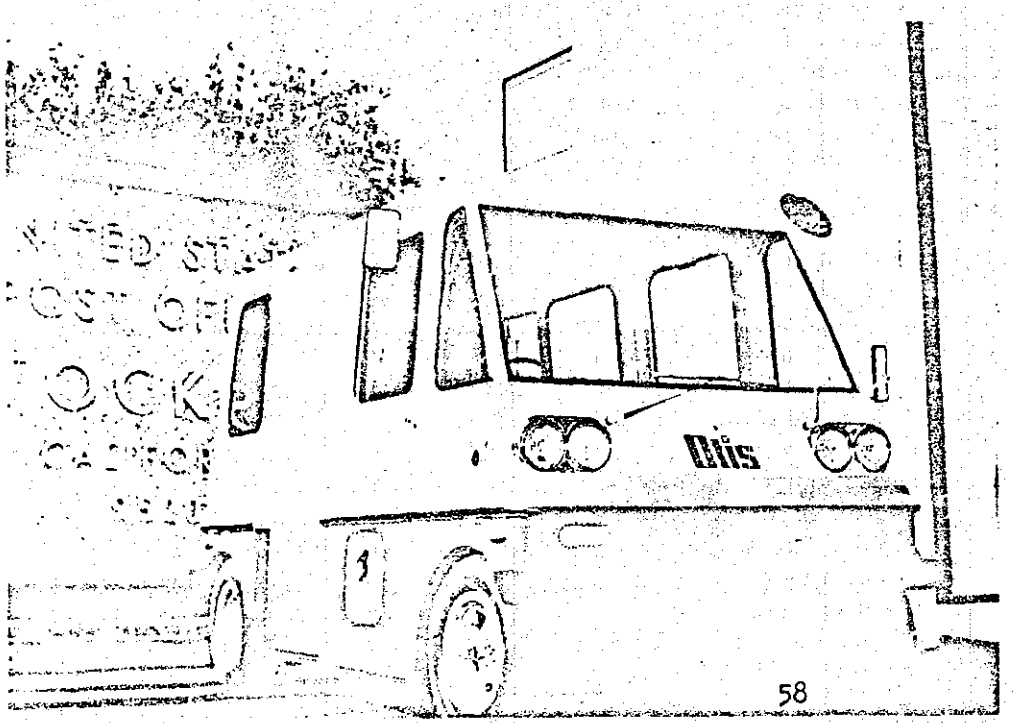
At the present time, commercially-available batteries that have lead electrode plates in an acid solution cannot meet the range requirements.

NASA's Lewis Research Center, through the use of space satellite technology, came up with a nickel-zinc battery that affords longer life and twice the previous range. Such a battery was installed in an Otis P-100 electric utility van.

During the initial testing period it gave 190 miles stop-and-go driving cycles per charge, compared with 99 for the lead-acid battery. At a constant speed of 20 miles per hour, the nickel-zinc battery gave the van 55 miles on a single charge while the lead-acid battery yielded less than 30 miles.

Research is being continued at the Lewis Research Center in improving the nickel-zinc battery performance, life and competitive costs. In a joint NASA-U.S. Postal Service field-test program nickel-zinc batteries will be installed in mail pickup and delivery vans.

NASA will continue working on evaluating the new battery's potential for urban family use in a test vehicle. Lewis researchers feel that a nickel-zinc battery producible within five years, could drive a car 120 miles at an average speed of 40 miles per hour on a single charge. CAN YOU SEE THIS CHANGE COMING?



U.S. Postal Service electric van uses nickel-zinc battery

NTIS Tech Notes

As reported in a previous issue, the National Technical Information Service (NTIS) publishes tech notes twice a month. The TAU report will feature some selected notes each issue. The notes presented each issue are picked on the basis of their possible applicability to the Delmarva area.

Air Curtain Provides Dust Protection

The National Bureau of Mines reports that it has developed a device that can be fitted to a vehicle operating in a dusty environment that protects the operator from inhaling dust. A protective curtain of filtered air is blown down around the head of the operator from a manifold mounted on the machine canopy. Air is drawn into the system through a filter, and is then passed through a centrifugal blower that pushes it through a flexible hose to manifold. This system could be adapted for use on farm, industrial, or construction machinery. An important advantage of this system is that it is not worn or carried or in any way connected to the operator. Unlike a cabin with windows, it does not become dusty over a period of time. The device is available in kit form for about $900. A full 106-page report is available from NTIS for $5.50; ask for PB-246 041/AS. The address is: NTIS, U. S. Department of Commerce, Springfield, VA 22161.

Energy Recovery from Municipal Solid Waste

The Urban Technology System (UTS) reports that Hampton, Va., is considering the pyrolyzation of solid waste as a means of solving its landfill area problem. The new wrinkle in the Hampton Study is that they plan to utilize a high temperature incinerator and offset its costs by producing and selling steam. Several large steam-using institutions have been identified in the area. A preliminary systems analysis indicate the approach is feasible and cost effective. A preliminary cost analysis reveals that the region would see a net gain of over $1,000,000 per year from energy sales, which can be directly applied as savings from the operation of many area landfills. For more information, contact Dr. Arleigh H. Morkhom, Regional Manager, Urban Technology System, Public Technology, Inc., 1190 Connecticut Avenue, N. W., Washington, D. C. 20036, (202) 452-7742.

Libraries Facilitate Technology Transfer

A short article appeared in the July *TAU Report* on films available at the Eastern Shore Regional Library, Salisbury. Mrs. Katherine White, Adult Services Consultant at the library has written TAU to report on other new movies available on fast-developing technologies in energy and related subjects. It is appropriate under this heading "Technology Transfer" to pass on these subjects and strongly recommend that all readers avail themselves of library service in their community.

Some of the new films listed, but not yet purchased by the library, are:

Energy:
Toward the Age of Abundance . . 19 min.
Solar Energy: To Capture the
Power of Sun and Tide . . . . . 21 min.
Superconductors:
Tomorrow's Energy
Breakthrough is Here . . . . . 20 min.

National Broadcasting Company
Selections: Energy Crisis Series

Environment . . . . . 11 min.
Coal . . . . . 27 min.
Natural Gas . . . . . 17 min.
Power . . . . . 19 min.
Oil in the United States . . . . . 37 min.
Oil in the Middle East . . . . . 20 min.
Future Fuels . . . . . 17 min.

Federal and state governments are writing, printing, and distributing hundreds of new books, pamphlets, and newsletters directed toward educating the public on technologies that will affect our social system for years to come. It is the job of TAU to "broker" these ideas to Delmarva industry, educational institutions, and local governments as quickly and totally as possible. Therefore, TAU supports all Delmarva libraries in their extension service connected with advanced technology. We encourage everyone to use their libraries.

In its second year, TAU plans to establish a network of all academic and public libraries on the Delmarva Peninsula to provide flows of technological ideas from federal and state research and development programs to all sectors of the community. All libraries on the Shore will be requested to attend a TAU-sponsored meeting in the fall where expertise will be sought on this subject.

Federal Laboratory Consortium Holds Meeting At UMCEES - Horn Point, Cambridge



Andrea Perry discusses FRC functions

TAU co-hosted a meeting of the Mid-Atlantic Region Federal Laboratory Consortium for Technology Transfer at the University of Maryland Center for Environmental and Estuarine Studies, Horn Point, Md.

Members included representatives from Environmental Protection Agency, Economic Development Administration, Dept. of Health, Education and Welfare, Dept. of Housing and Urban Development, National Science Foundation, National Aeronautics and Space Administration, National Bureau of Standards, Federal Energy Administration, Dept. of Transportation, etc.

They discussed the development of improved methods to assist state and local government and industry in the delivery of the benefits of federal research and development. Staff members of the Federal Regional Council which included representatives of EPA, HEW, HUD, FEA, CSA, Forest Service, etc., and headed by Andrea Perry, Staff Director, FRC, reported on her agency's activities and discussed ways in which it could tie in with Federal Laboratory Consortium activities.

Special reference was made to the Technology Acquisition Unit as an on-going rural model in Region III of the Federal Laboratory Consortium.

Technological Innovations In Rescue Programs

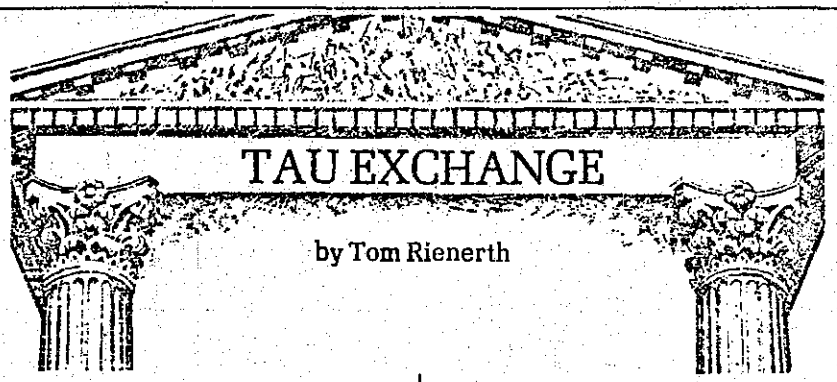
The Naval Air Development Center, in conjunction with the Horsham Aviation Unit in Pennsylvania, has demonstrated a helicopter rescue net system for local fire, police and rescue squads. Developed originally by NADC for rescuing downed Navy aviators, the commercially available rescue net system consists of a four to ten person fire net and a two person window net. Demonstrations were carried out on the use of the net for rescues from high-rise buildings, tall structures and water. Following the demonstration, members of various Bucks and Montgomery County fire/rescue units, including the NADC Fire Department, participated in training sessions involving evacuating persons from the roof and side windows of a 66 foot structure at the Bucks County Fire School.

R & D Research has also resulted in the development and application of *fire resistant clothing* and the development of methods and test procedures for evaluating materials on their capability to protect human skin from burns.

Examples where this technology can be applied include firemen's clothing, racing car driver suits, hospital pajamas and robes and children's nightwear.

TOM'S TWISTER

What letter follows OTTFFSSE?
(Answer on page 6)



In a continuous effort to inform Delmarvans about federal agencies, TAU has selected the National Science Foundation to report on this month.

The National Science Foundation (NSF) was established in 1950 to promote and advance scientific programs in the United States. The Foundation fulfills this responsibility primarily by sponsoring scientific research, encouraging and supporting improvements in science education and fostering scientific information exchange. NSF does not, itself, conduct research or carry out education projects. Recipients of NSF support or assistance have full responsibility in accordance with the terms of their grants or other agreements, for the conduct of their projects or activities and for the results produced.

Collaboration is encouraged between industry and university researchers, as well as between industry and state or local governments on appropriate programs. Similarly, broader efforts through industry associations, groups of companies, or professional societies may be supported.

One of the many agencies within NSF that TAU has direct relation to is the Intergovernmental Science and Public Technology Program (ISPT). These programs are responsible for facilitating the integration of science and technology into state and local government policy-making and program planning operations on an equal basis with legal, fiscal and institutional considerations. Issues and problems confronting various levels of government often have a scientific or technological content. Intergovernmental programs aid the governmental bodies in developing mechanisms to assist in assessing the need for applying science and technology.

Delmarva has many similar problems that go beyond state boundary lines relevant to changing technologies. TAU's prime objective is to carry out all of the above principles.

T tau report

The Technology Acquisition Unit is sponsored jointly by the National Science Foundation and the Economic Development Administration. *TAU Report* is published monthly to inform Delmarva citizens of research developments that can be applied to regional problems.

Editor	Tom Rienerth
Publications Director	Dale Holliday
Editorial Assistant	Betty Singh

Improved Street Lighting Available

Everyone is being reminded of and many are taking action on ways to cut electric costs. TAU suggests that town managers or persons involved in energy auditing public lighting systems look into *high pressure sodium street lighting.* Proof of savings can be outlined by manufacturers involved in such sales. This was covered in great length at an energy seminar held at VPI in July and attended by TAU's director.

High pressure sodium lighting produces a peach color versus conventional mercury blue white type lighting. A city in California is planning to install high pressure sodium lights in four trial areas. The added cost to this project over conventional mercury lights would be $6,000. The resulting energy savings will be $3,400 per year at current electric costs. As costs increase (as they are expected to do), the savings will increase, and most importantly, energy conservation will be applied.

Any Delmarva township or city interested in such an undertaking, please contact TAU at (301) 742-9271.

Readers' Questions And Answers

TAU would like to experiment with a column that will open a direct line for *YOU*, the reader. We would like to receive letters from readers that address current issues of technology relating to Delmarva. The letter will be quoted sufficiently to credit the writer.

We invite you to express your opinion on current or future technology. As an example, a letter recently received from Chestertown, Md., asked for "a cheap way of fixing drafty homes. So much filtered through our walls, it froze the hot water pipes inside the house while the heat was on. This draft problem has sent energy consumption and utility bills soaring." The writer went on to ask, "Does anyone have an inexpensive method of sealing a whole side of a house in order to prevent infiltration of those icy winds?"

TAU will be involved in all types of energy forums, seminars, workshops, etc., in the coming months. The best answer to the above problem will be found and reported on in a later issue.

Please mail or call in your questions or ideas.

(continued from page one)

TAU Supplies Solutions

to respond to the problems of the poo by being able to quickly and easily justif the need for federal support. NASA i now packaging "space food" that can b mailed to elderly individuals who ar unable to attend nutrition programs i their area. This is an example of hov federal technology can be used to sup port human services on Delmarva.

TAU will be available not only to Lant and his project but to all citizens of De marva as well.

TOM'S TWISTER

Answer to this month's question.
N (One, two, three, four, etc.)

T2
TECHNOLOGY TRANSFER SOCIETY
11720 W. Pico Blvd. Los Angeles, California 90064 (213) 477-5081

NEWSLETTER

October, 1977 Vol. 2, No. 4

PRESIDENT'S MESSAGE

Our past president, HERB ROSEN, has recommended tasks for the Society. They are, essentially, to increase memberships and Chapters, to expand the Board for better balance, to broaden our public, to stay solvent and alive, to cooperate with other societies, and to undertake constructive programs, such as the development of a data base (library). We will gladly undertake these tasks.

However, let us recognize a common philosophy in the activities we undertake as a Society. I would suggest 3 basic guidelines, namely:

1. As a professional society, we owe an obligation to the universe in which we operate to contribute constructive new knowledge.
2. The Society should render services not only to its membership, but thereby to the wider community of man.
3. The Society should not be expected to do something for us; it should enable us to do something for ourselves and others that we cannot do as individuals.

In these contexts, then, a membership drive becomes a seeking of like-minded persons who, when gathered together, provide economies of scale in their activities and greater impact from the results of their efforts. Solvency should result from membership support and activities so recognized for their value that they are not only self-supporting but contribute to the financial stability of the Society. This, rather than looking for unwarranted grants or contributions.

Thus, by testing our actions against these guidelines, we can develop a strong foundation for growth and contributions to our selves and our communities.

Parenthetically, I would like to make known my belief that a society is much less dependent on its leadership than on the efforts, great and small, of the larger body of its individual members toward a basic goal.

Therefore, could we not state pragmatically, instead of philosophically, that the Society's basic goal is to improve mankind's environment and life style through development of and wider use of science and technology.

These ideas and ideals I would ask our members to ponder, modify, and add to or subtract from as we evolve into a strong societal entity.

In future messages I would hope to address concrete and specific activities for your consideration.

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THE SOCIETY EXPANDS ITS HORIZONS

The Technology Transfer Society's Charter requires that it address itself to technology assessment and forecasting as well as transfer and use. A quantum advance of several orders of magnitude has been achieved in that direction,

Your Board of Directors recommended and the June 29th, 1977 Annual meeting approved the creation of 3 vice presidencies. They are, Vice President of Technology Assessment, Vice President of Technology Forecasting, and Vice President of Technology Transfer and Use.

The Society proudly announces the first incumbents in these offices who are each outstanding authorities in their fields.

MR. WALTER A. HAHN becomes the Vice President of Technology Assessment. He is currently the Deputy Director of the Congressional Research Service of the Library of Congress. In that capacity he was largely responsible for drafting the Federal Legislation creating the 'Office of Technology Assessment'. He was a founder and is a past president of the Society for Technology Assessment.

DR. NORMAN C. DALKEY becomes the Vice President of Technology Forecasting. Dr. Dalkey is Adjunct Professor, Engineering Systems Dept. and Research Psychologist at UCLA. He has an impressive background, ranging from Senior Mathematician at the Rand Corporation to Physicist at the Lawrence Radiation Laboratory, Berkeley. He is a consultant to D.O.D. in planning, analysis, and studies. He is on the Editorial Board of "Technological Forecasting and Societal Change". He is regarded as one of the fathers of forecasting science, having developed the Delphi Techniques for group judgement. He has authored many papers and books. His latest written work, just issued and titled, "Group Decision Theory", may become the classic text in this field.

J.R. "DICK" PERRIN, becomes our anchor man as Vice President of Technology Transfer and Use. He is a founding member of our Society, has served continuously on its Board of Directors, and is a past president of the Los Angeles Chapter. Initiating and managing TT programs for the Naval Weapons Center and the Air Force Rocket Propulsion Laboratory, Dick has demonstrated excellent cost effectiveness to the GAO on these programs. This activity led him to recommend and establish the D.O.D. Laboratories Consortium for TT, which later became the present-day Federal Laboratory Consortium. Dick has served on the National Academy of Engineering Committees on Technology Transfer and Utilization. In addition to these accomplishments and many other contributions in the field, Perrin's consulting firm specializes in consulting services to private firms and Federal Agencies in technology innovation evaluation and transfer, including corporate strategy planning.

These 3 Vice Presidents are in charge of developing programs in their disciplines for the Society, including but not limited to research projects, journal articles, assisting Chapters in obtaining appropriate speakers, and developing seminars.

We are certain that the exceptionally high caliber of the incumbents appointed to implement this organizational up-grading will result in a major step forward in the progress of our Society.

RECOMMENDED READING

DR. NORMA DALKEY recommends for reading a recently released report, NSF-RA-77036, "Study of Futures, An Agenda for Research", Wayne I. Boucher (ed.) 1977, for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The report is the output of 2 conferences held in January, 1974. As the foreword states: " . . . the volume is still timely, since cumulative progress in this field is unfortunately slow." Like most conference reports, the quality is uneven; but overall it represents a fairly complete summary of the state-of-the-art in longer-range technological and social forecasting. It also includes a healthy dose of caution concerning the limitations of present capabilities.

TECHNOLOGY TRANSFER & UTILIZATION (TTU)

A Status Brief with Highlights

J. R. Perrin, Vice President

As in the past, recent changes in Washington Administration and Federal Agencies have had little beneficial impact on the progress of TTU relative to policies, funding, planning, or results. There is some glimmer of hope in the establishment of the Intergovernmental Science, Engineering and Technology Advisory Panel (ISETAP) within the Executive Office of the President (Office of Science and Technology Policy). One of the panel's best forces is Science and Technology Transfer, which is examining various projects such as intergovernmental research demonstration and assessment effort, involvement of state and local governments in identifying needs and setting Federal research agendas, multiagency study of TT networks to local governments and user-oriented assessments of completely federally supported research. TTU is a prime national need, recognized by all concerned, but hamstrung by continued abuse of Federal support necessary to realize the public, industry, and local government economic benefits. Hopefully, ISETAP will be able to influence redirection of the Federal Government policies and programs in TTU. T^2S members interested in the Panel's activities should contact LOUIS BLAIR, Executive Secretary, ISETAP, OSTP, White House.

The continued success of the Federal Laboratory Consortium for Technology Transfer (FLC) has been encouraging, considering the lack of funding and affirmative policies. The latest addition of the Forest Service Laboratories increases FLC membership to 150 facilities, and represents the majority of Federal laboratory personnel.

During the past year the FLC has had 6 meetings with and without state and local government officials, throughout the 5 established regional areas. The TT workshop held during the Spring general meeting in Portland, Ore., saw over 400 local government people interfacing with 40 laboratory representatives and other TT resource activities. The FLC has recently completed an advance copy of a Resource Directory to complement its over 25 laboratories that serve as central contact points for various areas of expertise. The major barrier facing the Consortium to become a more effective technical resource for state and local communities is the lack of a national policy to allow the member facilities to develop effective TT programs without fear of parent agency reprimands. Further information on FLC can be obtained from GEORGE LINSTEADT, Chairman, FLC, Naval Weapons Center, China Lake, CA 93555.

Lawrence Livermore Laboratory is a very good example of a facility that receives some support for TTU and is thus able to conduct active programs with training courses, workshops, and meetings for private industry, Federal, state and local governments, educational institutions, trade associations, etc. Training programs for such technology areas as joining & fastening, microprocessors, welding, and bonding have resulted in successful applications for pump repair/maintenance, microcomputer traffic controllers, data collection systems for dams, computerized blood analysis for hospitals, pipeline repair, etc. Seminars and workshops for industry have transferred technologies in solid-state laser components, instrumentation, air pollution modeling, solar energy, and advanced test facilities. Additional inputs can be obtained from R.C. MANINGER, LLL, P.O.Box 808, Livermore, CA 94550.

An unfortunate event within ERDA occurred this past year when TTU responsibilities were transferred to the individual technology program offices, leaving no focal point within the agency for a coordinated program. It appears that only the Solar Energy Program has initiated formal TTU activities, and a trial 'Extension Services' effort will be starting with the universities in 10 states. Perhaps this will change at DOE with a centralized TTU office (or, conversely, TT may be transferred out of the agency). At this time, the spokesman for TTU at DOE has not been identified.

TTU (continued)

T^2S will be actively participating in 2 important meetings - co-sponsoring the International Conference of Energy Use Management and the Solar Thermal Energy Workshop. The former will be held October 24-28, 1977, in Tuscon, Arizona, with approximately 600 attendees (over 1/2 from outside the U.S.). Technical sessions, industrial exhibits, community workshops, and other TT exchange mechanisims will be featured. Co-sponsors include Department of Commerce, University of Arizona, Pergamon Press, University of Paris,. and ERDA. For more information, call Rocco A. Fazzolare at (602) 884-2551.

In January, 1978, T^2S takes a major step forward in the area of TTU by sponsoring a Los Angeles workshop on Solar Thermal Energy in conjunction with the SBA and DOE. The purpose of this one-day meeting is to provide detailed information on solar energy technologies, markets, and business opportunities for small-size firms. Attendees will receive a handbook so they can initiate follow-on activities in one or more aspects of solar energy business potentials. The Technology Applications Group at LLL is preparing the handbook as part of their Solar Energy Program activities.

The January workshop is the first in a T^2S sponsored series and, as such, represents a Society committment to actively engage in TT. Members of T^2S wishing to contribute in this effort should contact J.R. PERRIN at (213) 477-5081, T^2S Headquarters.

MEETING

The national Board of Directors of the Technology Transfer Society will hold its first full meeting on October 21, 1977 at the World Trade Center, International Room, in Los Angeles. The meeting is scheduled to convene at 10:00 a.m. and all Board members are urged to attend.

