interface...

People at Cray Research's Rice Lake facility have installed automated equipment to help save time and increase quality. Above, Judy Johnson feeds resistors into an automated preparation machine.

The transition to automation

The bilevel conveyor at the Rice Lake facility eliminates legwork by delivering totes to all areas of module production. People send totes from the routing point to a workstation using the top level and return them to the routing point on the bottom.

Mentioning the word robot brings to mind villainous black and silver machines that terrorize major cities and friendly little contraptions that beep, gurgle, and flash hundreds of blinking lights. The entertainment industry, by giving robots these life-like qualities, has painted a picture of what automation might look like in the years to come.

Cray Research's Rice Lake facility has installed automated systems to help with module assembly. But the only thing lifelike about these systems is that they have made quick friends with the people who use them. These new machines save time, increase quality, and allow Rice Lake people to work in areas where they are more productive.

"New machinery and increased automation are moving in at Cray," says Dennis Aney, manager of Rice Lake Modules. "We have to prepare ourselves for the future, and at the same time, improve our current production process. A quick tour of our automated systems shows that a little change can go a long way."

Simple, yet complex

The bilevel conveyor system in Rice Lake is a simple concept with some complex features. Its basic operation is similar to the conveyor at the checkout in a grocery store, but it has many added features that make it useful in manufacturing — especially in module production.

The production of a module requires 10 major operations. The conveyor, which covers almost all of module production, begins in the cleaning tank area. This area acts as the central routing point for all of the other stations. The top level of the conveyor carries work totes to the stations. The bottom level returns the totes to the cleaning tank area. To insure that the totes always go to the correct location, an automatic

system opens and closes gates along the path. When people at a workstation have a sufficient supply of parts, the system signals workers in the routing area to stop sending totes. When the last operation is complete, the modules are sent to Chippewa Falls for final test and assembly into a Cray computer system.

"Before the conveyor was installed, people carried modules from one station to the next," says Anita Peterson, senior production supervisor. "Sometimes we even had people standing in line to get to a particular station. The conveyor allows us to remain at our workstations, and it eliminates unnecessary handling of the modules. In this sense, it has also improved quality because less handling means less chance for defects.

"By using the old idea of a conveyor and adding new dimensions such as another level and a gating system," Anita says, "we are using a tool that saves time and money and increases our productivity."

A better way

Another form of automation at Rice Lake, the RISI machine, has been in operation since February and already is proving its worth.

Chips no larger than a fingernail are prepared by the machine for insertion into the printed circuit board. A person preparing a chip using the old method had to remove it from a small carrier, cut it to the correct size, shape it, and pass it to another person for insertion into a new carrier.

"The old method for preparing chips required two people, two different machines, and three separate operations," recalls Karen Marshall, component preparation. "One person could produce 450 chips an hour. The RISI machine

prepares 1,000 chips an hour. In addition to saving time, the RISI machine prepares the chips so uniformly that there are almost no defects."

Custom design for custom needs

Another automated device, the Anatol machine, was custom designed for the Rice Lake facility. Using automation techniques similar to the RISI machine, it prepares resistors for insertion into the printed circuit board. The Anatol cuts and shapes the tiny spiderlike resistors and deposits them into a carrier for delivery to the assembly crew. Operators only have to feed the resistors into the Anatol and remove the finished product. The previous method required that a person pick up each resistor, cut and form it, and then package it for the insertion area. "We produce over 1,100 resistors an hour using the Anatol, versus

800 an hour by hand," says Mary Hendricks, component preparation. "The Anatol is faster and more accurate than human hands. And inserting the resistors into a carrier is another benefit because it protects them from damage and provides an easy method of handling for the people who use them in assembly. Even people not working on the machine benefit from its use."

Using resources to the fullest is essential to the success of any company. Cray Research's Rice Lake facility is making better use of its resources by installing automated equipment to help with module production. These systems save time, increase quality, and improve productivity. Automation is part of the rapidly changing environment at Cray Research, and a smooth transition to automation will help the company keep ahead of the competition. In Rice Lake, the transition is beginning. ●

Shirley Thunberry loads raw chips into the RISI machine for preparation before assembly into a circuit board. The RISI machine prepares 1,000 chips an hour.

