

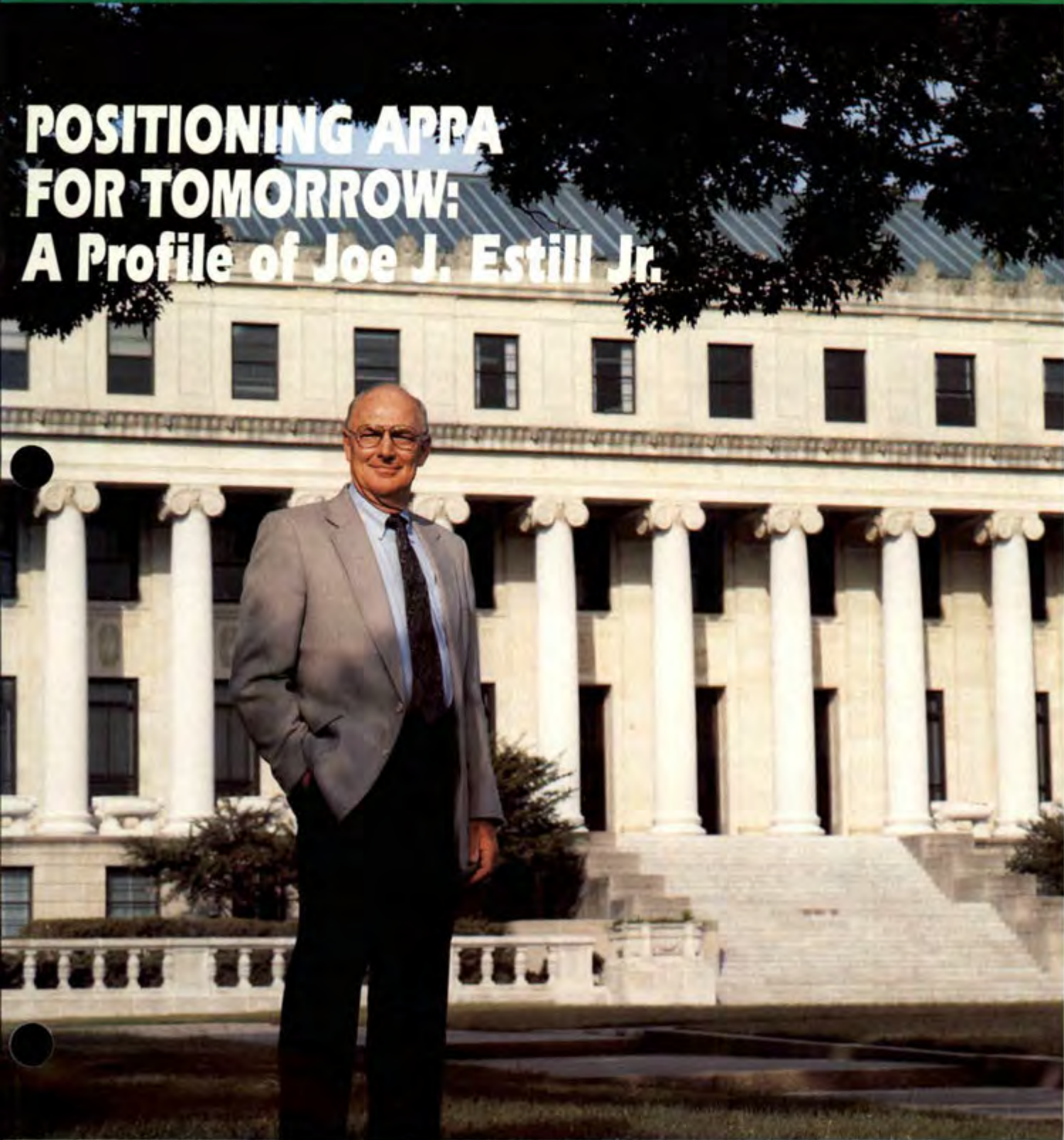
The official
publication of APPA:
The Association of
Higher Education
Facilities Officers

Facilities Manager

Volume 7 Number 4

Fall 1991

POSITIONING APPA FOR TOMORROW: A Profile of Joe J. Estill Jr.





ASBESTOS IN THE WORKPLACE: *Managing Small-Scale Abatement*

Asbestos in the Workplace: Managing Small-Scale Abatement, developed by the University of Georgia Physical Plant Division and published by APPA, provides a comprehensive set of asbestos abatement guidelines covering specific procedures, training requirements, worker protection, identification of asbestos-containing material, project planning, waste disposal, and responses to release episodes.

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Public Facilities
Officers

Facilities Manager

Volume 7
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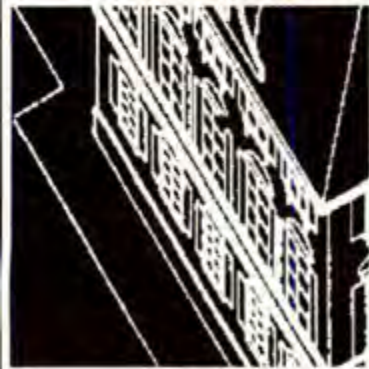
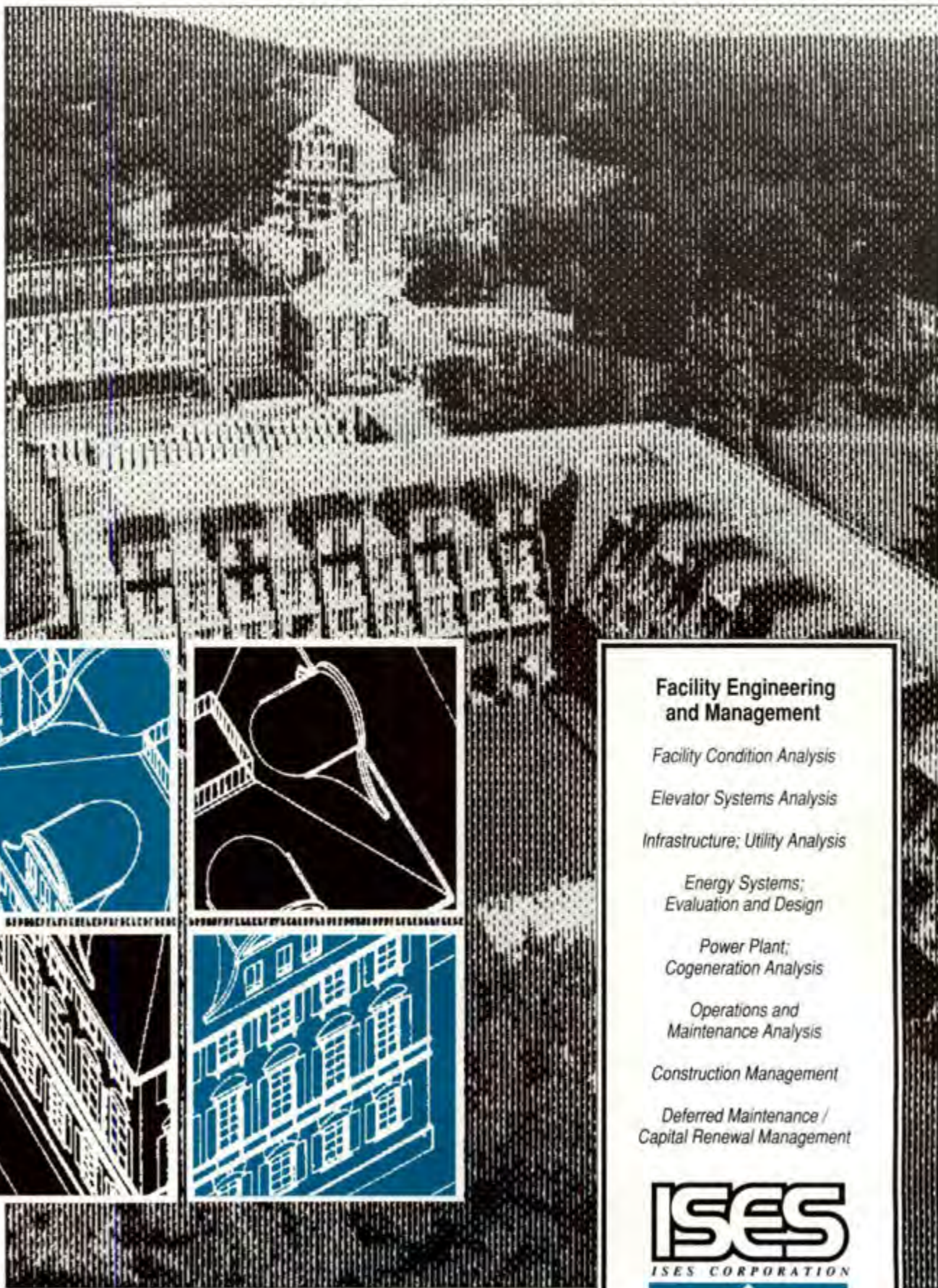
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From the Vice President for Professional Affairs

by Charles W. Jenkins
St. Mary's University

Writing in the Winter 1987 issue of this magazine, then Vice President for Professional Affairs Phil Rector announced the creation of the APPA Award for Excellence in Facilities Management. The purpose of the award, he wrote, was "to increase the recognition of professional achievement of the APPA membership." He told of the debate among his committee members as to how best to formulate the program and manage the award. At times, he said, it seemed that the whole project would be scuttled by the differences of opinion. "But," wrote Rector, "the goal was too compelling to be so easily tossed aside."

That was four years and four Awards for Excellence ago. After an enthusiastic response the first year, participation in the program steadily declined, as interest among our members waned and criticism of the program mounted. But, the purpose is still worthwhile and the goal is just as compelling as it was in 1987. For those reasons, the current Professional Affairs Committee has worked diligently over the past year to address the shortcomings perceived in the original program. You can find the complete results of our labor on pages 40-41 in this magazine. Let me speak to several of the criticisms of the program I've heard most frequently.

"Preparing a nomination package is too resource-intensive. Besides, the schools with lots of money to spend on

APPA News

slick graphic presentations have an advantage." Slick graphics were never a consideration in the selection of the award. And now, all you need to apply is written narrative, of a length that makes you comfortable, in which you enumerate the programs and accomplishments in each of the checklist areas that make your departmental management excellent. An APPA representative will come around to see the real thing. Isn't that better than pretty pictures anyway?

"Regional competition is divisive and probably unfair. The second best school in our region may very well be better than the best in another region." No more competition between institutions or regions. You only compete against the checklist. You may be, in fact, better than university X, but if you convince both the Professional Affairs Committee and the evaluator that you're excellent, you both get the award.

"The application period falls at an inconvenient time." No more annual cycle. Submit your nominating package at your leisure. Only then do time constraints come into play, and then they require the Professional Affairs Committee to be timely in processing your entry.

"It's like nominating yourself for the Medal of Honor." No, no, no—you weren't paying attention. This is recognition of your department and all its members, not just you. Aren't they worth a few hours of effort in writing a nominating narrative?

Please review the revised application procedures for the Award for Excellence in Facilities Management. I think you'll find that the disagreeable aspects have been removed. When you earn the recognition, you can also specify when and where you want to receive the award: at the annual meeting, at your regional meeting, on your own

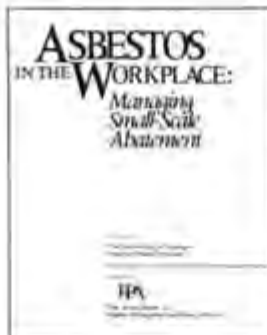
campus—just don't insist on our meeting you in Hawaii unless your campus happens to be there.

Another of our committee's primary focuses has been professional certification. Now why, you may ask, are you doing that? Early last year, the APPA Planning Committee, plus a number of augmentees from inside and outside APPA, met to formulate what eventually became the APPA Long-Range Plan. Dr. Mark Pastin, an organizational consultant and faculty member at Arizona State University, addressed that group and stated unequivocally that the most valuable thing a professional organization can offer its members is professional certification. Neil I. Levy and Neal Goldfarb of the law firm Melrod, Redman, and Gartlan state in the July 1991 *Executive Update* magazine, that "A certification program can be an effective tool for an association. It will promote the association, serve as a vehicle to upgrade professional standards, and create a sense of identity among members."

In the face of evidence such as this, the planning committee felt compelled to at least investigate certification for APPA members by APPA. You may have noticed, however, that the issue was considered so volatile that it was first mentioned as "credentialing." Well, the cat's out of the bag now. It's certification we're talking about, folks. But, we intend to walk before we run. So, what your Professional Affairs Committee has been working on is a member survey to test whether APPA members at large agree with Pastin, Levy, and Goldfarb.

Quite simply, if the survey indicates that our members are lukewarm to the idea, we'll spend no more energy pursuing it. If, on the other hand, response is positive, we'll press on with developing such a program. Watch for the survey later this year, and share your ideas beforehand with your Professional Affairs Committee representative and APPA leaders.

I can't close without telling you who those regional representatives are, and also telling you that they are doing a great job for APPA. They are: **Tom Vacha**, Eastern Region; **Bill Columbus**, Southeastern Region; **Gary Kent**, Midwest Region; **Dan McCrary**, Central Region; **Doug Christensen**, Rocky Mountain Region; and **Ken Hall**, Pacific Coast Region. Thanks a million.



APPA Asbestos Book Released

APPA has just published *Asbestos in the Workplace: Managing Small-Scale Abatement*, a comprehensive set of guidelines for campuses to use in small-scale asbestos abatement projects.

This book covers training requirements, worker protection, identification of asbestos-containing material, project planning, waste disposal, and response to release episodes. An introduction, twenty-six appendices, and a glossary are also included.

The publication was developed by the University of Georgia Physical Plant Division. The book is 140 pages and costs \$45 for APPA members and \$55 for nonmembers. To order, send a check (add \$8 for shipping and handling) to APPA Publications, Dept. ABNL, P.O. Box 1201, Alexandria, VA 22313. Prepayment is required.

KU Hosts E-Mail List for Custodians

Phillip L. Endacott, associate director of housekeeping at the University of Kansas Facilities Operations Department, has announced the creation of an electronic communications network for custodial professionals. The JANITORS list—hosted by KU and coordinated by Endacott—was started on June 13 and now has more than

forty subscribers. According to Endacott, subscribers are located from Vermont to California and in Hawaii, Canada, and the United Kingdom.

"The JANITORS list is dedicated to the discussion of any topic of interest to those engaged in the cleaning of public buildings," says Endacott. "Expected topics of discussion include staffing guidelines, levels of cleanliness, appropriate equipment, new discoveries in cleaning chemicals, environmental concerns, employee relations, training concepts and methods, and employee safety."

Subscriptions are open to all and should be sent to:

- Bitnet:
(LISTSERV@UKANVM.BITNET)
- Internet:
(LISTSERV@UKANVM.CC.
UKANS.EDU)

If you are unfamiliar with the potential of electronic communications through Bitnet or Internet (or a number of other networks), contact your institution's computer center for assistance. Most electronic networks allow you to dial a local number (no long-distance charges) in order to access lists, bulletin boards, forums, and individuals worldwide. Most large colleges and universities and many small ones are already hooked into Bitnet or Internet.

These networks have been in use mostly by academic departments and libraries, but are expanding in use by many administrative departments as well. If a campus already has Bitnet, for example, it should be relatively simple for your own department to receive an account; each individual using Bitnet should have his or her own address.

To reach any staff member at APPA, however, all you need to do is send your message to
APPA@BITNIC.BITNET.

To find out more about the JANITORS list, contact Phil Endacott at

913/864-3204; or reach him through Bitnet at
ENDACOTT@UKANVAX.BITNET.

Needs Assessment Workshop Slated

The Texas A&M University Office of Planning and Institutional Analysis is conducting a Higher Education Facility Needs Assessment Workshop in Jackson Hole, Wyoming, December 5-6. The focus of the seminar is to better understand the process of space needs assessment and projecting facility needs. Registration is \$295. For more information, contact the Office of Planning and Institutional Analysis, 102 Bizzell Hall East, Texas A&M University, College Station, TX 77843-1244; 409/845-7838; fax 409/845-0629.

Has your institution or department received special recognition, or have you undertaken new or innovative projects? If so, please send them to us for possible inclusion in the newsletter. Send all items to Stephanie Gretchen, APPA, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446, fax 703/549-2772.

Ride Sharing Information Needed

Any institution with experience in campus-operated ride sharing programs as an alternative solution to parking and traffic problems, please contact K.E. Turnbull, Manager, Buildings and Grounds, University of Wollongong, Northfields Avenue, 2500, N. Wollongong, Australia; 61/42-213905, fax 61/42-213192.

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Of APPA's annual membership dues, \$30 pays for the subscription to *Facilities Manager* and *APPA Newsletter*. Additional annual subscriptions for both periodicals cost \$40 (\$30 for non U.S. addresses). For information on rates and deadlines for display and classified advertising, telephone 703/684-1446.

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Capital Notes

In a recent seminar, author Tom Peters said that he had been flying full fare, in first class, and the flight attendant refused him a second bag of peanuts. On a different trip, a few airplane flights before, he had almost experienced a plane crash. I would give Tom Peters credit for being a reasonable guy. Which airline do you think he was most upset with? Yes, the bag of peanuts still makes him mad.

Sometimes even the smallest things can leave you frustrated and ineffectual. A current frustration might be how to collect data for the **Student Right-to-Know** and Campus Security Act by September 1, 1991, since the letter on what to collect just came out and it is August 21.

A recent, potentially costly development is the Federal Communications Commission's (FCC) Report Order and Further Notice of Proposed Rule-Making in FCC's Docket No. 91-35, which claims that universities, hospitals, and other entities are now considered **telephone aggregators**. As such they are prohibited from blocking access to operator services providers (e.g. AT&T, MCI, Sprint). Facilities managers must have notices placed on telephones informing callers of their right to access the carrier of choice. Plus, the rules bar charging a caller more for a call placed over the caller's carrier of choice than for calls placed through the pre-subscribed operator service provider. Rules will be effective thirty days after they are published in the *Federal Register*.

All (telephone) equipment or software manufactured or imported on or after April 17, 1992 must be capable of providing access via all access codes. All equipment must be brought up to compliance by April 17, 1997. (In the meantime, you must modify equipment, if the cost is no more than \$15 per line, within eighteen months of the effective date.) The FCC is expected to assess fines for noncompliance. Please ensure that telephone lines and equipment are modified, that new equipment meets the standards, and that budgets meet the cost of the added expense. For more information on this, please contact the FCC's Common Carrier Bureau Legal Branch at 202/632-6917.

Shelley Steinbach of the American

Donna Wiesner



Council on Education has been working with the FCC, APPA, and other associations to mitigate any detrimental effects on our institutions. He will be updating all of us as these complicated rules are analyzed and implemented. However, the FCC will stick to its definition of aggregator. Shelley asks that you please make sure your staff is up-to-date.

On a happier note, Christopher Jehn, Assistant Secretary of Defense for Force Management and Personnel, wrote me about a new program called **Heroes for Hire**. Data on personnel who are leaving the military is available free of charge. The Pentagon instituted the new transition bulletin board as an electronic want ad service available to all military personnel and their spouses at military bases around the world. More than 300,000 military personnel a year leave the armed services, and the military is trying to make the transition as easy as possible. Employers who would like to use the free service can call 703/614-5322 or write: Transition Support and Services Office Outplacement, OASD (FMP) Pentagon, Washington, DC 20301-4000, Attn: Lt. Russell.

To help you locate answers to questions and for technical assistance, following is a list of regional offices for OSHA, the Department of Education, and EPA.

Department of Education—Secretary's Regional Representatives

Region I, Dennis Smith, U.S. Department of Education, John W. McCormack PO & Courthouse, Room 536, Post Office Square, Boston, MA 02109; 617/223-9317.

Region II, Herbert Stupp, Acting SRR, U.S. Department of Education, 26 Federal Plaza, Room 36-120, New York, NY 10278; 212/264-7005.

Region III, D. Kay Wright, U.S. Department of Education, 3535 Market Street, Room 16350, Philadelphia, PA 19104; 215/596-1001.

Region IV, John F. Will, U.S. Department of Education, P.O. Box 1777 (30301), 101 Marietta Tower Building, Suite 2221, Atlanta, GA 30323; 404/331-2502.

Region V, Brian Carey, U.S. Department of Education, 401 South State Street, Suite 700A, Chicago, IL 60605; 312/353-5215.