A MEMBER DOING HIS THING

HERB ROSEN, Past President of T^2S, has accepted an invitation to attend and participate in the AIAA/NASA Conference on Aerospace Technology Transfer to the Public Sector, to be held in Crystal City, Virginia November 9-11, 1977.

The purpose of the conference will be to evaluate the effectiveness of the technology transfer process to date, and to explore the most effective avenues for its improvement and/or reorientation.

NSF "PROBLEM AREA PUBLICATION"

The National Science Foundation has published its report on "Assessment of Future National and International Problem Areas", which could be addressed productively by science and technology. The 6 critical problems chosen for study are:

1. Chronic unemployment and under-employment;
2. Growing conflict between central control and individual freedom;
3. Barriers to achieving large-scale technological projects (i.e., transportation systems);
4. Limits to the management of large complex systems;
5. Potential use and misuse of human consciousness technologies;
6. Effects of stress on individuals and society.

DR. ERNEST POWERS is the NSF Project Officer in Washington, D.C.

PROPOSED U.S. SENATE BILL ON TT

The Senate Commerce Committee staff is working on a bill to secure information on the impact on the U.S. economy of U.S. technology transfers to industrialized nations. Reportedly the bill would require:

1. A Commerce Department study assessing the ability of technology-intensive U.S. firms to compete with their West European and Japanese competitors, and
2. U.S. firms to report annually to the Commerce Department on methods, contractual terms, and payment schedules of new technology transfer agreements.

NEW PRODUCT FIRM EXPANDS OPERATIONS

As part of a heightened effort to build on its recent successes in commercializing inventions, Cambridge Research & Development Group (CRDG), located in Westport, Conn., has created a new Group post entitled, "Director, New Product & Venture Development." CRDG's general partners, KEN and LAWRENCE SHERMAN, have announced the appointment of ROBERT A. CURTIS to fill this position. In making the announcement, the Shermans expressed their great pleasure in finding a manager with so much direct and successful experience in new-product development.

The creation of this new post and the selection of Curtis to fill it are part of CRDG's overall plan to expand its new-product activity. As a first step, Curtis has announced an intensified search for inventions and new products that could qualify as the basis for new business ventures. In describing the qualifications, Curtis stated: "We are highly selective. We can consider only products that fill clear needs, have strong patent protection, high profit potential, and are in an advanced development stage."

Although CRDG has licensed products to established firms when appropriate, it has found that many products have a better chance of success if sold to new independent companies formed specifically to make and market those products.

Since January, 1975, inventors and owners have received cash payments and notes totaling $3,469,000 from CRDG. The Group's total sales for 1976 were $11,232,000. Net profit from sale of patented products, licensing agreements, and operations was $2,153,000 in 1976.

"CRDG receives hundreds of new product submissions per year," Curtis noted. "These come from independent inventors, patent attorneys, technology transfer companies, corporations, universities, and others. Products which meet CRDG's criteria are researched for market potential and manufacturing feasibility. Each new product then becomes the basis for a new venture supported by ample working capital, managed by experienced professionals, and organized specifically to make and market the new product. During the past 3 years, CRDG has aided in the establishment of 4 such new ventures around 4 of its products.

"The benefits to the inventor or owner of a product selected by CRDG are substantial," Curtis pointed out. "All expenses, including any remaining patent and development costs, as well as tooling and test marketing expenditures, are borne solely by CRDG and the purchasing or licensing firm. All revenues, whether from the profits of the new venture company or from licensing, are shared with the inventor."

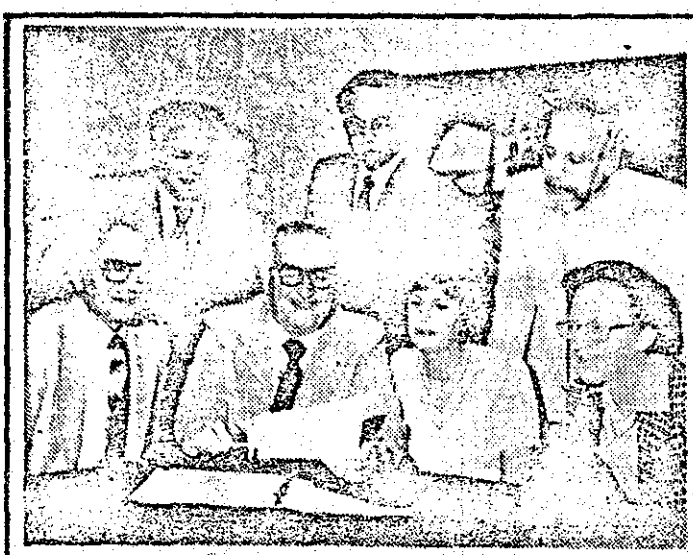
SOLAR THERMAL ENERGY SEMINAR PLANNED

In final planning stages is a Solar Energy Seminar to be put on by T^2S with joint cosponsorship by SBA and DOE. The purpose of the seminar will be to provide small business management with solar energy technology information and to discuss the varied business opportunities that are associated with the solar energy field.

A handbook is planned to be made available to attendees. It will detail the necessary requirements and procedures for participation in many of the solar energy business areas.

T^2S will release a complete announcement of the seminar, to be held in mid-January 1978, in the near future. Inquiries should be phoned in to JACK LANG, (213) 688-2946.

NEW Journal of Technology Transfer now in press. Your copy will be mailed soon (members only.)



T^2S officers, 1977-78. Clockwise from upper left: Tullio Ronzoni, President Elect; Ron Philips, Vice President; Herb Rosen, Past President; Bud Goldstone, Treasurer; Susan Underwood, Vice President; Jack Lang, President; Sy Gottlieb, Secretary. Not shown are Vice Presidents Rick DiCicco, Dick Perrin, Merle Albright, Norman Dalkey and Walter Hahn.

INTERNATIONAL TT CONFERENCE ANNOUNCED

A conference on 'Technology Transfer in Industrialized Countries," jointly sponsored by NATO and the U.S. Departments of the Army, Navy, and Air Force, will be held at the Hotel Palacia, Estoril, Portugal during 7-11 November, 1977. The conference will provide an opportunity to exchange information on TT mechanisms and processes employed within NATO countries. The technical program will include the following areas:

1. Processes & Mechanisms for TT
2. Barriers & Stimulants for TT
3. The Role of Technical Information in TT
4. Military Standardization
5. Incentives for Innovation in Industry
6. Human Factors/Attitudinal Considerations
7. Case Studies & Effectiveness Measures
8. Licensing Policies & Practices

The conference will be held in English, and only unclassified papers were requested. Further information is available from Dr. SHERMAN GEE, Code CL, Naval Surface Weapons Center, Silver Spring, MD 20910 (202) 394-1547.

Registration fee: $75.00

ENERGY USE MANAGEMENT CONFERENCE

T^2S is co-sponsoring the International Conference on Energy Use Management in Tucson, Arizona, October 24-28, 1977. Registration fee will be $125.00. Proceedings will be sold for $50.00 per copy.

The conference is structured to present a unique and comprehensive examination of technologies, policies, socio-economic requirements, and other elements that govern energy use.

Each session, as an "action-oriented" meeting, will assess current and future directions in thinking and technology for improved energy use. The program will offer a broad spectrum of topics to be discussed by speakers from a wide diversity of organizations and countries.

Published Conference Proceedings will be made available after the conference ends for a price of $50.00 per copy to any and all who are interested in energy use management.

Refer inquiries or requests for reservations to the conference General Chairman, DR. CRAIG B. SMITH, P.O. Box 64369, Los Angeles, Calif. 90064, or telephone (213) 829-2624.

NEW TT AWARD ESTABLISHED BY THE AIAA

HERBERT H. ROSEN, Chairman-Elect of the American Institute of Aeronautics & Astronautics, announced in a memorandum to all NASA Technology Utilization Officers, that the AIAA has recently established a new award to recognize a person who has made a notable contribution to society through transfer of aerospace technology.

It is intended to make the first award at the February, 1978 Annual Meeting of the AIAA, if a suitable slate of qualified candidates can be assembled and screened by that date.

PTI/NEWS

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PTI NOW IN PASADENA
HAZARDOUS SPILLS DEFENSES
URBAN CONSORTIUM REPORT
FIRST PTI/DHEW TRANSFER

No. 3—1977

PUBLIC TECHNOLOGY, INC.
1140 CONNECTICUT AVENUE, N.W.
WASHINGTON, D. C. 20036

West Coast Office
Pasadena Center
300 E. Green Street
Pasadena, CA 91101

Organized by
International City Management Association
National Association of Counties
National Governors' Association
National League of Cities
U. S. Conference of Mayors

New National Program For Smaller Communities

Public Technology, Inc. and the National League of Cities have recently received a grant from the National Science Foundation to develop a new intergovernmental effort in cooperative technology transfer. The Community Technology Initiatives Program (CTIP), is comprised of 28 cities and 3 counties. Each of the member jurisdictions will participate directly in this new, national network designed to address the common technological needs of localities under 50,000 in population.

Development of the CTIP program has resulted from the fact that small localities face common technology-related issues such as computer use, fire protection, emergency medical services, water supply, sewage treatment, solid waste management, road maintenance, energy conservation, and others. In many cases, understaffed and underfinanced local governments are poorly equipped to handle complex issues on their own. Moreover, a number of serious barriers stand in the way of effective technology utilization in smaller communities. Among them are inadequate technical information; the lack of a system for coordinating the needs of smaller localities with technology sponsored by the federal government, industry, and universities; and the need for fast responses to crises problems.

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User Survey Indicates Fire Station Locator Highly Successful

In October, 1976 all jurisdictions which had completed a PTI Fire Station Location Package (FSLP) study were surveyed to determine how effective the HUD-funded methodology has been in helping these jurisdictions make fire service management decisions, and to help assess the demand for similar location methodologies in other functional areas.

The survey is now complete, and several important conclusions can be drawn, all pointing to the fact that FSLP has benefitted jurisdictions that have used it, and that there is wide interest in similar location tools in other functional areas.

The effectiveness of the package was assessed in four ways: through determining whether jurisdictions achieved the objectives they set for their study; through determining whether jurisdictions took measurable action as a result of the study; through comparing the objectives set for the study with the results of the study; and through determining whether jurisdictions felt the study was successful and worth the effort. Each of the four survey measures of effectiveness shows strong, positive success for the FSLP.

Two of the more important questions asked of management in the survey regarding FSLP were: "What were the FSLP study

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Kansas City Uses Fire Evaluation System

On May 1, 1977, Kansas City, MO implemented the first stage of a Comprehensive Fire Protection Plan. This plan, developed by local staff in order to meet the changing needs of fire protection in the city, is based on extensive use of new equipment, carefully chosen locations for new fire stations, and an innovative 40 hour work schedule (the week for fire fighters using 8 hour shifts).

Recognizing the need for a method which could monitor the implementation of the plan and assist fire management personnel in its evaluation, Kansas City City Manager Robert A. Kipp contacted PTI early this year with a request for assistance. Responding to this request, PTI President Porter W. Homer and Costis Toregas, Vice-President for Fire Services, agreed to participate in an effort to develop an evaluation program that would allow a comparison of the previous Kansas City fire protection system against the new plan.

It was agreed during early meetings with City Management and Fire Management staff that this evaluation system should be centered around a committee of fire management personnel. This Steering Evaluation Committee would define information elements considered essential to the evaluation method. In turn, both computer based

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Consortium Strengthens Federal Support

The past few months, top federal officials have met with representatives of the Urban Consortium for Technology Initiatives (UC), to explore methods by which the federal and local governments can work in concert to further the ways technology can help improve the delivery of public services. During these sessions high priorities of the 10 Urban Consortium Task Forces* and overall Consortium goals were discussed. These discussions are part of a continuing effort to assist in focusing federal research and development resources on solutions to priority urban needs.

On May 25, Secretary Patricia Harris of the U. S. Department of Housing and Urban Development, two of her Assistant Secretaries and other senior HUD officials, met with Mayor Lila Cockrell, San Antonio, TX; Mayor Thomas Moody, Columbus, OH; Mayor Wes Uhlman, Seattle, WA; and Deputy Mayor Ken Sain, Chicago, IL. Also in attendance were John Gunther, Executive Director of the U. S. Conference of Mayors; PTI President, Porter W. Homer; and several representatives of the Urban Consortium for Technology Initiatives. The Mayors described the Consortium objectives and process, the top priorities of the two Task Forces involved in programs related to HUD's mission, and the importance of making HUD's R&D Program more responsive to the practical needs of local government. The Mayors also emphasized the unique cooperative nature of the Consortium and the strong participation by top-level local government staff. HUD officials were responsive, indicating general agreement with the priority topics and support for the concept of relevant R&D. While noting expected severe cuts in the HUD R&D budget, the Assistant Secretary for R&D indicated that three applied R&D projects of the Consortium are included in the FY77 financial plan.

Deputy Mayor Sain and the Mayors who participated in the HUD meeting went directly to meet with two of ERDA's Assistant Administrators, and then to meet with Dr. Schlesinger's staff concerning the Energy Task Force and Consortium roles and priorities in energy conservation. The Federal officials expressed strong interest in working relationships with the Consortium and a greater role in the National Energy Plan for major urban governments.

On June 13, 1977 Mayor Janet Gray Hayes, San Jose; Mayor Moon Landrieu, New Orleans; Mayor Thomas Moody, Columbus, OH; and Mayor Wes Uhlman, Seattle, WA met with U. S. Department of Commerce Secretary Juanita Kreps, and her Assistant, Larry Houstoun, during the U. S. Conference of Mayors annual meeting in Tuscon, AZ. The emphasis by the Mayors was on the strong interest of the Consortium in building an effective R&D partnership with Commerce in the areas of Fire Safety, Public Works and Public Utilities, and Economic Development. John Gunther and Mike DiNunzio, also of the USCM, were very helpful in fitting this meeting into the USCM meeting schedule.

The recent addition to PTI/UC staff of two highly experienced and very capable people adds valuable abilities to the Urban Consortium staff.

Chris H. Tomasides, the new Urban Consortium Productivity Coordinator, will work closely with PTI Vice President John Parker, to maximize and effectuate results from the ten Task Forces. From 1969 to the present, Mr. Tomasides has held several executive positions with the City and County of Denver, Colorado, each incorporating extensive budget and management responsibilities. Previous experience includes management and financial administration for the Martin Marietta Corporation and teaching experience at the Graduate School of Public Affairs, University of Colorado. Mr. Tomasides, already known to Urban Consortium participants, served as the past Chairman of the Urban Consortium Task Force on Management, Finance and Personnel.

Carol Andrea Whitcomb, a newcomer to both Public Technology, Inc. and the Urban Consortium, is no newcomer to local government operations. Ms. Whitcomb is serving as the new Task Force Director of the Management, Finance and Personnel Task Force. Ms. Whitcomb served for four years as Executive Assistant to the County Executive of Fairfax County, VA, where she

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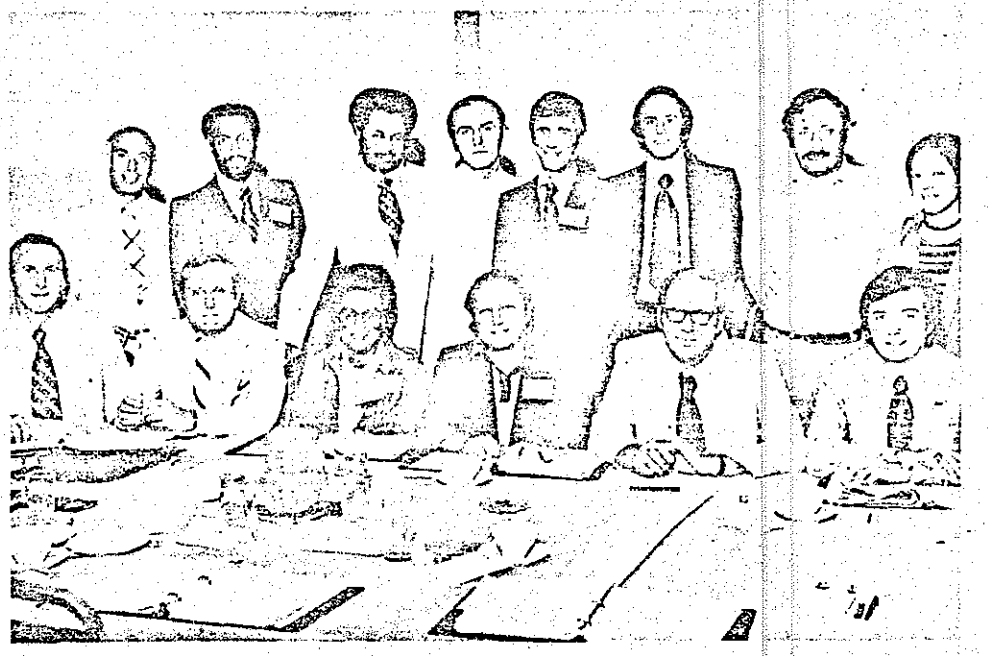


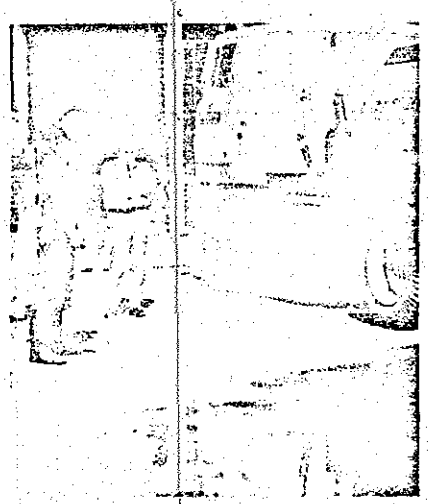
Some members of the 1977 Urban Consortium Steering Committee attending a recent meeting in Detroit are: Seated, left to right—John Parker, Vice President, PTI; John Lockwood, Deputy City Manager, San Diego, CA; Nansi Rowe, Deputy Corporation Counsel, Detroit, MI; Leon Eplan, Commissioner of Budget and Planning, Atlanta, GA; J. Robert Havlick, Senior Vice President; PTI; Michael E. Langton, Administrative Aide to the Mayor, Jacksonville, FL. Standing, left to right—Chris Tomasides, Urban Consortium Productivity Coordinator, PTI; Marrel Foushee, PTI; George L. Jenkins, Jr., Assistant Director, Office of Budget and Management Systems, Washington, DC; Eugene W. Waltz, Technical Assistant to the Mayor, Indianapolis, IN; Al Linhares, Chief, R & D Policy Analysis Division, Office of the Secretary of Transportation; Jeffrey C. Stern, Director, Regional and Intergovernmental Programs, New York City, NY; William Stafford, Manager, Intergovernmental Relations, Seattle, WA; and Anna Aiello, Program Manager, Intergovernmental Science and Public Technology, National Science Foundation.

Hazardous Spills Techniques Previewed

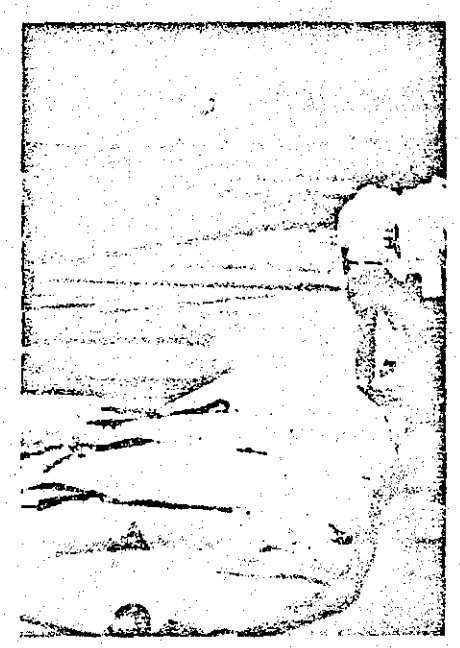
Each day thousands of hazardous and toxic substances are manufactured and transported by truck and rail in the United States. When spills of these materials occur, the first emergency force to arrive on the scene is generally the local fire department. By properly training and equipping fire departments to deal with these incidents, damage to life, damage to the environment, and property losses can be minimized.

The first meeting of a User Requirements Committee on Control of Hazardous and Toxic Chemical Spills was held June 22 and 23 at the Industrial Environmental Research Laboratory of the U. S. Environmental Protection Agency in Edison, NJ. The committee was shown prototypes of six devices which the EPA has developed for their spill response activities.

- Foam Dike System—for impounding spilled liquids
- Tank Plugging System—for stopping the flow from ruptured tanks
- Multi-Purpose Gelling Agent—for changing spilled liquids to semi-solids
- Detector-kit—for tracing the course of spills on water
- Spill Personnel Protective Ensemble—for entering toxic atmospheres
- Pump and Collection Bag—for providing temporary storage of liquids



Members of the User Requirements Committee on Control of Hazardous and Toxic Chemical Spills look on as a polyurethane foam barrier is formed around a simulated spill.



The pump and bag system designed to provide temporary storage for hazardous materials, being inspected by members of the User Requirements Committee on Control of Hazardous and Toxic Chemical Spills.

The committee evaluated these devices for applicability of use by first on scene emergency forces.

Jurisdictions represented at this initial meeting were:

Chicago, IL—Chief Fire Marshall William Foley
Cincinnati, OH—Assistant Chief Edward Avey
Edison, NJ—Department Chief Donald Dudics
Houston, TX—Fire Chief Joseph Perino
Kansas City, MO—Assistant Chief Louis Hansen
Michigan Department of Natural Resources-Spill Coordinator—James Miller
Montgomery County, MD—Director Warren Isman, Fire & Rescue Service

The meeting was also attended by representatives from the National Fire Prevention and Control Administration, and private sector firms who manufacture and transport hazardous chemicals.

Committee members were given a live demonstration of the devices being used on a simulated tank car spill. A field test program is planned for the prototype units in the fall.

For further information on this program contact: Tom Smith, Fire Service Programs, Public Technology, Inc., 1140 Connecticut Avenue, NW, Washington, DC 20036. □

PTI Has New West Coast Home

Public Technology, Inc. is pleased to announce the opening of its new West Coast location on August 15, 1977. The shift has been made from San Jose, CA, where we have been located for the past 4 years, to Pasedena, CA. PTI wishes to express its sincere thanks to the City of San Jose and to its City Manager, Ted Tedesco, for support received throughout this time period.

PTI/West Coast is now located at the Pasadena Center—a recently renovated city-owned building that will house a complex of offices relating to public services and public resources, plus the local civic auditorium which hopes to host many government-related conferences.

As announced in the last issue of PTI/News, Joseph N. Baker, City Manager of Burbank, CA for the past 10 years, has joined PTI as Vice President for West Coast and Regional Operations. Mr. Baker will be contacting all present PTI subscribing West Coast jurisdictions as quickly as possible.

According to Mr. Baker, "I look forward to my new job with enthusiasm. I feel that PTI can make a great impact in the Western area with programs such as its Equipment Management and new energy-related programs. In addition to various ongoing projects, one of my priorities will be to work with cities and counties to put together energy conservation plans."

Our new PTI/West Coast address is:

Public Technology, Inc.
Pasadena Center
300 East Green Street
Pasadena, CA 91101

The new phone number is 213/577-0515. □

Addendum

In the last issue of PTI/News we discussed the implementation of our new Ambulance Location Package in Hennepin County.