4

Committed to memory

On July 28, Cray Research announced new models in the CRAY-2 family. The CRAY-2S computer systems, developed from the original CRAY-2 computer system, bring product line performance improvements of up to 40 percent through the use of a new memory technology. In addition to moving CRAY-2 system technology forward yet again, the company also announced enhancements to the original CRAY-2 product and significant price reductions on CRAY-2 systems and SSD solid-state storage devices.

To understand the significance of the CRAY-2S models, it is important to understand the technology behind information storage and processing. Each module in a Cray computer system contains one of two types of integrated circuit (IC) chips — logic or memory. The logic chip processes the data, and the memory chip stores it. If data from a memory chip cannot be stored or retrieved quickly enough, logic chip performance is reduced. Increasing the speed of both chips improves the overall performance of a Cray computer system.

The CRAY-2S systems use a new memory chip technology which, in part, accounts for the significant performance improvements over the original CRAY-2 systems. The faster static random-access memory (SRAM) chips used in the CRAY-2S systems replace the dynamic random-access memory (DRAM) chips used in all but the largest CRAY-2 model. To indicate the difference between DRAM and SRAM models, the letter ''S'' — as in the CRAY-2S system — has been added to all CRAY-2 models using SRAM technology.

Performance, a vital factor

Why does SRAM technology outperform DRAM? First, SRAM chips have a faster raw chip speed. Raw chip speed is a combination of access time (the time span between asking for and receiving data from memory) and cycle time (the total time used to find or store the data). Second, because of the SRAM's fast cycle time, memory contention is reduced. Although there are a number of reasons, the SRAM's fast cycle time is one important factor in reducing memory contention. Other factors are the number of central processing units being used and the type of work being performed. In addition, some performance improvement is realized because the need for periodic refresh of common memory — as in the case with the DRAM chip — is eliminated.

Performance improvements may be achieved because of any combination of the above characteristics, but actual performance improvement figures are still dependent on the CRAY-2S model and the type of program being run. Generally, for a single job, throughput on a new SRAM system may be anywhere from 5 to 25 percent greater than that on an equivalent DRAM system, depending on whether the job is limited by memory bandwidth. For a mix of codes, overall throughput may improve by as much as 35 to 40 percent.

In addition...

What about the original CRAY-2 system with four processors and 256 million words of memory? It has been upgraded with faster DRAM memory chips. These new DRAM chips improve overall system performance by 15 to 25 percent over previous DRAM CRAY-2 systems. The DRAM CRAY-2/2-128 and CRAY-2/4-128 systems have been discontinued.

Also, all CRAY-2 systems now support online cartridge tapes through the new Cray Tape Controller (CTC). The three different CTC units available add additional data streaming capabilities by supporting up to 32 IBM cartridge tape devices. CRAY-2 users can talk to the system's common memory using a variety of I/O device configurations, including multiple CTC units, high-speed Cray disk drives, network adapters, and HSX high-speed external channels for connecting to other Cray systems or to high-speed output devices such as graphics workstations.

Cray Research also has reduced prices on SSD solid-state storage devices by up to 20 percent. The entire line of SSD solid-state storage devices offers from 32 to over 512 million words of random-access secondary memory.

A commitment to our customers

Seymour Cray anticipated customer need for a larger memory, and the

CRAY-2 system was born. Since the introduction of the CRAY-2 series, customers have grown accustomed to larger memory sizes. But the leap from the four-million-word memory system to the 256-million-word CRAY-2 system was only the beginning. Marcelo Gumucio, executive vice president, noted that the world continues to move toward bigger memory applications, and Cray Research is continually pushing toward memory improvement in Cray systems.