Region VI, Sam P. Wilson, U.S. Department of Education, 1200 Main Tower Building, Room 2125, Dallas, TX 75202; 214/767-3626.

Region VII, Cynthia A. Harris Hillman, U.S. Department of Education,



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Donna Wiesner is APPA's director of government relations.

P.O. Box 901381 (64190-1381), 10220 N. Executive Hills Blvd., 9th Floor, Kansas City, MO 64153; 816/891-7972.

Region VIII, Thomas Tancredo, U.S. Department of Education, Regional Office, Federal Building, 1244 Speer Blvd., Suite 310, Denver, CO 80204-3582; 303/844-3544.

Region IX, Dorothy Vuksich, Acting SRR, U.S. Department of Education, 50 United Nations Plaza, Room 205, San Francisco, CA 94102; 415/556-4920.

Region X, Roberta May, U.S. Department of Education, Office of the SRR, Jackson Federal Building, 915 2nd Avenue, Room 3362, Seattle, WA 98174-1099; 206/442-0460.

U. S. Environmental Protection Agency's Regional Administrators

Region I, Julie D. Belaga, Administrator, Region I, Environmental Protection Agency, John F. Kennedy Federal Building, Room 2203, Boston, MA 02173; 617/565-3420.

Region II, Constantine Sidamon-Aristoff, Administrator, Region II, Environmental Protection Agency, 26

Federal Plaza, Room 1009, New York, NY 10278; 212/264-2657.

Region III, Edwin B. Erickson, Administrator, Region III, Environmental Protection Agency, 841 Chestnut Avenue, Philadelphia, PA 19107; 215/597-9800.

Region IV, Greer C. Tidwell, Administrator, Region IV, Environmental Protection Agency, 345 Courtland St., N.E., Atlanta, GA 30365; 404/347-4727.

Region V, Valdas V. Adamkus, Administrator, Region V, Environmental Protection Agency, 230 South Dearborn Street, Chicago, IL 60604; 312/353-2000.

Region VI, Robert E. Layton Jr., Administrator, Region VI, Environmental Protection Agency, 1445 Ross Avenue, Dallas, TX 75202-2773; 214/655-6444.

Region VII, Morris Kay, Administrator, Region VII, Environmental Protection Agency, 726 Minnesota Avenue, Kansas City, MO 66101; 913/551-7000.

Region VIII, James J. Scherer, Administrator, Region VIII, Environmental Protection Agency, Suite 1300, 999

18th St., Denver, CO 80202-2405; 303/293-1603.

Region IX, Daniel W. McGovern, Administrator, Region IX, Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105; 415/744-1305.

Region X, Dana A. Rasmussen, Administrator, Region X, Environmental Protection Agency, 1200 Sixth Avenue, Seattle, WA 98101; 206/442-1200.

OSHA Regional Administrators

Region I, John B. Miles, Regional Administrator, U.S. Department of Labor—OSHA, 133 Portland Street, 1st Floor, Boston, MA 02114; 617/565-7164.

Region II, James W. Stanley, Regional Administrator, U.S. Department of Labor—OSHA, 201 Varick Street, Room 670, New York, NY 10014; 212/337-2378.

Region III, Linda R. Anku, Regional Administrator, U.S. Department of Labor—OSHA, Gateway Building, Suite 2100, 3535 Market Street, Philadelphia, PA 19104; 215/596-1201.

Region IV, R. Davis Layne, Regional Administrator, U.S. Department of Labor—OSHA, 1375 Peachtree Street, N.E., Suite 587, Atlanta, GA 30367; 404/347-3573.

Region V, Michael G. Connors, Regional Administrator, U.S. Department of Labor—OSHA, 230 South Dearborn Street, Room 3244, Chicago, IL 60604; 312/353-2220.

Region VI, Gilbert J. Saulter, Regional Administrator, U.S. Department of Labor—OSHA, 525 Griffin Street, Room 602, Dallas, TX 75202; 214/767-4731.

Region VII, John T. Phillips, Regional Administrator, U.S. Department of Labor—OSHA, 911 Walnut Street, Room 406, Kansas City, MO 64106; 816/426-5861.

Region VIII, Byron R. Chadwick, Regional Administrator, U.S. Department of Labor—OSHA, Federal Building, Room 1576, 1961 Stout Street, Denver, CO 80204; 303/844-3061.

Region IX, Frank Strashelm, Regional Administrator, U.S. Department of Labor—OSHA, 71 Stevenson Street, Suite 415, San Francisco, CA 94105; 415/744-6670.

Region X, James Lake, Regional Administrator, U.S. Department of Labor—OSHA, 1111 Third Avenue, Suite 715, Seattle, WA 98101-3212; 206/553-5930.

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The Environment

Stephanie Gretchen

EPA, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act may have a profound effect on the disposal of industrial wastes underground through wells, septic systems, or drain fields. EPA sponsored the development of a brochure with the Underground Injection Practices Council (UIPC) that describes how these regulations may affect waste operations and what owners and operators should do to address these problems. The brochure, "Does your facility generate industrial wastewater?" explains what EPA regulates and what you need to do. For more information, contact your state agency with responsibility for UIP or the regional EPA office covering your state. If you do not know how to contact your regional office, see the Capital Notes column.

The Labor Department will now require all glass-fiber products to have a carcinogen warning label, according to the June 17 *Wall Street Journal*. The paper said this decision stemmed from a number of medical studies that showed a greater amount of respiratory-tract cancer among fiberglass production workers.

Thompson Publishing Group has published *Stormwater Permit Manual*, a looseleaf manual covering all aspects of stormwater permitting. The publication also includes mailings of updated supplemental pages, monthly newsletters highlighting new regulatory developments, compliance strategies, and federal and state guidance. The publication costs \$398. For more information, contact Thompson Publishing Group, Subscription Service Center, 1725 North Salisbury Boulevard, Salisbury, MD 21801-9848; 800/424-2959.

Clark Boardman has published *Clean Air Act Handbook*, which includes information on air quality standards, mobile sources of air pollution, hazardous air pollutants, acid deposition controls, permitting requirements, ozone and climate protection, and enforcement provisions. For more information on this \$85-book, contact

Clark Boardman, 375 Hudson Street, New York, NY 10014; 800/221-9428, in NY 212/645-0215.

Representative Gerry Sikorski (D-Minn.) introduced legislation July 11 that would significantly expand industry reporting requirements under the Toxics Release Inventory (TRI) Program and link TRI to RCRA. Sikorski introduced "Community Right-to-Know-More Act of 1991" (HR 2880) to promote pollution prevention and extend reporting of waste to off-site waste management facilities. Reporting thresholds would change and waste generators would need to tell EPA if they send waste off-site in amounts that exceed 100 pounds per year for metals, or 2,000 pounds per year for other chemicals.

EPA is sponsoring Green Lights, a program that encourages facilities to install energy-efficient lighting technology to reduce energy consumption. EPA helps participants with technical support projects. A computerized system developed by EPA allows participants to rapidly survey the lighting systems in their facilities, assess their retrofit options, and select the best energy-efficient lighting upgrades. The program proceeds in four phases: survey of facilities to determine where lighting can be upgraded; options analysis of the most favorable upgrades for each area covered by the lighting survey; trial installation of new technology and a collection of employee feedback; and final upgrade of new technology. For more information, contact Green Lights, Global Change Division, U.S. Environmental Protection Agency, 401 M Street, S.W., (ANR-445), Washington, DC 20460; 202/479-6936, fax 202/479-6937.

Congress is working on two indoor air bills designed to limit exposure to contaminated indoor air. The Indoor Air Quality Act of 1991 would expand the EPA's research and development

effort on indoor air problems, provide grants to help states develop programs to manage indoor air quality (IAQ), and require reports to Congress on IAQ. Watch for progress in this arena.

EPA proposed, on August 9, to extend the compliance deadline for financial responsibility for underground storage tank owners. The extension would affect owners with twelve or fewer tanks at more than one facility and fewer than 100 tanks at a single facility.

EPA plans to extend the date from October 26, 1991 to December 31, 1991. The extension is part of the agency's effort to reduce the cost of these regulations while still ensuring the protection of human health and the environment.

Under Subtitle I of RCRA, UST owners and operators must show financial ability to cover cleanup costs and third-party damages resulting from potential leaks. Owners and operators can comply with the financial responsibility requirements through insurance, state assurance funds, and self insurance. Forty-three states have created state assurance funds. For more information, contact EPA's Lauren Milone at 202/382-4355.

In an effort to curb the leading source of water pollution in the United States—storm water—EPA issued on August 2 a proposed general permit for storm water discharges associated with industrial activity. The proposal was published in the August 16, 1991 *Federal Register*. When the general permit is final it would become a National Pollutant Discharge Elimination System permit under the authority of the Clean Water Act.

According to EPA, the general permit proposal outlines pollution prevention plans that industrial facilities would be required to develop and implement. Pollution prevention measures include sediment and erosion control, detecting and removing illegal hookups to storm sewer systems, and stopping improper dumping of oil and other wastes into storm sewers and preventing and controlling spills.

Industrial facilities that must be permitted for storm water discharges include construction operations disturbing five or more acres, power plants, some oil and gas operations, certain transportation facilities, and others. ■

Stephanie Gretchen is APFA's communications manager and assistant editor of Facilities Manager.

APPA Committees 1991-92

* Members in standing committees are listed by region from east to west.

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NOBODY'S PERFECT

It's important to set high standards of performance for yourself and your subordinates and to evaluate results in a tough but fair manner. However, as we strive to be as good as we possibly can, to beat the competition and our goals, to pitch the "perfect" game, we must recognize that nobody's perfect.

The point is, you have to understand that you, your superiors, colleagues, peers, and subordinates (as well as your suppliers and contractors) are going to make mistakes, wrong decisions, errors of omission and commission, and simply blow some. Obviously, this applies not only to work. The President of the United States, the Chief Justice of the Supreme Court, your clergy, your parents, spouse, children, and, alas, the writer of this essay are also not perfect.

Learning to live with mistakes and poor, even terrible, decisions and actions made by you and others is an important aspect of being a successful manager and leading a reasonably calm life. This does not mean that one should overlook major errors or shrug them off. It does mean that we have to understand that they will occur. In baseball, for example, hitting .400 is almost impossible, and hitters who hit .333 are considered excellent. Consider what that means. If a player has a career batting average of .333, he is likely to get into the Hall of Fame. But that simply says he got a hit one third of the time, and the very rare .400 hitter only got a hit 40 percent of the time. The professional basketball player who makes 65 percent of his shots is considered outstanding, and a basketball coach would be extremely pleased if the team made 55 percent of its shots.

Once we begin to understand that various degrees of errors will occur, from simple goofs or "I forgot's" to colossal or calamitous blunders, we can then focus on learning from the errors and dealing with them. It is important to do a post-mortem examination on the major mistakes. Why did they occur? Why, for example, were there de-

Focus on Management

Sigmund G. Ginsburg



lays (and worse yet, no action) in starting and/or completing high priority projects, room set-up/breakdowns, promised repairs, responding to emergency situations? What breakdowns in communication, analysis, planning, information, execution of plans, follow-up, and so on caused them? What can we do now to control the damage or bring the situation under control? In regard to preventing future errors, what procedural or policy changes, training and development, improved methods of analysis, communication, planning, information gathering, and so on are necessary? What improved methods of monitoring, control, or evaluation are necessary? For mistakes that range from relatively minor to important, one can follow the approach as indicated above and adjust it depending upon the nature and importance of the er-

ror. For minor and infrequent goofs, it is probably best to forget them.

The most important thing about "nobody's perfect" is to fully accept the fact that you and others are human, and to be forgiving. At the same time, we ought to be learning and growing from our failures, and to be learning as much as we can about the situation and the elements within ourselves that caused the problem. We can then take corrective action and lessen the chances for the same type of error happening in the future.

You should be concerned whether the same kind of error is being repeated. It is better to have five different kinds of mistakes than five mistakes of the same kind. In order to get a better batting average in decisions or actions (33 percent to 65 percent is not acceptable in management—with those batting/scoring averages one not only doesn't get into the Hall of Fame, one doesn't get into the office any longer), one must know about the errors, analyze why they happened, and take corrective action for the present and future. This may include taking various types of courses and training experiences; making notes to improve your memory; modifying your operating style; improving your use of time, concentration, attention to detail, and information flow; developing subordinates; reviewing resource allocations, delegation, supervisory techniques, the authority one has, the organizational structure, and planning system; etc. It may also be that a person is burned out or needs a vacation or a modification in assignment.

Perhaps making mistakes is the best learning device, but at advancing rungs of the success ladder one expects to have decreasing education through that means. You must be wise enough to know that though you have been burned by and learned from a particular situation, the new situation faced may not be exactly the same as the previous one. Thus, you have to be careful not to make the mistake of acting in such a manner that avoids a previously committed mistake, only to find it is not relevant to the present situation.

As we strive for greater success, we must have the humility and humanity to recognize human fallibility as well as capacity to learn, grow, and improve. ■

Sig Ginsburg is vice president for finance and administration at Barnard College, and lecturer in management systems at Fordham University, both in New York City.



POSITIONING APPA FOR TOMORROW: A Profile of Joe J. Estill Jr.

By Christina Zack-Bordeaux

Joe Estill is committed to APPA. As APPA's new president, he shares the dedication and enthusiasm of former presidents, while bringing to his term a fresh perspective on facilities management. Taking the helm in July as president at APPA's annual meeting in Orlando, Florida, Estill is confident that APPA can keep up with the challenges presented to higher education during these changing times.

Originally from Leakey, Texas, Estill graduated from the University of Texas at Austin in 1960, where he earned a bachelor of science degree in mechanical engineering. He had entered college as a mathematics major, but uncertainty with his choice led him to take a break from his college studies. In 1955, he went to work for Otis Pressure Control, an oil field service organization.

The company provided Estill with

specific, technical field work. "It is a wire line oil well service," he explained. "A tool is run into a well for a specific purpose, perhaps to work on the choke or to plug up a well completely so the top of a well can be removed without it blowing off."

It was this experience that helped to direct Estill toward a career in engineering. "I was exposed to a lot of engineering aspects and principles in the oil fields which I found very interesting—and I always knew I enjoyed working on mechanical things," he said. His job took him to work sites all over the state of Texas, to Louisiana, and he even spent a six-week stint on an oil field in Venezuela.

In 1957, Estill returned to his studies to pursue a degree in mechanical engineering. "Mechanical science seemed to provide the broadest curriculum of all the engineering disciplines," he said. "It incorporates some work in all the areas, including chemical, electrical, and structural." After graduating from college, Estill spent a short time in the Army as a specialist fourth class, working as a helicopter mechanic. He continued his Army affiliation for seven-and-a-half years in the Army reserves.

Gaining Experience

Before carving out a place for himself as a physical plant administrator in institutions of higher education, Estill began his engineering career in the private sector. "I worked for several years in Houston as a consulting

engineer starting with Golemon & Rolfe, and I worked on various designs in commercial and industrial settings," Estill said.

Continuing on the private firm track, Estill joined D. Dana Price Consulting Engineers, also of Houston, in 1961. He remained with this firm for seven years, providing final mechanical and electrical designs, plans, and specifications for various commercial, industrial, and institutional projects.

Yet it was a business connection he made while he was working at Golemon & Rolfe that eventually lead Estill to facilities management on a university campus.

At Golemon & Rolfe, Estill worked with a man named Jim Berry who left the firm to become staff architect and head of facilities planning and construction for the University of Houston. "One day he called me and said he needed to set up an engineering group, and that he would like me to join him."

Estill joined the University of Houston in 1968 as a mechanical engineer for facilities planning. His responsibilities included providing technical assistance to the director of architectural services in planning new facilities for the campus, reviewing project plans, and serving as project planner and engineer (including projects such as the central plant expansion and utility tunnel extension).

"There is a big difference between working at a consulting firm and on a college campus," said Estill. "At a pri-

Christina Zack-Bordeaux is a freelance writer based in Washington, D.C. She wrote about William D. Middleton in the Fall 1990 Facilities Manager.

vate firm, an engineer will design systems and work on them as they are constructed, but once the system is tested, up, and working, then the engineer moves on to a new project. In the university setting, however, you've got to live with that system forever."

In 1970, Estill was promoted to staff engineer for physical plant at the University of Houston. His responsibilities included providing mechanical and electrical expertise for project plan reviews, producing contract documents (plans and specifications) for various projects using maintenance funds, supervising contractors on these projects, and reviewing overall maintenance procedures and specific maintenance projects. Estill remained in this position for two years.

In 1972, Estill moved to his next post, the campus of Duke University in Durham, North Carolina, as asso-

"Our goal is to give legislators good, factual information on what the impact of their decisions will mean to higher education."

ciate director of maintenance and engineering services. At this point in his career, Estill had worked in the private sector and on the campus of a state university; this move provided him with an opportunity to learn about physical plant administration at a private institution of higher education.

As associate director, the scope of Estill's work widened to include supervising control of coal-fired heating plants; reviewing plans, inspecting new installations, and recommending approval for new construction projects; and overseeing all aspects of renovation projects. He also planned for and recommended utility expansion and maintenance for the university.

Estill found that the difference in the mode of operation between a private school and a state-supported university was enormous. "A private institution is much more concerned with keeping a very close watch on profit-



Joe Estill inspects the granite wallcoating in elevator lobby of State Headquarters Building.

ability. Private institutions may be nonprofit, but they must at the same time keep their head above water. Duke is a wonderful institution with a very nice endowment, but obviously one does not go and spend that endowment," Estill said.

"That meant that Duke was much more intensive in what I would call value engineering and in accountability for budget. The school was very interested in getting the most for its money," said Estill. "Because it was a private institution, it had the ability to write proprietary specifications for equipment—and be assured that they got that specific piece of equipment with the requested operating characteristics."

He added that this differed from a state institution, which may write a performance specification, but generally requires that the low-bid price be accepted. "You have more flexibility at a private school, but with that flexibility goes the accountability that it had better perform just as you had predicted it will."

Unlike the University of Houston, Duke provided Estill with the challenges associated with two working hospitals and a large research group on campus. Although the medical school did have its own physical plant department, the daily procedures had to be systematically coordinated with the overall campus operations.

Yet the biggest challenge Estill faced at Duke was not found in the operating room, but in the boiler room. "The

other unique aspect of Duke was that I had probably never seen more than twenty-five pounds of coals in my life," said Estill. "When I arrived at Duke, I was confronted with a complete coal fired boiler plant to operate and 25,000 tons of coal in a pile out back."

Duke also provided Estill with extensive renovation projects. "At any university you are going to be faced with renovation projects from many aspects, especially changing curriculums. Duke's campus is unusual in that it really has two campuses that are separated by a mile," Estill said.

The residences built along the road between the campuses provided Estill with unique renovation opportunities. "One of our major projects was to convert these homes into usable university buildings to be used by such groups as the university police and the alumni association," he said.

After three years at Duke, Estill was then promoted to physical plant director. At this level, his responsibilities included: directing the maintenance force operations, programs, and utilities; assisting in determining definitions for new projects; reviewing proposed university policies and procedures and serving in an advisory capacity to university officials; determining fiscal requirements for the department; and formulating budgetary recommendations for presentation to university officials.

In 1980, Estill returned to the Lone Star state when he landed a job at



Estill with Bill Middleton at APPA's 78th Annual Meeting.

Texas A&M University in College Station. "It is the oldest institution of higher education in the state of Texas," Estill said. "It has a student population of about 41,000, with about 300 buildings covering approximately 13 million square feet of building space."

Since joining Texas A&M, he has held three positions, including director of physical plant, associate director for utilities, and now manager of the construction division for the Texas A&M University System.

As director of physical plant, Estill was responsible for an operating budget of \$35 million as well as the maintenance of buildings, building equipment, structures, and custodial services for more than 10 million square feet.

His duties also included overseeing the transportation section, which includes maintenance and repair of some 700 vehicles on permanent lease to various departments, and the scheduling, maintenance, and repair of the 300 vehicles in the daily rental fleet.

Last year, Estill became associate director for utilities, shifting his focus on the university to the operation and maintenance of a large cogeneration power plant (35 mega watts, 850,000 pounds/hour boiler capacity, and 32,000 tons of refrigeration).

Estill was also responsible for all utility distribution lines, a 4-million-gallon-per day waste water treatment plant, a 12-million-gallon-per day water production system, and the Riverside Campus utility system. Estill also developed a \$74.5-million capital improvement plan for the utility systems,

and he developed and implemented a plan for the replacement of PCB transformers and the 2.4 KV electrical distribution system.