We regret forgetting to mention the agency that made possible not only the ambulance locator, but all PTI facility location packages. We would like to thank the U.S. Department of Housing and Urban Development, Division of Community Development and Management Research, Office of Policy Development & Research, and its Director, Alan Siegel, for continued and continuing support of these and other PTI programs that help accelerate the availability of new technology for local governments.

Grumman Completes NPO Retrofit

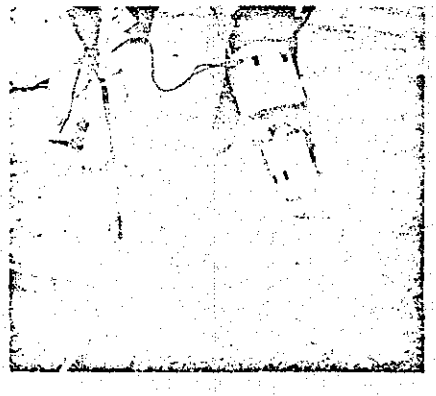
During laboratory quality control testing of the Grumman NPO Automated Flow Control System for pumper apparatus, a problem was found in the circuit chips which make up the control boards. The NPO system contains 75 such chips.

Grumman had devised a method simulating several hundred hours of system operation that each NPO was subjected to prior to shipment. During these tests a significant rise in the failure rate was noted. Microscopic examination of the failed components revealed that moisture had penetrated through the coating of the connectors and corroded the contacts causing a circuit failure.

Because failure of the NPO might possibly create a situation that could prove dangerous to the firefighter operating at the face of a fire, Grumman informed the 40 jurisdictions using NPO systems to operate their pumpers on manual controls until the problem had been solved and suitable retrofits made.

A new class of circuit chips not susceptible to moisture problems was secured for the system, extensively tested by Grumman, and retrofitted at Grumman expense into the NPO systems in the field. This retrofit program was completed in April. Since the retrofits of the new chips were made, Grumman has encountered no failure of these new chips in the field or in the laboratory.

A limited survey of jurisdictions using NPOs revealed that no down time on the systems has occured since retrofitting. □



The Underground Utility Locator, an instrument for locating underground utility lines, both metallic and nonmetallic, to a greater depth and accuracy than existing equipment, is shown here at a recent test and demonstration in Minneapolis, MN.

Utility Locator Tests Underway

In June PTI conducted the first field tests of Terrascan® a new pipe locator developed by Microwave Associates, Incorporated, that had design input from a PTI User Requirements Committee and gas utility personnel. Tests were performed in Minneapolis, MN on June 1, 2 and 3, and in Henrico County, VA on June 27, 28 and 29.

The tests in Minneapolis were conducted with the cooperation and assistance of the Department of Public Works. Principal representatives for Minneapolis were Norm Yarosh, Technology Agent; William G. Ridge, Director of Engineering Operations; and Milton R. Christensen, Sewer Planning Engineer. Two locations in the city were used for the tests; one was a street in a residential apartment area, the other was a park at the government center. Utilities located included water, sewer, gas, power, and telephone lines. Sizes of these lines ranged from less than one inch to approximately two feet in diameter, while the depths at which the lines were buried varied from two feet to more than eight feet. Several demonstrations were also conducted: one for those attending the annual meeting of the Urban Technology System, sponsor of this test program; one for local municipal employees; and one for the local utilities coordinating council.

The tests in Henrico County were performed with the assistance of the Department of Public Utilities, which operates the county water system. The principal participants in that test were Larry O'Keefe, Technology Agent, Billy P. Brown, Field Operations Supervisor, and H. G. Ragland, Utility Engineer. It was particularly encouraging and noteworthy that Terrascan® accurately located a six-inch transit water main and a two-inch polyethylene service line. At several of the locations, the county had previously excavated test holes to measure the depth of buried water line, and then refilled them. Most of the Terrascan® depth readings at these test holes were within a few inches of the measured depths.

PTI plans to continue testing this device in other jurisdictions. A test was recently conducted in Nashville, TN, and another is scheduled to take place in San Jose, CA in September.

Microwave Associates, the developer and manufacturer, will be exhibiting and demonstrating Terrascan® at the American Public Works Association show in Chicago September 10-15. □

New PTI Publication

Fifth Annual NASA Report

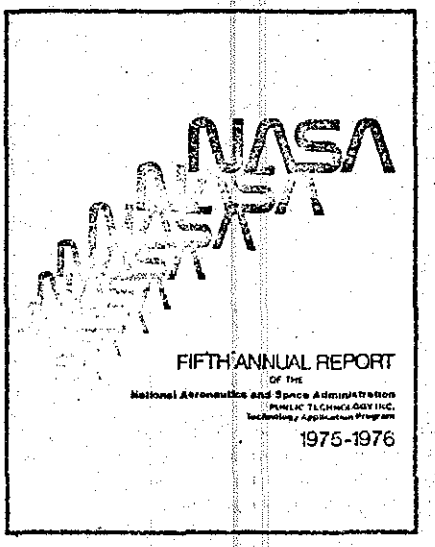
The NASA Technology Utilization Program is continuing its sponsorship of a Technology Applications Team at PTI, to identify problems and develop practical solutions involving the use of aerospace technology.

Each year the program publishes a report describing new technological developments and advances. The Fifth Annual Report presents the background of the program, and discusses project areas worked on during the last program year, which covers portions of 1976-1977. These projects include:

- High Pressure Charging Stations for Firefighter's Breathing System
- Firefighter's Integrated Response Equipment System
- Urban Technology System Problems
- Building Inspection Technology
- Opportunities for Productivity Improvement in State and Local Governments

NASA's continued support of the Technology Applications Team is a demonstration of their long term commitment to technology transfer and leadership in the field. The Fifth Annual Report has already been mailed to PTI subscribers. Additional copies are available, free of charge, to anyone interested in this program. For your copy of the Fifth Annual Report, or for more information about the NASA Technology Utilization Program, including the NASA report, "Spinoff 1977," please write to:

NASA Program
Public Technology, Inc.
1140 Connecticut Avenue, NW
Washington, DC 20036 □



Locator *from page 1*

objectives in your jurisdiction?" and "Which of these objectives have been realized in your jurisdiction?" By comparing answers to these questions it was possible to determine how well the study met management's objectives—the textbook definition of effectiveness. Results are as follows: out of all objectives set by all jurisdictions responding to the survey, 91% were achieved. In fact, 78% of the jurisdictions achieved *all* objectives set. Finally, the two objectives most frequently set by jurisdictions—"to examine immediate alternatives for new construction of fire stations" and "to plan intermediate to long-term fire protection coverage"—were achieved by 93% and 100% respectively, of all jurisdictions setting those objectives.

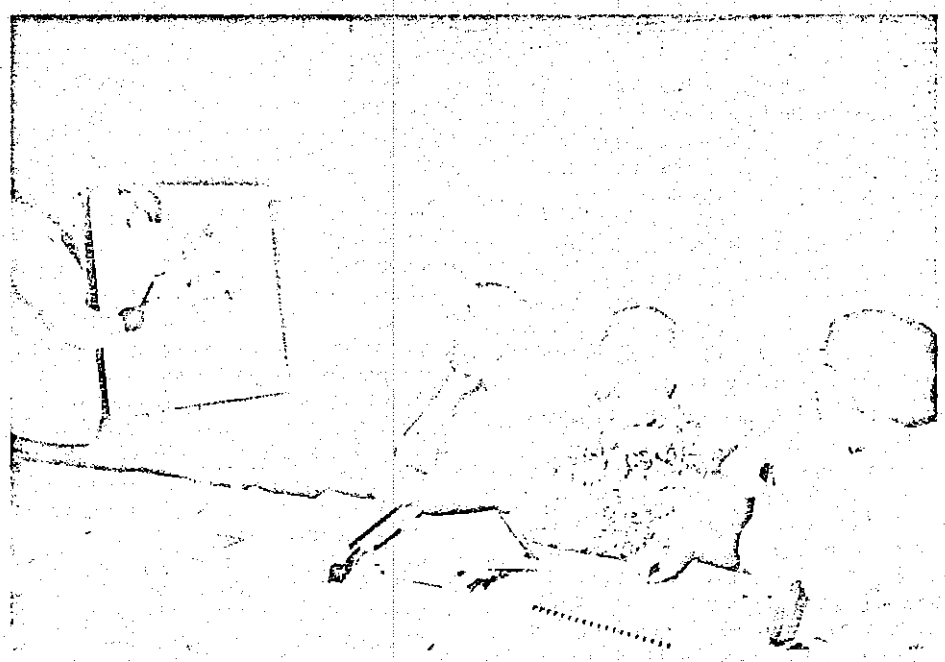
Since the main stated objective of the FSLP is to help jurisdictions plan the locations for new fire stations, a second indicator of effectiveness is the proportion of jurisdictions which actually undertook action—made a final location decision, acquired land, built a station, or closed a station—as a result of the study. Eighty-six percent took one or more of these actions. Further, 90% of the responding sites changed their future plans for fire protection as a result of the FSLP study, and 52% *changed current operations* upon completion of the study. Twenty-two percent of all responding jurisdictions took immediate action that resulted in lower total annual costs: Long Beach, CA saved $5,113,235 over several years; Gainesville, FL saved $1,500,000 in operational costs over a 3-year period; Phoenix, AZ saved $1,116,000 in capital costs; New Orleans, LA saved $294,216 in one year; Riverside, CA saved $250,000 in one year; St. Petersburg, FL saved $200,000 in one year; and San Jose, CA, saved 650,000 over a five year period. 33% immediately instituted changes that resulted in lower response times. And one jurisdiction, San Bernardino, CA, was able to take action that resulted in *both* faster response times *and* lower costs.

A third way to look at the effectiveness of the FSLP is to compare objectives set for the study with the end results of the study. Once again, strong results are indicated. Of jurisdictions that had set the objectives, "to examine immediate alternatives for new construction of fire stations," implying that they intended to use FSLP to at least explore ways of reducing response time, one-third took immediate action to lower response times at the conclusion of the study, and 80% changed their future plans to achieve lower response times. Similarly, of jurisdictions which set the objective "to examine immediate alternatives to consolidation or reduction of number of stations," implying that they intended to use FSLP to at least explore reductions in cost, almost half (43%) took immediate action to reduce the number of operating stations and costs at the conclusion of the study, and 80% changed future plans to reduce costs.

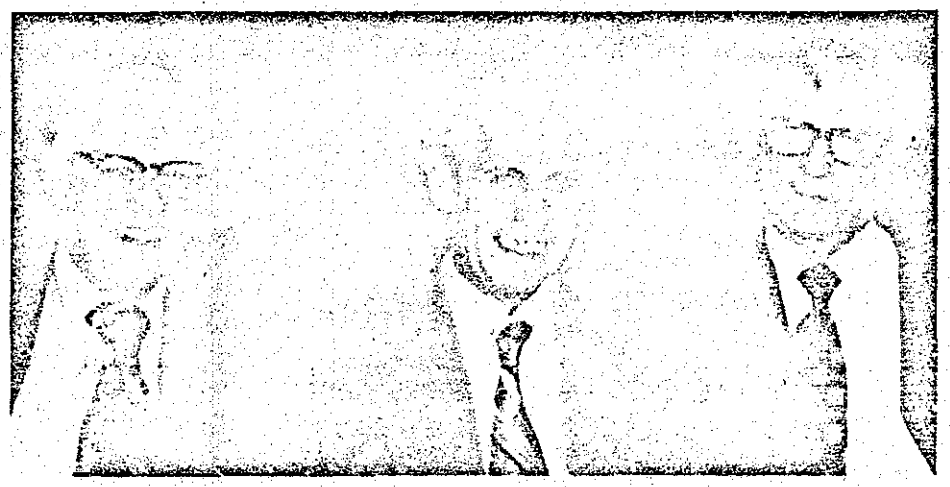
Finally, perhaps the best summary measure of the effectiveness of FSLP can be determined from the question, "Overall, do you feel your experience with FSLP was successful and worth the effort?" Out of all responding jurisdictions, *90% said yes, it was worth the effort.*

Given the overwhelmingly positive results of the survey with regard to effectiveness, it is not surprising that responding jurisdictions strongly indicated an interest in other location methodologies similar to FSLP. In fact, 9 out of every 10 responding jurisdictions stated an interest in at least one additional system in other functional areas, and indeed, 75% of all sites stated that they had begun development of at least one such system on their own, many using PTI/FSLP data bases. The fact that three-quarters of all FSLP sites felt a strong enough need for FSLP-like systems in other functional areas to actually spend local resources in system development speaks highly not only of the transfer potential to the FSLP concept with respect to other functional areas, but also of the regard and feeling of success held for FSLP in those 52 jurisdictions which have used it. Other than Ambulance Location, and Parks and Recreation Facility Location—two additional PTI packages already developed and now being tested in 9 jurisdictions around the country—functional areas most often cited in the survey were police, solid waste disposal, libraries, and public works garages. PTI expects to begin developing additional location tools in several of these areas, shortly.

A detailed summary and analysis of the FSLP survey is now available to all interested PTI subscribers. For further information, please contact Bob Havlick or Jack Barrett at: Public Technology, Inc., 1140 Connecticut Avenue, NW, Washington, DC 20036. 202/452-7700. □



Leon Karr, Superintendent of Fire, Lower Merion Township, PA; Jim Rhone, Job Stimulus Program Administrator, City of Phoenix, AZ; and Robert Lakin, Planning Director, Wichita/Sedgwick County, Kansas Planning Commission watch as Jack Barrett of Public Technology, Inc. demonstrates how to optimize the usefulness of the PTI Fire Station Location Package.



Left to right: Dr. R.G. Rice, Consultant; Dr. Heinrich Sontheimer, Director, Water Chemistry Department, Engler-Bunt Institut, Universität of Karlsruhe; and Dr. Harold Wolf, Texas A&M and a public health official. Three widely renowned experts in water supply who are working with PTI to assess the use of ozone and chlorine dioxide in water treatment.

European Water Plants Studied

A PTI site visit team headed by G. Wade Miller, PTI Director of Water Programs, visited 23 European water treatment plants during the month of May. The site visits were conducted as part of a United States Environmental Protection Agency (EPA) grant in which PTI is assessing the status of ozone and chlorine dioxide in municipal water treatment (see PTI/News, No. 1-1977).

The site visit objectives were numerous. Efforts were made to acquire as much information as possible on the 1) engineering design of ozone systems; 2) design purpose of ozone and/or chlorine dioxide technology; 3) operating history (system effectiveness); 4) public health considerations; and 5) operating costs of ozone systems. A substantial amount of information on these subjects was acquired and will be incorporated into a final report that will be submitted to the EPA in November.

Along with Mr. Miller, the site visit team included C. Michael Robson, a design engineer from the City of Indianapolis; Dr. Harold Wolf, a public health expert from Texas A&M University; and Dr. R. G. Rice, a recognized expert in the use of ozone. The team was accompanied throughout the visit by Dr. Wolfgang Kuhn of the University of Karlsruhe. Dr. Kuhn is functioning as the European coordinator for the project.

The PTI team visited eight plants in France, one in Belgium, three in Switzerland, and eleven in Germany. During the course of the trip they also met with officials from all the major ozone systems manufacturers in Europe.

Ozone and chlorine dioxide are well established technologies in Europe. More than 1100 water treatment plants use ozone for some purpose; while several hundred use chlorine dioxide, primarily as a disinfectant. Although most data on the use of ozone and chlorine dioxide in Europe has not yet been analyzed, a number of interesting observations regarding both oxidants can be made.

Ozone is not viewed only as a disinfectant by the Europeans; it is used also for iron and manganese removal, as a flocculating agent to nullify taste and odor problems, as an oxidizing agent to break down long chain organics prior to treatment by biologically activated carbon, and as a virus inactivating agent. All European water officials contacted expressed satisfaction with their ozone systems. Cost does not appear to be a concern. Operation and maintenance problems appear minimal.

Chlorine dioxide is used as a disinfecting agent in European systems. Although more expensive than chlorine, chlorine dioxide offers several advantages: it does not appear to combine with organic compounds to form trihalomethanes (these have been shown by EPA research to have a potential carcinogenic effect) and, it does not leave a chlorinous taste in the finished water.

This same site survey team visited Canadian water treatment plants that use ozone during the week of August 1-5. We will report on that trip in our next newsletter.

Further information on this project can be obtained by contacting Wade Miller at 202/452-7736. □

DHEW Grant Aids Human Services Record Keeping

Public Technology, through a grant from the U. S. Department of Health, Education and Welfare, is investing in the transfer of several human service information systems. The purpose of this investment is to study and document the transfer process. Results will be incorporated into a set of transfer guidelines for local government administrators.

The PTI investment will take two forms: funds transfer for technical assistance through contracts between local government jurisdictions and PTI; and direct, on-site technical assistance by PTI staff.

The Department of Mental Health and Corrections, State of Maine, was awarded the first technical assistance contract by PTI on July 22, 1977. Using monies and technical assistance provided by PTI, Maine will transfer a mental health financial and reporting information system from the Bangor region to the area around Bath/Brunswick. The recipient site is presently operating under a manual system. When accomplished, the transfer will provide the State of Maine with a state-wide information system for mental health out-patient services.

The transfer of the mental health information system in Bangor to Bath/Brunswick will involve the movement of a complete software package, rental of a mini computer, on-site technical assistance from Bangor Systems staff, outside technical consultation to Bath/Brunswick, and training of present Bath/Brunswick personnel.

Funding provided by PTI to the State of Maine through this contract is strictly for technical assistance, and represents an extremely small portion of the overall cost of the transfer. Bath/Brunswick will make up the difference through its local commitment to the program. □

Subscriber News

Santa Barbara, CA has joined the growing list of jurisdictions that reap the benefits of cooperative research and development and technology transfer through the Public Technology process. A hearty welcome to Santa Barbara, Mayor David T. Shiffman, and City Manager Richard D. Thomas. □

Kansas City from page 1

and manually prepared reports would be provided to this committee periodically, so that an objective comparison of the plan performance against the performance record of the previous system could be made.

A computerized system was designed and implemented to take advantage of a two-year information base that already existed and was continuing to track information on a call-by-call basis. Using this Uniform Fire Incident Reporting System (UFIRS) as a base, PTI and local staff developed procedures and schedules that allow data to be collected and extracted weekly, rather than monthly, and then connects this data base with the generally available standard report generating package called the Statistical Package for Social Science (SPSS). This combination gives the committee the ability to review, on a weekly basis, some 32 different indicators of fire effectiveness and efficiency, including: response times, times in service, calls by alarm level, loss figure estimates, in-depth analysis of incident types, manpower levels by incident type, death and injury statistics, water flow used by incident types, equipment utilization tables, and an equipment efficiency analysis.

The computerized system also has the flexibility to produce, on demand, special reports that may not be covered in the weekly summary, but may be deemed important for a quick decision on an operational or planning issue.

Another component of this evaluation system is a computer based program capable of reporting resource availability in terms of station equipment and manpower for any given location in the city.

This system can also quickly pinpoint the effect of operational changes on the fire suppression system's ability to respond to calls for service, and to provide both computer tables, as well as computer generated maps for quick visual inspection.

In addition, a manual system has been set up that can track important measures of effectiveness and efficiency using fire department files and reports in a graphic display manner. These graphics include elements such as: fire department training, sick leave and injury time, age of apparatus, dangerous building demolition, and new equipment being used by fire fighters.

"One of the major advantages of this evaluation system is that it uses information which is commonly available in many fire departments. However, the comprehensive manner in which computerized and manually developed information is being brought together and analyzed by the Steering Evaluation Committee is unique," according to Costis Toregas of PTI. "The same system can eventually be expanded to include assistance in the dispatch area. The dispatcher could tell the computer the location of the fire call and, based on data concerning fire equipment availability and location, the computer could recommend which units to send. The dispatcher would still use his knowledge to make a decision, but the information would be available to him instantaneously. Right now, that's all being done in the dispatcher's head," Toregas said.

According to Kansas City Fire Chief John H. Waas, the evaluation system is linked, in part, to the city's new Fire Protection Improvement Plan, and so City Management personnel can gauge how well the fire plan is working. "But more importantly, it's a tool for the Fire Department to respond to changes down the road. It's just good management sense," Waas said.

The system has been in effect for over two months now, and has been providing objective comparison data on the planned performance objectives. City Manager Kipp says, "We are quite pleased with the system, which more than meets our earlier expectations."

This effort represents a good example of how Public Technology, Inc./Subscriber interaction can lead to the development of a strong, local ability to monitor and evaluate a new program—in this case, Kansas City's innovative Fire Protection Improvement Plan. □

Consortium from page 2

helped oversee County executive professional staff of twelve county departments or offices, and helped plan county programs and policies. She has also served as a Task Force Member on the Governor's Cost Control Council for the State of Vermont, and has worked on a five-year business development plan for a firm operating 5 plant sites in a two state area.

The ten Urban Consortium Task Forces are:

Community and Economic Development Task Force
Criminal Justice Task Force
Environmental Services Task Force
Energy Task Force
Fire Safety and Disaster Preparedness Task Force
Health Task Force
Human Resources Task Force
Management, Finance and Personnel Task Force
Public Works and Public Utilities Task Force
Transportation Task Force □

CTIP from page 1

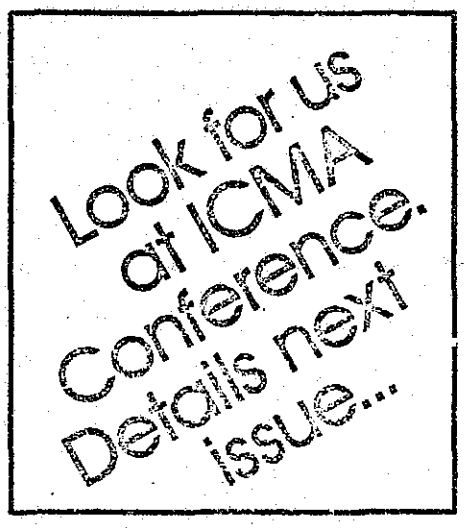
CTIP constitutes a necessary first step for strengthening local government capabilities in applying technology to critical issues. CTIP will provide a forum and a meeting ground for local officials as they undertake first year program objectives. These objectives include establishment of a needs assessment process and the related requirement to develop a priority problem agenda for localities under 50,000 in population.