Employee success

This announcement is yet another example of Cray Research's commitment to maintaining leadership in supercomputing. It's because of employee entrepreneurship and creativity that Cray Research is able to announce system enhancements. Although public announcements occur a few times a year, it could be said that inside Cray Research, an announcement occurs every time we congratulate an associate for a job well done. ●

To be a winner

Dan Cummings, PRD editor

A professional baseball player is quick around the bases, but speed alone doesn't win the game. The best baseball player also has a strong arm, a sure glove, a powerful bat, and a talented supporting team. A supercomputer, like a baseball player, can't win just because it's the fastest. It also needs efficient I/O, large memory, easy upgradability, and reliable system software.

Cray Research supercomputers lead the league in speed, but strong system support is essential to the company's success. The software needs of customers have to be met, and success in fulfilling these needs comes largely as a result of teamwork demonstrated by the marketing and software development groups.

An ongoing challenge

Software needs are determined by both existing and potential customers. Current users search for additional software features that enable them to do more with their systems, and prospects take software requirements into consideration when shopping for a supercomputer. Marketing has its finger on the pulse of these customers and prospects in an effort to define existing user needs and prepare for future demands.

Defining software needs, however, isn't enough. The people in software development have to meet those needs to keep users satisfied.

This challenge is made easier by the Product Requirements Document (PRD), a publication written by the marketing group that outlines future software needs.

"Software is an essential selling point for a Cray computer system," says Dan Cummings, marketing consultant and PRD editor. "Because of this, marketing requirements for software need to be satisfied.

"Before the PRD, people in marketing called software development directly to communicate a customer request for software. This was fine in the beginning, but it became confusing as our user base expanded and customer needs diversified. Software development had a hard time prioritizing marketing needs."

A better method — the PRD

To clearly communicate these needs to software development, the marketing people compiled their requests into the PRD. This book was reviewed and revised by marketing employees in the field, regions, and subsidiaries. Once the review was finished, the PRD was sent to software development.

The PRD makes it easier for people in software to work with marketing requests. Instead of making the software developers guess customer needs, the PRD defines what software will make the Cray system more useful to customers and prospects. In addition to giving a detailed definition of each request, the PRD includes a timeline for completion. It also prioritizes the list of requests so that software developers can deal with the most important requests first.

The PRD is not a document that will be obsolete in two years. "Instead," Dan says, "the PRD will continue to be updated to meet the needs of a constantly expanding user base."

Benefits of the PRD

"Ideally, the PRD benefits everybody," Dan says. "It benefits the people in marketing because it tells what software we need to sell the Cray systems. It benefits software developers because they now have a systematic way of dealing with requests, and it benefits customers because it ultimately will provide them with full-featured software for their Cray systems."

Most important, the PRD benefits the company. With the help of the PRD, the marketing and software development groups continue to make improvements on Cray system software. People in all areas of Cray Research are making an effort to combine supporting features with the speed of the Cray system. These efforts will keep Cray Research a winner. ●

6

AN UNCONTROLLABLE EPIDEMIC

There's an epidemic spreading through the halls of Cray Research.

There's no way to avoid it.

Oh no — here it comes again!

The neural circuits in your brain begin to reverberate. Chemical and electrical impulses flow rapidly through your body.

Hormones and endorphins race through your blood. Your temperature and blood pressure rise, your arteries and muscles contract, your face contorts, and your vocal chords quiver.
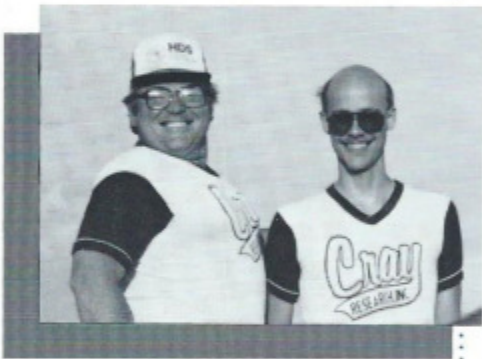
Pressure builds up in your lungs, and tears form in your eyes. Your face feels flushed. Your lower jaw suddenly becomes uncontrollable, and a blast of air bursts from your mouth at 70 miles an hour.

And you laugh.

How do you stop this seemingly uncontrollable ritual?

Work for the competition.

"At Cray Research, we take what we do very seriously, but we don't take ourselves too seriously."

...NOT JUST WALL STREET...