Today at Texas A&M

"I came to Texas A&M as director of physical plant and I am now manager of construction," Estill said. "Instead of having a single campus of Texas A&M, I now supervise the construction on eight campuses scattered throughout the state. And I oversee the construction for the eight agencies that come under the university system, which are also located throughout Texas."

"At Texas A&M, we have a good program of value engineering and try to develop bid documents and construction projects that have good value for the money that we spend," he added.

To Estill, a unique aspect of Texas A&M is its medical school because, unlike Duke, it does not have an operating hospital on campus. Instead, the school utilizes a microwave system to tie in with the Veterans Administration Hospital in Temple, Texas, some seventy miles away.

Estill explained that medical students take their first two years of courses on-campus. Through the use of the microwave link with the hospital, they are able to observe lectures and surgical procedures that are beamed onto the campus. This transmission is available back to the hospital as well. "We were very much involved in the design and implementation of the microwave link. We set it up in 1984 by developing a relay station that is approximately half way

between the hospital and the school," said Estill.

Although Texas A&M does not have a working hospital on-campus, it does house a school of veterinary medicine, which Estill said is just as demanding. "The veterinary hospital treats large, small, and exotic animals and is in operation twenty-four hours a day, seven days a week. The cleanliness standards in a veterinary hospital are almost identical to those in a hospital anywhere in the United States. The cleaning aspects have to be handled and monitored closely, as well as managing the large amounts of research that are done on campus," Estill said.

The introduction of exotic animals into the curriculum is a recent venture for the school, bringing in a variety of African animals, including zebras and camels. "When exotic animals became part of the picture, new procedures be-



came paramount because the handling of exotic animals is much different than the handling of domestic animals," Estill said. "Ten years ago, the veterinary school had no ostrich facilities here. With these new animals, we were required to develop supporting systems—we needed to be able to get into the facility to do the proper maintenance. These activities must be coordinated closely with the school so there is no confusion with the animals."

The research park is another facet of Texas A&M that provides Estill with a variety of challenges. "The park was established to attract the research arms of private industry to come in and build facilities on property that is owned by the university," Estill said. "We lease that property so that groups can build research facilities on campus, giving them access to the gradu-

ate student programs and faculty members that participate in the research."

The four buildings currently up and running do a variety of research—from agriculture to deep ocean drilling. "The basic research and operations that they do requires a continuously changing mode of operation," he said. "We must be able to support these changing activities, especially in terms of each specific research area."

Despite Estill's progress on the campus and his genuine enthusiasm for his field, like many other facilities managers today he is troubled by possible university budget cuts. "Texas has a law under which the legislature cannot exceed the anticipated income from the state, so we have no deficit spending here," said Estill. "In our particular case, it then becomes a matter of the legislature having to establish criteria for funding the three biggest areas in the state: higher education, the prison system, and mental health and retardation programs. Whenever legislators are looking at a deficit in request, it puts us on the hot seat and we must defend our position."

"Texas has been very fortunate in the past in that the cuts we have seen have not been of the magnitude that we are now facing. We currently anticipate that the cuts at Texas A&M will be across the board," Estill explained. "However, we also know that the maintenance budget will be looked at very critically, and that we will be asked to recommend what services can be cut back. It is not a good position to be in because we do not want to reduce services. But it is a typical position for many colleges today—either they have gone through it or they will."

Although most of Estill's time is spent fine-tuning the facilities at Texas A&M, hunting and fishing are two activities he enjoys away from the campus. Most of his hunting trips are in West Texas where he stalks desert mule deer. "It is a very desolate part of Texas, and we hunt on a ranch that consists of 117 sections—one section of land is 640 acres," Estill said.

For fishing, Estill concentrates on the Gulf of Mexico where he fishes for speckled trout and red fish.

Along with his interests in hunting and fishing, Estill also has a real passion for guns, and even owns a few that are more than 100 years old. "I have several different caliber high-

powered rifles and shotguns of varying ages—a few flint-lock rifles from the 1800s and some rather semi-customized high-powered rifles," he said.

Joining APPA

Estill joined APPA in 1975 while he was working on the campus of Duke University—but his familiarity with the organization goes back even further. "When I worked at the University of Houston in the new construction division, the director of physical plant was a gentleman named Harry Ebert. Although I never worked for him there, he was an active member as well as very effective in getting information from the APPA organization," Estill said.

Seven years later at Duke, Estill met up with Ebert again, this time to work for him. Ebert had since become deeply involved in APPA affairs, including holding the position of president in 1976. A long-time champion of APPA, it was Ebert who encouraged and supported Estill's early involvement in the organization. "He was a very active contributing member to APPA, and he insisted that his staff be involved in the organization—take active participation," Estill said.

Estill was immediately impressed by what APPA offered to its members, and by the enthusiastic participation of those members. "The information available, the schools that participate, the seminars presented, and the publications produced by APPA were and are just super, very informative, and really made me want to be a part of it," said Estill.

Since joining APPA, Estill has been an important player within APPA's leadership. He served as president-elect last year; as vice president of special projects from 1987-1989; as a member of the Energy Task Force from 1976-1979; and as the Task Force chair from 1979-1980. At the regional level, Estill was first vice president of the Central regional association from 1980-1981, and president from 1981-1982.

For Estill, one of the other initial attractions to APPA was the ability its members had to exchange information. "Most of the problems that a physical plant encounters are not new," he said. "There are many ways you can attack a problem, and knowing how somebody else has attacked this problem or solved it is an immense help to any physical plant administrator. You don't have to make the same mistakes someone else did, and APPA members are very willing to share this type of information."

This factor made an important contribution to Estill's career when he went to work at Duke. "With regard to the coal plant on the campus, one of the first things I did when I began working at Duke was to go to Brigham Young University. Ebert sent me out there and said that they had the very best coal fired plant operation in the country, and that I needed to see how they ran things," Estill explained.

"Sam Brewster and his group at Brigham Young could not have been more cordial or helpful. They spent two days showing me how they did things, how their plant worked, and it

Satellite cooling plant in the center of the Texas A&M campus.



was an immense help for me to see how they had been able to work with coal," Estill said.

Along with APPA's colleague support system, APPA's new president believes the educational opportunities offered to its members are another key factor in successfully meeting the needs of facilities managers today—and tomorrow.

"I believe that APPA as an organization has to have available for its members the capability to teach and disseminate information that will allow an administrator to make good decisions, and to work smarter with the money available," Estill said. "It will mean looking at our educational programs to determine if they are enough? The Institute for Facilities Management is an excellent tool to help administrators take a closer look at what they do, and to come up with better ways of doing it."

Estill said that he would also like to increase the participation of the regional and state organizations, while making progress accessible to more people. "I would like to see us develop seminars and educational programs that are affordable, and more available, to a larger population than we currently have. I would also like to get more regional seminars going—with APPA providing speakers and instructors, but with the regions and states really pulling together to develop new programs," he said.

Facing Tomorrow: A Changing Work Force

The dramatically changing work force is a serious issue to the physical plant administrator today, Estill said,

and if not addressed will make the administrator's job even tougher tomorrow. "There are a number of studies that indicate that service organizations in the United States are one of the fastest growing groups in the nation as a whole. Physical plant is a service organization and, therefore, we are going to have to draw on a dwindling trained labor force to staff our maintenance forces," Estill said.

The construction industry was once a viable pool from which to draw physical plant workers. However, Estill said that as this industry condenses and keeps more of its own workers in place, physical plant administrators will have to begin looking elsewhere for staff.

"The work force is changing—the construction industry today has become a much more stable work force than it was in the past. We can no longer attract those workers," Estill said.

As institutions of higher education begin looking for other viable hiring options, training and education levels become a real concern. According to Estill, most members of the physical plant work force today have earned high school diplomas. "A lot of the people we will be seeing in the coming years may not. In the near future, one of the first things that we may have to do when we hire someone will be to teach them to read and write." This will also affect physical plant budgets because it means that the mere cost of training a physical plant work force is going to increase.

Another work force factor that Estill believes cannot be ignored is the increasing number of single parents in

the United States. "I think each university is going to have to be looking at the increasing number of single parents. In order to attract another segment of the work force, universities may have to start developing day care centers for its workers. This is not something that I think most institutions want to get into, and I don't think that they will unless they are forced to," Estill said.

Capital Renewal and Deferred Maintenance

Another area that concerns Estill as APPA's new president is the question of capital renewal and deferred maintenance. From 1987 through 1989, Estill served as APPA Vice President for Special Projects, which focused on this problem. The committee was created at that time to develop criteria for establishing CRDM as a critical question that physical plants and universities had to face.

"Deferred maintenance is a term that has been around for some time, and APPA wrestled with it to try to get a handle on it. The committee asked is CRDM a problem, and if so, how big is it?" Estill explained that one of the problems involved with capital renewal and deferred maintenance was the mere definition of it.

"Our committee decided we did not care what you called it—whether it's refurbishing something or bringing buildings and systems back up to standards—the problem is that it is a ticking time bomb. At some point, this is all going to fall down around our ears," he said.

"Buildings and utilities have a finite life," said Estill. "This finite life is determined in many parts by how a facility was constructed. Normally, colleges and universities are thought of as being very old institutions with very old buildings—they were constructed to last 100 years."

"During the 1950s and 1960s, buildings were designed to last more like twenty to thirty years. The systems that support those buildings, such as plumbing, air-conditioning, and electrical systems, were just not designed to last the life of the building, and they need to be refurbished," Estill said.

The changing curriculums on campuses today are also compounding the problem. "Twenty years ago the computer was used only by a research scientist or a full professor. Today, everyone has access to a computer. And

Estill inspects the operation of a ceramic cooling tower at satellite cooling plant on Texas A&M campus.



there are many other drastic changes on campuses, including changes in the laboratories," Estill said.

"Institutions need to become alerted to the fact that things on campus are wearing out because of the massive expansion that took place, together with the changing curriculums. I'm afraid we are all in for a bad shock."

It is not an easy problem to solve, "You cannot defer a professor's salary, you cannot defer a secretary's salary, you cannot defer an electrician's salary, but you can defer maintenance on a facility," said Estill. "You don't have to paint it, but if you don't paint, it is going to start rotting. You don't have to fix the roof; you can sit a bucket under the leak, but eventually, you have to do something about that leak."

The Special Projects Committee took an aggressive stance on the CRDM issue, moving to thrust the issue higher on the agenda of institutions of higher education. "The bot-

"APPA will continue to disseminate information that will allow an administrator to make good decisions."

tom line is that institutions need to know how serious the problem is—and it is up to the physical plant directors to quantify it on their campuses. APPA's committee devised ways to find out what the problems actually were, and now it is time to act on that information," Estill said.

APPA's Long-Range Plan

As APPA's new president, Estill remains a champion of APPA's Long-Range Plan, which was passed by the Board of Directors at the 1990 annual meeting in Ottawa, Canada. It was developed to effectively meet the needs of the membership in fulfilling a broader mission in higher education facilities management.

"The Long-Range Plan is a very viable program. I think it identified very clearly the issues for APPA as an organization to look at, as well as issues that physical plant administrators will have to address in their operations for the next ten years," Estill said.



Joe Estill, July 1991, 78th Annual Meeting, Orlando Florida.

For Estill, the Long-Range Plan serves as a starting point for the organization. He believes it should have the ability to remain flexible for the future. "We are in a rapidly changing time—I believe that the plan is a document that gives us a path to start on, and I think that we've started down that path. But as a plan, it is subject to change," Estill said.

One element from the Long-Range Plan that Estill believes is essential for physical plant administrators to plan effectively, was the creation of a government relations position at the APPA office. Estill said that in today's atmosphere, the information link between legislators and APPA has never been more important.

"The number of regulations that are going to affect colleges and universities, and the magnitude of these regulations, has increased significantly. In order for physical plant departments to comply with these new regulations, it's going to require more monetary resources than the physical plant has," Estill said.

The creation of the director of government relations position will help combat legislation that is made without input from institutions of higher education. "Our goal is to give legislators good, factual information on what the impact of their decisions will mean to higher education. The anticipated hope is that legislators may be able to recommend a change that would not be nearly as drastic a cost to our institutions," Estill said.

"This is a two-way communication system. Not only does it let us communicate to the members about what is in the legislative hopper, but it also allows us to communicate with the legislative staffs about how their actions will ultimately affect us." However, Estill made it clear that he did not see this as a lobbying position, but more as an educational tool for both

legislators and plant administrators.

Updating APPA Bylaws

Another move toward streamlining the effectiveness of APPA was the approval by the Board of Directors of seven changes to the Bylaws of the association. The changes were ratified earlier this year by the APPA membership. In essence, these changes will provide greater communication among the program areas within the Board and its Executive Committee, all ideas which Estill fully supports.

"I think the Bylaws changes are good, and they reflect once again the changing times, and the growing up of APPA. We are becoming a significant association among institutions of higher education, and I think that the Bylaws changes we made this year are a significant step toward bringing us into a new era—while maintaining our position as a significant organization," he said.

One of the key Bylaws changes that Estill believes to be of significant value was the move to make the Executive Committee include all the vice presidents. "Vice presidents are the real core of our program development, and they need to be on the Executive Committee so that they can have input into the main direction to which APPA is headed," said Estill. "This is something that I have felt very strongly about ever since I was a vice president."

As Estill leads APPA toward 1992, he remains confident of the strides the organization has made in the past, and hopes to keep that momentum in motion. He said, "I would like to see us continue to move forward with the long-range goals that we have established—and the changes we made in the Bylaws this year were an excellent start for the work we face tomorrow."

REVIEWING APPA'S FACILITIES MANAGEMENT EVALUATION PROGRAM

by Steve Glazner

Since February 1989, APPA has conducted one pilot and six comprehensive evaluations through its Facilities Management Evaluation Program (FMEP). The institutions participating in the program have included four major state universities, two state health sciences centers, and one world-renowned museum/archive/tourist complex. In addition to these seven institutions, another three dozen have indicated an interest in the program and are currently assessing their needs for such an evaluation. Twenty-nine evaluators have participated as team members thus far.

Program Overview

The Facilities Management Evaluation Program was developed by APPA's Professional Affairs Committee for use by member institutions and is available to others as a service to the profession. The purpose of the program is to assist institutions that wish to obtain a better measure of the effectiveness of their facilities operations.

The FMEP uses experienced facilities managers and individuals with specialized expertise to conduct an on-site evaluation and produce a written report. The criteria used to structure the evaluation and final report include the following topics:

- Purpose and goals
- Organization and resources
- Policies, procedures, and processes
- Personnel training and development
- Fiscal planning and management
- Campus condition and appearance
- Communications and quality of relationships
- Campus planning

The objective of the evaluation program is to provide institutions with a concise picture or profile of the quality of the processes used and the results achieved by the facilities management department. This profile is developed by examining the department in key areas to determine the degree to which goals and objectives have been established, the extent to which these are being fulfilled, and the effectiveness of the processes being used to pursue stated goals.

The program focuses on the mission and standards that have been established by the institution and the degree to which they are being met. Many of the processes used to achieve the institution's goals are assessed within the context of recognized management practices. The evaluation is *not* a measure of conditions relative to external standards defined by others.

Sequence of Events

First, the institution contacts the APPA office to inquire about the eval-

uation program. APPA sends an informative booklet that describes the purpose of the FMEP, the pre-visit procedures involved, the selection of an evaluation team, the general on-site schedule, the written report, and the fee structure. Also included are the eight topics and definitions for the self-evaluation report, which is the backbone of the evaluation program. A completely revised FMEP booklet has recently been mailed to all APPA members; additional copies can be obtained from the APPA office.

When the institution has determined that it wants to request an APPA evaluation team, it next prepares an institutional profile, with particular emphasis placed on the facilities management department organization and the objectives to be met by the evaluation. The profile will be used to verify the suitability of the evaluation program and to select the evaluation team members.

Once the institutional profile is completed, the institution must complete a self-evaluation that addresses the topics and format defined in the FMEP booklet. The status of the department in each of the topic areas should be clearly defined. The self-evaluation should be an objective statement of conditions as seen by members of the department. It provides the institution and the evaluation team with an organized, consistent foundation on which the resulting evaluation can be based. A well-pre-

Steve Glazner is editor of *Facilities Manager* and APPA's director of communications.

pared self-evaluation is the most important contribution to a successful evaluation program.

When the evaluation team is on-site at the institution, they will meet in a group setting with appropriate managers and receive a tour of the facilities. The bulk of their stay is spent in interviews with facilities staff members, campus administrators, students, faculty and staff customers, members of the campus facilities committee, and anyone else who can assist the team in assessing the facilities operation. An exit/oral report is presented by the team to the institutional representatives and provides initial impressions and areas of strengths and weaknesses that will be expounded upon in the printed report.

Within four to six weeks of the site visit, APPA will provide the institution with an initial draft report of the team's findings and recommendations. The institution will have the opportunity to query any possible misconceptions stated by the team, clarify any questions the team may have, and clean up any misspellings of individual's names. In general, the final report—which is typeset and printed professionally by APPA—will be delivered to the institution about three months after the date of the site visit. All FMEP reports are produced in the strictest confidence; only with the permission of the institution may APPA or any team member share any portion of the evaluation report.

Fees and Expenses

Fees for the Facilities Management Evaluation Program are based upon a combination of the institution's full-time equivalent (FTE) student enrollment and its gross institutional expenditure (GIE). The three basic programs follow.

1. Institutions with more than 12,000 FTE and/or GIE of more than \$200 million; includes one team leader and three team members for a four-to-five-day on-site visit: **\$10,000.**
2. Institutions with FTE between 5,000 and 12,000 and/or GIE between \$50 million and \$200 million; includes one team leader and two team members for a three-to-four-day on-site visit: **\$7,500.**
3. Institutions with less than 5,000 FTE and GIE of less than \$50 million; includes one team leader

and one team member for a two-to-three-day on-site visit: **\$5,000.**

Institutions may also request additional team members to complement the existing team makeup, and institutions may request a pre- or post-visitation for special concerns. APPA also offers the option for the smallest institutions (generally those with fewer than 800 students) to request a one-day evaluation.

For more information or to receive a copy of the FMEP booklet, contact APPA, 1446 Duke Street, Alexandria, Virginia 22314-3492; phone 703/684-1446; fax 703/549-2772; or Bitnet APPA@BITNIC.BITNET.

FMEP Institutions as of July 1991

- University of Arizona (pilot evaluation)
- Medical University of South Carolina
- Oregon State University
- University of Virginia
- University of Toledo (OH)
- University of Texas M.D. Anderson Cancer Center
- Smithsonian Institution (DC)

Following are endorsements and testimonials from team leaders who have served on APPA's FMEP, and from institutional representatives who have requested the service.

William D. Middleton, APPA Immediate Past President and Assistant Vice President for Facilities Management, University of Virginia

[Team leader, University of Arizona evaluation; University of Virginia evaluation contact.]

I am pleased to comment on the evaluation program from two viewpoints: 1) from the perspective of the chief facilities officer at an institution that has used the APPA evaluation service, and 2) as a professional who has participated in a number of facilities evaluations.

The basic foundation for APPA's Facilities Management Evaluation Program is the comprehensive set of criteria for higher education facilities management programs. These represent well-defined and recognized professional criteria against which any program can be evaluated. They are

extremely useful for either self-evaluation or external review and help to make any evaluation a much more objective process than it would be if each evaluator were working against his or her own subjective criteria.

As the chief facilities officer at a major research university, I can strongly attest to the value of a periodic external evaluation, and most particularly, an evaluation against well-defined criteria such as those established by APPA. No matter how well run it may be, any program can benefit from a periodic external, objective evaluation by experienced and well-qualified professionals.

APPA's facilities management evaluation of the University of Virginia was by far the most thorough and complete that we have ever had. The evaluation team, made up of highly qualified professionals in specific subject areas, gave us a detailed report that has proved to be the basis for a continuing program of improvement in quality and effectiveness of our program.

Over the last decade, I have participated in a number of evaluations of facilities management programs at other institutions, including one evaluation conducted as the head of an evaluation team testing the criteria established for the APPA program. Participation in these evaluations are of perhaps equal value to our program at the University of Virginia as it has been to the extraordinary diversity in the facilities management field in the way that we build and develop organizations to plan, construct, maintain, and operate the facilities of higher education. I have never visited another institution without encountering at least several new ideas or different



procedures that I could effectively use to provide a better program at my own institution. Participation as an evaluator is an educational experience.