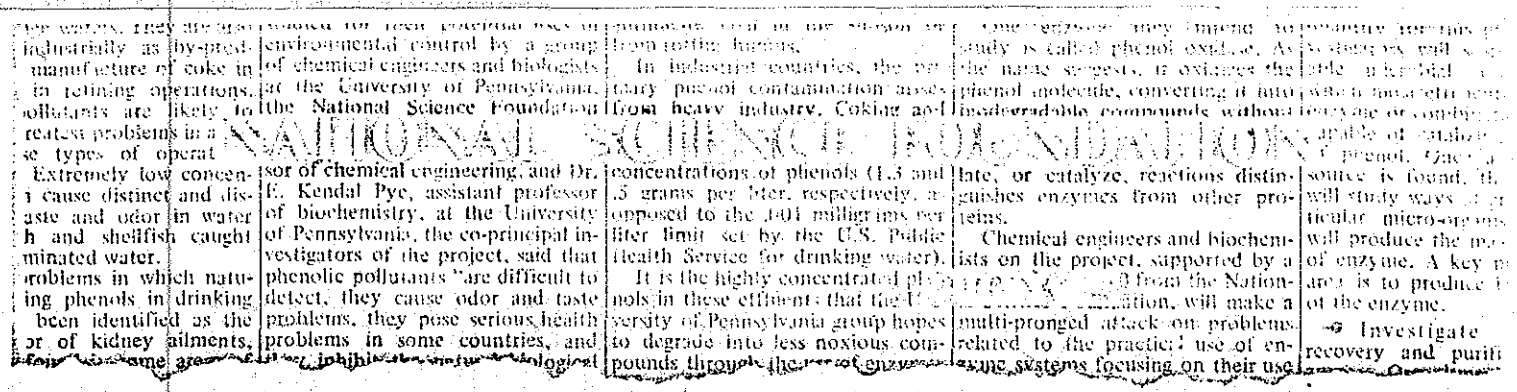
PTI, as Secretariat of CTIP, will be working closely with the NLC in support of program operations. Overall policy development of the network is presently guided by an interim seven member Steering Committee that includes:

Larry Bashe, City Administrator, Plainfield, NJ
Bill Carstarphen, City Manager, Spartanburg, SC
Paul Flynn, City Manager, East Providence, RI
Alan Harvey, City Manager, Vancouver, WA
Tom Herring, City Manager, Galesburg, IL
Ed Stiff, Manager/Secretary, O'Hara Township, PA
Wayne Wedin, City Manager, Brea, CA

The Community Technology Initiatives Program is being funded by the National Science Foundation's Research Applied to National Needs, Division of Intergovernmental Science and Public Technology; William H. Wetmore, Director. CTIP will be supervised by NSF/RANN's Bruce Reiss, Program Manager for Local Government Intergovernmental Programs; and O. James Linenberger, Program Manager for Local Government Intergovernmental Programs.

Address any inquiries concerning this program to Theodore J. Maher, CTIP Director, Public Technology, Inc., 1140 Connecticut Avenue, NW, Washington, DC 20036. □





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FOR RELEASE: Immediate
Mail: September 2, 1977
NSF PR77-84

ATKINSON APPOINTS SANDERSON TO HEAD RESEARCH APPLICATIONS

Dr. Richard C. Atkinson, Director of the National Science Foundation, today announced the appointment of Dr. Jack T. Sanderson as Assistant Director for Research Applications.

Dr. Sanderson is currently Director of NSF's Office of Planning and Resources Management (OPRM). The Assistant Directorship has been filled on an acting basis by Dr. Larry Tombaugh since the resignation of Dr. Alfred J. Eggers from the post as of June 30, 1977.

Dr. Atkinson also announced the appointment of Dr. M. Kent Wilson as Acting Director of OPRM. Dr. Wilson will also continue in his current post as Senior Science Associate in the Office of the Director.

The Research Applications Directorate supports scientific and technical research aimed at contributing to solution of selected problems of national importance.

"The appointment of Dr. Sanderson comes at a time when significant changes in the Directorate for Research Applications are contemplated," Dr. Atkinson said.

-more-

1800 G STREET • WASHINGTON, D. C. 20550

"A special Science Applications Task Force headed by Dr. John Whinnery, of the School of Engineering of the University of California, Berkeley, in its draft report has reviewed the place of science applications research within NSF, charted the philosophical basis for NSF activity in this area, and made organizational recommendations. The National Science Board and the Office of the Director intend to move ahead on some of those recommendations," said Dr. Atkinson.

Dr. Sanderson has been asked to prepare a detailed reorganization plan for the directorate by October 1 to become effective November 1.

Prior to joining the Foundation in February, 1971 as a Staff Associate in the Planning and Policy Analysis Office, Dr. Sanderson served as Assistant Director of the Physics Laboatory at Harvard University. He has also served as a consultant in the Physics Department of Oak Ridge National Laboratory. His experience includes serving as a physicist, mathematician, and as an electronic technician for various scientific and research laboratories. His educational background includes B.A., M.A., AND Ph.D. degrees in physics from Harvard University, as well as attendance at the Harvard Business School.

Since coming to NSF in 1966, Dr. Wilson has served as Head of the Chemistry Section in the Research Directorate, Deputy Head and then Head of the Office of Energy-Related General Research, and Deputy Assistant Director for Planning and Evaluation in the Directorate for Mathematical and Physical Sciences, and Engineering. He was appointed as Senior Science Associate in March, 1977.

Dr. Wilson holds a B.S. degree from the University of Utah and a Ph.D. from the California Institute of Technology. He has taught at Harvard University and was Chairman of the Chemistry Department at Tufts University. During 1954-55, he was a Guggenheim Fellow and Fulbright Scholar at King's College, London.

-END-

National Governors' Conference
HALL OF THE STATES
444 North Capitol Street • Washington, D.C. 20001
(202) 624-5300

Vol. I, No. 8 October 1977

Senators Leaning Toward Rejection Of Major Elements in President's Energy Plan

President Carter's energy plan has run into serious trouble in the Senate, where numerous key provisions which passed through the House virtually intact have been or are about to be either rejected flatly or altered substantially. The major House-Senate differences promise long and difficult conference committee battles before a compromise energy package emerges from Congress. *(See table on page 3.)*

In the latest defeat for the President, the Senate on October 4 voted 50 to 46 to lift federal price controls from new onshore gas in two years and from offshore gas in five years. Controls would remain on old gas now being produced under contract. The action climaxed 14 days of Senate debate and filibuster on the issue. Mr. Carter wanted, and the House agreed, to continue regulation at a higher ceiling and to extend price controls to gas consumed in the State where it is produced.

Energy Tax Provisions. In addition, the Senate Finance Committee is in the process of dismantling the Carter energy tax proposals. The crude oil equalization tax will be approved only if the revenues are plowed back in some form for energy development. Although the vote was not final, the equalization tax was stricken in a committee vote on September 26. The committee has already rejected the gas-guzzler tax, and indications are that the oil and gas users tax, which is central to the success of the Carter coal conversion proposals, will also be rejected.

Inside This Issue

New NGA energy and environmental policies (pp. 4-5)

New program to aid state purchasing (p. 6)

Organization chart for Energy Department (p. 7)

Key appointees at DOE (pp. 7-8)

NGA energy calendar (p. 8)

In mark-up sessions that began on September 19, the Finance Committee has approved a tax credit of up to $400 for home insulation and up to $2,200 for installing solar, wind or geothermal devices. Unlike the House-passed version of these credits, the Finance Committee's credit would be "refundable," meaning that the excess would be returned to anyone whose credit entitlement was larger than his tax bill. Other Finance Committee actions would (1) continue the income tax deduction for state gasoline taxes and (2) extend to 1985 the 4-cents-per-gallon federal tax on gasoline, which otherwise would drop to 1 1/2 cents in 1979.

Utility Rate Reform. The Senate was expected to take up the utility rate reform portion of the Carter energy package soon after disposing of the natural gas question.

Having already rejected the Administration's proposed mandatory reforms, the Senate Energy Committee has approved a substitute bill which would *(continued on p. 2)*

Senators Leaning Toward Rejection *Cont'd*

require state regulatory authorities and utilities to report on costs of service. The committee bill also authorizes the Secretary of Energy to intervene in all state rate-making proceedings. Under the original Administration proposal, which was passed by the House, state authority in rate making would be preempted by requiring the elimination of declining block rates and the implementation of time-of-day and seasonal pricing.

Coal Conversion. After rejecting an amendment to block major oil and gas companies from acquiring additional coal and uranium resources, the Senate has passed the coal conversion bill, a considerably less-stringent measure than desired by the Administration and passed by the House. The Senate version prohibits construction of new power plants and major fuel-burning installations using oil or natural gas but permits numerous exemptions. It also requires the phasing out of natural gas at existing power plants by January 1, 1990, and permits the Department of Energy to order conversion to coal at existing plants which have the capability to burn coal. It would leave existing plants which cannot burn coal largely unaffected. New and existing peaking power and intermediate-load power plants could win permanent exemptions from any prohibitions on natural gas or oil use. During floor debate the Senate took the following actions:

- Adopted an amendment by Senator J. Bennett Johnston, Jr. (La.) limiting applicability of the Act to oil-fired plants 30 megawatts or greater in size. (The bill originally applied to all oil and natural gas plants over ten megawatts in size).
- Adopted amendments by Senator Jacob K. Javits (N.Y.) extending loan and loan guarantee programs to cover all costs of conversion to coal (the bill had been limited to costs of pollution control equipment), and increasing loan authorization from $1 billion to $2 billion and loan guarantees from $5 billion to $10 billion.
- Adopted an amendment by Senator John A. Durkin (N.H.) to authorize an additional $100 million for railroad rehabilitation for branch and spur lines, (to be added to the existing program under the 1976 Railroad Revitalization and Regulatory Reform Act).
- Adopted an amendment by Senator Jennings Randolph (W.Va.) changing the trigger mechanism for impact aid to boom towns to an increase of eight percent in the coal or coal-related labor force and adopted an amendment by Senator Pete V. Domenici (N.Mex.) making uranium impacts eligible for the impact aid program contained in the bill.
- Rejected amendments by Senator H. John Heinz III (Pa.) to move up the natural gas phase-out at existing plants to 1985 and the phase-out for coal-capable plants to 1982.

The conference on the bill is expected to begin in mid-October, although it remains to be decided whether coal conversion will be considered separately or as part of an overall energy package. The House bill permits fewer exemptions to the prohibitions on oil and natural gas use, allows some case-by-case prohibitions on existing plants that are not capable of burning coal, and does not contain programs for loans, loan guarantees, railroad rehabilitation or impact assistance.

In another coal-related move, the Senate added an amendment by Senator Clifford P. Hansen (Wyo.), repealing the "local coal option" included in the recently enacted Clean Air Act Amendments of 1977, to its version of the energy conservation provisions of the National Energy Plan. The amendment would eliminate the Governors' option to prohibit the burning of other than locally or regionally available coal at noncomplying power plants or at new plants, provided that the plants sign 10-year contracts for the local coal and install scrubbers or utilize coal preparation.

MAJOR CARTER ENERGY PROPOSALS	HOUSE ACTION	SENATE ACTION
Increase in gasoline tax	Killed	Not considered
Tax on low-mileage "gas guzzlers"	Approved	Killed in Finance Committee; sales ban approved on floor
Tax rebates on gas-efficient cars	Killed	Not considered
New crude oil tax	Approved	Pending in Finance Committee
Rebate on oil tax proceeds to public	Approved	In trouble in Finance Committee
Coal conversion regulations	Approved	Approved with major changes
Oil and gas users tax	Approved	In trouble in Finance Committee
Extension of natural gas price controls	Approved	Phased deregulation approved
Conservation program for homes, schools and hospitals	Approved	Approved
Tax credits for insulation, solar heating installation, etc.	Approved	Approved by Finance Committee
Changes in utility rate structure	Approved	Rejected by Energy Committee

Energy Conservation. On September 13 the Senate passed the National Energy Conservation Act, incorporating the previously passed bill (S 701), which provides $900 million for energy conservation measures in schools and hospitals, with the other major conservation portions of the National Energy Plan.

The Senate bill matches the House-passed energy conservation provisions in many respects but does include some major differences. On the key issue of taxing gas-guzzling autos, the Senate passed a provision in effect banning the sale of such cars. The bill would add a $10,000 fee to the selling price of any car that does not get at least 16 miles per gallon beginning with 1980 models. The minimum standard would rise to 21 miles per gallon in 1985. The House had passed a graduated tax on the sale of energy-inefficient cars, which is more in line with the President's proposal. Major provisions of the Senate energy conservation bill include:

- A program requiring electric and gas utilities to advise homeowners on ways to save energy, inspect homes to determine costs of various energy conservation measures, and offer to arrange installation and financing of energy conservation measures.
- A program to provide financing to homeowners for the installation of solar heating and cooling devices. Administered by HUD, the program would create a $100-million revolving fund for 10 years. The House bill does not contain such a provision, although it provides for up to $2,150 in tax credit on the first $10,000 of expenditures for solar and wind energy equipment.
- A government-insured loan program for homeowners to finance energy-saving improvements. The ceiling on the loans would be $2,500. The Government National Mortgage Association would be authorized to purchase up to $5 billion of such loans. The House established subsidized loans up to $2,200 for homeowners who are at or below 90 percent of the area's median income.
- A program of mandatory energy efficiency standards for home appliances. Although the House version contains a similar program, the Senate further mandated standards for industrial equipment such as electric motors and pumps.

NEW ENERGY AND ENVIRONMENTAL POLICIES

Governors attending the annual meeting of the National Governors' Association in Detroit early in September adopted new policy resolutions calling for additional powers to act in energy emergencies and for a national conference with the President on the subject of increased energy production.

The two resolutions were added to a package of eight suggested energy and environmental policies, which were adopted by the Governors with the recommendation of the NGA Committee on Natural Resources and Environmental Management (NREMC).

Details of the proposed policy package were described in the September issue of *The Energy Resource*. The Governors in Detroit made virtually no deletions in the proposals presented by the Committee, but approved a number of additions -- also with the Committee's endorsement. Along with the resolutions on emergency preparedness and a national energy production conference, the additions include:

- A new resolution on national water policy review;
- Language in the National Energy Policy section calling for promotion of outer continental shelf development and an end to federal action which increases the cost of energy transportation without increasing energy supplies; and
- A provision in the Energy Facility Siting section limiting federal funding for intervenors in the siting process to groups or individuals that "will suffer direct and personal adverse impact by the approval . . . of an energy facility and have a demonstrated need for such funding."

Emergency Preparedness. The problems involved in preparing States to meet severe energy emergencies were discussed at a plenary session of the Detroit meeting by Governor Robert D. Ray (Iowa), chairman of the NGA Subcommittee on Emergency Preparedness, and by David Bardin, deputy administrator of the Federal Energy Administration who will become administrator of the Economic Regulatory Administration in the new Department of Energy.

The resolution offered later by the Committee on Natural Resources and Environmental Management and adopted by the NGA says, "The States should adopt energy emergency management plans including at least the following: emergency powers for the Governors, 'load-shedding' plans, energy user priorities and a petroleum allocation system." Also, because some States may not be able to provide adequate emergency authority, the resolution calls for national legislation "which will allow presidential delegation of emergency powers to Governors upon request of the Governor."

Urging the Department of Energy to provide assistance to the States to develop and implement energy emergency plans, the preparedness resolution adds, "Such assistance should be incorporated into a comprehensive state energy management grant program . . . .

"An information system should be developed by the Department of Energy to facilitate the delivery of fuels in . . . situations in which transportation difficulties contribute substantially to a fuel crisis. . . . A central energy emergency management function should be established at the national level to provide the States with information in a timely manner as to the extent of fuel shortfalls and the location of possible supplies. . . ."

Energy Production Conference. The idea for a national conference on increasing energy production grew out of the early July meeting at the White House between President Carter and the Governors, which many Governors felt concentrated heavily on energy conservation. The language added in Detroit to the NGA position on national energy policy states:

". . . the best interests of the United States would be served by a conference of the Governors with the President on the potential of this nation to increase the production of energy and [by having] these discussions fully reported to the American people." Governor Julian M. Carroll (Ky.), NREMC chairman, was urged to work with the Administration to assure convening of the conference "in a timely manner." (The conference has since been scheduled for November 3-4 at the White House.)

Water Policy Review. The resolution adopted by the NGA "in response to President Carter's request for a review of national water policy" declares:

"The States have established systems of water laws to meet their individual economic and environmental needs, and uneqivocally oppose any intrusion of the federal government into water resource areas traditionally managed by the individual States. Specifically, the States oppose any attempt by the federal government to usurp their role in adjudicating water rights.

"The nation's Governors agree that there is a need for clarification and improved coordination of federal water policy among federal agencies, as well as reforms that can be made on a state-by-state basis, but believe that these actions should take place without intrusion into the States' role in water administration."

The resolution also points out that individual States already have expressed "legitimate areas of concern" over "unclear, unrealistic and unworkable" proposals contained in water policy option papers submitted to them by the Administration for review and urges that these concerns be reflected in future policy recommendations. It concludes:

"The federal government has a well-established traditional role of financing and funding water projects and in providing technical assistance to States. The States oppose any significant change in these policies."

Outer Continental Shelf. Stating that it is "clearly in the best interest of the United States to accelerate rapidly the pace of offshore exploration and development . . . in accordance with sound and efficient" environmental standards, the resolution says that offshore activity "by nongovernmental entities should be facilitated and supported" by federal officials and amendments to the Outer Continental Shelf Lands Act "should expedite rather than hinder OCS development."

Energy Transportation. Recognizing that energy prices "will necessarily rise as a result of efforts to increase supplies and discourage wasteful use," the Governors added an amendment, authored by Governor Pierre S. du Pont IV (Del.), stating that "the federal government should not take any further action the result of which would artificially inflate the cost of recovering, transporting or distributing energy supplies without either increasing those supplies or discouraging their waste."

Also, the Governors at Detroit changed the name of their organization from National Governors' Conference to National Governors' Association.

TECHNICAL ASSISTANCE FOR STATE PURCHASING

The National Governors' Association Energy Program, with cooperation from the National Association of State Purchasing Officials and state energy offices, is developing a project to provide technical assistance to States in carrying out the mandatory procurement policy objectives of the Energy Policy Conservation Act (PL 94-163).

The project will cover the design, implementation and testing of a public purchasing technical assistance system that will be the focal point for product specifications, test methods, policies and procedures relating to the procurement of more energy-efficient goods and services. The system can also provide a focal point for industry to identify public market needs and to offer new products, product improvements or new technology to state and local markets.

The basic framework, content and institutional relationships between NGA, NASPO, state energy offices, federal agencies, industry and other public interest groups will be tested through a series of procurement-oriented demonstration projects. In order to develop the criteria for the demonstrations, the NGA and NASPO project staffs reviewed the various state plans submitted to the Federal Energy Administration under the Energy Policy Conservation Act. From this review a matrix was developed showing major areas of consensus among States with respect to their procurement activities. Major areas of state interest include the use of life-cycle costing, energy-related seminars and workshops, development of a system for ranking products by energy consumption, cooperative purchasing with the political subdivisions in the State and the offering of technical assistance in specification development and in the evaluation of products on an energy basis. The products enjoying state consensus include autos and trucks, appliances of all types, office equipment, oil (recycled and synthetic), lighting, asphalts and tires. From these plans the NGA will develop major demonstrations, either along product or policy lines, on a regional or national basis, or within a State. The product/policy matrix will identify States with an interest in or commitment to a particular process or product.

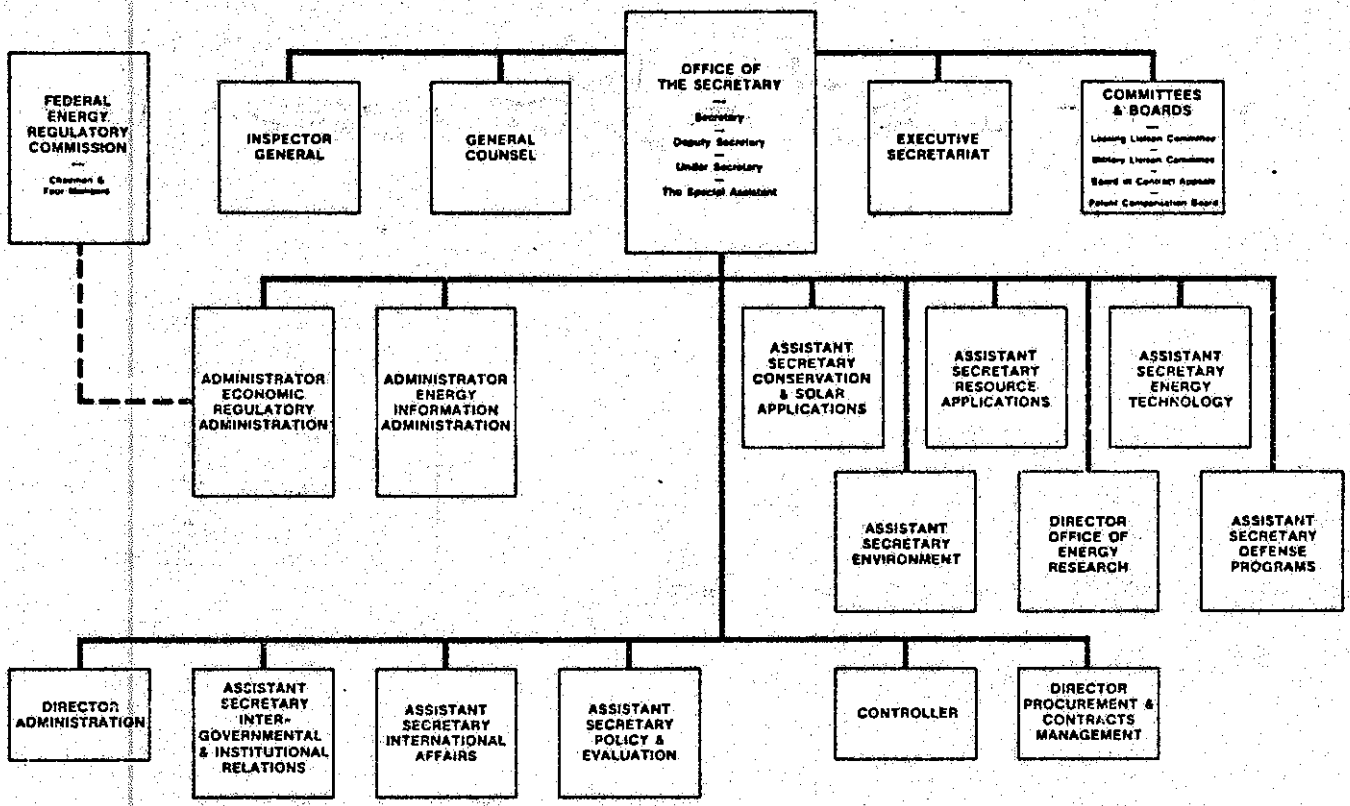
To provide guidance and review to the project staff, the NGA Natural Resources and Environmental Management Committee's Subcommittee on Energy Conservation formed a task force on Procurement and Energy Conservation. The task force brings together state and local public purchasing officials and several representatives of state energy offices. It has met to review the initial set of demonstration projects and has endorsed the following for further work:

- Life-cycle cost training and technical assistance programs;
- A system for identifying, ranking and selecting energy-intensive products;
- A generic system of developing product-specific procurements; and
- Procurement of solar hot water heaters for public buildings.

The NGA is currently working with FEA and the Energy Research and Development Administration in developing the mechanics of project design management and funding.

States needing technical assistance or procurement information, and those wishing to contribute to any of the demonstrations, propose new procurement project ideas or participate in the experiments should contact Joseph G. Berke, Director of the Conservation/State Procurement Project at the NGA Energy Program. Telephone: 202/624-5376.

DEPARTMENT OF ENERGY



KEY DEPARTMENT OF ENERGY APPOINTEES. President Carter has submitted nominations to fill most of the top positions in the Department of Energy, which began operation October 1. The chart above shows the organization of the new Cabinet-level department. Key officers in the department will be located temporarily at 730 Jackson Place, N.W., Washington, D.C., until permanent space in the James V. Forrestal Building, 1000 Independence Avenue, S.W., becomes available; most other employees will come from agencies absorbed by DOE and will remain at their old locations pending the move to the Forrestal location. Appointments to top DOE positions, most of them requiring Senate confirmation, are listed below:

James R. Schlesinger, Secretary
(confirmed August 5, 1977)

John F. O'Leary, Deputy Secretary

Dale D. Myers, Under Secretary

Roger D. Colloff, Special Assistant*

Lynn Coleman, General Counsel

Inspector General, no appointment

Federal Energy Regulatory Commission
Charles B. Curtis, to be designated chairman after confirmation
Georgiana Sheldon, member
George R. Hall, member
Matthew Holden, Jr., member
Don Smith, member

David J. Bardin, Administrator, Economic Regulatory Administration

C. William Fischer, Administrator, Energy Information Administration**

Don Beattie, Assistant Secretary for Conservation & Solar Applications**

Thomas E. Noel, Assistant Secretary for Resource Applications**

Robert D. Thorne, Assistant Secretary for Energy Technology

Dr. James L. Liverman, Assistant Secretary for Environment**

John M. Deutsch, Director, Office of Energy Research

(continued on p. 8)

CALENDAR

Oct. 12-13	Meeting of the Resource Recovery Task Force, NGA Subcommittee on Waste Management, Natural Resources and Environmental Management Committee (NREMC), Washington, D.C.
Oct. 12-13	Meeting of the NGA Subcommittee on Energy Emergency Preparedness, NREMC, Washington, D.C.
Oct. 30	Second-round applications due for State Science, Engineering and Technology (SSET) grants to States
Nov. 3-4	SSET workshop for executive branch applicants, Atlanta, Ga.
Nov. 3-4	White House Conference on Energy Production
Early Nov.	Meeting of the NGA Subcommittee on Water Quality Management, NREMC, Washington, D.C.
Early Nov.	Meeting of the Surface Mining Task Force, Coal Subcommittee, NREMC, Washington, D.C.

The Energy Resource

A newsletter of federal-state developments in energy, technology and the environment published monthly by the National Governors' Conference Energy Program.

Edward L. Helminski
Energy Program Director

Joseph G. Berke
Director, Conservation/State Procurement Project

Rosalie T. Grasso
Director, Waste Management Project

Edward A. (Ned) Helme
Federal-State Coordinator

Connie B. Q. Laughlin
Staff Associate for Conservation

Lynn Muchmore
Director, State Science, Engineering and Technology Project

Joan Simmons
Research Associate, SSET

David W. Stevens
Director, Facility Siting Project

Subscriptions may be obtained from *The Energy Resource*, Suite 202, Hall of the States, 444 North Capitol Street, Washington, D.C. 20001. Dwight E. Jensen, Editor.

ENERGY REPORT AVAILABLE. *Nuclear Reprocessing and Proliferation: Alternative Approaches and Their Implications for the Federal Budget*, a 64-page background paper and analysis by the Congressional Budget Office, is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

ENERGY PRODUCTION CONFERENCE. Telegrams were sent to Governors during the first week in October inviting them to the White House Energy Production Conference on November 3-4. The agenda is still being formulated. Tentative plans call for a briefing for Governors at 1:30 p.m. November 3 at National Governors' Association headquarters, with the group going to the White House complex at 2:30 p.m.

DEPARTMENT OF ENERGY APPOINTEES *Cont'd*

Alfred D. Starbird, Assistant Secretary for Defense Programs**

William S. Heffelfinger, Director of Administration*

Phillip S. Hughes, Assistant Secretary for Intergovernmental and Institutional Relations
- James Bishop, Jr., Deputy Assistant Secretary for Public Affairs*
- Frederick P. Hitz, Deputy Assistant Secretary for Congressional Affairs*
- William E. Peacock, Deputy Assistant Secretary for Intergovernmental Relations*

Harry E. Bergold, Assistant Secretary for International Affairs

Alvin L. Alm, Assistant Secretary for Policy & Evaluation

Merwyn C. Greer, Controller*

Michael J. Tashjian, Director of Procurement & Contracts Management*

Raymond L. Walters, Director, Executive Secretariat*

*Does not require Senate confirmation
**Acting appointment

September 1977

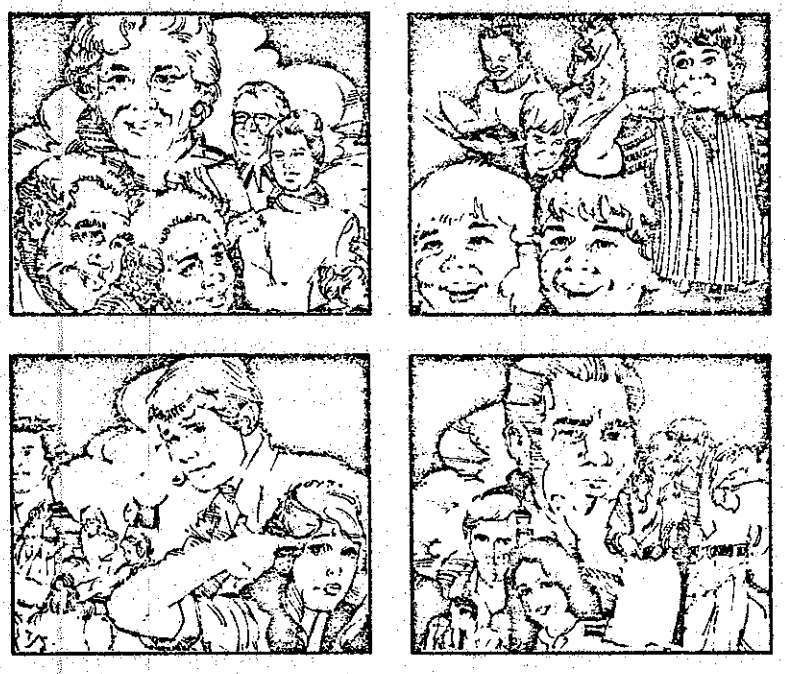
FIREWORD

A BULLETIN FROM
THE NATIONAL FIRE
PREVENTION AND CONTROL
ADMINISTRATION U S
DEPARTMENT OF COMMERCE
WASHINGTON D C 20230

Public Fire Education Marches Across Nation

Fire Education Planning

U.S. DEPARTMENT OF COMMERCE
National Fire Prevention and Control Administration



Fire Education Planning helps local fire educators develop programs for children, youthful firesetters, adults, and the elderly.

"Everybody always talks about the weather, but nobody does anything about it," Mark Twain observed—years ago. The fire community is not only talking about public fire education, they are doing something about it.

Public fire educators nationwide are entering a new era of activity—and results. The goal of the NFPCA's Public Education Office is to provide local fire educators with the tools to develop their own programs. The result is measurable fire loss reduction through education.

The Public Education Office is organized into two divisions for achieving its mission. The Public Education Assistance Program provides technical and programmatic assistance to states and communities. The Research Division develops education programs for high risk groups and special environments.

Through its research programs, PEO is working to develop and disseminate cost-effective public fire education programs. One result has been the Community Fire Education Planning Model developed with the Children's Museum and Whitewood Stamps, Inc. of Boston. This five-step process allows local fire educators to plan, implement, and evaluate education programs, specifically designed to solve their local fire problems using local resources.

A key element of PEO's educational research efforts is education programs for special groups. Pre-school children, for example, can learn simple fire-safety skills, such as "Stop-drop-and-roll." Working under a National Fire Administration grant, Nancy Dennis of Oklahoma State University is developing education programs for pre-schoolers; her results will be shared with public fire educators nationwide.

Fire educators can use other products of PEO's educational research efforts as the "raw material"

for planning local programs. For example, PEO has published "Fire Education Planning," a booklet and set of planning posters to help plan education programs for children, youthful firesetters, adults and the elderly. Another research publication examines community and fire service attitudes in a New Orleans neighborhood which is similar to many high fire risk urban settings.

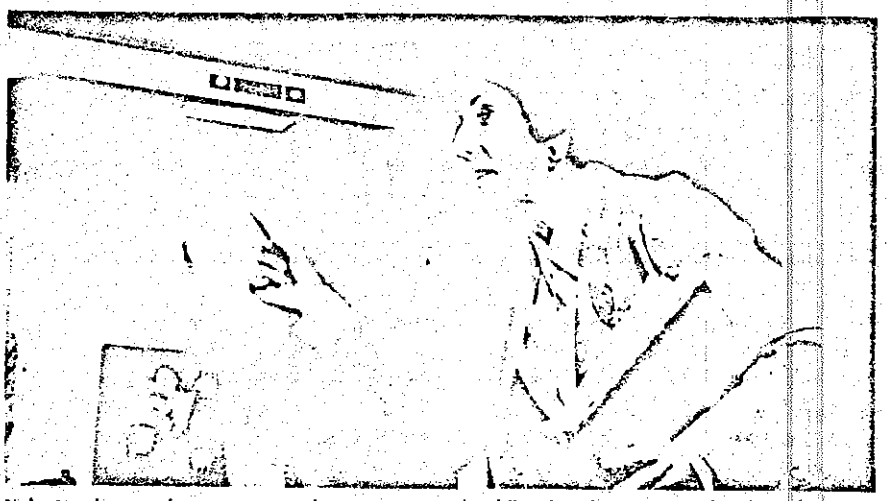
In a related effort, PEO is developing a home inspection program to reduce fire loss. Fire Chief Jack Cooper and Public Education Officer Donna Gorman of Edmonds, Wash., have completed a training package to teach civilians how to conduct home inspections or surveys. The "Edmonds Home Inspection Program" including training manual and slides can be purchased now.

Resource exchange—the active sharing of locally developed program ideas and materials—is the goal of PEO's Public Education Assistance Program. In this way, members of the fire community can use each other's talents and resources to reduce local fire loss.



Lt. Tom O'Connell of the Chicago Fire Department receives a warm welcome from first graders. Through the Public Education Assistance Program, fire educators nationwide share their program ideas and experiences with each other.

Conferences and publications are major tools for resource exchange at NFPCA. Public fire education conferences, co-sponsored by the Public Education Office and a local, state or regional organization, provide a forum for local fire educators to learn of other local programs from across the country. In addition, participants plan state resource exchange systems at conferences co-sponsored by PEO.



Voluntary home safety surveys are the cornerstone of public education programs in Edmonds, Washington.

NFPCA publications also promote sharing ideas and experiences. Established in 1976, the *Resource Exchange Bulletin* features short descriptions of local programs. Each article includes the name, address and telephone number of the local contact for more information. The *Bulletin's* circulation has grown from 25 to more than 4,000 during its one and a half years.

Other PEO publications describe local programs in more depth. "Teaching Fire Safety Education" was the first of a series of monographs on local programs. Prepared by Cathy Lohr of the Guilford County Fire Marshal's Office in Greensboro, North Carolina, the booklet describes a variety of in-school programs in Guilford county and suggests ways to work with school officials. In June 1977, "The Fire Safety Training Workbook" was published as the second monograph. This booklet outlines a training course developed by Lt. Earle B. Poole of the Montgomery County, Maryland, Department of Fire and Rescue Services. Originally devised to train members of the Ladies' Auxiliary to make fire safety presentations, the booklet can be the basis for training a wide range of community groups, such as the Kiwanis and Red Cross.

Each PEO activity reflects the conviction that fire is a local problem that can be solved using local resources. The result—as fire educators from Santa Ana, California, to Mt. Prospect, Illinois, are discovering—is reduced fire loss.

Editor's Note: A PEO publications list is available from Public Education Office, National Fire Prevention and Control Administration, P.O. Box 19518, Washington, D.C. 20036.

Names Tokyo New Fire Chief

Deputy Chief Kenji Ajioka was appointed the 9th Chief of the Tokyo Fire Department July 3, 1977, succeeding Chief Shigenao Murayama who retired after 36 years of service in the TFD.

Born February 4, 1924, Chief Ajioka is a graduate of the Department of Architecture, Tokyo University. Having joined the Tokyo Fire Department in March 1948 concurrently with the establishment of the municipal fire service, he was promoted to Fire Lieutenant in 1950, Fire Captain in 1955, Battalion Chief in 1961, Assistant Chief in 1967, 1st Assistant Chief in 1970, Deputy Chief in 1973, and this time Fire Chief by Governor of Tokyo.

Before his appointment as Chief, Chief Ajioka held the posts of Chiefs of Fire Science Laboratory, Fire Prevention Division, Command Division, Personnel Division and Administration Division.

He will head all Fire Chief's positions for Japan including the presidency of the Fire Chief's Association of Japan and the International Fire Chiefs' Association of Asia.

Successful Fire Education Programs Means Careful Local Planning

Fire educators work in environments as varied as their communities.
Although the fire problems, the budget and staff resources, and the communities themselves vary, each fire educator shares the goal of reduced fire loss.

Public Education is a small item in many fire department budgets. Yet many fire educators are discovering that targeted, systematic education programs succeed in reducing fire loss. For example,

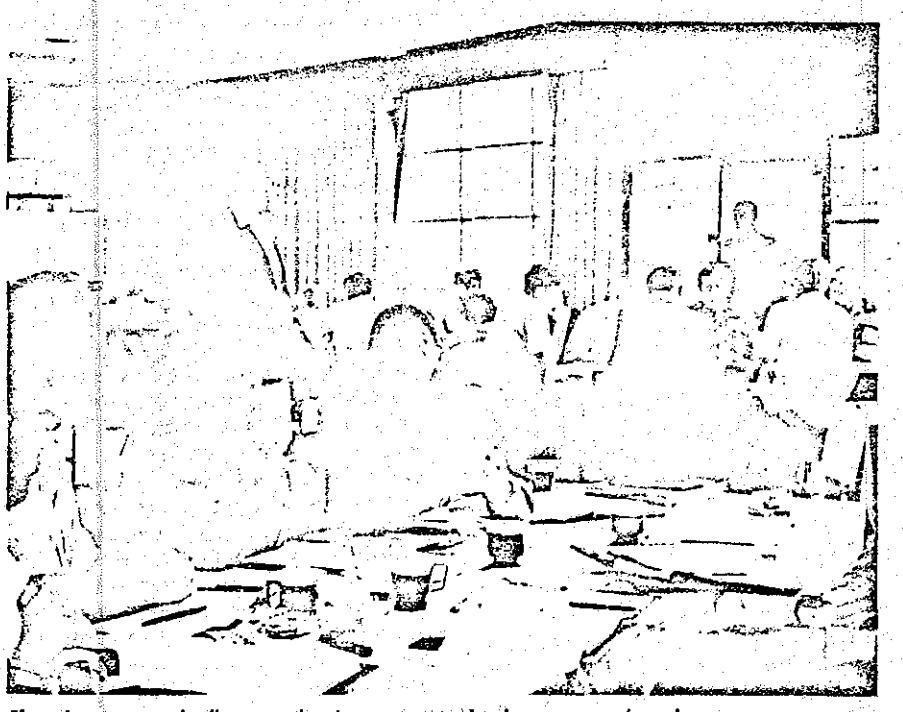
°Mississippi County, Ark., experienced a 50 percent reduction in injuries from fires and explosions after education programs targeted at electrical hazards, flammable liquids, and leaving children unsupervised.

°Kileen, Tex., experienced a 44 percent reduction in cooking and grease fires.

°Santa Ana, Calif., has achieved a per capita fire loss rate 75 percent below the national average for more than a decade.

°Rockford, Ill., reduced false alarms from two schools from 5-8 per day to none.

Success stories like these from around the country have a common theme: public fire education reduces loss when specific local problems are attacked using coordinated local resources. The Community Fire Education Model helps local fire educators plan and implement education programs that work.



Fire educators use the five-step planning process to develop programs for urban areas.

Five Steps To Reduced Loss

The Model is a five step blueprint for action. In the first three steps, you use your knowledge of your community to devise the attack on fire loss. In the final steps, the education program is implemented and evaluated.

Knowing which problem to attack is crucial to effective public fire education. In the first step, you identify your community's major fire problem by answering questions such as "What are the ignition sources or causes of fire?" "Where are the high risk locations and when are the high risk times?" "Who are the high risk victims and what is the high risk behavior?" The local answers to these questions draw a scenario of the problem to be attacked through education.

The answers, of course, differ from community to community. For example, Oregon identified smoking as a statewide fire problem; Upper Arlington, O., identified juvenile firesetters as a target for education; and Minneapolis, Minn., sees elderly residents of high-rise apartments as an important potential audience for public fire education messages. However, each of these communities took the important first step of pinpointing the problem to be solved.

After identifying the problem, you then complete the second portion of the Model: finding the resources to help reduce fire loss. These resources can be people, such as community business or civic organizations. For some local fire educators, the media—television, radio and newspapers—are a valuable tool in transmitting fire safety information. Resources are also materials. the films, slides, posters, and brochures that make up the fire educator's arsenal against fire.

As those using the Model are discovering, many communities have many resources for people and materials. The Kiwanis in Mt. Prospect, Ill., the Jaycees in Erie, Pa., and the Women's Club in Covina, Calif., are all providing people to educate the public about smoke detectors. The Red Cross in Montclair, N.J., and the Orlando Insurance Association in Florida provide materials to their local fire departments.

By knowing the problem to be solved and the resources available, you can then complete the planning

phase by designing an education program package, the third step in the model. At this stage, you determine which formats are best in presenting the educational message. Among the many choices are slide shows, tabletop displays, home inspections, school programs, brochures, and television or radio public service announcements.

Now you are ready to implement the public education program, the fourth step in the education process. Many fire departments are finding that broad community participation is crucial to implementing their programs. One method of involving the audience in education is using a member of the audience to present the message with fire service guidance. In Minneapolis, for example, the "star" of a slide show for elderly high-rise residents is an elderly high-rise resident herself. Other decisions outlined in the Model include determining who will become fire educators and how to train them. Ways to produce and distribute educational materials must also be decided.

The educational process described in the Model does not end with implementation. From the viewpoint of reducing fire loss, the most important step may be evaluating the program's impact.

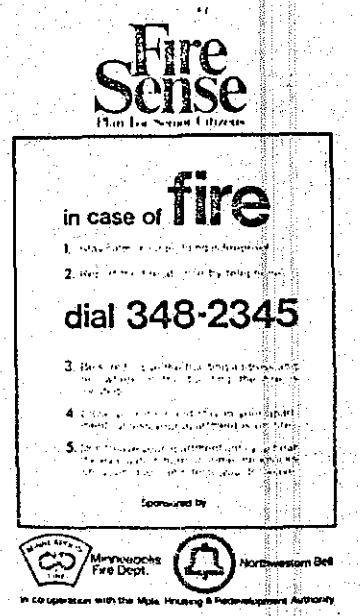
In the early stages of planning, you identified the community's fire problems and set the education program's goals. Through evaluation, the Model helps educators measure their success.

Success comes in many forms. One measure of success is comparing "before and after" statistics on fire deaths, injuries, loss and incidents. Another method involves gauging changes in knowledge, awareness, and behavior.

The evaluation techniques will depend on the program's goals. For example, medical examiners' reports are compared in Delaware, which has set a statewide goal of no residential fire deaths by 1980. In Laurel, Md., where the goal is increased life-safety through smoke detectors, telephone surveys reveal how many homes have installed detectors.

Even the most thoughtfully planned and implemented education programs have areas of weakness. Evaluation shows you where to modify the education program. In a U.S. Forest Service project in Louisiana, for example, evaluation revealed that mass media techniques changed fire safety knowledge, but not fire safety behavior. As a result, the program was revised to reinforce media messages with "personal contactors" or local opinion leaders.

According to reports from educators who have completed the five steps in the Community Public Fire Education Planning Model, using a systematic process allows them to focus limited fire department resources on specific tasks. The result, the users say, is a cost-effective approach to public education for reduced fire loss.



The "Fire Sense Plan for Senior Citizens" in Minneapolis is one example of fire education programs developed for a specific audience.

Model States Selected To Begin Fire Education Thru NFPCA Grants

Ask a Texan about Texas, a New Yorker about New York, or a Georgian about Georgia. They will each tell you the unique characteristics of their state.

Each of the 50 states has its individual qualities and each does public fire education its own way. To learn more about the ways states can practice resource exchange, the Public Education Office has identified California, Delaware, Illinois, and Oregon as pilot public education states.

Four pilot states have each received grants from PEO. The grants fund the first year of a three-year program and will be used to establish state resource systems and to implement public education planning on a statewide basis.

California

In California, the grant recipient is the Office of State Fire Marshal. Robert Egan of San Jose State College is project director.

Because of the size of the state, California plans to utilize regional representatives to gather and disseminate fire education programs and materials. Two workshops are planned to provide technical assistance to these fire educators in utilizing a systematic approach to fire education programs within the state.

Delaware

The Delaware State Fire School, under the leadership of Director Lou Amabili, received another PEO grant. Senior Instructor Frank Richardson and Florence Legates are actively involved in implementing the program.

Like many states, Delaware relies heavily on volunteer firefighters—and volunteer fire educators. The State Fire School will offer training courses for volunteer, certified Fire Safety Instructors. The instructors give fire safety presentations in their own communities, using materials and equipment coordinated by DSFS with grant funding. Regional resource centers in the state offer the Fire Safety Instructors convenient access to educational materials.

Illinois

Illinois fire educators have also decided to use part of their grant to establish resource centers. The Illinois

Fire Inspectors Association, the grant recipient, has organized a northern resource center in Mt. Prospect (a suburb of Chicago) and a southern center in Springfield, the state capital. In addition, the Illinois grant will help support a statewide fire education newsletter. Lt. Phillip Guzzeta, past president of the IFIA, and Lt. Lonnie Jackson, chairman of the IFIA Education Committee, along with Fire Chief Larry Pairitz of Mt. Prospect, Ill., are responsible for establishing the statewide fire education system in Illinois.

Oregon

The grant to Oregon's Fire Standards and Accreditation Board will reach many communities in the state. Among other uses, the grant will fund 10 "mini-grants" to individual, geographically scattered areas in Oregon. *Each* of these areas is developing unique fire education programs to meet local needs, according to Board Director Dick Small. The mini-grant communities will all use the Model to develop their programs. Oregon has already successfully used the Community Fire Education Planning Model to develop statewide programs.

Helen Moskal of the Board and Fire Chief Floyd Pittard of Seaside, Ore., are sharing grant implementation responsibilities with Small.

Benefits to Other States

While each state has its own fire education needs and resources, the lessons of the four pilot states can be applied to others. For example, regional resource centers, mini-grants, and training for fire educators are potential approaches to statewide public fire education across the Nation. The Public Education Office will share the insights gained in California, Delaware, Illinois, and Oregon with other states in the interest of more effective public fire education.