I consider the Facilities Management Evaluation Program to be one of the most important developments in the last several years in continuing APPA growth and development as one of the leading higher education administration associations.

Jack Hug, 1989-90 APPA President and Assistant Vice Chancellor, Physical Plant Services, University of California/San Diego

[Team leader, Oregon State University evaluation.]

How are we doing? Compared to what? These are two questions that repeat over again in our physical plant departments. To assist those who are serious about the answer to these questions, and who wish to obtain a better measure of their physical plant operations, APPA provides a valuable tool in the form of the Facilities Management Evaluation Program.

The FMEP capitalizes on a concept that is based on an acceptance that we have a continuing need for increased knowledge of our complex and changing needs. This is something that many of us have a tendency to oversimplify. There is no doubt that there is a heightened awareness of facility needs at our colleges and universities. A topic of equal awareness is the manner in which we employ management skills and techniques to meet these needs.

The quality of facilities management services requires top management attention now more than ever before. If quality facilities management services are important to us—if we are striving to achieve continuous improvement to meet customer needs, to develop a planning tool for strategic and long-range purposes, to improve understanding of facilities management issues in our department and throughout the institution—then we should take a good look at the FMEP as a tool to help us achieve this.

In our business of providing facilities management services, every day is chock-full of opportunities to improve awareness, understand services, and gather information; however, many of

these opportunities go unnoticed because we are often too close to the action to notice. What better way could there be than to call upon our respected peers for specific useful recommendations?

Finally, fundamental to the success of continuous improvement of physical plant services on any of our campuses is our ability to build active partnerships between facility departments and our service customers, including the resource providers. The FMEP can provide an effective bridge to facilitate these all-important relationships.

The leadership of our colleges and universities is being challenged strongly for institutional accountability, productivity, quality, and costs. The FMEP can stimulate institutions to improve quality and productivity, and produce pride in recognizing this achievement.

Kathleen Mulligan, Assistant Vice President, Finance and Administration, Oregon State University

[Oregon State University evaluation contact.]

APPA's evaluation team did its fine work for Oregon State University during February 1990. The team was very thorough and, because of the broad diversities of experience, provided an excellent assessment of our facilities management program. Using their insight, the OSU Physical Plant has made meaningful and positive changes in the way we do business.

The team's review and analysis of our administrative and operational functions have resulted in a major reorganization, which has greatly enhanced our effectiveness. The team also identified project management, staffing levels, deferred maintenance, and serious budget underfunding as areas needing attention by the physical plant department and the university administration. Because of the team's credibility, attention is being given to these areas.

The team's visit was a good experience for us. Unlike most "inspection teams," this evaluation process was like having a good friend in for a visit. We were very pleased with the team and the results. Keep up the good work!

Gene Cross, 1977-78 APPA President and Associate Vice Chancellor, Office of Physical Resources, University of California/Berkeley

[Team leader, University of Virginia evaluation.]

After having advocated such a program for many years and now having had the opportunity to serve on an evaluation team, I can give the program a very positive affirmation.

The program is not only an excellent "self help" tool for the facilities manager, but it is viewed positively by the campus administration, faculty, and general campus clientele. The evaluation team is staffed to meet the needs of the individual campus. Consequently, their rapport and perspective provide a credible evaluation that identifies the effective strengths of the program, while providing an objective review of the service shortfalls that indicate unmet needs and expectations.

The quality of the team members is exemplary and, when compared to the economical cost to the participating institutions, is one of the biggest bargains to be found when bringing in outside expertise.

This is truly the right program, for a critical need, at the right time in providing a quality, economical service to our higher education colleagues.

Bill Neland, Associate Vice President for Administration and Finance, Oregon Health Sciences University

[Team leader, University of Toledo evaluation.]

The invigorating thing about APPA is the many opportunities it presents



its members to both take from the organization and to give back to the organization and to the profession of facilities management. The essence of both these postures is made most vivid in the Facilities Management Evaluation Program. Here the giving and the taking become a sharing that is synergistic.

Institutions do not request an APPA evaluation to learn that they have no problems in their facilities management areas. But the fundamental benefits come not from the identification of these problems, wherever or whatever they may be, but rather in the search for them. This is where the give and take, the sharing, occurs.

There is a certain bravado, no, chutzpa, to believe that a team that has not functioned together, perhaps has not even met each other, can enter onto a campus and in three to five days interview the management of a physical plant department, as well as the institution's business office, budget office, faculty, students, president, and other administrative officers; observe the broad picture as well as the small details that may reveal a larger flaw; and then compile this random wisdom into a coherent, analytical, and hopefully, beneficial report that reflects well on APPA, and which may lead the subject institution to exclaim on how it missed such an obvious and singular recommendation.

The test of the Facilities Management Evaluation Program will be when APPA is able to evaluate improvements that flow from the recommendations. The evaluation effort is not an end, but is a means to an end—that being an improved and more productive physical plant operation. It will be disappointing if an institution evaluated two or three years ago could have the same problems found if evaluated today.

Bill Daigneau, Director of University Facilities, University of Rochester

[Team leader, University of Texas M.D. Anderson Cancer Center evaluation, team member on two other evaluations.]

Undergoing a formal facilities evaluation is much like going for your annual physical examination. While you intellectually know that it will be good for you in the long run, most of us still have some fears that the doctor may discover something unpleasant.

So, if you are going to do this, you want to be assured that your doctor is competent, thorough, and professional. Likewise, knowing that those entrusted to conduct an evaluation of your facilities operation are respected and knowledgeable facilities professionals, helps ease the uncertainty of this process.

APPA's use of practicing professionals in the field of higher education facilities management offers institutions a number of significant advantages over other alternative evaluation approaches. First, APPA often recommends that a pre-evaluation site visit be conducted by the team leader. This opportunity to visit the campus and meet with the institution's senior management helps ensure that the institution's objectives for the evaluation are fully covered and that key issues or conditions are identified. It also provides an opportunity to confirm with the institution the composition of the team and the criteria to be used in the evaluation.

Second, based on first-hand knowledge of the institution's characteristics, a request for appropriate information and documentation can now be made. The advance submission of documents detailing budgetary and financial conditions, organization and staffing, policies and procedures, and the administrative aspects ensures that the entire team is given an accurate "baseline" picture of facilities management at the institution.

The pre-evaluation site visit—and the advance review of pertinent documentation regarding the institution and the management of its facilities—lays the groundwork for the actual site visit by the entire team. It is this process that allows the team to focus its attention on the real issues, often of quality and/or effectiveness. This focus allows APPA to conduct its site visits in three to five days, versus the three to five weeks required by consulting firms. Not only does the institution receive a realistic evaluation, with practical implementable recommendations, but does so at from one-third to one-tenth the cost of for-profit consulting firms.

Upon completion of the site visit, the evaluation team meets to summarize its findings and develop its recommendations. A draft report is provided to the institution for its review and comment. This review is important if one recalls that the intent of the

evaluation is to help the institution improve the management of its facilities. The institution's review helps ensure that conclusions of the team are based on factual data and that the team's recommendations are "doable."

Having participated in these facility evaluations, including one as the team leader, I can honestly say that APPA's approach is superior to that provided by other firms or services. This is because care has been given to develop a comprehensive set of evaluation criteria, and because the evaluation itself is conducted by people who understand the practice of facilities management within the higher education environment.

David Bachrach, Executive Vice President for Administration and Finance, University of Texas M.D. Anderson Cancer Center

[M.D. Anderson Cancer Center evaluation contact.]

The University of Texas M.D. Anderson Cancer Center is a publicly supported comprehensive cancer center. Founded in 1941, the cancer center is celebrating its 50th anniversary. It was created by an act of the Texas State Legislature to serve the people of State of Texas, the nation, and the world.

The mission of the center is to eliminate cancer and allied diseases as significant health problems by developing and maintaining integrated programs in patient care, research, and education.

The 1991 operating budget for the University of Texas M.D. Anderson



Cancer Center exceeds \$500 million, of which approximately 20 percent comes from general revenue funds from the State of Texas. The balance of its income comes from the operation of its 514-bed hospital and its large ambulatory patient service program. Its Houston operation has sixty-eight buildings totalling 2.8 million square feet. This is divided into approximately 45.6 percent for patient care, 27.6 percent for research, and 26.8 percent for administration, education, and other purposes.

The institution's pervasive commitment to excellence extends to the Office of Administration and Finance. The executive vice president, whose tenure began in January 1989, has developed a performance review and enhancement process for each of the units, one of which is facilities, under his direction. The office of facilities includes three major divisions: facilities services; design and construction services; and the office of major building program.

The first unit review and evaluation was facility services. This unit is made up of the following major divisions: biomedical instrumentation; building services; environmental health and safety; facilities resources; and physical plant.

The institution's unit performance review is a five-part process, which includes the following:

1. A self-evaluation of the unit by the senior administrator and his or her support staff.
2. An intramural review conducted by clients (i.e., other units of M.D. Anderson) of the unit.
3. An extramural review conducted by experts selected from successfully managed institutions with features comparable to those at the M.D. Anderson Cancer Center.
4. The development of a work plan based upon the identification of opportunities for performance improvement resulting from the intramural and extramural review, and implementation of that work plan.
5. Follow-up evaluation of the efficiency of the work plan implementation, fine tuning of the plan, etc.

The leadership of many of the administration and finance units serve as members, if not leaders, of professional organizations representing their areas of expertise. In some cases, these

professional organizations have a formal peer review process that they offer to their member institutions. APPA, which was selected to conduct the extramural review of facilities services, has such a process. The executive director of facility services initiated contact with APPA, and further discussions were held by the evaluation team leader with the executive vice president. The review team was recommended by the APPA team leader to the executive vice president and concurrence was reached on its membership.

Copies of the self-evaluation and intramural report were provided to the APPA team, along with the expressed written objectives of the extramural review.

The APPA team was on-site for three days (two interview days), and met with forty-eight people, including the president, executive vice president, and other senior officers of the institution. A draft report of their findings and recommendations was received and reviewed by the senior staff in facility services, during which time an opportunity for the clarification of the data and any correction and interpretation of factual information was offered. A final APPA report was issued thereafter. The process is a lengthy one, which may vary based upon the size of the unit being reviewed.

Since this was the first major review conducted for an Administration and Finance unit, greater time was taken as we refined the protocol. Additional reviews are now underway in the faculty practice plan, human resources, police department, and materials management (a component of business affairs). All units will complete their reviews within a five-year period after which time the cycle will begin again.

The leadership of the University of Texas M.D. Anderson Cancer Center is grateful to APPA for having developed and participated in this review process. We found their work to be professional, insightful, and extremely helpful.

Norm Bedell, Assistant Vice President for Physical Plant, Pennsylvania State University

[Team leader, Smithsonian Institution evaluation.]

The Facilities Management Evaluation Program is a natural service for

APPA to offer to its members. As an organization of professional managers of facilities, we have members who are achieving high results in the implementation of good management techniques and practices. For various reasons, we also have members who are not achieving such high results; the FMEP offers a way of matching high achievers with those who can use the advice.

The program also improves on the other opportunities we have to share experiences, such as one-on-one discussions, personal visits to other institutions, and by bringing together a team of several experienced managers to the institution that is being evaluated. The FMEP blends the experience and philosophy of the team members in a format that presents their organized thoughts and recommendations for improvements in the organization being evaluated. Other than highly paid consultants, there is no more effective way to provide thoughtful facility evaluations than this APPA program.

I was honored to serve as team leader for the evaluation of the Smithsonian Institution. The team members each brought different backgrounds and management philosophies to the evaluation visit, and our discussions with the Smithsonian staff were in areas we felt were our areas of highest competence. After each day's interviews we discussed the comments we had heard and then shared our thoughts on the group's successes in meeting their goals. We also discussed the self-evaluation and institutional profile prepared by the Office of Plant Services (OPLANTS) of the Smithsonian and asked ourselves if they had adequately identified their strengths

and weaknesses in these reports. Early in the process we concluded that OPLANTS staff had a very good understanding of their organization.

During the three-and-a-half days of the on-site evaluation, we experienced an intense time of preparation, interviews, analysis, discussion, and report drafting. We spent twelve to fourteen hours together each day and became good friends as well as a closely knit team. We were generous with our thoughts about the information we had gathered and expressed our opinions to each other about the management programs in place at the institution. We found that members of the OPLANTS staff expressed an interest in giving us their frank comments and recommendations to improve their organization. Those of us on the team were very impressed with the enthusiasm and excellent spirit exhibited by the organization.

Preparation for performance of the evaluation was a demanding task for both the institution and for the team. The Smithsonian staff had prepared a detailed self-evaluation and institutional profile with supporting documents. The team had this information several weeks before our visit to Washington, D.C. We all read general information and then focused our attention on the specific sections of the report that we had agreed to write. Thus, when the team assembled in Washington, we were able to review the information for our specific sections of the report and reach a clear understanding of the OPLANTS organization and functions.

The first day we also met with the leadership of the organization to hear their concerns and goals for the evaluation and also for the team to clear up any questions about the organization we had from review of the information sent to us earlier. We also toured a few buildings to develop a better understanding of the unique nature of the Smithsonian facilities.

We spent two long days interviewing directors, managers, supervisors, and tradespeople in their offices, shops, and work sites. We also met a cross section of the Smithsonian leadership and the customers served by OPLANTS.

On the fourth day we concentrated on developing our exit briefing, which was a fairly detailed outline of the final report's comments, conclusions, and recommendations. The exit briefing provided an opportunity for the

team to clear up any questions and for the Smithsonian to correct any obvious misconceptions the team may have developed. A comment was made at the end of the exit briefing that the Institution had received about 80 percent of the benefit of the evaluation during the visit and the exit briefing. I support that conclusion.

The written report was prepared in sections. Each member of the team prepared the discussion, conclusions, and recommendations for the sections he had agreed to handle. We then sent each other the draft reports and reviewed the information in them.

My job was to pull the sections together and ensure the various sections were consistent with each other and the format of the report. Initially, I was concerned there would be duplication of comments and recommendations, but this did not become a problem because we had reached an excellent understanding of each other's ideas and concerns during the preparation for the exit briefing.

The members of the team asked ourselves two questions—"Was the effort worthwhile?" and "Would we do it again?" I can't speak for everyone, but I believe in this program and feel that we were able to provide our thoughts, experience, and philosophy in a well-coordinated manner. The report format ensured that we considered all functional areas of the organization and gave us a framework to present our thoughts. The exchange of ideas with the members of the Smithsonian staff was an important part of the evaluation.

Of course, during any visit or exchange with our counterparts we always bring back to our own organizations some ideas for improvement. I found this to be true with this evaluation. Thus, it was definitely worthwhile from my point of view and I believe it was worth the cost and effort from the institution's point of view, too. Would I do it again? Probably yes. It was a lot of work, but the benefits are also high.

An important key to a successful evaluation is the attitude of the organization being evaluated. This is not a program one should begin without a firm commitment to do a good job. Much effort is required to prepare the self-evaluation and institutional profile. In addition, during the visit, day-to-day operations for the managers and supervisors will be seriously affected. Every person in the organiza-

tion should know the purpose of the evaluation and be encouraged to be active supporters of the process. Fortunately, we found all these characteristics in the Smithsonian's staff. We were greeted with enthusiasm at all levels of the organization and we were given access to any person or information we requested. Thus, any success we enjoyed is due to the dedication and wholehearted support of Mike League and his staff.

Mike League, Director, Office of Plant Services, Smithsonian Institution

[Smithsonian Institution evaluation contact.]

The Smithsonian Institution has been an active affiliate member in APPA since 1972, and over these many years has supported and benefited from the numerous programs and educational opportunities made possible by membership in the association. Therefore, when we made the decision that OPLANTS would benefit from an independent evaluation of its current operations, the choice of APPA to conduct the evaluation was an obvious one.

It is important that the physical organization of the facilities services operation be structured and functioning in a mode that provides the most effective and efficient service possible to the Smithsonian Institution. Knowing the professionalism of the members that comprise APPA from our many years of interaction, we were confident that APPA could provide us with valuable information to ensure that OPLANTS was indeed supplying the most responsible and economical service possible within available resources.



Once the decision is made to have the evaluation performed, the most important and critical aspect of the program involves the selection of the evaluation team and the completion of the self-evaluation that addresses the topics and format defined in the evaluation program. The evaluation team selection, while important in its own right, became much more important for the Smithsonian because of the obvious differences between our physical plant operations and most public and private universities.

We were very careful in reviewing not only the areas of expertise of each possible team member, but where this expertise was obtained. We searched for team members who showed work experience in government and private industry as well as in universities. It is important to tailor the makeup of the team to the particular circumstances of your organization to ensure that a fair and knowledgeable evaluation is conducted. It was obvious from the results of the Smithsonian evaluation that the time spent on selecting our evaluation team members was well spent.

The completion of the self-evaluation portion of the program proved to be the most difficult and yet the most useful part of the program for me. There is an obvious tendency on the part of most physical plant directors to think their operation is almost perfect. Even when they know there are problems, there is a natural hesitancy to publicly acknowledge those problems. I know I had difficulty at first with this aspect. However, I finally reached the conclusions that it would be far better for me to acknowledge a problem existed and explain what is being done to try and remedy the problem, then have the problem surface as a result of the evaluation process.

If I learned one thing from the evaluation program process, it was that one needs to be honest—even painfully so—with not only yourself and your organization, but with the evaluation team. Honesty helps the team do their job more effectively and efficiently. Approach the self-evaluation like you are on the outside looking in. It is not easy, but is well worth the effort if you can succeed. I learned more about my organization, both good and bad, than I gathered after six years as director. As a result of the self-evaluation, I feel that both I and my organization have improved.

After all the preparatory work, the on-site evaluation portion of the pro-

gram seemed sort of anti-climatic when it arrived. I was impressed with not only the friendliness and knowledge of each team member, but with their dedication to completing the task at hand. I can assure you that the team members did not have a vacation away from their campus. Each spent ten to eleven hours at the Smithsonian, each day, and who knows how many hours in the evening sorting out their notes.

After two days of meetings and interviews with approximately fifty people both in and out of OPLANTS, the team presented an oral report of their findings. I expected a very sketchy presentation because how much can one put together after two very full days. Boy, was I surprised. I sat in amazement as the four team members went through one of the most detailed briefings I have ever attended. I saw my organization reviewed from one end to the other, and both the good and the bad points brought forward. In two short days, four people seemed to know my organizational strengths and weaknesses as well, if not better, than I did. There were but a few findings that I would even attempt to ar-

gue with.

In summary, the team did well and I will forever be the benefactor of their efforts. Now that it is over, would I do it again? The answer is an emphatic YES. I admit that the evaluation results indicated that the Smithsonian Institution was being well served by OPLANTS in the accomplishments of its mission, and this conclusion makes it easier for me to say yes. However, even if the results were different, I believe the information obtained from the process would be beneficial in helping me and my organization grow and aid our customers.

In closing, I would like to again thank APPA and our evaluation team; they did a yeoman job. If you need a team who works well together, this was one. They were terrific. We implemented a number of the evaluation recommendations, and more are in the process of being implemented, and even before we received the final report. That by itself should give you an idea of our opinion of the merit of the APPA Facilities Management Evaluation Program. Feel free to have anyone contact me for a recommendation. I think APPA has a winner!!! ■



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The physical plants of colleges and universities are diverse, complex, and demanding. Maintaining these facilities requires dedicated individuals working with creativity and cooperation so that their colleges and universities can fulfill their goals of educating students and broadening the knowledge available to all.

APPA recognizes outstanding physical plant departments with its Award for Excellence in Facilities Management. The award goes not to individuals, but to departments for their contributions to their educational institutions and the discipline of facilities management. See the spread and application form on pages xx-xx for information on changes to the Award for Excellence program.

This year, the awards were presented at the 78th Annual Meeting of the association held in July in Orlando, Florida. APPA presented two international awards, one in the small campus category (under 5,000 full-time equivalent enrollment) to Fayetteville State University in North Carolina; and one in the large campus category to the University of California at Berkeley.

Receiving regional awards in the small campus category were Southeastern, Fayetteville State University; Central, University of Tulsa (OK); and Rocky Mountain, South Mountain Community College (AZ).

Receiving regional awards in the large campus category were Eastern, Mohawk College of Applied Arts and Technology in Ontario; Southeastern, Virginia Polytechnic Institute and State University; Central, University of North Dakota; Rocky Mountain, Northern Arizona State University; and Pacific Coast, University of California/Berkeley.