Lt. Lonnie Jackson of the Mt. Prospect Fire Department, here with local schoolchildren, is helping implement statewide resource exchange under a Public Education Office grant to the Illinois Fire Inspectors Association.

Using Conferences Is A PEO Way To Spread The Word

The voice from the podium speaks with many accents, at public fire education conferences. Some voices are crisp New England and some are soft Southern. A matter-of-fact Midwestern voice joins a casual California tone.

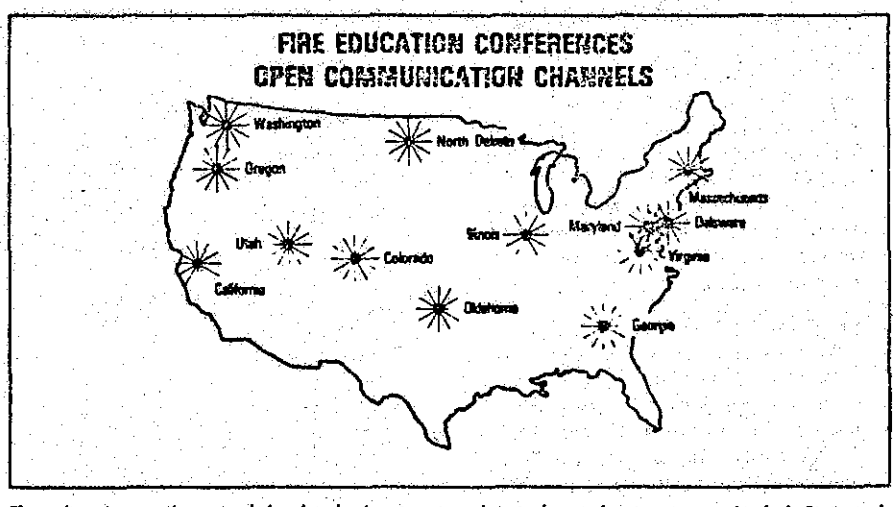
At public education conferences sponsored by PEO grants, fire educators from across the Nation acquaint conference participants with the many approaches to local fire education.

The first pilot conference was held in College Park, Md., in late 1975. Then, the originators of 20 successful programs from around the country met to share information and ideas on public fire education. The conference was so successful that the participants requested regional conferences to bring presentations to other parts of the Nation.

Since the Maryland meeting conferences have been held in Massachusetts, Delaware, Oklahoma, Utah, California, Illinois, Washington, Georgia, and North Carolina. The Mountain States Conference, held in Denver, Colo., in May 1977, brought together local fire educators from an additional eight states. The Missouri Valley Conference in Fargo, N.D., added fire educators from the upper Midwest to the growing list of participants in PEO co-sponsored conferences.

Each conference has two goals. First, the meetings allow educators to learn about other programs and available materials. Participants bring their brochures, posters, and slide sets with them to the conferences. In many cases, fire educators arrive with a briefcase full of their own materials and leave with the case full of samples from other people. Often these first encounters at conferences lead to continued, informal resource exchange.

Secondly, the conferences are a catalyst for public fire education in the host state. The conference agendas include time for round-table planning of state-wide resource exchange. Improved and expanded fire safety public education programs at the state and local levels grow from



Fire education conferences bring local educators together to learn about programs in their State and across the Nation.

this resource exchange.

Illinois is a prime example of public education growth through conferences. In 1976, Mt. Prospect, Ill., Fire Department, with the assistance of PEO, held the Midwest Public Education Conference. Since then, fire suppression personnel have volunteered their off-duty time to teaching children fire safety in community schools, purely on a non-paid basis. Fire prevention personnel who once spent all their time on enforcement now add public education to their duties. The Illinois Fire Inspectors Association independently sponsored a second conference to extend the benefits of the first.

States that have not yet sponsored a conference under a PEO grant are showing increased interest in gathering their local fire educators for a meeting. Fire educators interested in having a conference in the grant state should first identify an organization with a statewide focus as a sponsor. State fire marshals, directors of state fire service training or statewide societies or organizations could each become a sponsoring host.

Potential sponsors should also identify short-term and long-term conference benefits, such as the establishment of statewide resource exchange systems. Possible conference participants should be identified. PEO and the local organizations are jointly responsible for locating conference speakers.

Nationwide Smoke Detector Campaign Launched

"Smoke detectors have the potential for reducing the loss of life from fire in American homes by over 40%."

Howard D. Tipton
Administrator, NFPCA

When used with a practical home escape plan, smoke detectors provide a variety of advantages. To the individual, smoke detectors offer early warning and escape. To the community, smoke detectors offer reduced fire spread. To the fire service, the early warning of smoke detectors can offer easier extinguishment and increased loss reduction.

The National Fire Prevention and Control Administration Public Education Office has undertaken a nationwide campaign to assist fire departments meet local demands for smoke detector information and education programs.

"WAKE UP!"

An early step was providing fire departments with smoke detector information for public distribution. In cooperation with the National Bureau of Standards and the Consumer Product Safety Commission, NFPCA published a consumer brochure, "Wake Up! Smoke Detectors Can Save Your Life If . . ." Using non-technical language and strong illustrations, the brochure explains selection, installation, and maintenance of smoke detectors, as well as the need for practiced home escape plans.

In December 1976, fire departments around the Nation received single copies of "Wake Up!" The Hartford Insurance Company and Sears, Roebuck and Company were the first organizations that offered to re-print the brochure as a public service to fire departments. By June 1977, Hartford had distributed more than 160,000 copies through its agents. During the same time period Sears has distributed 2,095,400 copies fire departments in 22 Standard Metropolitan Statistical Areas. Sears has now extended its brochure program nationwide.

Individual fire departments, local government agencies, and other organizations were also anxious to re-print "Wake Up!" as a public service. PEO loaned the brochure negatives to these organizations, resulting in the distribution of an estimated additional 400,000 copies.



Sears, Roebuck and Company and the Hartford Insurance Company are among the many organizations which have re-printed "Wake Up! Smoke Detectors Can Save Your Life."

Smoke Detector Public Education Manuals

While coordinating the re-printing of "Wake Up!", the Public Education Office has been developing a five-part series of Smoke Detector Public Education Manuals for the fire educators.

The series includes:

The Smoke Detector Resource Catalog. A fact sheet on smoke detectors, guides to finding smoke detector materials, case histories of successful programs, a legislative overview, and evaluation techniques;

Smoke Detectors: Moving the Public. A two part manual on generating support through community organizations and the media;

Smoke Detector Technology. A detailed description of how smoke detectors work;

Smoke Detectors and Legislation. An in-depth review of the current status of state and local smoke detector legislation;

Smoke Detector Training. A suggested program for preparing members of the fire prevention community to present smoke detector education to the public.

The manuals are to be released in two stages. The **Resource Catalog** is the "core" manual and was released first, in June 1977. **Smoke Detectors: Moving the Public, Smoke Detector Technology, Smoke Detector Legislation** and **Smoke Detector Training** are expected later in 1977.

The need for the manuals is seen in the requests for copies. Three weeks after announcing the availability of the **Resource Catalog,** 14,000 requests for the manuals arrived at PEO.

Smoke Detector Outreach

The five Smoke Detector Public Education Manuals are seen as the primary tools for implementing smoke detector programs. The ultimate goal of the program is assisting the local fire service in presenting smoke detector information to the public.

NFPCA Plans Third Annual Conference For St. Louis

How do you know you are providing the fire protection of your community desires? How do you measure the effectiveness of your fire protection programs? How do you measure the productivity of your fire department?

What does a mayor expect of a fire chief? What does a fire chief expect from a mayor? With rapidly rising costs, what impact do budget cuts have on a community's fire protection? Should the 24-hour shift be eliminated?

What is the State responsibility in fire protection? What role do fire service chief officers play in the management of the fire department and the city? Should the community fund on-duty physical fitness programs for firefighters?

These are only a few of the policy issues that will be addressed at the National Fire Administration's Third Annual Conference, "Policy Leadership in Fire Protection." The conference is scheduled to be held October 24-26, 1977 at the Sheraton St. Louis Hotel, Convention Plaza, St. Louis, Missouri.

It will tackle such subjects as legislating fire safety through codes, enforcing codes and regulations, labor-management negotiations, prosecuting arson cases, policy issues on fire suppression, as well as those affecting fire prevention.

The objective of the conference is to bring together policy decision-makers (mayors, council members, county supervisors, State legislators, city managers, corporate officers, labor leaders) and members of the fire protection community to examine critical policy issues in fire protection. The fire protection leaders and the decisionmakers will sit together and listen to presentations on key policy issues, participate in joint discussion periods, and talk informally during meals for the three intensive working days of the conference.

CONFERENCE REGISTRATION FORM

Policy Leadership In Fire Protection

The Third Annual Conference of the National Fire Prevention and Control Administration
U.S. DEPARTMENT OF COMMERCE

Please complete the following form and mail with a check for $55.00 (to cover all conference meal functions and the Conference Proceedings) to: NATIONAL FIRE CONFERENCE, National Fire Prevention and Control Administration, P. O. Box 19518, Washington, D.C. 20036. Make all checks payable to NATIONAL FIRE CONFERENCE. Your Registration will be confirmed along with a hotel reservation card and other details. Register early because conference attendance is limited.

NAME _____ TITLE _____

ORGANIZATION _____

ADDRESS _____ ZIP _____

TELEPHONE _____

☐ Number of additional dinner tickets desired for your guests not attending conference. (Two dinners, Monday, Oct. 24 & Tuesday, Oct. 25 @ $25.00 per set)

Please duplicate this form for multiple registrations.

For conference information, contact Peg Maloy (202) 634-7663

CONFERENCE REGISTRATION

ENCLOSED:

Registration Fee:	$55.00
Dinner Ticket Sets for Guest Non-Conferees	_____
TOTAL:	_____

CHECK ENCLOSED ☐
Make Check Payable to:
National Fire Conference

AREAS OF INTEREST:

- ☐ Volunteer Fire Dept.
- ☐ Cities of less than 50,000
- ☐ Cities of 50-250,000
- ☐ Cities over 250,000
- ☐ Special Program for spouse and guests.

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Single _____ **Double** _____

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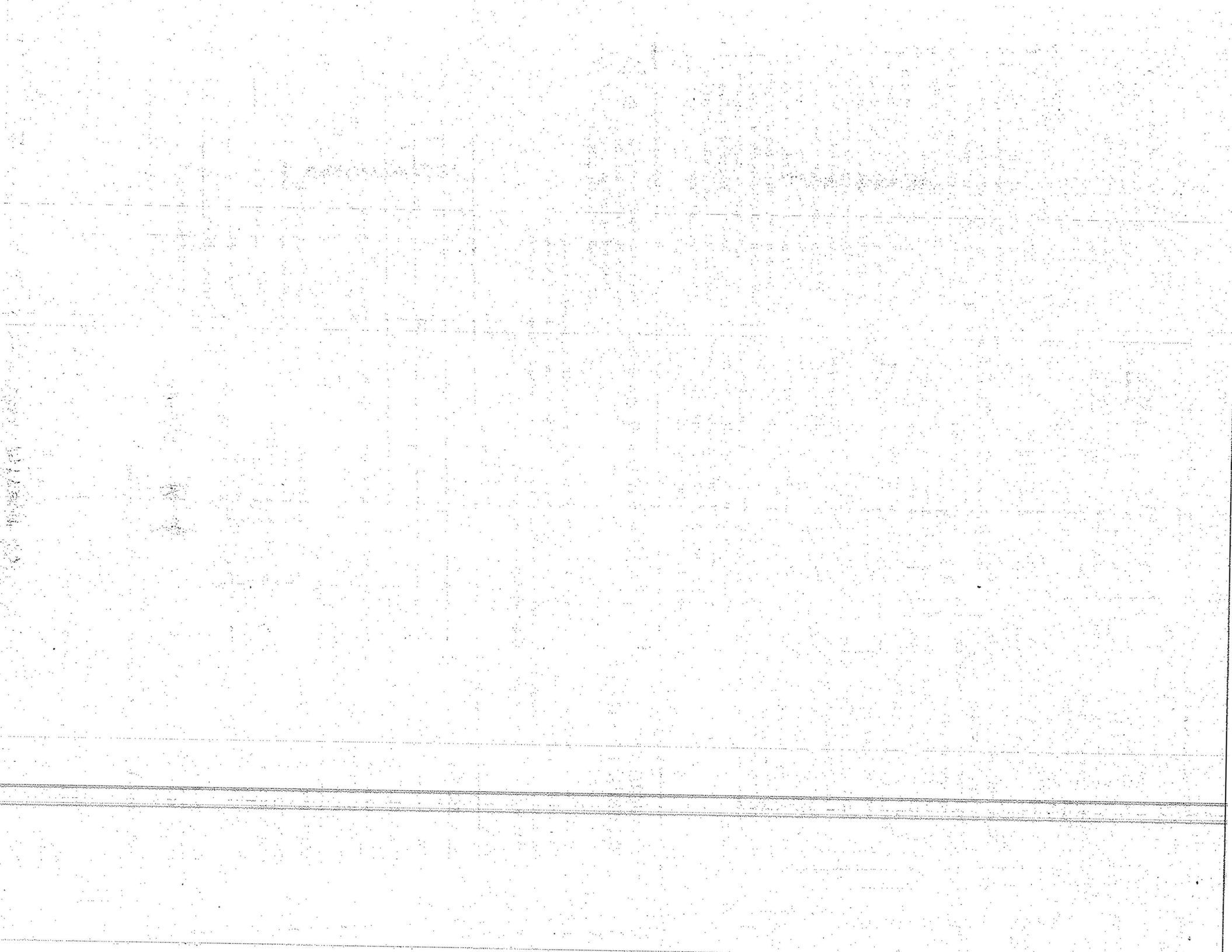
Room Rates: $31.00 per night, single or double. No deposit required.



SITREP

ENERGY R&D

23 September 1977 Report No. 185

October 27 Set for Lease Sale of Cook Inlet Oil and Gas Tracts — Secretary of Interior Cecil Andrus has set October 27 for the lease sale of 135 offshore oil and natural gas tracts in Alaska's Cook Inlet near Anchorage. The lease sale area is 60 miles long and 30 miles wide and covers 768,580 acres. The Department of Interior (DOI) will offer 89 tracts under the traditional cash bonus system and 46 tracts under the royalty bidding system. Under this bidding system, the reverse of the cash bonus system, a fixed cash bonus for the tracts is set, while the companies bid on the royalty to be returned to the government. DOI has set the fixed bonus at the minimum, about $142,000, on 36 of the 46 tracts. The fixed bonus for the 10 remaining tracts was set according to the estimated value of the tracts. The royalty bidding system, aimed at increasing competition, allows smaller companies with less capital to participate in the sale.

Lease stipulations and regulations have been set to ensure maximum environmental protection to the lease area. One of these stipulations requires lessees to prepare an environmental impact statement before they can explore or develop a tract. Companies leasing tracts are expected to "work closely with the state and local officials to minimize potential conflicts with commercial fishing and traditional native customs and to reduce the adverse effects of onshore development." To minimize the impact of the operation on the seabird and marine mammal communities, aircraft and boat traffic will be restricted from May to September.

New Motor Oil Rerefining Process Developed — A new process to rerefine waste motor oil into a high quality product comparable to virgin motor oil has been developed by Phillips Petroleum Company. Higher grade oil can also be produced by blending the rerefined oil with additives. According to Phillips, the process is faster, more economical, and overcomes the environmental problems associated with other processes. Ninety percent of the oil can be recovered from motor oil waste using the Phillips 3-hour rerefining process. Other processes have been able to recover only 55 to 75 percent of the oil in waste. Environmentally, the Phillips process alleviates waste-disposal problems. The waste remaining after oil removal is in a solid form that is safe for landfills or other uses. The wastewater from the process can be discharged into waterways or municipal sewage systems.

A plant using the new oil-rerefining process will be built by Phillips in Raleigh, North Carolina. The $1.4 million plant, expected to start operation in mid-1978, will have a capacity of nearly 2 million gallons of waste oil annually.

Milestone Reached at Synthane Pilot Plant — The Synthane gasification pilot plant reached a major milestone during August; it operated at controlled conditions for long periods without interruption. The plant, owned by the Energy Research and Development Administration and operated by The Lummus Company of New Jersey, produced gas for 190 hours during an 11½-day run. Using 465 tons of western subbituminous coal, the Synthane plant produced 19 million standard cubic feet of dry raw gas. The best results were obtained during a 98-hour period of the test run when the gasifier temperature was held at 1,500° F, the coal feed rate averaged 2.2 tons per hour, and gas conversion averaged 73 percent. The run concluded the test program for Montana rosebud subbituminous coal. Enough data have been obtained for use in designing a Synthane demonstration plant for western coals.

Navy Refuse-to-Energy Plants to Be Built — A solid-waste incinerator plant will be built at the Naval Air Station in Jacksonville, Florida, and a refuse incinerator plant will be built at the Naval Station in Mayport, Florida. Both plants are designed to dispose of 40 to 50 tons of solid waste per day and convert the refuse into steam. Construction of the two plants will begin in October 1977 and is expected to be completed early in 1979.

The design used in the Jacksonville plant is an advanced concept that employs packaged controlled-air incinerators with watertube waste-heat boilers. The solid waste is processed to remove glass and metals and is then burned in the packaged incinerators. The Mayport plant is designed to employ a conventional, field-erected, refractory-wall incinerator with mechanical grates and a firetube waste-heat boiler. In the Mayport design, the solid waste is not processed before it is burned in the incinerator.

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Approved:

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SITREP

ENERGY R&D

30 September 1977 Report No. 186

Interior Approves Development of Second Oil Shale Lease – The Department of the Interior (DOI) has approved the development of Tract C-a, located in the western part of Piceance Creek basin of Rio Blanco County, Colorado. The Rio Blanco oil shale project, the second in recent weeks to be approved by DOI, is being developed by Gulf Oil Corporation and Standard Oil Company (Indiana). The Occidental Petroleum Corporation and Ashland Oil Company project on Tract C-b was the first to receive approval for the resumption of development (SITREP No. 182). Rio Blanco plans to spend about $93 million on the project through 1981.

DOI suspended work on the project last year at the request of the developers, primarily because of environmental, legal, and technical problems. In December, Rio Blanco will sink a 15-foot shaft to a depth of 900 feet. After completing the required access areas and other work, workers will use explosives to break up the shale for the first retort in April 1979. The retort will be a narrow vertical cave-like structure (30 x 30 x 140 feet) in which the shale will be pyrolized to recover oil. The first burn experiment is scheduled for July 1979.

Canada Reexamines Tidal Power Project – Because oil and gas prices have escalated in the past several years, Canadian authorities are taking another look at a tidal power project proposed in 1969. The original study proposed to harness the tidal flow of the Bay of Fundy in southeastern Canada for electric power generation. At the time, however, a tidal power plant was considered uneconomical because of the availability of cheap fossil fuels. The power potential in the Bay of Fundy is immense because the difference between high and low tides is as much as 50 feet. Canadian engineers are contemplating harnessing this resource by building a dam across the tidal estuary, forcing the rising and falling waters through turbines, thus generating electric power.

Canada is now considering three potential sites. Costs may range from $1 billion for a facility that could generate 800,000 kw to $3.4 billion for a plant that could generate 2.5 million kw. A capacity of over 800,000 kw would exceed the needs of that region of Canada. A larger plant may allow export of some electric power to the United States.

Canadian officials believe that production could begin in the 1980s, but some technical problems remain to be resolved. For example, the difference between high and low tides in the Bay of Fundy is large for only 12 hours a day. Conventional backup generating equipment may therefore be necessary.

The Navy is investigating the feasibility of constructing a tidal power station at the Naval Radio Station, Cutler, Maine. The technical, environmental, and economic aspects of a tidal power station in this area are being examined.

Coal Gasification Tests Continued – The Energy Research and Development Administration (ERDA) will begin a major test of an underground coal gasification experiment near Hanna, Wyoming, about October 10. Testing of the linked vertical well technique being used in this experiment began at the ERDA Laramie Energy Research Center in March 1973. In three early experiments, the wells were spaced 60 feet apart. In this fourth and largest test, ERDA will drill three 330-foot wells, penetrating a 30-foot thick coal seam. There will be 100 feet between wells one and two, and 150 feet between wells two and three. The coal in the seam will be ignited and air will be injected to maintain the burn. The burning of a portion of the coal in the seam will supply the energy necessary to pyrolize the remaining coal, generating gas. ERDA officials expect a maximum production of 25,000 mcf of gas per day, based on the test results of the three previous experiments.

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Approved:

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SITREP

ENERGY R&D

7 October 1977 Report No. 187

U.S. Demand for Petroleum Up 6 Percent – U.S. demand for all petroleum products averaged 17.9 million bbl/day for the 4 weeks ending September 23. This represents a 6 percent increase above 1975 and 7 percent above 1973 levels, according to the Federal Energy Administration. Imports for all petroleum products for the same period averaged 8.6 million bbl/day. This is an increase of 10 percent over 1976 levels, 27 percent above 1975, and about 34 percent above 1973. Crude imports averaged 6.5 million bbl/day for the period, more than 11 percent above last year. Gasoline demand during the 4-week period averaged 7.3 million bbl/day, or a 3 percent increase from last year, and residual fuel demand increased 15 percent over 1976 with an average level of 2.9 million bbl/day. Distillate demand increased 8 percent to an average level of 2.7 million bbl/day, and demand for all other products increased 5 percent over 1976 levels to 4.8 million bbl/day.

Study Shows Zero Imports Possible by 2000 – The U.S. could meet its energy needs by 2000 without importing oil by commercializing a synthetic fuels industry to produce the equivalent of 9.8 million bbl/day of clean gaseous and liquid fuels from coal and oil shale, according to a study by the Institute of Gas Technology (IGT). IGT examined the development of domestic resources that could gradually eliminate the need for oil imports by 2000, while allowing for an increase in domestic energy consumption of 3.5 percent each year to 1985 and 2 percent a year from 1985 to 2000. To end oil imports by 2000, IGT claims that the most critical milestone would be the commercial demonstration of first- and second-generation techniques for producing high- and low-Btu gas, distillate and residual fuels, solvent refined coal, and methanol. Under the IGT plan, direct industrial use of coal for other than central power generation would be limited to 250 million tons/year (or roughly 70 percent above 1976 consumption) because of environmental, logistic, technical, and cost limitations. The plan calls for electric power generation to consume 50 percent of primary energy sources (including hydropower, solar and geothermal energy, and some oil and gas); the other 50 percent would be split equally between nuclear energy and coal. IGT's assumptions about synthetic fuels production and electric power generation imply an increase in domestic consumption of coal to more than 1 billion tons/year by 1985 and about 2.3 billion tons/year by 2000.

Developing a synthetic fuels industry would cost an estimated $242 billion in 1977 dollars, according to IGT. A substantial investment would also be necessary for the coal processing or clean-up requirements of coal fueled central power generation plants. IGT officials commented that it is apparent that such a program as suggested in the study will require massive federal assistance in terms of regulatory treatment, tax legislation, water resource allocation, and coal and oil shale leasing, and will quite possibly require direct financial involvement.