The winners were selected by APPA's Professional Affairs Committee using such criteria as purpose and goals; organization and resources; pol-

AWARD WINNERS IN '91: Delivering the Best in Services

by Brooke C. Stoddard



Fayetteville State University

icies and procedures; personnel training and development; fiscal planning and management; campus condition and appearance; communications and quality of relationships; and campus planning for future development.

Each winning institution submitted application material that included an indepth self-evaluation and supporting documentation. Following are just a few examples of how each institution has excelled at delivering quality facilities services to its campus community.

THE INTERNATIONAL WINNERS

Fayetteville State University

Tracing its history to 1867, Fayetteville State University, Fayetteville, North Carolina, has increased its enrollment 30 percent in the past three years and in the process has become more of a community university. The

Fayetteville State HVAC workers.

university's 156 acres and forty buildings serve more than 3,200 students. It is constructing new facilities for the school of business and for physical education. The physical plant department recently won a beautification award from the city of Fayetteville. There is tremendous change underway, and the physical plant depart-

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University of California/Berkeley.

ment is playing a key role in bringing the campus into the future.

Multi-Disciplinary

George Benstead, the director of physical plant, says that he and his staff have to be especially innovative since they not only do the jobs of most similar departments around the country, but also maintain the athletic fields, the pools, and perform custodial duties for the dormitories.

As a tactic for coping with its many responsibilities, the department is moving steadily to a multi-disciplinary approach. It is training employees within the skilled areas to be proficient in each of the department's trades. Employees will increasingly work in teams, the less skilled learning from the experience and advice of the more skilled. Formal classes and seminars will assist in this training effort.

On staff are only two electricians, two plumbers, two carpenters, two painters, and six HVAC technicians. In all, the department has about sixty people, including thirty custodians and eight groundskeepers. "Right now, each person is assigned a building," says Benstead. "That person is trained in the building's HVAC system, boiler, plumbing, and so on. The person is taken through the building separately by persons knowledgeable in a certain skill, and all the equipment is explained. The employee gains a good deal of knowledge in the

various disciplines. This has been working very well for us."

By using a multi-craft system, work orders have declined 50 percent. Only when a building craftsman cannot solve a problem is it written up for a specialized tradesperson.

In addition, the department believes that the appearance of the staff and of the equipment they use reflects on the quality of the university. Benstead began having the staff wear uniforms, which have their names attached, plus their skill areas. "There were gripes at first," admits Benstead, "but the new people coming in like it a lot. They ask for their uniforms right away. I think the uniforms lend more dignity to the department and the university."

Computerized Preventive Maintenance Program

The department runs a computerized preventive maintenance program. The computer houses data on boilers, air handlers, air conditioners, and electrical equipment, plus the fleet of cars and trucks. The printouts alert the staff to needed maintenance, and from season to season the printouts change in order to accommodate the needs of boilers and air conditioning equipment.

A typical preventive maintenance work order for a vehicle lists its location, work priority, and detailed instructions for work, as well as who planned the work, who approved it, and appropriate dates.

Another program that physical plant has put together is one for the removal of hazardous waste. The university's Chemical Hygiene Plan meets environmental and Occupational Safety and Health Administration regulations and includes policies, procedures, and responsibilities designed to develop employees' awareness of potential hazards with the chemicals they encounter. A chemical inventory is performed annually. A complete list of chemicals is kept with the university health and safety services and is computerized to allow for sorting according to manufacturer and location.

University of California at Berkeley

Situated on more than 1,000 acres, the University of California at Berkeley comprises more than 230 buildings and educates more than 31,000 students. It has a reputation of being one of the outstanding academic universities of the world.

In fact, this standing for academic achievement goes hand in hand with its physical plant services department and its staff of 500. According to Karl Mellander, the acting director of the department, "The level of excellence among the faculty spurs us to look for and retain people of excellence for our own department."

The former director, Paul F. Tabolt, who recently accepted a new job at the University of Colorado, agrees. "People have made the physical plant department at Berkeley what it is. They are innovative and willing to go to new heights. We learned, like many others, that if you empower people to do what they do best, they will do it, and with a very high degree of excellence."

Customer Service Center

One outstanding feature of the UC-Berkeley program is its Customer Service Center. At other colleges and universities, this may be called the service desk or work order center, but according to Tabolt the department wanted to send a message to the university community that the department was trying to go the extra mile to serve them with excellence. "We wanted to show that we would be there for them and to set the right tone immediately."

The Customer Service Center has a single telephone number. Anyone on

Award for Excellence in Facilities Management

campus can call it for work that needs to be done; there is no need to call one number for electrical work, another for plumbing, and so forth. The center's staff of eight prioritizes the work orders into groups known as A, B, and C and enters them into a computer. "A" work orders require immediate attention—staff mechanics are alerted by radio to attend to these at once. "B" orders are generally scheduled for the following day. "C" orders are the ones without a pressing deadline.

In addition to the telephone number, many departments around campus can enter work orders through remote terminals, about 100 of which are now scattered among the university buildings. Customers can also inquire through the remote terminals the status of each work order. Presently, a goal of the department is to send work orders for printout at remote terminals.

Quality Circle Program

The department runs a quality circle program. "I was against the idea at first," admits Tabolt. "I thought they would be an opportunity for people to get together and waste time. But better heads prevailed and the department now has a very productive program."

As an example, he cites an instance of steamfitters coming up with an idea, making an excellent presentation, and following through to see that the idea was carried into action. The proposal was to eliminate the temporary installation of 220-watt power; the steamfitters proposed that when 220-power was required, they would make a permanent installation instead of a temporary one so that it would be there when anyone needed it again.

"It was a case of management not being able to see the forest for the trees," says Tabolt. "Of course it made sense, and it ended up saving a lot of money. The staff came up with the idea. The real value of the quality circle program is sorting through ideas. Everyone has twice as much work as he or she could ever get to, but the quality circle program sifts through ideas to come up with the ones that really should be done."

Training

Another high priority within the de-

partment is training. Under Tabolt, a training coordinator was hired to identify training needs, to keep the staff knowledgeable of new technology, and to encourage the notion that education and development can and should continue throughout one's career.

Mellander points out that the technology of building construction and maintenance is changing and that the staff has to be trained to keep up with technology. This applies to materials, paints, piping, computers, and more.

"In addition," adds Mellander, "we take care to train our people in dealing effectively with their clients." That is especially important where so many scholars and scientists are working on many important projects—they expect the best, and the staff has to deliver it.

THE REGIONAL WINNERS: LARGE CAMPUS

Mohawk College of Applied Arts and Technology

Fourth largest of the colleges of applied arts and technology in the Canadian province of Ontario, Mohawk College comprises thirty-two locations and has a main campus of forty-two acres in the city of Hamilton. The physical resources department comprises about 150 persons.

Staff Enrichment

Of particular note in the Mohawk College program is the emphasis it

places on staff development, including training and the exchange of information and ideas. Ron Baskin, associate director of physical resources, points out that the employees gather five times a year for a safety meeting. Each meeting lasts a full morning, during which speakers from outside the college are heard and ideas from persons at the various campuses are exchanged.

In addition, once a year the staff goes on a two-day retreat. During these sessions, the staff also learns from outside speakers, especially in the field of better understanding and meeting the needs of those for whom the staff works.

"Really, the group is one huge team—there is no doubt about it," says Baskin, who joined Mohawk only two years ago from industry and is in a good position to more readily detect the staff's distinctive qualities than someone who has been there much longer.

Environment

Mohawk has an active commitment to the environment, says Baskin. It was years ahead of others in Ontario in replacing 40-watt fluorescent bulbs with 32-watt bulbs that consume less electricity. The local electric utility is now actively trying to get other institutions to follow. Baskin also points out that the department is working diligently on a strategy of chilling water at night for use the next day in



Mohawk College of Applied Arts and Technology.

Award for Excellence in Facilities Management



Northern Arizona University Social and Behavioral Sciences Annex.

cooling buildings. This reduces the demand on electricity in peak daytime hours when rates are higher.

In addition, Mohawk has an effective anti-litter campaign, now several years old. Each September, students and staff assemble a table of litter in the cafeteria, cordoned off but piled high with the kinds of trash that they hope never to see around the campus grounds. Then a student costumed as the Litter Critter, a fanciful creature featured on campus litter baskets, is ceremoniously hauled before a "trial judge" and "sent to jail" for his crimes (his portrait on litter baskets is seen behind bars). As a result, says Baskin, "Our campus is exceptionally clean."

Mohawk is a leader in recycling as well. Baskin says that for the last two years they have been recycling paper and aluminum cans. Students are eager to participate in the program. "We have a simple, but effective program," says Baskin. "It is not very costly, and we run it at a net gain. Unlike some places, we are paid for our fine paper (computer paper). That has helped pay for the cost of purchasing recycling containers. It really is a super program. We have no problem with people complying."

Other Innovations

The department has been a leader in other areas as well. For one, it was the first department on campus to install a facsimile machine. It did so as a means of becoming more productive in communicating both within its own division—for routing purchase orders and so forth—and with outside entities. That was three years ago. Since

then the college has followed the department's lead.

In addition, it has a Merit Mug Award. The award is presented to members of the staff who go beyond the call of duty to be of service to the college or community. Persons receiving the award have helped visitors to the campus find help for their malfunctioning cars, helped persons with medical emergencies by taking them to the health department, and helped persons with disabilities.

The physical resources department won the college's President's Award for Excellence, a citation from the city for the community's best-kept grounds, a student appreciation award for going beyond the call of duty in helping students, and other awards.

Northern Arizona University

Northern Arizona University is located on a 730-acre site in Flagstaff. It is home to some 16,000 students and is surrounded by exceptional natural beauty, consisting of mountains and canyons.

The director of physical resources, Fred A. Giles, explains, "We do everything there is to do that is physical here—grounds, custodial, locks, utilities, and so forth." The staff numbers 286 full-time employees, plus seventy-five students, and up to 150 temporary and part-time workers.

Efficiency and Innovation

The Northern Arizona University Physical Resources Department has a number of innovative and distinctive programs. One of them is the bar coding of incoming materials for easier

tracking, inventory control, and budgeting. Originally, the department was only going to implement bar coding in its maintenance stores division to reduce data entry and purchase transaction time at the counter, but it branched into bar coding throughout the department. Now, for example, it has under consideration the bar coding of work orders and employee IDs not only to help track specific job costs, but also time spent on each job. It is also looking into bar coding deliveries in the fashion of Federal Express.

Another distinctive feature of the department is its lock shop. Giles calls it "second to none." The department has on staff three certified master locksmiths (of only 400 in the world). They have devised a system for allowing student workers to make repairs, but without compromising the security of university rooms. The important ingredient is a color-coded turntable developed by the locksmiths that tells the operators how the repairs should be done without informing them of the codes linked to the colors. "A new core for the lock whose key has been lost can be reset in half an hour," says Giles.

The department is also able to boast its own 135,000-square-foot building put up less than two years ago. It is a modular, pre-engineered building, but does not look it because of the added veneer. Rather than costing the customary \$80 to \$120 per square foot associated with most buildings on campus, the department put up its building for a mere \$40 a square foot. Inside are all fifteen sections of the department, including bays for the fleet of seventy-nine on-road vehicles (the department also maintains 350 other motorized vehicles).

A recent innovation was carried out in conjunction with a Coopers & Lybrand study of physical resources. The state had been mandating that the three state institutions of higher learning evaluate one-third of its buildings each year. But this time around, rather than submit three separate reports, the department worked with the other institutions to render a single report. The department also worked with the other institutions to develop a single and coordinated infrastructure plan to determine deferred maintenance needs.

Personnel Development

Physical resources has a number of distinctive personnel programs. One is offering its departments the option of having its members work four 10-hour days. All departments except that of the custodians elected to do so, the custodians feeling their work was too demanding for such a schedule. With the 4/10 program, the campus is fully covered Fridays, Saturdays, and Sundays, because some employees have elected to have those days as regular work days. Consequently, physical resources is saving on overtime and compensatory time.

The department also operates a zone program for many employees. Rather than being given the whole campus as territory, many employees are given individual sections of buildings and grounds. "This has been very successful," according to Giles. "It has given a sense of ownership to our people, and they appreciate it."

In addition, the department shortcuts many work orders by having building overseers (not members of physical resources but persons working in the buildings) write down work to be done on a centrally-located sheet. Mechanics operating in these sections see what needs to be done more quickly and get to the work faster under this system.

Giles also holds what he calls 18+2 meetings. He invites eighteen employees plus a member of the university community—a vice president or dean, for example—and sits down with them to knock around ideas, complaints, whatever. These meetings keep the lines of communication open and the ideas flowing.

Virginia Polytechnic Institute and State University

Virginia Tech (VPI) is the largest institution of higher learning in Virginia. Its campus stretches through 2,000 acres in the town of Blacksburg, just west of Roanoke. It hosts more than 22,000 students, comprises more than 100 major buildings, and can count more than 6 million square feet of floor space.

The director of physical plant, F. Spencer Hall, is also the institution's vice president for facilities. Hall points out that institutions of VPI's size

might have a physical plant staff of 700, but at VPI the number is only 350. "The department is almost totally computerized," says Hall, "and that allows us to make up for the low number here."

Staff Members

One result of having a relatively low number of staff is putting a good deal of emphasis on their development and well-being. The department engages in extensive training for its people, and on three levels. "We believe our non-supervisory people are exceptionally important," says Hall. Training at this level includes stress management and techniques in getting along with others. Supervisors and managers receive more emphasis on customer satisfaction, leadership, and management skills. "We have a very dedicated staff," says Hall, "and we have very little turnover."

Also to compensate for the relatively low number of staff, the department has invested heavily in labor saving machinery. That includes large-swatch grass mowers and floor cleaners that cover half a hallway at a time.

Not only does the physical plant department perform all the normal functions one would expect, but it has some extra and odd duties as well. For example, since 1893 it has run the Virginia Tech Electric Service, which is the electric power company for 6,000 residential and commercial clients in the town of Blacksburg. It also runs what it believes is the last university-operated stone quarry. It quarries and

cuts by hand all the stone used in the university buildings.

Renovation Program

The department conducts an extensive and efficient renovation program. Typically, the department runs 400 renovation projects a year totaling \$5 million to \$6 million. Its involvement in these projects runs from estimating to finish carpentry, and it generally does the work for 20 percent less than an outside contractor could. The department is prepared to tackle jobs of almost any size and recently completed a \$1.2 million renovation of the President's House.

To begin, the department has a staff of three estimators. They typically work on ten to fifteen projects a week, using estimating software and PC-AT computers. Once estimates are approved, work proceeds to the materials expeditor and scheduler. The department has its own purchasing department that works to avoid what is typically the worst bottleneck for renovation work, the slow delivery of supplies.

The scheduler also works with a computer to track progress. Ongoing expenditures for the work are also logged onto a computer; budgets are carefully watched.

Most of the work from grading to plumbing and finish carpentry is done by in-house staff. Where extra help is needed, the department has in place "body contracts" to bring in additional tradespersons from outside the university.



Virginia Tech



University of North Dakota Old Main Memorial Monument

Air Quality Program

The department tackles head on problems related to "sick building syndrome." A specialized crew of eight cuts into and crawls through ducts, cleaning them and painting the interiors with anti-microbial paint. They also install high-efficiency filters. In addition, the department conducts engineering studies of ductwork to determine where physical alterations, such as the introduction of new dampers, might improve air quality. The work is labor-intensive, but thorough.

University of North Dakota

Situated on 570 acres in Grand Forks and composed of 240 buildings, the University of North Dakota hosts 15,000 students and is the largest institution of higher learning in the Dakotas, Montana, Idaho, and Wyoming. The physical plant department is headed by LeRoy Sondrol.

High-Technology

Despite being removed from major urban centers, the physical plant department of the University of North Dakota is exceptionally well-versed in high technology. In fact, according to Sondrol, the relative remoteness of the site has led to a reliance on sophisticated technology to make up for the lack of other resources.

The university, for example, is one of only two national testing sites for a major technology company, which asks the department to assist in designing and then testing major hardware and software. The department has wired the campus with fiber-optic cable, a move that makes the campus far more automated than most. The department runs a highly sophisticated building monitoring program and energy management program.

In addition, the university operates one of the largest aviation schools in the world. And although it does not perform maintenance on aircraft, it does learn a great deal about the world's most advanced technology by seeing what is being done with aircraft and by maintaining both the aircraft facilities and helping to run the weather monitoring system.

The department also runs a design engineering section that works on computer aided design (CAD) projects about twelve hours a day.

Energy Efficiency

"One result of being relatively remotely located is that we have become exceptionally self-sufficient," says Sondrol. "In fact, we pride ourselves in it and in our inventiveness."

One way this shows itself is in energy efficiency. The physical plant department has made the university the

lowest consumer of energy per square foot of any institution or agency in the state; when compared to similar institutions in the United States, it ranks in the lowest quarter. Sondrol credits this to "good people who are well-versed." He also points to an electronics crew that can install sensors and monitoring devices.

The department operates a sophisticated electricity-saving program. Devices monitor the use of electricity in various buildings, its main computer always searching for both high consumption and low consumption and places to "shed" fifteen-minute blocks of electricity. The effort helps to reduce peak hour charges. What is more distinctive is the department's steam-saving program. The idea is the same, and the hardware and software are basically the same, but the product is different. This steam-shedding program is synchronized with the electricity-shedding program.

Recently, the university in conjunction with the North Dakota State College of Science received a grant to further automate and manage its steam plant, the one at UND being capable of producing 300,000 pounds an hour. The new equipment would allow the steam plant to be "managed" as well as operated, that is, to run it so as to maximize fuel usage and energy dollars.

The department, after rejecting outside contract bids for the project installation because of their high costs, rewrote the specifications itself, accepted bids for the equipment, and installed it with its own people. In fact, it did the job so well that it received \$35,000 back from the equipment manufacturer for engineering support that the department ultimately did not need.

Motivation

The pride that Sondrol takes in the self-sufficiency of his department is reflected in that taken by the individual members of his staff. "We don't believe in a lot of supervision," he says. "Instead, we believe in a lot of freedom and high expectations. We lay out the job, say what we expect, and the employees get the job done by their own devices. If we are particularly distinguished, then it is on account of our people and their attitude."

THE REGIONAL WINNERS: SMALL CAMPUS

University of Tulsa

The University of Tulsa occupies an urban campus and is home to 4,500 students. The physical plant department consists of about 103 full-time persons, and in the summer about a dozen students.

The director of physical plant, William Johnson, points out that morale in his department is exceptionally high. "We hardly ever get a resignation from one of the trades," he says. "We work very hard at keeping the channels of communication open at all times, explaining our policies and listening to our employees. We have numerous awards, and we host several dinners throughout the year. Attendance here is outstanding."

Cost Savings

One of the fruits of the high morale is a vibrant suggestion system for lowering costs. The department has won two Cost Reduction Incentive Awards in recent years from the National Association of College and University Business Officers.

The first award was for a means of cooling computer rooms. Conventional methods call for mechanical refrigeration equipment, which are sometimes run only part of the time. The first-cost is high and so are the operating charges. The department instead decided to use cooling tower water. But because cooling tower water cannot be used in the closed loop used to cool the computer rooms, the department installed plate heat exchangers. These allow water in the computer room closed loop to be cooled by the cooling tower water. The system is simple, has no moving parts, and saves approximately \$35,000 a year. The payback period was only twelve months.

The second award saved money at the university swimming pool. Like many other pool designs of the 1960s, this one gave little thought to the cost of water or the cost of heating it—water that splashed into the gutters was pumped away to the city sewers and make-up water brought in. The make-up water had to be purchased and heated, and chemicals had to be added. At the suggestion of an employee, physical plant installed a res-

ervoir tank to hold and recycle pool water. The cost was less than \$1,000, but the annual savings has been about \$17,000.

Efficiencies

Physical plant has been innovative in other ways, too. It has been installing a computer network that ties in with the university's main computer. The network should offer a number of efficiencies. For one, work orders can be typed in from any department, not mailed to physical plant for entry there. The network will also help in inventory control and cost accounting. It will also speed billing to departments, especially important near the

end of the fiscal year so that charges do not spill into the succeeding year's budget.

Physical plant also has an exceptional asbestos maintenance program. A manager is licensed by the state in asbestos maintenance, and three workers are certified. When remodeling requires the containment and removal of asbestos, these workers do the job nights or weekends, and even with the overtime pay involved, the work is done at about one-fifth the going outside contractor rate. In addition, the university community feels better about having its own people do the work, believing they take greater care.



University of Tulsa, Kendall Hall

Award for Excellence in Facilities Management



South Mountain Community College courtyard and Student Union.

Image

Johnson points out that physical plant is very concerned about its image. It conducts a survey about every two years to see if it is properly satisfying its customers. In addition, it plants dozens of trees a year and encourages departments at Christmas time to buy live trees for decoration that the department can later plant around campus. The department also carries out a successful recycling program. Working with Browning-Ferris, it recycles aluminum, computer paper, and office paper. "Cooperation has been very good," reports Johnson.

South Mountain Community College

Located in Phoenix, Arizona as part of the Maricopa County Community College System, South Mountain Community College serves 3,500 undergraduates. Its maintenance and operations staff, under the direction of Phillip Belsterling, comprises twenty-two employees who care for the 104-acre campus plus the electrical, plumbing, and carpentry needs of four satellite campuses.

Hazardous Communications Program

Belsterling is especially proud of the Hazardous Communications Program he helped establish in 1988. Having learned from a seminar on new OSHA regulations that the department had to move swiftly, it did so, writing draft after draft until a twenty-five-page

version, plus updated regulations, was adopted.

"We have training sessions regularly on such hazardous materials as bleach, herbicides, and pesticides that our employees might be handling," says Belsterling. "In addition, we train our people about hazardous substances from the chemistry and biology labs that some might have to handle. We have also worked into these sessions appropriate measures to deal with Right-to-Know regulations.

"Our Hazardous Communications Program is now well established, and we are especially proud that we have Material Safety Data Sheets on all containers of hazardous materials handled by the staff or students. Additionally, in each Hazardous Communications packet located around the campus, we have all the emergency telephone numbers anyone could need."

Communications

The maintenance and operations department also has an advanced communication system. The department members keep in close touch with one another and with persons outside the department. Inside the department, a multi-function telephone system allows employees to forward and transfer messages, dial automatically, and store voice mail.

"We have pagers on all key personnel," says Belsterling, "and I have a mobile phone in my car. Each key person has a wallet-size card with im-

portant telephone numbers on it. We find that we use the beepers a lot. That way we can keep in touch with plumbers, administrative staff, and so forth, and they can keep in touch with me."

Energy Analysis

Five years ago, the energy system on campus was not automated. Staff had to go out each morning to start the chillers, pumps, and air handlers. Around 1986, the staff installed clocks on the air handlers to have them start and stop automatically. Later they automated the pumps and chillers. Still, these pieces of equipment were not coordinated, so they brought all the controls under the supervision of an energy management system. Now chillers, pumps, and air handlers can all be controlled from one room.

In addition, key personnel can tap into the energy management system computer with personal computers at home. Says Belsterling, "With my home computer, I can see what is and is not running on campus, and I can control what is running, too. I can shut off air conditioning, for example, to a building on a Saturday during hours when I know it is not being used. This creates savings in two ways: one, in energy saved, and two, in staffing, by not having someone sent out at overtime rates to make the needed changes on campus.

Training

SMCC also has an advanced training program, one for its employees and one that brings in and trains outsiders. Under the apprenticeship program, employees can advance through training into one of the craft positions. The department also participates in the Vision Program, by which any employee can request training in maintenance or non-related fields that would benefit both the employee's career and the department.

For bringing in outsiders, the department is involved in a maintenance outreach program that allows outside organizations to participate in on-campus training for grounds and custodial services. Goodwill Industries of Arizona was the first such organization involved. As a result of coordinated training, Goodwill Industries has placed five trainees in well-paid positions. ■

The greatest challenge facing university physical plant administrators in the 1990s and beyond is a problem they inherited from the past: rundown buildings, patched grounds, and obsolete operating plant equipment. A shortage of money, the decision to fund prestigious new academic programs rather than building repairs, and a lack of awareness concerning the importance of facility preventive maintenance programs, among other factors, have had devastating effects on the aging, even antiquated, physical plants at many of our nation's colleges and universities.

On many campuses, it's the mechanical systems and associated equipment that get replaced last when it comes to new construction planning. College and university administrators, hard-pressed to meet all their diverse capital improvement needs, find it difficult not to opt to build the automated new library or the 30,000-seat gym before replacing the mechanical infrastructure. Donors tend to prefer to see their names on handsome new classrooms rather than basement boiler rooms.

This shortsighted approach regarding mechanical systems greatly compounds a major problem confronting higher education today: the deferred maintenance dilemma. It's the mechanical systems, after all, that provide a college's or university's essential services—heat, light, and air conditioning. Always choosing the least expensive option (or exercising no option at all) when it's time to replace old systems or build new ones only hastens the deteriorating conditions found on many campuses today.

With these thoughts in mind, I'd like to discuss a recently constructed University of Pennsylvania mechanical systems project—a centralized chilled water plant we call "Mod Five" (for Module Five, the fifth such central plant servicing the campus).

James Wargo is executive director of physical plant at the University of Pennsylvania, Philadelphia, Pennsylvania.

MOD FIVE: Planning, Promoting, and Building a Central Chiller Plant

by James A. Wargo

Inside "Mod Five," the University of Pennsylvania's newest chiller plant - a look at the future of centralized air conditioning for college campuses.



The story of how we developed and built the new chiller illustrates in practical, real-life terms the importance of mechanical systems planning for the future, and not just the immediate present.

This chiller case study also offers insights concerning a centralized approach for campus air conditioning, as opposed to the individual building-by-building air-conditioning scheme common at many institutions.

An Innovative Facility

Mod Five is a highly atypical project. Before discussing its planning and development, its specific cooling objectives, and its equipment, mechanicals, and capabilities, it will be worthwhile to provide a quick preview of a few of its more unusual aspects.



\$53 million Clinical Research Building, with new medical facilities in the background.

Independently Housed

Due to the crowded nature of Penn's modest (260-acre) main campus in downtown West Philadelphia, academic departments must lobby constantly for every square foot of additional classroom and research space. Since Mod Five really is nothing more than just a big water cooler, it would have been customary to stick it off in an out-of-the-way basement. Despite these considerations, the new chiller plant was planned and built in its own aboveground and elegantly designed building, located next to the site of the future main entrance to the south end of the campus.

Building Interior

Facilities people are astonished when they first see Mod Five—it is unlike any chiller plant most have ever seen! It is not buried deep within the bowels of some building, its equipment crammed into every last square inch of space; instead, everything is carefully laid out (a "fantasy of color-coded water pipes and giant engines," according to the *Philadelphia Inquirer*), and its mechanicals are installed so they can be easily reached and serviced.

To replace a major piece of equipment—pump, filter, valve, chiller motor—all a technician must do is 1) pull the service truck through the plant's street level roll-up doorway (big enough for one trailer truck to enter or two trailer trucks to park) and go directly into the chiller plant; 2) detach the damaged piece; 3) then use one of two permanently installed, five-ton, pendant controlled bay cranes to lift out the defective piece of equipment; and 4) replace it with the new. A service job that might normally take weeks and cost tens of thousands of dollars (breaking through an adjacent sidewalk or plaza, dismantling the equipment, then craning everything out in small sections) now can be easily done in just a few hours!

Floating Concrete Beds

Another unusual aspect of the Mod Five design and construction plan are the two massive inertia pads upon which the chilled water and condensing water pumps and full flow filters rest. Measuring 62' x 10' and 63' x 13' respectively, these concrete platforms are installed on their own gigantic steel spring isolators so as to reduce vibratory effects from the chiller's huge pumps. The rest of the plant's rotating mechanical equipment is also installed on additional steel spring isolators.

Mod Five and the Penn Tradition

Mod Five reflects the special spirit of the University of Pennsylvania as well as that of its famous founder, Benjamin Franklin, one of America's most bold yet sensible thinkers. To understand Mod Five and how it came about, it will be helpful to first know something about Penn and its values and traditions.

Penn was started by Benjamin Franklin in 1740, which makes it our nation's oldest university. It is an Ivy League school with more than 20,000

students and tuition rates of more than \$13,000 annually at the undergraduate level. In addition to first-rate academic credentials, Penn also is a leading research university. It is responsible for such notable achievements as the invention of the computer (ENIAC), the use of tungsten in incandescent light bulbs, the discovery of RETIN-A to prevent the effects of aging, and more.

In fact, it was Penn's strong commitment to medical research that initiated the planning and construction of the Mod Five chiller plant.

CRB

When the old Philadelphia General Hospital was demolished in 1977, city planners, along with the University of Pennsylvania and other local organizations, began planning to develop the now vacant site adjacent to Penn's campus into a new medical care complex, to be known as the Philadelphia Center for Health Care Services. In 1983, the PGH Development Corporation was formed, a health care consortium that includes, besides Penn, Children's Hospital of Philadelphia and the Children's Seashore House, a long-term care facility for children. Penn's part of the development would be a new clinical research building, referred to as CRB, and budgeted at \$53 million. Research activities would center around molecular biology (Penn has become one of the world's premier centers of research and education in this field), with specific projects being conducted concerning AIDS, the common cold, and other infectious diseases.

For most building projects, planning for the mechanicals usually means attempting to squeeze everything into as tight an area as possible, thus freeing up the maximum amount of space for the building's mission—offices, laboratories, and so on. But this was not to be the case for CRB. Art Gravina, Penn's vice president for facilities management, decided that the planning of CRB's mechanical systems would be just as important as the planning and design of CRB itself. I joined Penn in 1985, just as the initial planning began. Thereafter, I was jointly responsible for supervising the Mod Five project with Gravina.

Special Air Treatment Requirements

CRB's air handling and air conditioning requirements would be exacting in the extreme, due to the spe-

cialized nature of the research activities conducted within. For example, air introduced into the building would need to be 100 percent clean and non-recyclable, unlike the recyclable air that is characteristic of most other buildings; this procedure would safeguard research results from contamination. Also, the air temperature within the building would need to be maintained at specific settings within selected areas (with an allowable hot/cold variance of only plus or minus two degrees), depending on the type of research being conducted. To protect the integrity of research results, this rigid standard would have to be met twenty-four hours a day, seven days a week, 365 days a year, and year after year. Failure to do so could invalidate the integrity of vital research results representing years of scientific study and millions of dollars in grants to the institution.

Air Conditioning Alternatives

Although Penn has adopted a centralized strategy to handle most of its campus air conditioning needs, we first considered a decentralized approach for CRB—installing chiller units in its basement. The building would be large enough to warrant its own chillers; it would be far less expensive to install chillers within CRB than in a separately built building; and it would be a problem freeing up a site for a new separately housed central chilled water plant on Penn's confined urban campus.

But as we looked closer at this option, serious shortcomings soon became apparent. And since many of these are reflective of what we believe are basic and irredeemable flaws inherent in the overall decentralized scheme for campus air conditioning, I will detail the more significant problems here.

Backup

Because of the importance of providing CRB with a totally failsafe system, a backup to the main chiller also would need to be installed. This would have to be available in case the primary system failed and for maintenance downtime of the systems. But a basement installation meant that any catastrophe that might throw the primary chiller system out of service (e.g., flood, loss of electrical service) could also shut down the backup system. So Penn would have invested in a standby chiller system that itself

might be unavailable when needed. (It is unlikely that such a situation could develop for a building that is part of a centralized system. At Penn, for example, nearly all of our separate chilling modules are "looped," so an emergency that shuts down service at one locale can be dealt with by simply feeding chilled water from another module.)

Service

If the new chiller was installed in CRB's basement, we would be forced to deal with the numerous service problems associated with that type of arrangement—difficulties concerning access, ease of service and maintenance, equipment replacement, and so on. The replacement problem, in particular, worried us: it could take up to a week to access the basement equipment hatch, provide a clear airway, and crane out a 6,000-pound motor or other large piece of defective equipment. We would be gambling the entire time that nothing would cause our backup system—operating now with no backup of its own—to go down. And that was a gamble we were not prepared to take.

Ground Water Table

The parcel of PGH land available to Penn, designated as the site for CRB, has a relatively high water table. This presented a major engineering problem concerning the location of the electrical substation that would be needed to supply building power. (Our plan was to house CRB's mechanicals and electricals together for economy purposes.) Placing the substation's transformers, high voltage switch gear distribution system, and other electrical equipment in a basement beneath the ground water line would create a hazardous situation. With the high water table and storm sewage lines above the electrical vault, safe operation would necessitate a specially designed hydrostatic concrete floor, 18 inches thick, incorporating trench piping and an expensive up drainage system (over 32 feet to ground level). Further, the system would be entirely dependent upon sump pumps. All in all, this was not an efficient or an acceptable situation.

Another reason militated against our installing a new chiller and electrical substation in the basement of CRB: the difficulty of providing mechanicals located in a below ground setting with adequate, properly humidified air cir-

culation—an essential requirement to promote optimum operation and the long-term life of the equipment.

Finally, since Penn's long-range plans call for another clinical research building to be built in the future near CRB, it would be more economical and efficient to provide air-conditioning to both CRB and the future research facility from the same centralized chiller plant.

Value of a Centralized Approach

We like the centralized approach to campus air-conditioning at Penn—it works well for us. During the cooling season, our centralized system, i.e., modules one, two, three, and four, supplies air conditioning to the majority of buildings on campus. This system had proven successful, both operationally and economically, in



Mod Five's planning team: from left to right, Charlie Boyle, Paul Williams, Jim Wargo, Juan Suarez, and Joe Botta.

operation at Penn for more than fifteen years.

Our good experience with the centralized approach to air-conditioning led us to believe that another new central chiller, Mod Five, would enable us to meet the air conditioning needs of CRB and another new research building in a proficient, reliable, and cost efficient manner. And with such a unit, we could even provide additional backup emergency cooling capacity to other buildings at the south end of the campus.

This valuable backup and diversity factor support—i.e., being able to pump chilled water from different lo-

cations—is one of the prime advantages of a centralized air-conditioning scheme for a college or university campus. Additionally, there are a number of other distinct benefits that a centralized system provides.

Less Costly Operation

Having chiller modules looped together provides an opportunity to supply the required amount of air-conditioning to the majority of buildings on a campus and at the lowest possible kilowatt/ton figures. The looped system permits the proper loading of the chillers for maximum efficiency and performance. This is critical because partially loaded chillers are extremely inefficient and costly to run, and have a shortened life cycle.

Partial loading can be a major problem, however, with independent chill-

and maintenance to hundreds of smaller units. And since service can be handled more efficiently, fewer personnel are needed to keep everything in proper working order.

Fewer Spare Parts Needed

Prior to Penn's move to centralize its air-conditioning, the purchasing department faced the formidable task of stocking an adequate supply of all the different parts and equipment needed for the more than 300 different chillers on campus. This is not a problem with a centralized system, however, in which the number of needed spare parts can be kept to the minimum.

For all of these reasons, and because a decentralized, installation in the basement plan for the CRB chiller just didn't make sense, we decided to recommend that Penn's administration authorize planning another central chiller plant (module five), and that it be housed separately from CRB. But where should it be located and how should it be built?

Module Five Options

A chiller plant that would be housed in its own specially constructed building was the popular preference of everyone on the planning team. But with new building space on the Penn campus at a premium, we had to be extremely judicious as we investigated the different sites available.

For one reason or another, all but one of the four vacant sites available for a Mod Five plant had serious drawbacks. Any successful plan demanded that the Mod Five site be relatively close to not only the main load (CRB), but also to the site of the second planned research facility, and to at least one of the existing cooling modules. (Close proximity to another chiller plant meant that Module Five and the second chiller module could be looped together economically for diversity factor purposes.) Two of the proposed sites, however, did not meet these fundamental criteria. A third location, while close enough to everything, had been earmarked for a 1,700-space parking garage, and there was no practical way we could combine such a facility with a chiller plant.

The one remaining site, a small parking lot situated in an attractive area of the south campus, was located within a reasonable distance to CRB, to the site for the planned second re-

search facility, and to our module three chilled water plant. But while ideal in many ways, the site nonetheless presented us with a number of problems and worries.

One of our major concerns was based on, of all things, the lot's very attractiveness and desirability—it seemed as if nearly every academic, research, and medical department on campus wanted to build something there! This meant we would have a formidable task arguing that the valuable parcel of land should become the site for a utility plant.

Another serious issue concerned the potential effects that vibrations from Mod Five's huge chiller pumps and other large pieces of rotating equipment, along with electromagnetic forces from the plant's 22 MVA substation, might have on vital medical research activities being conducted nearby. This was a real problem because the research underway in the immediate area was substantial.

Across the street from the vacant site, for example, was Penn's anatomy chemistry building, location of various medical research offices and laboratories. Much of the scientific study conducted there is accomplished through the use of gigantic electron microscopes—incredibly delicate devices that can be easily thrown out of calibration and rendered valueless by the slightest vibration. With Mod Five in operation directly across the street, its chiller pumps and other heavy rotating equipment could cause strong vibrations to pulse regularly through the ground and possibly disturb the vital scientific studies.

We therefore requested that Dr. Allan Schollar, a Penn professor and one of the world's leading experts on vibration analysis, conduct a Mod Five vibration study. After months of examination, Schollar concluded that Mod Five's vibrating equipment would not disturb the research activities, so long as everything was installed on giant steel spring vibration isolators and/or mammoth concrete inertia pads. Through this design, the isolators would absorb any heavy vibrations from the rotating equipment, thus eliminating any possible negative effects to the microscope research across the street.

In addition to the vibration issue, we also had to consider whether the electromagnetic fields created by Mod Five's powerful transformers and other substation equipment would disturb



The chiller plant's fancy exterior belies its utilitarian purpose.

ers. During periods of cooler weather, parts of the fall and spring, for example—a certain amount of air-conditioning may still be needed. This means that independent chillers, which normally are sized for the total building load, must run on partial loads. Central modules, on the other hand, permit far more efficient load handling during the so-called off season cooling period.

Fewer Service and Maintenance Problems

It is far easier to service and maintain a few centralized chiller plants than it is to provide the same service

some of Penn's multimillion dollar cancer treatment equipment. This included a new cyclotron in operation at an underground facility next door to the Mod Five site, and an underground MRI (magnetic resonance imaging) facility, located next door on the other side. We also had to determine if the placement of a new building on the Mod Five site would create harmful drainage patterns that might affect nearby buildings.

Finally, we had to ensure in advance that construction of Mod Five would not interfere with patient care or access for nearby medical facilities, including the MRI facility.

These were all major concerns, and all were fully investigated. We were pleased that our various feasibility studies showed the proposed Mod Five plant would not create problems due to magnetic effects, construction activities, drainage patterns, and so on.

The Separate Building Problem

There remained, however, one large stumbling block. It concerned our idea of housing Mod Five in its own independent building. To some on campus, this proposal seemed extravagant, i.e., an impractical request for a highly limited and much sought after resource at Penn—building space.

We were able to resolve this thorny issue in three ways. First, we made sure to involve representatives from Penn's academic and medical research communities during the earliest planning stages for Mod Five. Second, we kept Penn's senior vice president, provost, and other key university executives regularly apprised of Mod Five planning developments—vibration analysis results, cost/benefits savings projections, and so on. Third, we developed the idea of planning Mod Five so that eight additional stories could be added later, to be used for academic and/or research purposes. This eliminated the major point of contention—the construction of a Penn building strictly for utility purposes.

It was this idea of adding on to Mod Five at some later point, in fact, that enabled us to finally secure approval for the basic Mod Five proposal and to commence specific design, construction planning, and then actual construction activities.

Design and Construction

Once we received the go-ahead to

proceed on the project, we assembled a Mod Five project planning and design team, comprising some of the top engineers and project management professionals at Penn. We also selected Walter F. Spiegel Company as outside engineers and Bower, Lewis, and Thrower as architects. We chose them for their proven expertise in achieving a balance of design and function that would accommodate even the most utilitarian of construction projects. It would be essential that they design Mod Five in a style consistent with the campus community.

With our team in place, we began to scope out all of the finite details of the Mod Five project. One of the most difficult issues was, of all things, the styling for Mod Five's exterior housing. This is normally not a factor in the design of most utility buildings. But, since the chiller plant would be located in its own prominently situated building, adjacent to the planned site of the new main entrance to the southern portion of the Penn campus, it would have to look good.

This design issue was a matter of no small concern to the university's administration and to the project planning team. Penn is a historic institution, with a charming mix of venerable and modern campus buildings. Because of its age and colonial traditions, the university has received National Historic Landmark status. This means that a blending of new construction with Penn's older structures, many standing now for 100 years or more, is desirable.