Peat May Be Important Energy Source – Recent research and development have shown that peat could be an important fuel for electric power generation through a process known as wet combustion. Techniques for gasifying peat are also being evaluated. IGT has reported that gasifying peat is both easier and less expensive than gasifying lignite or subbituminous coal. Furthermore, results of an economic analysis indicate that, at an initial estimate of $2 per million Btu, peat compares favorably with conventional energy sources.

The United States has known reserves of about 120 billion tons of peat that, if converted, would yield 1,440 quads of energy. At least 42 states have peat deposits and, with the exception of Alaska, which has about 51 percent of U.S. peat reserves, most states have no other large, indigenous energy source. According to officials of the Department of Energy (DOE), peat has several desirable qualities. It has a low sulfur content, for example, and its extraction usually improves the agricultural value of the land. On the other hand, peat is bulky and has a high water content (around 90 percent). Since it would therefore be uneconomical to transport, peat would have to be converted on site.

North Carolina and Minnesota, both of which have large peat deposits, are conducting research and development of peat as an energy source for use commercially. The North Carolina Electric Membership Corporation, which consists of 28 electric cooperatives in the state, is planning a 150 Mw electric power plant to be fueled by the direct combustion of peat harvested around the plant site. Minnesota, with the largest reserves in the lower 48 states, is studying peat gasification. The Minnesota Gas Company is working with DOE and IGT to develop a process for converting peat into pipeline-quality gas. To date laboratory results have been promising; conversion rates and methane yields have been high.

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SITREP

ENERGY R&D

14 October 1977 Report No. 188

Shale Oil Project Funded – Occidental Petroleum Corporation and the Department of Energy (DOE) have signed a cooperative agreement on a $60.5 million in-situ oil shale retorting project, according to DOE officials. Under the terms of the agreement, DOE will fund 71 percent of the cost of the two-phase, 53-month effort. The first phase of the project, which will cost an estimated $19.4 million, involves evaluation of two specific underground retort designs at Occidental's Logan Wash site in Garfield County, Colorado. In the second phase, which will cost an estimated $41.1 million, the design found superior in the first phase will be tested in a demonstration plant to determine its technical feasibility. The phase two demonstration plant, located on the Occidental-Ashland Oil federal Tract C-b in Rio Blanco County, will produce about 2,500 barrels of oil per day. In addition to demonstrating technical feasibility, DOE and Occidental hope to clarify the potential environmental hazards of modified in-situ retorting. This federally supported test is also expected to help give companies the incentive to develop a full-scale commercial program.

This award completes the series of four negotiations for the in-situ extraction of oil from western shale, which began with a program opportunity notice in February 1976. The three other awards went to Talley-Frac Corporation, Mesa, Arizona; Equity Oil Company, Salt Lake City, Utah; and Geokinetics, Inc., Concord, California.

Direct-Contact Binary-Cycle Geothermal Power System Demonstrated – A new type of geothermal power system has been demonstrated in a plant near El Centro, California. The project is being carried out by Barber Nichols Engineering and DSS Engineers, Inc., under the direction of DOE's Lawrence Berkeley Laboratory. The geothermal system being developed uses a new type of heat exchanger in a binary-cycle process. In this type of direct-contact binary-cycle process, hot geothermal brines flow downward through a cylindrical tank. The working fluid is introduced at the bottom of the tank where it absorbs heat, vaporizes, and bubbles up countercurrent to the flow of the brine. This heated gas then drives a turbine, thus producing electrical energy. The cooled brine flows out of the tank and is reinjected into the ground to be reheated. DOE plans to use the direct-contact heat exchanger concept in a 500 kw(e) pilot plant in 1978.

Navy geothermal sites may require binary cycles for production of electricity, should resource assessments dictate.

Standards to Be Set for Solar Collectors – DOE is preparing to sign a contract with the Solar Energy Industries Association to institute a testing, certification, and rating system for solar collectors. The technical project officer for the contract has stated that the 1-year, $300,000 effort will result in a handbook detailing methods for testing solar collectors, as well as certification and rating standards. The project's aim is to build on work done on standards for solar collectors by the Department of Housing and Urban Development (HUD); the American Society for Heating, Refrigeration, and Air Conditioning; and others. The results will be used for all federal government programs involving solar collectors. The standards program will be developed and implemented by a committee comprising representatives of the solar industry, consumer organizations, the American Institute of Architects Research Corporation, and the American National Standards Institute. The work of the committee will be monitored by a federal oversight committee composed of representatives from DOE, HUD, the Federal Trade Commission, the National Bureau of Standards, the National Aeronautics and Space Administration, and the Department of Defense.

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SITREP

ENERGY R&D

21 October 1977 Report No. 189

Oil Shale Accord Signed — The U.S. Navy's Energy and Natural Resources Research and Development Office (MAT-08T3) and the Oil, Gas, and Shale Technology Division of the Department of Energy (DOE) have signed an interagency agreement to conduct an oil shale research program. The principal objectives of the 60-month program are to (1) produce shale-derived military fuels in sufficient quantities for meaningful operational testing; (2) produce such fuels under commercial refining conditions; (3) accumulate data on the extraction technology, processing requirements, yield, economics, and other parameters that affect the utilization of domestic crude shale oil as a feedstock for military fuels; (4) determine the operational and hardware compatibility of shale-derived fuels in military systems; and (5) determine the extent to which current fuels and system specifications should be modified to best utilize fuels derived from crude shale feedstocks.

It is estimated that the cost to DOE for performance of the required work will not exceed $15,000,000. (DOE funds are not yet allocated under this new agreement, but should be soon.) The initial DOE funds to be provided under this agreement will be utilized in support of the ongoing joint DOD/DOE 100,000-barrel shale oil research and development project. This project involves refining and testing military fuels derived from 100,000 barrels of crude shale oil being produced at the Naval Oil Shale Reserves in Colorado (SITREP Nos. 144, 170, and 183). Under this initial project, DOE is providing technical support and R&D direction to the Navy. The Navy, as DOD's agent for synthetic fuels R&D, is serving as the contracting agency and as project director. Subsequent projects under this agreement will involve acquiring and refining crude shale oil and testing fuels derived from syncrudes produced using various technologies.

Navy Geothermal Update — DOE drilling at the Coso Geothermal Area has progressed since the exploratory drilling plans were approved (SITREP No. 174). DOE has estimated that the potential capacity of this resource may exceed 4,000 Mw of electric power. The well bore has passed through three fracture zones. The second fracture zone produced fluids at a rate of 90 barrels per hour with an estimated bottom hole temperature of 300° F. The well, now about 3,000 feet deep, is passing through a hard granite zone. It appears that the major hydrothermal reservoir has not yet been penetrated.

Work has been completed in the geothermal area at Adak, Alaska. Two heat-flow holes have been drilled and are being instrumented to measure the temperature gradient.

Gulf to Study Coal Gasification — A process for gasifying coal in seams that cannot be mined using present technology will be developed by Gulf Research and Development Company under a cost-sharing contract with DOE. DOE will contribute $12.75 million and Gulf, $1.5 million.

An estimated 100 billion tons of coal in the United States are in seams dipping so steeply that the coal cannot be mined with present technology. Gulf expects that about 25 billion tons of that coal can be burned in-situ to produce a low-Btu gas (150 Btu per cubic foot) for commercial use. The first phase of the 5-year project—selection of a site in either Colorado or Wyoming and preliminary environmental assessment—will begin immediately; site characterization and field development will start next summer. Field operation and testing will be done through 1980, with large-scale tests of the process scheduled for 1981. The final stage will be preparation of preliminary design and cost estimates for a pilot-scale project that would include surface facilities for processing the gas for commercial use.

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SOLAR ENERGY

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Vol. 3 No. 36 October 17, 1977 Page 231

SLANTS & TRENDS

SENATE FINANCE COMMITTEE'S ENERGY TAX BILL contains none of the punitive taxes that President Jimmy Carter had wanted; only the benefits were included and expanded dramatically. Most significantly, the bill would grant businesses, churches, local governments, charitable organizations and hospitals an additional 40% tax credit (in addition to the existing 10% credit) for converting a boiler to a fuel other than oil or gas. Intended primarily for coal conversions, it would apply equally to solar or a fuel from biomass. House version lacked this big an incentive. Also approved was the 30% credit for the first $2,000 and 20% on the next $8,000 spent by homeowners for solar installations, for a total possible credit of $2,200, slightly higher than the House version. Also approved was a 10% credit for equipment to convert biomass (and other substances) into fuels, for other solar equipment; and a 10% depletion allowance for equipment to change peat into fuel.

SOLAR COLLECTOR PRODUCTION CONTINUED TO RISE during the first six months of 1977, but not by quite as much as it had been climbing in the previous six months, according to the latest figures from Department of Energy. According to still incomplete analysis, SEIR has learned production rose another 50-60% over the first six months of the year to about 1.5-million sq. ft.

* * *

NOBEL PRIZE FOR PHYSICS GOES TO WORK THAT COULD LEAD TO CHEAPER SOLAR CELLS

Theoretical studies of the way electrons can be localized in disordered, amorphous materials that may lead to extraordinarily inexpensive solar cells netted three solid state physicists the Nobel Prize for Physics. Philip W. Anderson, consulting director in physical research division at Bell Telephone Laboratories and Sir Nevill Mott of Cambridge University, England, share the award with John H. Van Vleck of Harvard University, whose work was in the field of centralized magnetic moments, atomic-sized magnets that remain fixed at a particular site in a metal.

Anderson explained, "What my work consists of is classifying two kinds of situations: one in which the electrons can move freely in the whole of the irregular material and the order in which the electrons are pinned down, or localized, in one particular place." According to the Royal Swedish Academy, a 1958 paper by Anderson "has become one of the cornerstones in our understanding of, among other things, the electronic conductivity of disordered systems."

Anderson added, "People are also using my work in the field of amorphous semiconductors... If we can understand how these devices work, it will undoubtedly lead to new advances in the science of optically sensitive devices, such as solar cells." Two areas of research in amorphous semiconductors are being investigated. Chalcogenide glasses, one of the areas, contain large quantities of sulfur, selenium or tellurium, the chalcogen elements. Other area is amorphous silicon. Here, Stanford Ovshinsky, chairman of Energy Conservation Devices, Inc., Troy, Mich., created a stir in the photovoltaic field with his predictions of the availability in a few years of large sheets of solar cells with efficiencies of 10% and better for 10¢ per peak Watt or lower (SEIR, July 11, 1977, p. 147).

SOLAR ENERGY INTELLIGENCE REPORT including Solar Energy Washington Letter and Solar Energy Industry Report, is published weekly by Business Publishers, Inc., P.O. Box 1067, Silver Spring, MD 20910, (301) 587-6300. Subscription price: $50 per year $50 for six months, U.S., Canada and Mexico: $105 per year in all other countries (including air mail postage). Multiple copy rates on request to Henry E. Kleiner, Jr., Business Manager. Second class postage paid at Silver Spring, MD ©1977 Business Publishers, Inc.

HUD ANNOUNCES MAJOR CHANGES IN CYCLE FOUR RESIDENTIAL SOLAR HC DEMONSTRATIONS

Fourth cycle of the Residential Solar Demonstration Program has been announced by Department of Housing and Urban Development, and several key changes have been made in the integrated projects' submission criteria to be published next month. As with previous cycles, applicants will have about eight weeks to submit applications, which will be due in mid-January. Awards of about $8-million total probably will be announced in mid-March.

Solar grants will: (1) be made only for systems in compliance with HUD Minimum Property Standards Supplement; Solar Heating and Domestic Hot Water Systems (SEIR, Sept. 26, 1977, p. 218); (2) be made only for residential units representative of the major portion of the market; (3) be limited to $250,000 for any individual project; (4) be evaluated according to their achievement of significant reductions in cost per million Btu used in first year of system operation over the $300/million-Btu level used as cutoff in Cycle Three; (5) be limited in private rental housing applications to 60% of the solar package cost in projects not individually metered; (6) be made to public housing projects only if they have been presold so that participants shall have been pre-identified and a firm fixed-price shall have been established; (7) be made for single-family retrofit projects only if these are part of a larger redevelopment or rehabilitation plan; and (8) continue to pay the difference in cost between a residential unit with solar and an equivalent unit with a conventional system.

Grants will not: (a) be made for single-family domestic hot water systems; (b) be encouraged from previous cycle grantees; (c) be made to individuals for their private homes; (d) be made to builders or developers of for-sale projects that have been pre-sold; or (d) permit changes unless requested by HUD.

For information, contact: HUD Solar, Rm. 8158, HUD, Washington, D.C. 20410.

* * *

SOLAR RETAIL, CATALOG STORES STARTING UP AROUND COUNTRY, BUT NOT WITHOUT TROUBLES

Solar retail and catalog sales stores, which began opening in significant numbers around the country only in the last few years, have been trying to gain a niche in the market without having to be closely affiliated with a manufacturer. Most are new enterprises, but some such companies have been in business for decades and only recently have added solar products to their stock.

Some stores reportedly are in trouble. Partnerships have been strained at the Solar Store, Inc., Mastic, N.Y., but although their telephone has been disconnected, the company is trying to continue to conduct business. Washington, D.C.'s Sky Is Falling also has had its troubles and may not survive. However, Sky continues to get numerous inquiries and is busily filling orders. Neither stores' manager could be reached for comment.

Federal grants program to homeowners for purchase of solar equipment has been the "Midas touch in reverse" for Don Kent Solar Heating Supply Co. in Weymouth, Mass., store manager Marilyn Strauss told SEIR. Solar retailers in the Northeast cannot sell or even take deposits from recipients for HUD's $400 solar grants, Strauss said, until a list of approved systems, expected in January, is released. Strauss said the store has had to expand and rely on sales from insulation and wood stoves although HUD grant recipients come to the store to look at solar equipment.

But for many solar suppliers, sales have increased dramatically. Solar Usage Now, Inc., located in a solar-heated warehouse-store complex in Bascom, Ohio, is one example of a solar success story. Co-founders Joe Deahl and Jim Van Valkenburg started in 1973 with a thin catalog of solar products, but sold mostly books and novelty items. In fact, 90% of their sales were of "gimmicky" solar products.

Not so today, says Deahl. Business has steadily increased since the beginning of this year. They are now selling a 60:30 ratio of novelty items to serious solar apparatus. SUN, Inc., is now producing a 176-page catalog, sporting products with buyers from Maine to Florida to Colorado. Deahl says he cannot attribute the jump in business directly to recent tax incentives proposed by the Carter Administration. Rather, he said, good weather and long weekends have more to do with sales than anything else.

(Continued on following page)

SOLAR RETAILERS AND CATALOG-SALES OUTFITS GAINING ENTRY INTO MARKET (Cont.)

It was very tough at first, Deahl said. "We never went to a bank for a loan, mainly because they would have thought the idea was too ridiculous." Although the company is now grossing over $40,000 per month, Deahl claims there are still times when he doubts the stability of the solar business.

Deahl said the firm is planning to establish retail outlets throughout the country and is setting up six stores in New England. SUN will act as product supplier for the stores, but will not require that it be the stores' only supplier. SUN only will ask that the new entrepreneur purchase a minimum of 500 SUN catalogs. From there, all the retailer must do is pay SUN 5-10% of its profits.

Deahl and Van Valkenberg hope to market SUN's concept nationwide, and perhaps someday, internationally; they feel that solar is definitely on the way up. "People are finally realizing that these things really do work," Deahl said.

A-Z Solar Products, Minneapolis, Minn., is another catalog-sales solar company whose financial position is "definitely improving," spokeswoman Lee Tilton told SEIR. Their new catalog will have goods from 75 retailers, about half of them additions since the last catalog but all of them companies that contacted A-Z on their own. Perhaps in the future, Tilton said, A-Z will seek out suppliers.

Majority of the sales remain in "demonstrator" goods like reflective materials and in books. But some of the better-selling items include an outdoor solar grill for $45 and a solar cigarette lighter for $1.98. Collector components are among the slowest-selling items, she said.

Edmund Scientific, Sunspot Solar Products

Edmund Scientific Co., Barrington, N.J., is another catalog-sales outfit, but it also carries a wide variety of medical, astronomical, weather, optical and photographic equipment. In operation since 1942, it has carried solar energy-related products for several years.

Until recently, it sold Solaris collectors, built by Harry Thomason. However, by mutual agreement that left "nobody unhappy," marketing official Bob Gallagher told SEIR, that was dropped. Thomason's books and design plans remain a big seller. Other popular solar items include photovoltaic panels made by Solarex Corp., fresnel lenses, costing up to $3,000, solar cookers, reflectors and windmills.

Gallagher described the solar catalog-sales market as one of "slow growth, but I think it is a healthy growth. Sales also are up in Edmund's telescopes and other optics equipment as well as their highly popular magnets.

After a full year of operation, Sunspot Solar Products, Inc., in Carrboro, N.C., is doing well for a small Southern business, co-owner Mary Jane Meeker told SEIR. Sunspot's best sales are in wood stoves and solar domestic hot water systems, Meeker said; and the first four months of this fiscal year have seen dramatic sales compared to last year's total, she noted.

Last year, Sunspot sold 50 Jotul cast-iron wood stoves, costing $260-$850, but the firm has sold about 45 stoves since July, Meeker said. Sunspot only installed six residential domestic hot water systems and one domestic space heating system last year, according to Meeker, who noted that the $5,000-8,000 price range might be a major deterrent. Department of Housing and Urban Development's $400 residential solar grants for homeowners only went to Northeastern states, Meeker added.

Sunspot is contracting with three participants of HUD's solar grant program for new residences. Meeker commented that she thinks the program is having trouble because of industry rather than from government, noting that she only expects one of the projects to get off the ground because of financing problems. Sunspot probably will be installing the systems in a three-unit apartment complex planned by one of the HUD participants, Meeker said.

Meanwhile, other solar stores are getting noticed. Friends of the Sun, Brattleboro, Vt., conducts teachings on solar energy for homeowners; Solar Center, San Francisco, Calif., specializes in design, installation and equipment sales; and Home Energy Center, Inc., Needham, Mass., carries energy conservation products and rents its offices out to architects and engineers specializing in alternative energy. And another store has opened in Columbia, Md., which offers a variety of solar goods and publications.

BRITISH ENERGY FUTURE PREVIEWED; ROLE FOR TIDAL, SOLAR, WIND ENERGY

In an evaluation of potential contributions from alternative energy forms, British Undersecretary of Energy Alexander Eadie says solar, tidal and wind energy could provide the United Kingdom the energy equivalent of 40-million tons of coal, or 12% of current yearly energy consumption by the turn of the century. Eadie indicates that the largest contribution could come from tidal power.

Main use of solar energy in the short and medium term in U.K. is in providing low-grade heat for space and water heating, Eadie said. Therefore, initial thrust of national solar research is in improving the cost-effectiveness of solar panels and systems, and in getting detailed insulation data for urban areas, he noted.

In the longer term, Eadie said, bioconversion may be a major means of harnessing energy. Initial research in this area is directed toward learning whether sufficient land can be set aside for growth of energy crops, Eadie said. Also, application of photovoltaic technology in the U.K. is seen to be mainly in instrumentation and associated fields, rather than for large-scale power production, according to Eadie.

As for wind energy, Eadie said the total contribution from this source would be relatively small because the number of suitable hill sites is limited. However, Britain has one of the most suitable sites in the world for use of tidal power in the Severn Estuary, Eadie said. Trial tests are scheduled for this fall on scale models of a raft-type wave extraction device, the Cockerell raft, and a van-type device, the Salter Duck (SEIR, Dec. 20, 1976, p. 208).

Indicating economic contributions by year 2000 from alternative energy sources are likely to be low, Eadie said much will depend on the rate at which technologies can be introduced, as well as costs of conventional energy.

* * *

ELSEWHERE IN THE NEWS

ALABAMA -- Southern Railway Co. has installed solar devices to power crossing signals in Jackson, Ala. Railroad officials say solar units have demonstrated the cost savings possible in remote locations where AC power is too expensive. Company is now studying more uses for solar including powering remote microwave relay stations.

DENMARK -- International Energy Agency has said this nation is probably doing the best all around job of any of the industrialized nations in cutting energy waste. Nine experimental houses in Skive, which use solar and wind energy, are a good example of the emphasis on conservation. Wind turbine designer Torben Esbensen acknowledges that few people would want to live in houses with windmills on top, but he thinks the experiment could lead to development of a community windmill producing hot water to heat about 30 homes.

ISRAEL -- Technion Faculty of Mechanical Engineering in Haifa has developed a new system for collecting solar energy for domestic space heating and cooling and hot water. System represents major advance in solar technology because it can heat water to a temperature of 200°C. System, based on a stationary concave reflector fitted with a mobile absorber, uses a fixed mirror bowl, covered with reflecting aluminum sheets and has a small tracking absorber. Gershon Grossman of Technion worked with Frank Kreith of University of Colorado.

JAPAN -- Government has announced plans to participate in three International Energy Agency cooperative research agreements concerning development of solar energy systems for heating and cooling. Japan will join projects to study overall heat efficiency, durability and other aspects of solar heating and cooling systems; to study individual performances of different systems; and to test the heat collecting panels. Meanwhile, National Ministry of International Trade & Industry plans to create a Solar System Industrial Affairs Committee to study domestic demand and ways and means of popularizing solar systems and also to check comparable systems abroad.

NETHERLANDS -- Dutch researchers are experimenting with wind turbines as one of many alternative energy forms it hopes can replace dwindling natural gas supplies, expected to run out by about year 2000. However, windmills are provoking criticism from environmentalists who note difficulties with using them on a large scale. Windmills create large demands for land, and about 500 of them would be needed to replace one electric power plant, one government official complained.

NOAA RESEARCHERS TO TEST EFFECT OF CLOUDS, AEROSOLS ON SOLAR RADIATION

Systematic measurement readings to determine the effect that clouds and aerosols have on incoming solar radiation will be undertaken by National Oceanic and Atmospheric Administration this year, the agency has announced. NOAA researchers plan to take mobile laboratories to four western locations to measure solar radiation and certain optical effects of clouds and aerosols that could affect the amount of sunlight reaching the earth.

NOAA said the goal of the scientists is to establish a computer model with which the amount of sunlight reaching a given site could be calculated from weather data. "Such a model would also enable solar engineers to predict the effects of increases in pollution," NOAA said, "or a change in climate at a proposed solar-power plant site."

Coordinated by NOAA's Wave Propagation Laboratory, work will focus on Colstrip, Mont.; Boulder and South Park, Colo.; and Point Mugu, Calif. Sites were selected to represent a wide variety of geographical areas and climate types within the U.S. NOAA said testing will continue next year at several different sites. Study is funded by Department of Energy and Environmental Protection Agency.

* * *

OTHER BUSINESS AND TECHNOLOGY NEWS

American Heliothermal Corp., Denver, Colo., has released operating results for its first full fiscal year, ended June 30, 1977. Sales increased to more than 600% of those of the previous year, while the reported net loss totaled $136,500 on revenues of $811,000 or 0.01 per share of common stock. President Bill Phillips termed the results as "greatly encouraging," and attributed much of the firm's improved financial position to its success in securing Federal grants for solar installations. In the firm's start-up year, there was a net loss of $88,500 on revenues of $134,000.