To guarantee that all new Penn construction meets acceptable standards, the university's design review committee must approve all exterior plans for new building construction. This stricture applied to Mod Five, a refrigeration plant, as it would to any other proposed new Penn building. In short, Mod Five would not be considered a successful project solely on the basis of its operating performance; our new chiller plant also had to be beautiful!

To make this a reality, we submitted numerous conceptual drawings and building samples to the design review committee. These included various eight-by-eight panels of different brick and mortar combinations and limestone blends. We also submitted separate panels for the cowl of the cooling tower, plus more than 100 different types of exterior caulking samples. (All samples were assembled on-site so everyone could see how the

materials would blend in with the surroundings.)

Design Approval

Eventually our efforts paid off—we were able to arrive at a design for Mod Five with an exterior that was acceptable. As it was finally approved, Mod Five would incorporate features more in keeping with a showy new classroom building or fancy auditorium than a chilled water plant. Besides the brick and mortar work, this also included a special wrought iron designer grill. A parapet wall also was necessary to partially hide the cooling tower, which had to be color coordinated with the building's exterior nonetheless. (It was interesting to see the expression on the face of the cooling tower sales engineer when we asked to see his firm's paint chip list!)



Mod Five was designed so microscope research conducted nearby would not be affected by chiller vibrations.

Construction

Once our designs for Mod Five had been approved, we then had to carefully map out the actual construction. An excellent plan and imperfect execution almost always add up to a poor project. In this regard, we knew it would be critical to secure the services of a top construction management firm to be responsible for the day-to-day supervision of the project, and to help us meet our design, performance, and budgetary goals. Mod Five was budgeted at \$12.5 million. After reviewing a number of organizations, we decided to hire D&L, Inc., a

project/construction management and engineering firm.

We broke ground in January 1988, and targeted January 1989 for project completion. We planned on a completion date that would take place well before the actual cooling season began. This way we would have ample time to test the equipment and eliminate any bugs.

Complex Construction Project

Although Mod Five was minutely planned and carefully managed from start to finish, it proved to be an extremely challenging project nonetheless, and for a number of reasons.

Confined Work Area

Mod Five's building had to be "shoehorned" into place between busy academic and medical facilities on three sides. All mobilization, construction, and demobilization activities had to be carefully planned, sequenced, monitored, and controlled, so as not to disturb medical education, treatment, and research activities taking place in nearby buildings.

Staging and Delivery Problems

Mod Five's lay down area was extremely confined, making it difficult to shake out steel, brick, and other building materials. Deliveries of construction supplies were further complicated because only two narrow access roads were available to the project work area. These were used primarily for the delivery of essential medical supplies to nearby medical buildings; our own delivery activities could in no way interfere with these vital consignments. Further, diesel tractor trailers could not off-load at certain hours of the day, because their on-site operation might disturb the fresh air intake requirements of nearby medical buildings.

Another problem: construction had already begun for most of the other new health care facilities being built on the PGH site. This meant we constantly had to juggle the schedule of our construction supply deliveries so as not to interfere with deliveries already scheduled for other work sites.

Unusual Design Details

The two-story, above-ground "basement" had to be built with oversize steel beams and massive underground foundations far larger than would normally be required (i.e., big enough to support the eight additional stories to be added at a later point).

Project Completion

Despite the difficulties mentioned, Mod Five was constructed on time and within budget. After completion, we tested all operating systems and everything worked exactly as planned.

Now that it is built, Mod Five has come to be regarded as a valuable and handsome addition to our campus and a credit to the innovative yet practical Penn spirit. The new facility has been singled out for attention and review

by diverse groups, including area engineering firms, the local steam fitters union, ASHRAE, and other professional organizations.

Mod Five is such a showcase project, in fact, that a manufacturer and supplier of the chillers plans to include a photo feature of the plant in its annual report.

Although in operation less than one year, Mod Five has already surpassed all of its original efficiency goals. Elec-

EQUIPMENT SPECIFICATIONS AND TECHNICAL DATA

Chillers:	Four 1250 T Centrifugal, York OTT4G2IM, 2500 GPM chilled water from 54°F to 42°F, 3750 GPM cond. water from 86.8°F to 96.3°F, .664 KW/ton, 4160V/3ph/60 hertz. Marine water boxes, internally epoxy coated (including tube sheets). Note: Motors are up blast to direct hot air to roof and exhaust fans.
Cooling Tower:	Marley counter flow, two cell, one 50 HP 2-speed motor per cell.
Chilled Water:	Five pumps (one spare) Wienman 8L2 8X10 double suction, split case, centrifugal, W/100 HP, 1750 RPM TEFC motors, 2500 GPM @ 130 ft. TDH. Two filters, FSI full flow, 62", 38 bags, 100 Micron.
Condenser Water:	Five pumps (one spare), Wienman 10L3, 10X12 double suction, split case, centrifugal, W/100 HP 1750 RPM, TEFC motors, 3750 GPM @ 80 ft. TDH.
Valves:	DeZurik Hi Performance Butterfly.
Instrumentation:	Each chiller: One chilled water and one condenser water flow meter, consisting of Badger Flow Tube & Merriam 30" Manometer; four 12" Philadelphia separable, well thermometers. Ashcroft 4 1/2" brass, glycerine filled pressure gauges—read pump differential and filter differential pressure. Automation is connected to existing Dayton General Energy Management central systems—provides readout and alarms of chiller operation: chilled water flow & temperature in and out, condenser water flow in and out, chiller status, alarm, KW, KW/ton, pump status, filter differential pressure and alarm, and cooling tower fan status.

ELECTRICAL TECHNICAL DATA

Power to Chillers:	Provided by two Westinghouse 2500 KVA 13.2 KV/4.16KV unit substations, each feeding two Westinghouse chiller starters.
Building Aux. Power:	Provided by one Westinghouse 1500 KVA 13.2 KV/480 V unit substation.
Two Motor Control Centers:	Provide 480 V power to pumps, cooling tower fans, and building services.
Two 5-ton Bridge Cranes:	Provided for maintenance purposes. The layout of the plant allows a straight lift of any piece of equipment that requires removal for repair.

AWARD FOR EXCELLENCE IN

The Award for Excellence in Facilities Management, sponsored by APPA: The Association of Higher Education Facilities Officers, provides educational institutions with the opportunity to receive national and international attention for their outstanding achievements in facilities management.

The Award for Excellence—the highest institutional honor granted by APPA—places the applying institution in competition not with other institutions, but with the criteria established by the Professional Affairs Committee. The institution will submit a detailed self-evaluation based upon eight topic areas and accompany it with supporting documentation. If an institution has successfully met or surpassed all eight criteria, it will be presented the Award for Excellence in Facilities Management.

The number of awards presented each year depends upon the number of successful submittals received. There may be no award winners in any one year, or there may be several.

A variation of this primary award was developed by the committee and is also considered an award for excellence in facilities management. An institution may know that it must improve in one or more of the topic areas before feeling comfortable in applying for the primary award; such improvements may take months or years to implement and quantify. Thus, an institution may submit a self-evaluation report and supporting documentation in only one of the eight topic areas. Again, the institution is competing only against the criteria, but this time in a specific area in which it feels particularly confident. The format for the module applications is the same as with the primary award.

1. The Program

The purpose of the Award for Excellence in Facilities Management is to recognize outstanding achievement in facilities management at educational institutions. The Award provides an equal opportunity to all institutions.

The Award recognizes an entire department's effort rather than a single

that serves as the application. The institution submits an application form with a narrative report that states how the facilities management department quantifies excellence in each of the eight topics mentioned in the self-evaluation checklist. Contact the APPA office for a full description of the eight topics. The self-evaluation should be an objective statement of conditions as seen

by members of the department. The status of the department in each of the topic areas should be clearly indicated. A ninth category, Other Considerations, may be included if a program or activity cannot easily be placed under one of the eight topics.

The narrative may be as long as the applicant deems necessary and may have any desired supporting evidence attached. While there is no limit on the length of the narrative, it must address each of the eight topics sufficiently to give the reviewers a clear perception of the operation. Otherwise, the application is too short.

Applications will be sent directly to the APPA office in Alexandria, Virginia. There is no timetable for applications, and they may be sent at the discretion of the applicant.

If the organization has recently (within the past twelve months) participated in APPA's Facilities Management Evaluation Program, the final report of that evaluation may be used, at the discretion of the applicant, as all or part of the justification narrative for the Award for Excellence application.

3. Review of the Application

APPA's Professional Affairs Committee, either in session or individually, will review each application package. The committee member from the applicant's region will provide a regional perspective regarding the

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Honor*

individual or a specific unit or division.

The importance of the services provided by facilities management departments, in support of the institution's overall mission and goals, is emphasized and brought to the attention of others who are not practitioners in the facilities management profession. The recognition and acknowledgment of achievement by APPA will enhance the efforts and purposes of the profession.

2. The Submittal

The strength and value of the Award for Excellence lies in the self-evaluation process

FACILITIES MANAGEMENT

applicant's institution and facilities management operation. The committee then scores the application.

If the committee feels that the application does not sufficiently support the award, committee members are polled for their perceptions of weakness in the narrative. These are then mentioned to the applicant in the notification of disapproval, with encouragement to address these areas and resubmit the application.

4. Verification

Following the approval by the Professional Affairs Committee of an application, an on-site visit will be made to substantiate the statements of the application narrative. This visit will normally last no longer than one day.

Using the narrative application as a guide, the visitor will review all facets of the applicant's operation and specifically verify that the procedures, policies, etc., mentioned in the narrative are, in fact, being followed. Other observations may be made as appropriate. The visitor will then report in

confidence to the Professional Affairs Committee.

Expenses associated with the verification visit will be borne by the applicant institution, except in cases of hardship. The applicant may declare hardship by including with the application package a letter from the institution's CEO (president, chancellor) stating that the institution desires consideration for the award but that financial constraints preclude underwriting the verification visit. The constraints—e.g., declining enrollment, reduced funding from governing authority—should be specified. The letter should be addressed to the APPA Professional Affairs Committee.

The committee will again seek comment from its regional member and the appropriate regional president regarding the hardship claim. If the hardship is recognized, the committee will attempt to find funding for the verification visit.

If the report of a Facilities Management Evaluation Program visit is the basis for application, another visit is not necessary.

5. Approval

Upon review of the verification visit report, the committee will again be polled. A simple majority voting in favor will cause approval of the application.

6. Recognition

The Award for Excellence in Facilities Management will be recognized by the presentation of an appropriate trophy to an institutional representative, in a ceremony to be selected by the recipient. The award may be presented at the next APPA annual meeting, at a meeting of the winner's regional association, or at the institutional campus by an APPA representative.

Award winners will be recognized in APPA media and through other news media as appropriate.

The Award will be valid for a period of five years from the date of receipt. Recipients may not apply again until expiration of their current award.

AWARD FOR EXCELLENCE APPLICATION COVER FORM

Institution _____ APPA Region _____

Institutional Representative _____ Title _____

Address _____

City, State, Zip _____ Telephone _____

Attached is our application for the Award for Excellence

- ☐ in Facilities Management (*comprehensive award; will automatically be considered for separate awards*)
- ☐ in Purpose and Goals
- ☐ in Organization and Resources

- ☐ in Policies, Procedures, and Processes
- ☐ in Personnel Training and Development
- ☐ in Fiscal Planning and Management
- ☐ in Campus Condition and Appearance

- ☐ in Communications and Quality of Relationships
- ☐ in Campus Planning



Send the cover form and application materials to APPA Award for Excellence,
1446 Duke Street, Alexandria, Virginia 22314-3492. For more information, contact your regional representative
on the Professional Affairs Committee, or call the APPA office at 703-684-1446.

THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem opened atop Mount Scopus in Jerusalem's northeastern fringe as Israel's first university in 1925. The country was still under British mandate. It was meant to serve as, and still considers itself, the university of the Jewish people. It operates the most extensive programs for students from abroad of any Israeli university. The main language of instruction is Hebrew, though courses for overseas students are also taught in English, French, Spanish, Russian, Hungarian, and Turkish.

The university continued to function on Mount Scopus until 1948, when it found itself isolated within an Israeli enclave, totally surrounded by Jordanian territory, as the result of the cease-fire lines established during the Israeli War of Independence.

Due to lack of access to its campus, except for a minimal guard presence, the university scattered its facilities throughout Jerusalem. It finally settled, for the most part, in a new campus it developed in the 1950s in Givat Ram, an area of west-central Jerusalem near the Knesset (Parliament) and other government buildings. This was followed shortly by the development of the medical sciences campus in Ein Kerem (southwestern Jerusalem).

A school of agriculture was inaugurated in 1942 in Rehovot, a coastal plain city south of Tel Aviv, and this became the Faculty of Agriculture in 1952, the only such faculty in Israel. (Other exclusive areas of study in Israel that are at the Hebrew University are the School of Pharmacy and the Koret School of Veterinary Medicine. The only field not offered at the Hebrew University is engineering.)

With the unification of Jerusalem under Israeli administration resulting from the Six-Day War of 1967, the university began an extensive rebuilding and expansion program at its original site on Mount Scopus. Today this constitutes the largest campus of the university in terms of students and faculty, while Givat Ram has become primarily the science campus. Givat Ram is also the home of the Jewish National and University Library, the main university library and the official national depository (akin to the U.S.

Jerry Barach is foreign press liaison at The Hebrew University of Jerusalem, Jerusalem, Israel.

Global Exchange

Jerry Barach

Library of Congress).

Thus, we are today operating on four campuses, three in Jerusalem and one in Rehovot, totaling about 400 acres, or 165 hectares. There are 550,000 square meters of building

area, incorporated within 200 buildings.

Our buildings are nearly all of reinforced concrete construction with stone facing, in harmony with the decorative stone facing (Jerusalem stone) that has been required on all Jerusalem buildings since pre-state days.

Jerusalem is blessed with a relatively mild climate—temperatures rarely below freezing in winter, and dry, sometimes hot summers—so our heating demands are not very great and our air-conditioning needs even smaller. At the Faculty of Agriculture,



The Givat Ram Campus, The Hebrew University of Jerusalem.



Mount Scopus Campus, The Hebrew University of Jerusalem.

PHOTO: W. BRAUM

PHOTO: BRAUM

cooling is required more extensively, because of the more humid climate in Rehovot. Our central boilers are mostly fueled by heavy oil, although in Mount Scopus we also have large, central, electrical heat pump units for heating and cooling.

In addition to the differences in climate between Jerusalem and Rehovot, another great difference exists within Jerusalem itself in the maintenance demands at our Mount Scopus, Ein Kerem, and Givat Ram campuses. Whereas Givat Ram is an open campus with vast areas of trees, shrubbery, and lawns to maintain, our Ein Kerem and Mount Scopus campuses are primarily sprawling indoor complexes with many kilometers of connecting corridors that require a large cleaning staff. Our physical plant staff totals 300 people. The physical plant department falls within the division of administration and organization, which is headed by Eli Gonen.

As for the financing of the university, this constitutes a mixture of government funding (more than 50 percent), which is channeled through the Israel Council for Higher Education; tuition payments by students; and contributions from friends of the university all over the world. The university is governed by an international Board of Governors, which is headed by Harvey M. Krueger of New York City.

The academic year 1990-91 at the Hebrew University had a record number of students; according to the registration figures the number of students will exceed 20,000. The university will continue with its feverish activity to absorb immigrants, by planning and implementing retraining programs in various fields, and by absorbing student immigrants within the framework of the Rothberg School for Overseas Students. According to current estimates, there will be more than 1,000 immigrant students studying at the Rothberg School, most of them from the Soviet Union, in addition to the hundreds of other overseas students in the various programs of the school.

In the academic year 1990-91 the university continued to expand the system of dormitories on the university campuses in Jerusalem and Rehovot. This is in addition to the renovation of 500 new places in the Guatemala dormitories. This year construction will begin for two new dormitory buildings in Kiryat Bronfman

on Mount Scopus, and the planning for three additional buildings will begin. At the conclusion of this project an additional 400 beds will have been added to the dormitories. Also in the planning stage is a new dormitory complex on Mount Scopus that will include 1,200 additional places. The Hebrew University is working diligently to expand the total student dormitories. Because about 70 percent of the students of the university come

from outside Jerusalem, the university is trying to find housing solutions for as many students as possible.

Also in the Faculty of Agriculture in Rehovot this year, there are basic renovations being made in the existing student dormitories, and the planning is in an advanced stage for an additional 200 spaces for single students and some apartments for married students and for students with disabilities. ■

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SAVING SPACE AND TIME WITH FORM GENERATORS

One of the benefits computers offer you is the comfort of knowing where you can find copies of all your letters, memos, and notes—or at least increasing your odds of finding a copy when you really need it. Rather than ransacking four rows of file cabinets, three storage rooms, two subbasements, and a partridge in a pear tree to find documents, you look in the computer's wordprocessing directories. This practice of using a computer for compact, secure, and easily accessible storage works well for letters and memos because you have created these documents. However, it falls short when dealing with preprinted form documents such as purchase orders, personnel records, requests for services, or any of the dozens of preprinted forms your institution has declared de rigueur for getting things done.

Surprisingly, a ready solution exists. Few users, however, outside of custom software developers know much about form generating applications. These applications are one of the industry's best kept secrets, although not on purpose. It's just that these applications defy classification. In every sense of the word, electronic forms processing software is a niche product. Although of limited value to the average home computerist, they are extremely valuable in large organizations.

Easy to use, reasonably priced, and a guaranteed timesaver, packages such as PerFORM PRO, JetForm Design, and FormBase enable you to create original forms or precisely duplicate existing paper forms. "What's so great about that?" I hear you saying. "We already have the paper forms, why do I need to design my own." Good question. Here's why:

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Howard Millman is a frequent writer and consultant for facilities management and computer issues. He designs and installs computer systems for universities and hospitals. He is based in North Tarrytown, New York.

Data Base Update

Howard Millman

though that's like buying a Ferrari then pushing it everywhere). The better way is to fill in the data while it's onscreen and then print a copy. Twenty-four-pin dot matrix printers provide acceptable, surprisingly legible copies. Lasers provide a print quality that rivals, perhaps surpasses, the original. One caveat, unless you have a color printer, your forms will be in one color.

To create a form to match one already in use you can start from scratch or modify one of the dozens of samples supplied with the application to suit your needs. The software's built-in word processor enables you to enter fixed text into the form (headings, instructions, etc.) and to fill in the forms with the required data. Most packages offer you text enhancement features like bold, italics, and various type sizes. Anything and everything you want can be designed into forms including boxes, graphics, and horizontal and vertical lines.

4. When entering data into the onscreen forms, the software provides techniques for minimizing data entry errors. These techniques include:

- Validation. Fields will only accept certain kinds of data. For example, social security fields will accept just numbers; telephone number fields will always request area codes for addresses with non-local zip codes.

- Cross checking. Eliminates incompatible data. Check a box that says "Mr." and the software will not ask you for the gender again. Select "interim inspection" and it will not ask you for the date of the certificate of occupancy.

- Conditional responses. The response you enter in a field triggers a linked reaction. For instance, depending on the budget codes, the software will know to classify a project as capital, routine, or chargeback. Enter a dollar figure exceeding a predefined maximum and the form reminds you to obtain prior authorization. At your option the software will subsequently display the authorization form with common information fields already filled in.

- Intelligent tabbing. The response you enter in a field determines the next field. If the response in the first line of "bill to" is "same," the cursor skips over the rest of the address and automatically fills in the rest of the address based on the "ship to" response.



• **Look-up tables.** The electronic equivalent of a photographic memory, this feature rivals even such inventions of convenience as Post-It Notes. Look-up tables will eliminate thumbing through manuals to locate codes, phone numbers, descriptions of anything, addresses, serial numbers, date of hire, etc. Reference data that was stored separately can now be easily summoned and integrated into the form with a keystroke.

In addition to designing and expediting form design, form generators also manage the form's data. For example, say you use a form to record daily attendance that includes employee's names, time in/out, ID number, and date. Once a week you send another form to payroll that contains similar information except instead of providing time in/out it totals the hours worked, puts the last name first, appends a title, and adds a budget code. Calling on the software's data base manager, you punch a key and the software automatically generates an errorless form for the kind souls in payroll. Most packages also provide numerous mathematical functions (total, divide, multiply), as well as finan-

cial and statistical formulas.

If all you gained by using forms generators was to increase accuracy, save some time, and reclaim filing space, you would have received your money's worth and then some. But the data handling abilities of these applications offers one more important benefit—it enables you to search and retrieve any archived data in seconds. If the information was ever entered, you can find it, read it, and print a copy. By using keywords such as the name of an employee, a building, or a range of dates or dollars, you can pull up the form containing the information you want. If that form shared data with others you can retrieve those other forms, too. Keywords can be nested, which means that you can progressively narrow in on the targeted data.

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Critical Issues in Facilities Management

7

PLANNING, DESIGN, AND CONSTRUCTION

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Campus Crime

Crimes and Transgressions on College/University Campuses 1988-1989, by John J. Carpenter. Hartford, Connecticut: International Association of Campus Law Enforcement Administrators, 1989. 52 pp. \$25, softcover.

The International Association of Campus Law Enforcement Administrators appointed a committee to review breaches of law on college campuses. During 1989 the "increasing crime rate on our college campuses" was the topic of various research studies and frequent items in the national press. The committee wanted to determine the extent of the increase and possible reductions of criminal activity. The survey methods included formal and informal data gathering methods. Personal contacts between departments, existing published information from various sources, and a survey were used to collect data.

Crimes occurring on campuses tend to follow the trend in the surrounding community. Reported crimes tend to be controlled by the administrative atmosphere of the campus. Survey results indicate about half of the crimes are reported. Some campuses, by directive, do not report alcohol violations occurring on college property. Other institutions account for all violations, whether treated administratively as a campus disciplinary matter or reported through the local police. Non-stranger rape is treated as a guidance-and-counseling matter at some institutions. Off-campus violations by students are included in some reports, while others only account for on-campus violations. Reporting differences render statistics incomparable between institutions.

Alcohol-related crimes create the most problems on campuses. Half of all campus crimes are estimated to be alcohol-related. Sustained criminal behavior is not characteristic of alcohol abuse. Substance abuse problems are seen as the most critical. The addition and high cost of drugs encourages illegal acts and continued criminal behavior. Six percent of all reported crimes are related to drugs, excluding alcohol. More alcohol is consumed by underage students than students of legal age. Enforcement varies from none at all to prosecution according to the laws of the local community. The trend seems to be toward the middle with some administrative action and some statutory enforcement.

Reported rape among surveyed institutions is generally low, and comparable to the community. Institutions tend to publicize off-campus rape on nearby property for the health and welfare of the students, without including the crimes in campus statistics. A number of respondents reported that rape by a known assailant is treated administratively or through the counseling department; only stranger rape would be reported as rape. Some institutions treat alcohol-related rape as date rape.

Racial tension and racially motivated violence were seen as a serious and increas-

The Bookshelf

ing problem on campus. The tension created between ethnic groups by the exercise of free speech is a challenge to academic administrators. Emphasis should be placed on raising the level of sensitivity and awareness of all groups: students, law enforcement personnel, faculty, and administrators. Several examples of successful cultural awareness programs are included. The attitude of administration plays a large role in reducing racism on campus. Community problems are mirrored on the campus.

The IACLEA committee concluded that crime on college campuses was not increasing, and reporting was consistent enough that meaningful comparisons are possible. This report contains samples of statutes, university policies governing acts of intolerance, and news articles. The twenty-five pages of text contain much food for thought, and ideas that could be used to improve campus life at any institution.

This book is available from the International Association of Campus Law Enforcement Administrators, 638 Prospect Avenue, Hartford, CT 06105.

—Kate Fenton
Fiscal Officer
University of Alaska/Fairbanks
Fairbanks, Alaska

Indoor Air Quality: Two Perspectives

Managing Indoor Air Quality, by Shirley J. Hansen, PhD. Lilburn, Georgia: Fairmont Press, 1991. 315 pp. \$62, hardcover.

Environmental Quality in Offices, by Jacqueline C. Vischer. New York: Van Nostrand Reinhold, 1989. 250 pp. hardcover.

Many books, articles, and papers have been written about indoor air quality (IAQ) in the past few years. APPA members have been treated to several excellent discussions and case studies of this complex topic in the association's publications and related educational programs. In fact, many sessions at the last few APPA annual meetings concerned environmental safety. The 1990 meeting included Dr. Marilyn Black's presentation on "Indoor Air Quality of Buildings and Schools," and the description of a typical problem building by Aidan Kieman, P. Eng., in "Resolving IAQ Problems in a New University Library."

Facilities managers in all APPA institutions are responsible for maintaining those aspects of indoor air quality that are affected by the building systems under their

control. Black pointed out that the sources of IAQ problems "may be the result of a myriad of contributors such as inadequate ventilation, chemical pollutants emitted from inside activities and materials, chemical pollutants being brought in the building from outside sources, and biological pollutants from both internal and external sources."

Clearly, some of these sources are not controllable by facility personnel; those that are, however, can and must be identified, evaluated, and resolved if IAQ is to be managed effectively. To this end, engineering personnel must realize that individual building occupants have admittedly subjective, but nonetheless legitimate, concerns and symptoms related to their building environment.

As Aidan Kieman indicated, "Too often the engineering profession takes itself for granted and assumes an arrogant attitude to non-technical people based on supposedly superior knowledge. Instead of fobbing individuals off with platitudes, we must give them credit for having common sense and we should realize that denying a problem exists is no solution." In addition, building systems that produce an environment that is "acceptable" using current standards may not be viewed by the occupants as a "good" building. This places physical plant personnel in the all-too-familiar no-win position: Inaction or slow reaction could easily allow a building to earn the dreaded Sick Building Syndrome description. However, there is no guarantee that action in solving building system-related IAQ matters will result in an "acceptable" building environment.

Two of the many books published recently concerning IAQ approach this problem from different perspectives. *Managing Indoor Air Quality* is a practical, hands-on guide for the facilities manager who must deal with the realities of today's IAQ concerns. This book is an excellent reference source for treating existing problems and for preventing IAQ problems from occurring. It cuts across the single discipline approaches of the environmental engineer, the industrial hygienist, and the medical doctor to offer the facilities manager a broader and more complete range of control and treatment options. Hansen presents all the information in an orderly and logical manner, suggesting a methodology for identifying and solving potential economic and legal outcomes of IAQ encounters.

Managing Indoor Air Quality contains ten chapters, followed by excellent reference, glossary, and appendices sections. The first two chapters discuss IAQ from an historical perspective, citing references to air quality problems in antiquity and placing the problem in the forefront of modern concern. The third chapter suggests management procedures for coping with the problem, including a recommended total management plan for addressing IAQ. The fourth and fifth chapters describe the classification and investigation of IAQ

problems, while the sixth discusses specific methods of controlling IAQ. The very important operation and maintenance aspect of IAQ is covered in chapter seven.

The final three sections cover the comfort and health aspects of the thermal environment, HVAC systems, and various codes and recommendations for providing acceptable indoor air quality. The chapters on classifying indoor air problems and investigating these problems are especially well written and are the highlights of the book. In addition, appendices concerning contaminants, sample contaminant protocol, and investigation forms offer invaluable assistance to a busy facilities manager.

Vischer's *Environmental Quality in Offices* approaches IAQ problems from a total-building-performance and environmental-quality perspective. The book contains chapters, features, and an extensive bibliography; an appendix is also included that summarizes the statistical approaches used to analyze the data from three office building surveys.

The first two chapters review deficiencies in office buildings that have been discovered in recent years. Chapters three and four report the results of scientific studies of office buildings, concentrating on behavioral and psychological concerns of the occupants. The "building-in-use" concept of assessing a building's environment is described in chapters five through seven, and the final chapter discusses implementation of the results of the assess-

ment.

This book reaches beyond quantifiable and code-related symptoms and design parameters. It studies the impact of the entire building environment, including psychological and social factors on building occupants, using the concept of the "building-in-use" approach to determine the cause of IAQ problems. While written specifically with office buildings in mind, many concepts can be applied to most building types. For example, the author suggests that feedback from building occupants be used not only to identify building system problems, but also to modify the physical environment to respond to social and psychological needs of the occupants. Vischer then takes a holistic systems approach to the entire building environment, in which HVAC and lighting design play significant, but not all-consuming parts. In the process, she chides the engineering profession for often failing to design systems adequately, and for failing to acknowledge the psychological and social aspects of the "building-in-use."

Managing Indoor Air Quality is a gem of a book that covers all aspects of IAQ in an orderly manner. As a mechanical engineer, I consider this to be the right-next-to-the-dictionary book of the 1990s on my desk. If the book has a flaw, it is only that it comes without a statement on the cover reminding us all that a building's environment will probably never satisfy every occupant. I suspect that most design engi-

neers and architects realize that, and do, in fact, take psychological factors into consideration when designing buildings; Hansen reminds the readers of the psychological and social aspects of IAQ in the fourth chapter of her book.

Environmental Quality in Offices, in spite of its naivete ("economy cycles which produce no fresh air at all...") and its reliance on somewhat arcane statistical analyses of survey data (including canonical correlation) is an important book; the social scientist in me appreciates the value of applying behavioral and psychological principles to human problems. For example, Vischer suggests that seven dimensions of environmental ratings represent building users' ways of experiencing the office environment; only three of these (air quality, thermal comfort, and lighting comfort) are directly controlled by facilities managers.

In sum, both books belong on the shelves of APPA members. *Managing Indoor Air Quality* will probably be used more frequently by facilities managers than *Environmental Quality in Offices*, but each book has merit based on its perspective of the IAQ problem.

Since physical plant administrators have a duty to maintain building systems that allow successful building environments to exist, APPA member institutions must be guided by publications such as these two books. In addition, indoor air quality is predicted to be a major growth area in our

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litigious society in the next decade; facility managers must, therefore, arm themselves with appropriate information to help keep the legal profession at bay. As each book suggests, a formal plan to evaluate and monitor indoor air quality must be established by all responsible building managers as the first step to gain control over the IAQ problem. A word to the wise is sufficient.

Managing Indoor Air Quality can be purchased from Fairmont Press, 700 Indian Trail, Lilburn, GA 30246.

Environmental Quality in Offices can be

purchased from Van Nostrand Reinhold, 115 Fifth Avenue, New York, NY 10003.

—John M. Casey, PE
Manager, Engineering Department
University of Georgia
Athens, Georgia

Grounds Management

Lawns: Basic Factors, Construction and Maintenance of Fine Turf Areas, by Jonas Vengris and William A. Torello, Fresno, California: Thompson Publications, 1982. 240 pp. \$15.50, softcover.

In this book the authors' intent is to address the present needs of a student taking an introductory course in turf science. Most of the basic facts about turfgrass culture are covered extremely well. But a lot of specifics about new cultivars, fertility, and integrated pest management (IPM) are not covered because of the changes that have taken place in the industry since 1982 when this book was published, or even since its most recent edition.

Chapters two through five deal with flora from seed to mature plant. The botanical descriptions are general and easy to understand. Chapter three deals with turfgrass species, their identification, and characteristics, such as which are cool season and which are warm season. Chapter four explains how climate factors (temperature, light, and water) determine turfgrass adaptation and usefulness.

The chapter on soils is very general, as it should be in an introductory book like this. Chapter seven, fertilizers and lime, identifies and explains their nutrients both major and minor, their sources, and symptoms that appear when these nutrients are deficient. The paragraph on natural organic fertilizers is extremely out of date. The authors minimized their importance and use, when in fact they are becoming very important as users look for more ways to reduce their dependence on synthetic fertilizers.

Chapters eight, nine, and eighteen are helpful as they pertain to establishing new lawns by self or by contractors. Both seed and vegetative establishment are discussed.

The rest of the book deals with maintenance of an established lawn. Fertilization, watering, mowing, aeration, and renovation are all well covered. Included within maintenance are the sections dealing with turf pests: weeds, diseases, and insects. This is the area in which I feel the book is most outdated. IPM or integrated pest management is a relatively new term for common sense pest management. IPM is a decision making process for determining if and when pest suppression treatments are needed, where they are needed, and what ecologically safe and sound practices are to be used on unwanted pests.

Even though the book is easy to read and factual, I could not recommend it because it is outdated in the areas that I have mentioned.

This book is available from Thompson Publications, P.O. Box 9335, Fresno, CA 93791.

—Irvin Brawley
Associate Director of Buildings and
Grounds
Davidson College
Davidson, North Carolina

Planning

Strategic Planning and Energy Management, published quarterly by the Association of Energy Engineers, Lilburn, Georgia, 1989.



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Strategic Planning and Energy Management is a compilation of research reports and a sharing of information about a very important issue in today's world. All of the reports in the issue I reviewed were informative, obviously well researched, and left this reader with the feeling that it was time well spent. The journal also provides common sense strategies of interest to governments, facility managers, and anyone responsible for energy management.

The fall 1989 issue includes "Policies to Improve Efficiency and Reduce Global Warming," by Dr. Arthur Rosenfeld, Robert Mowris, P.E., and Jonathan Koomey. The research for this report was funded by the U.S. Department of Energy and provides a complete energy strategy for our country. The report also addresses proposals to improve energy efficiency through

1. Research and development (public and private),
2. Energy information, product performance labels (i.e., appliances, cars, buildings, etc.),
3. Efficiency standards (local, state, and federal),
4. Financial incentives (consumer, industrial, institutional), and
5. Utility regulations and programs.

One of the highlights of this article is the message that should be conveyed to developing nations: "We need to convince governments that if they want to subsidize an industry they need to do so directly and efficiently, rather than indirectly with cheap energy. Cheap energy seduces industry into retaining inefficient processes and equipment, compounds pollution, and contributes to economic instability through accelerated resource depletion. Put more simply, cheap energy is only cheap in the short term. For the long term we need to use financial incentives to directly subsidize energy efficiency and promote environmental quality."

The authors state, "The goal of this policy is to reduce energy intensity in the U.S. by 3.5 percent per year over the next 20 years," and after careful deliberation of their proposal I believe this goal to be realistic. This is definitely one of the best articles it has been my privilege to read. It caused me to give a great deal of thought to our nation's energy strategy; it also leaves me wondering, if our government has this information, why don't we see more aggressive changes in policy?

"Responses to the Global Warming Crisis," by Dr. Wayne Turner and Scott Moses, focuses on the solutions required to deal with the problem. The report gives the economic impact of its effects, the political responses, and describes what energy managers can do to help correct the problem. Many suggestions are given, including switching from fossil fuels to alternative sources, the discontinuance of coal, and a reexamination of the nuclear power issue and reforestation.

The key to this report is the final chapter, "Managing the Future," wherein the authors state, "Previously we have been

able to exploit the environment beyond the point at which it could spontaneously renew itself. Now we must learn the principles of sustainable development, which will ensure that our development of the universe can continue indefinitely." Being previously familiar with Dr. Turner's work, as usual, this report seems well researched and well written.

"What's New in Building Automation: Network Applications Add New Levels of Synergy" by Harris Bynum explains exactly what direct digital controls and building automation systems can do. It is written in a style that is concise and informative, yet with little technical jargon. Excellent reading!

"Minimizing Commercial Electrical Bills Through Choice of Rate Structures" by Dr. Barney Capehart and Dr. John Mahoney gives the reader a detailed strategy for manipulating the commercial electric rate structure to save operating costs. While this

report addresses a specific situation to reduce energy costs, it does not address ways to reduce consumption, and the authors state this in the opening paragraph. Further, it gives the reader a way to save money on electric bills by altering consumption patterns to select the proper rate structure. In the appropriate situations this could prove valuable to many energy managers.

In conclusion, *Strategic Planning and Energy Management* is another valuable tool that can be used by those involved in energy management. I am convinced most would find it to be highly informative, and time and money well invested.

This book and the series is available from Association of Energy Engineers, 700 Indian Trail, Lilburn, GA 30247.

—Kerry Farnham
Lincoln University
Jefferson City, Missouri

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Job Corner advertisements are available to any nonprofit institution with a facilities-related position opening available. Regular classified advertisements cost \$20 per column inch; display ads cost \$25 per column inch. There is a two-inch minimum charge on all ads and no agency discounts are available.

Upcoming Job Corner deadlines are **October 10** for the November issue, **November 8** for December, and **December 10** for January. Closing deadlines for job announcements are posted at the request of each institution. In some cases, deadlines may be extended by an institution. APPA encourages all individuals interested in a position to inquire at the institution regarding its closing/filing date.

Send all ads, typed and double-spaced, with an official purchase order to Diana Tringali, Job Corner Advertising, APPA, 1446 Duke Street, Alexandria, VA 22314-3492. Or send your ad via fax 703/549-APPA (703/549-2772). Call 703/684-1446 for more information.

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Foreman for Custodial Maintenance, Murray State University. Requirements: degree in business administration or related field with four years of recent custodial supervisory experience at a university or large industry. Should have ability to manage multiple crews and communicate effectively with university personnel of all levels. Familiar with quality control systems, cleanliness standards, hazardous communication laws, custodial equipment, cleaning procedures. Job entails managing 50-60 custodians, maintaining inventory, inspection, vacation and attendance records, and training new employees. Send resume with references to Physical Plant Department, C/O Terry Steiden, Murray State University, Murray, KY 42071. *MSU is an equal opportunity employer.*

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APPA Events

Contact the APPA Educational Programs Department at 703/684-1446.

Oct. 21-22—Facilities Audit Workshop. Indianapolis, IN.

Nov. 17-19—Institute for Facilities Finance in Higher Education. Washington, DC.

Dec. 5-6—Environmental Issues Seminar. Washington, DC.

Jan. 19-24—Institute for Facilities Management. San Antonio, TX.

Regional Meetings

Oct. 6-9—Eastern. Annapolis, MD. Contact: H. Allen Stearns, Prince George's Community College, 301/322-0655.

Oct. 13-16—Midwest. St. Paul, MN. Contact: Dale Haack, Gustavus Adolphus College, 507/931-7507.

Nov. 2-6—Southeastern. Hilton Head, SC. Michael Faires, Clemson University, 803/656-2186.

Other Events

Oct. 22-25—14th World Energy Engineering Congress, 1991 World Environmental Engineering Congress. Atlanta, GA. Contact: Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340; 404/447-5083; fax 404/446-3969.

Oct. 28-31—A/E/C Systems '91. Nashville, TN. Contact: A/E/C Systems, P.O. Box

Coming Events

310318, Newington, CT 06111; 203/666-9487; fax 203/666-4782.

Nov. 3-7—A New Tree Biology Seminar. Appalachian State University's Camp Broadstone, Valle Crucis, NC. Contact: Division of Continuing Education, Office of Conferences and Institutes, Appalachian State University, Boone, NC 28608; 800/438-6022, in NC call 800/222-8636.

Nov. 4-5—Acoustics and Noise Control Standards. St. Petersburg, FL. Contact: Kathy Dickinson, ASTM Standards Technology Training, 1916 Race Street, Philadelphia, PA 19103; 215/299-5480, fax 215/977-9679.

Nov. 7-8—HVAC Systems: Improving Operation and Maintenance. Honolulu, HI. Contact: Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340; 404/447-5083; fax 404/446-3969.

Nov. 11-13—Trees for Energy: The National Fuelwood Conference. Lincoln, NE. Contact: National Arbor Day Foundation, 211 North 12th Street, Lincoln, NE 68508; 402/474-5655.

Nov. 12-14—42nd Annual Kansas Safety and Health Conference. Wichita, KS. Contact: Lani Himegarner, University of Kansas, Division of Continuing Education, 6330 College Boulevard, Overland, KS 66211-1506; 913/491-0509.

Nov. 13-15—Roof Repair and Maintenance. New Jersey. Contact: Fairleigh Dickinson University, Center for Maintenance Technology, 285 Madison Avenue, Madison, NJ 07940; 201/593-8666.

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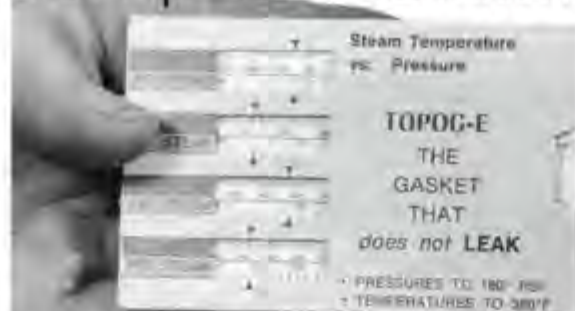
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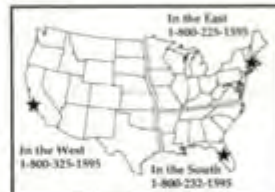
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