Friends of the Earth consulting engineer Amory Lovins told a group of petroleum engineers last week the U.S. is at the crossroads between developing traditional energy sources, such as coal and nuclear, and research into the renewable energy sources, including solar, wind and geothermal power. Lovins said that replacing oil and natural gas with coal and nuclear power, instead of switching to the "soft" energy sources, will cause more problems than it will solve.

National Aeronautics and Space Administration's Lewis Research Center, in cooperation with National Weather Service and Department of Energy, will install six new solar-cell-powered weather stations to improve weather forecasting and storm predictability. First in a series of 38 new automatic weather stations developed by National Weather Service, the six stations will be located at Clines Corner, N.M.; Loggerhead Key, Fla.; Halfway Rock, Me.; South Point, Hawaii; Point Retreat, Ala.; and Stratford Shoals, N.Y. NASA said the solar-cell-powered units require no fuel or periodic maintenance, and are designed to operate uninterrupted for years in remote locations. In addition, said Louis Rosenblum, chief of the Solar and Electrochemistry Division at NASA-Lewis, the systems should prove to be half as expensive as thermo-electric generators. Designated as Remote Automatic Meteorological Observing System (RAMOS), each station will report temperature, dewpoint, wind speed and direction, barometric pressure and hourly precipitation readings to forecast offices via radio, satellite or telephone. System design for RAMOS was provided by NASA-Lewis under DOE's Photovoltaic Energy Conversion Program.

Wyle Laboratories, El Segundo, Calif., has been awarded $253,860, under former Energy Research and Development Administration programs, to supply research and engineering services in the development of performance standards and test procedures for solar heating and cooling equipment.

Neiman-Marcus Co., Dallas, Tex., has added "his and her" windmills to its chic gifts for the well-to-do. "In an area with average wind velocity of 12 mph (Boston, for example), her windmill would generate more than enough wattage to brew her morning coffee, Benedict an egg, heat her hair rollers, soothe her psyche with stereo, and give her bronze beauty while she relaxes under the sun lamp," the catalogue explains. According to the catalogue, the "his" windmill provides energy for more masculine activities. Store vice president Richard Marcus said, "I don't know how we plan to show them." Catalogue comes with no windmill pictures. "But they exist for real." He admitted, though, that items not displayed usually do not sell well.

GRANTS AND CONTRACTS

Department of Energy (through former Energy Research and Development Administration programs) has awarded Franklin Institute of State of Pennsylvania, Philadelphia, Pa., $39,000 for self-controlling, self-pumping heat circulation system study; Solar Control Corp., Boulder, Colo., $91,476 for development of a novel controller; University of Waterloo, Waterloo, Ontario, Canada, $59,495 for methods of reducing heat losses from flat plate solar collectors; San Diego Unified School District, San Diego, Calif., $392,740 for integrated solar heating, cooling system for University City High School;

DOE (under former ERDA programs) has also awarded Princeton University, Princeton, N.J., $134,125 for development and applications of photosensitive device mechanisms to biological observations; Kaman Sciences Corp., Colorado Springs, Colo., $120,000 for complete development of potentially marketable solar-assisted optimized heat pump system for new or retrofitted residential and commercial buildings in seven common nominal sizes; Carnegie Mellon University, Pittsburgh, Pa., $45,000 for foam sea solar power plant; Massachusetts Institute of Technology, Lexington, Mass., $1,282,900 for planning and analysis for development of photovoltaic energy conversion systems, and MIT, Cambridge, $73,100 for design methodologies for energy conservation and passive heating of buildings utilizing improved building components; Minnesota Mining and Manufacturing Co., St. Paul, Minn., $176,270 for thermoelectric materials evaluation program.

Department of Housing and Urban Development has awarded American Institute of Architects Research Corp., Washington, D.C., $407,380 for general consultation and technical evaluation services for solar energy systems.

* * *

CALL FOR BIDS AND PROPOSALS

Investigation of Wind-Powered Hydrogen Generating System: Interested firms are invited to submit qualifications and experience by Oct. 29. Information furnished should reference CFM/78-60011. For technical information, contact: Capt. Strother (CEEDO) Hq ADTC/CNF, Tyndall AFB, Fla. 32403, (904) 283-4114. For contractual information, contact: Lt. Minter, R&D Contracts Directorate, ADTC/PPR, Eglin AFB, Fla. 32542, (904) 882-2871. This is not a request for proposals.

Preparation of a Study To Determine the Feasibility Study of Using Solar Energy for the Proposed 2400 Man USAR Center, to be constructed at Fort Totten, N.Y.: Study will include determination of five separate life-cycle cost studies in order to assess the cost-effectiveness of conventional heating and cooling systems and solar energy heating and cooling systems using standard flat plate collectors and medium-temperature, high-efficiency collectors. Also, solar energy heating systems using standard flat plate collectors, and medium-temperature high efficiency collectors. Requirements include technical capability, mechanical engineering, special qualifications, experience in designing feasibility studies and design of solar energy systems. This will be a firm fixed-price contract, beginning Nov. 1, 1977, and ending Dec. 16, 1977. Architect-engineering firms should submit a SF 255 by Oct. 22. Other interested parties must submit two copies of SF 254 along with the SF 255. Contact: U.S. Army Engineer District, New York, 28 Federal Plaza, New York, N.Y. 10007.

Highway Applications of Alternative Energy Sources: Department of Transportation is seeking to determine the potential of various alternative energy sources for application to highway facilities and to develop a guide to highway applications of alternative energy sources for highway engineers. Request for proposals will be issued on or about Oct. 19 and due Dec. 1. Requests for copies must be received by Nov. 14. Contact: DOT, Federal Highway Administration, Office of Contracts and Procurement, Washington, D.C. 20590.

Roof-Mounted Solar Collectors: U.S. Army Engineers, New York District, is looking for an architectural, mechanical or engineering firm to design roof-mounted collectors to include plumbing controls and fan coil units for a warehouse having a gross area of 85,624 sq. ft. Estimated construction cost of the structure, to be built at Fort Devens, Mass., ranges from $100,000 to $500,000. Prior experience with the design of solar heating systems is desirable. Contact: U.S. Army Engineer District, New York, 28 Federal Plaza, New York, N.Y. 10007, or phone (212) 264-9010.

nsf SCIENCE RESOURCES STUDIES HIGHLIGHTS

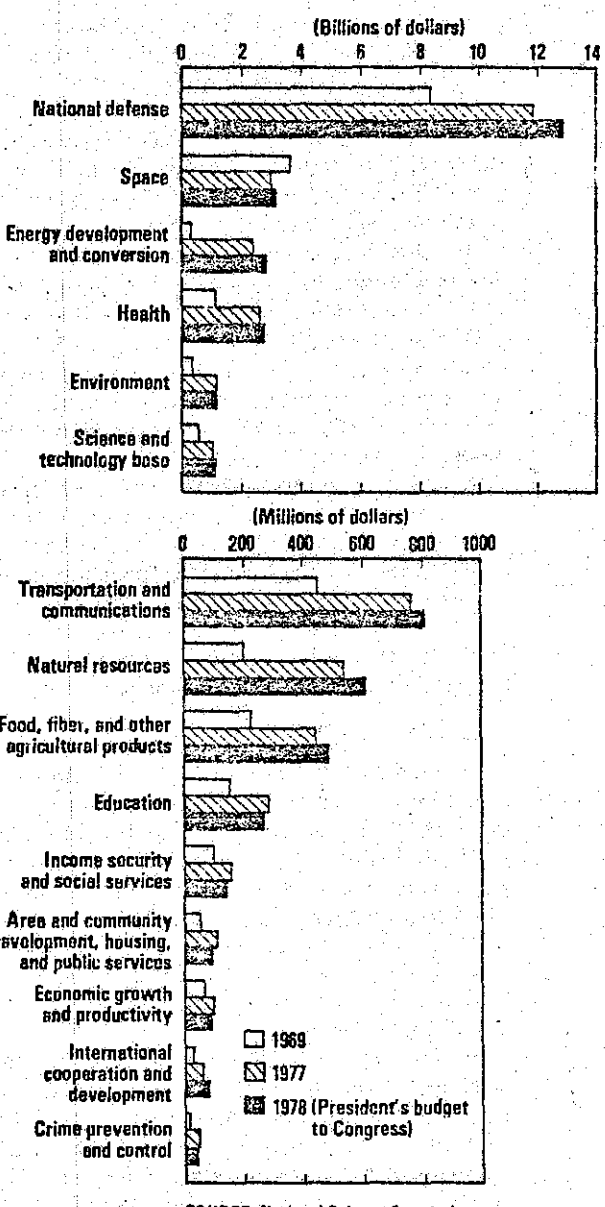
NATIONAL SCIENCE FOUNDATION • WASHINGTON, D. C. 20550 • SEPTEMBER 30, 1977 • NSF 77-320

Defense and Energy Spur Federal R&D Growth From FY 1974 to FY 1978

Data discussed below are taken from a forthcoming report, An Analysis of Federal R&D Funding by Function, Fiscal Years 1969-1978. *The 15 functional categories were chosen to make visible the chief objectives reflected by R&D programs in the 1978 budget. Data are additive to 100 percent, and thus each program can appear only under the function that embraces its primary purpose and not under functions that relate to secondary purposes.*

- In fiscal year 1978 Federal R&D obligations will amount to an estimated $26.3 billion, a figure 7.6 percent above 1977 but only a slight increase in real terms, assuming a 6-percent rate of inflation.
- Federal R&D funding grew so slightly between 1969[1] and 1974 that it represented a decline in real terms, but between 1974 and 1978 the annual average growth rate is 10.9 percent, or an increase of 3.4 percent in constant dollars.
- Between 1974 and 1978 most of the expansion (92 percent) has been generated by gains in six leading functional areas, especially those of defense and energy.
- In 1978 energy development and conversion is expected to grow by 17 percent over 1977, more than any major function. Science and technology base will increase an estimated 11 percent, and defense, an estimated 8 percent. Each of these functions probably will show a gain in real performance, assuming a 6-percent inflation rate for the whole economy.
- The other three leading functions—space, health, and environment—all will probably reflect declines in the real level of effort.
- Of the next three largest R&D functions transportation and communications is also scheduled for an apparent 1978 decline in real terms, whereas natural resources and food, fiber, and other agricultural products appear to be scheduled for real increases following a recent period of significant growth.

Federal R&D obligations by function, FY 1969, 1977 (est.) and 1978 (est.)



SOURCE: National Science Foundation

[1] Data on R&D funding by function are available for prior years only back to 1969. Accurate detail for earlier years is not available.

(Prepared in the Government Studies Group, Division of Science Resources Studies)

- Between 1969 and 1978 an outstanding feature of Federal R&D support has been the sharp rise in emphasis on civilian R&D programs as compared with defense and space. In recent years, however, defense funding has grown, especially after 1974, and although space programs declined from 1969 to 1974, a moderate rise has been recorded in the years since then.

Factors in Funding Changes

From 1974 to 1978 an estimated $8.9 billion has been added to the Federal R&D total, and most of the impetus to growth has come from national defense and energy, which account, respectively, for 44 percent and 25 percent of the total gain. In the 1972 budget, administration policy was focused on higher defense spending, following a 3-year period of no growth. This policy was subsequently reflected in defense totals, especially after 1974. The effect on defense R&D efforts was somewhat delayed; after significant growth in 1972, R&D support did not rise importantly until 1975 but has continued in a positive upward trend since then.

Growing concern about a national shortage of energy was heightened by the Arab oil embargo in the fall of 1973. The Federal response was to increase energy R&D programs sharply. Between 1974 and 1978 R&D funding for energy increased more than 4½ times, far more than for any other function. The energy function is now the third most heavily funded area after national defense and space.

In the same period, 1974-78, funding for space has contributed 7 percent of the increase in Federal R&D obligations. With the phasing out of the Apollo program by 1973, the space shuttle became the chief focus of space support. Not until 1975, however, did the increases in funding for the space shuttle produce a rise in obligations for the total space function, a rise that has continued each year since that time. Even so, funding in 1978 is lower than in 1969.

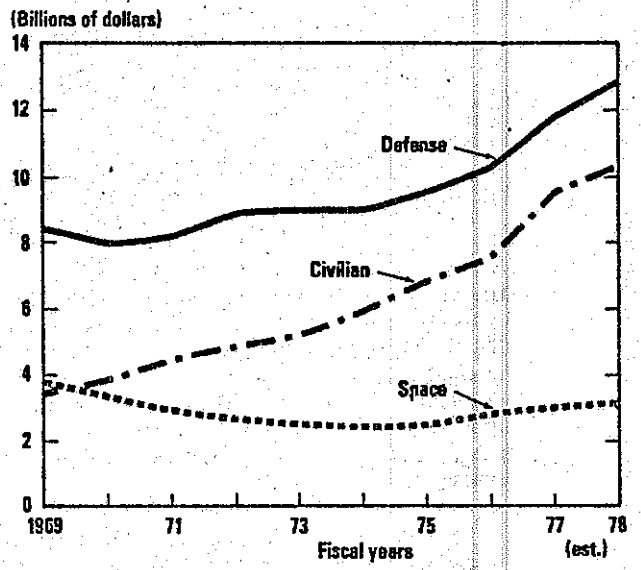
Health has also accounted for 7 percent of the 1974-78 Federal R&D gain. A Presidential policy decision in 1972 added impetus to growing support to cancer research, which continued to rise every year thereafter. Additional emphasis was placed on heart and lung research in 1974 with increases in most subsequent years. More recently other areas of biomedical research have gained importantly: arthritis; metabolism and digestive diseases; allergy and infectious diseases; general medical sciences; child health and human development; and environmental health sciences.

Environmental R&D support in the 1974-78 period, which makes up 5 percent of the overall Federal growth, covers a large number of program areas. The most notable of these are energy-related programs, a group of environmental data and monitoring programs, and programs in occupational safety and health. Recent emphasis is on earthquake engineering and prediction.

Funding for science and technology base has risen significantly in the 1974-78 period and accounts for 4 percent of the increase. Chief gains for this function have been shown by high-energy physics and by research project support for a number of science disciplines. The 1978 rise reflects a Presidential policy decision to support basic research at a level 3 percent ahead of inflation.

Other functional areas that have contributed to overall Federal R&D growth in the 1974-78 period are natural resources, 3 percent of the total; food, fiber, and other agricultural products, 2 percent; and transportation and communications, 1 percent.

Trends in Federal obligations for defense, space, and civilian R&D programs: FY 1969-78



SOURCE: National Science Foundation

R&D Programs by Function

- Growth for **national defense** in 1978 is strong, accounting for more than one-half the Federal R&D dollar gain over 1977. Defense has also accounted for approximately one-half of all Federal R&D support in the 1969-78 period. The share of this function, however, has dropped since 1972 when it reached a high of 54 percent; the estimated share in 1978 is 49 percent.

The leading area, *tactical programs*, accounts for one-third of all defense R&D support in 1978. This area is scheduled to grow by 17 percent in the current budget to a level of $4.4 billion. In air warfare systems, work will go forward on the Air Force F-16 and Navy F-18 fighter aircraft and accompanying air-to-air missiles. Development will continue on V/STOL (vertical short takeoff and landing) technology. In land warfare, major developments include the Army XM-1 tank, the Advanced Attack Helicopter (AAH), and the Patriot (SAM-D) air defense system. In ocean control, the major development effort is the LAMPS antisubmarine warfare helicopter.

Strategic programs are next in size, and these are scheduled to total $2.3 billion in 1978, the same level as the previous year. A major development effort is planned for the Navy Trident sea-launched ballistic missile system.

Federal R&D obligations by function:[1] fiscal years 1969-78
(Dollars in millions)

Function	1969	1970	1971	1972	1973	1974	1975	1976	Estimated 1977	Estimated 1978
Total	$15,641	$15,340	$15,545	$16,498	$16,800	$17,415	$19,013	$20,759	$24,465	$26,317
National Defense	8,354	7,976	8,106	8,878	8,998	8,975	9,621	10,346	11,917	12,907
Space	3,732	3,510	2,893	2,714	2,601	2,478	2,511	2,863	2,972	3,140
Energy development and conversion[2]	328	317	324	383	442	605	1,110	1,388	2,390	2,798
Health	1,127	1,126	1,338	1,589	1,624	2,096	2,177	2,366	2,622	2,683
Environment	315	354	465	533	651	693	837	899	1,107	1,098
Science and technology base	513	525	524	601	605	695	782	839	953	1,060
Transportation and communications	458	590	779	615	630	703	641	636	769	805
Natural resources	201	238	326	354	341	341	445	489	547	610
Food, fiber, and other agricultural products	225	241	247	291	297	291	349	388	444	488
Education	155	147	186	191	214	173	149	142	284	269
Income security and social services	97	106	128	125	157	134	148	133	156	148
Area and community development, housing, and public services	49	91	89	87	97	96	102	104	111	99
Economic growth and productivity	56	80	99	63	75	72	67	84	98	97
International cooperation and development	27	32	32	29	33	27	30	45	53	71
Crime prevention and control	5	9	10	25	35	36	46	36	49	44

[1] R&D plant excluded.

[2] The inclusion of R&D plant obligations for energy would add $267 million in 1976, $509 million in 1977, and $552 million in 1978.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation.

Another is planned for the Air Force B-1 bomber (procurement of which has been discontinued by the President while development goes forward). Full-scale development will begin on the Air Force M-X intercontinental ballistic missile. Two cruise missiles—one Navy, one Army—will continue in full-scale development.

Technology base reflects planned growth of 10 percent to the $1.9 billion level in 1978. This is in line with a DOD policy initiated in the 1976 budget to reverse a real long-term decline.

Intelligence and communications is scheduled for an 11-percent rise to $1.2 billion to cover improvements in capabilities in this area.

Advanced technology development will show an estimated 6-percent increase.

Defense-related atomic energy programs, entirely conducted by ERDA, are scheduled to increase 7 percent in 1978.

• In 1978 the increase in funds directed to **space** is not great enough to reverse the downward trend in the share of this function in the Federal R&D total. In 1969 the share was 24 percent, but in 1978 it is an estimated 12 percent. Space is the only function to show lower funding in 1978 than in 1969.

The largest program is the NASA space shuttle, on which development will continue. Another program within *manned space flight* is space transportation system (STS) operations capability development scheduled for a fivefold increase in 1978. Under *space sciences* large relative increases are planned for physics and astronomy, including the start of development by NASA of a 2.4-meter space telescope. A Jupiter orbiter/probe will also be initiated in 1978.

• Gains in **energy development and conversion** have been unprecedentedly high for a major function ever since 1974. From 1969-74 the average annual growth rate for this function was 13.0 percent; from 1974-78 an estimated 47 percent. In 1978 the dollar gain will account for more than one-fifth of the total Federal R&D dollar increase. As a share of Federal R&D programs those in energy have grown from 2 percent in 1969 to an estimated 11 percent in 1978.

In 1978 *nuclear* programs make up more than one-half of the energy total. As a group they are scheduled for a 15-percent increase. Among them considerable growth is shown for ERDA fuel cycle R&D, NRC reactor safety research, and ERDA laser and magnetic fusion programs, but obligations for the ERDA liquid metal fast breeder reactor are down.

Nonnuclear programs as a whole reflect a 19-percent increase. Among these *fossil* energy shows no growth because of lower emphasis on the ERDA coal utilization program, but ERDA *solar* energy development shows a rise of 9 percent and ERDA *geothermal* energy development a rise of 60 percent. *Conservation* programs are scheduled for an 88-percent increase. Chief among these is work by ERDA on end-use conservation.

• In 1978 the growth for **health** R&D programs is so slight (2 percent) as to reflect a decline in the real level of effort. Obligations for 1977 were high because of the effects of a congressional override of the President's veto of the 1976 HEW appropriation midway in the fiscal year; this caused an increase in obligations that continued into fiscal year 1977. Over the longer term, funds in the health area have grown substantially; the average annual growth rate from 1969-78 is 10.1 percent compared with 6.0 percent for all Federal R&D programs. The share of health in the total has risen from 7 percent in 1969 to an estimated 10 percent in 1978.

Biomedical research accounts for 9 out of 10 health dollars. A gain of 3 percent is shown for this subfunction.

Most work is carried out by the National Institutes of Health (HEW). Institute programs showing real growth in 1978 are general medical sciences, allergy and infectious diseases, aging, and environmental health sciences.

• **Environment** reveals a slight decrease in 1978 as a total area. Until 1978, however, this function has shown very strong growth: between 1969-74 an average annual growth rate of 17.1 percent and between 1974-78 a comparable rate of 12.2 percent. The share of environment in the Federal R&D total is 4 percent in 1978 against 2 percent in 1969.

Environmental health and safety is sheduled for a 5-percent rise, chiefly influenced by ERDA's environmental R&D efforts. *Pollution control and environmental protection* will receive a decrease (of 9 percent) for the first time, largely resulting from declines in EPA water quality and energy-related environmental control programs, which were not offset by a large increase in ERDA nuclear materials security efforts. A 4-percent rise in *understanding, describing, and predicting the environment* is influenced by the large expansion of Interior mapping of earthquake geologic hazards and NSF earthquake engineering programs.

• **Science and technology base** maintained fairly level funding until 1974 when significant increases began to be shown. In 1978 the rise is an estimated 11 percent. From 1969-74 average annual growth of 6.2 percent was recorded; from 1974-78, the growth is 11.1 percent. The share within the Federal R&D total has grown from 3 percent in 1969 to 4 percent in 1978.

The largest individual programs within this function—high-energy physics (ERDA) and basic energy sciences (ERDA)—both reflect substantial increases in 1978 as do a number of research support programs of NSF, notably those in materials, physiology, cellular and molecular biology, and behavioral and neural sciences.

• **Transportation and communications** is expected to gain by 5 percent in 1978, a decline in real performance overall. This function has grown during the 1969-78 period at 6.5 percent on an average annual basis about the same rate as Federal R&D obligations as a whole. A 3-percent share of total was shown in 1969, the same as is estimated for 1978.

• **Natural resources** is scheduled for 12-percent growth in 1978. This function has shown such important gains over the long-term (1969-78) period that the average annual growth rate is 13.1 percent, more than twice that of total Federal R&D funding. The share of natural resources within the Federal R&D total in 1978 is an estimated 2 percent.

• The **food, fiber, and other agricultural products** function grew slowly between 1969 and 1974 but much more rapidly thereafter: an average annual growth rate of 5.3 percent for the earlier period compared with 13.8 percent in 1974-78. The share of this function in the Federal R&D total in 1978 is 2 percent.

The 10-percent rise in the food function in 1978 is mainly directed to research by USDA on animal and plant production, including the initiation of a 5-year program of competitive research grants.

• Six functions—*education; income security and social services; area and community development, housing, and public services; economic growth and productivity; international cooperation and development;* and *crime prevention and control*—together will account for an estimated 2.9 percent of all Federal R&D obligations in 1978.

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