The legal and financial communities are struggling to reach a concrete conclusion as to what constitutes illegal insider trading. While people work to create a consensus that is neither too narrow for Washington nor too broad for Wall Street, what transactions are permitted — and what are not — remains unclear.

Meanwhile, the markets rage with activity. Not just in New York City, where million-dollar fortunes are made and lost in a matter of minutes, but in cities and towns all across the country.

Until there is a clear understanding of what falls into the realm of illegal insider trading, people must rely on their own good judgment. Beyond that, they must rely on their personal sense of ethics and principles when it comes to securities transactions. To help Cray Research employees exercise good judgment in trading company stock, *Interface* talked to John Rollwagen about the basic facts and ethical considerations. Here are John's thoughts on the subject.

Interface: What exactly is inside information?

John: Inside information is any nonpublic information that, if known, would affect the market price of the company's stock or would influence investors to buy, sell, or hold securities. Some examples include undisclosed information on company earnings, new products, contract negotiations, change of capital structure, and stock splits.

I: Who are the insiders at Cray Research?

J: There are official insiders at every company — officers and directors are an example. But actually, anybody who is aware of the types of information I just mentioned is an insider.

Cray Research has a very open environment. We distribute sensitive documents widely, and we also discuss many company-private issues quite openly. Our first priority is to maintain the common trust and open environment that has given Cray Research its reputation and style. The last mode the people in this company want to operate in is one of restriction. What this means, however, is that at any point in time there are many people who have access to material, non-public information — in other words, there are many insiders. Employees must therefore be very careful to exercise good judgment and avoid questionable trade practices. These might include frequent buying and selling of company stock, buying or selling stock as information becomes available inside the company, or trading in options of the company's stock.

I: What are the ramifications of trading with inside information?

J: The company's Business Conduct Guidelines point out that using inside information for financial gain is a conflict of interest. All employees have the responsibility to safeguard corporate information as a valuable company asset and to avoid any use of it for personal financial gain.

Not only is trading on inside information contrary to the company's interest, but it also is illegal under federal and state securities laws. Insider trading exposes both the employee trading and the company to the risk of lawsuits by individual investors as well as the Securities Exchange Commission. The potential liability can be much greater than any profits from the trading.

Right now, about three quarters of our domestic employees and half of our international employees participate in the stock purchase investment plan. Beyond this, many employees are part of the stock option and leadership performance award plans. Given the high levels of employee stock ownership, an open environment, and extremely volatile stock, the opportunity is there for someone to successfully trade using inside information. This is where ethics and principles come to play.

I: What are some of the ethical considerations?

J: There are no predetermined answers; each case is individual. However, at Cray Research, we trust each other to maintain the highest ethical standards.

The recent news reports of insider trading abuses and prosecutions should remind us that at

Cray Research, whatever we do should reflect our high ethical standards. The test in the company Ethics Statement should always help in an ethical dilemma: How would I feel if my family and friends heard about my actions? Would I want an account of my activities to appear on the front page of the daily newspaper? If you have the slightest hesitation on either account, you should probably reconsider your actions.

I: What is your feeling about employees specifically playing the options market with Cray stock?

J: For an employee, playing the options market with company stock is dangerous from legal standpoint and is certainly inappropriate from a common-sense standpoint.

Only a year ago, our stock was at 90. Then it dropped to 70, shot up over 130, dropped again below 90, and now is back over 100. Cray stock is very volatile, and chances are it will stay that way. For this reason, our stock is very popular on the options market. Playing the options market is a practice designed to take advantage of short-term swings in company stock price — it is not a long-term investment.

Options trading is like gambling. Gambling is fine, but it isn't fine with Cray stock. If you were to play the options market using Cray stock, it would be very hard to defend your actions. The options market is by nature short-term, and options trading strongly suggests the use of inside information. We don't want to make a policy where we have to watch the people who work here. But my advice to all Cray people is: just don't do it, it's not the Cray way of doing things. ●

News Briefs

Air Force Laboratory to install supercomputer

Cray Research announced June 30 that Unisys Corporation, acting as prime contractor for the United States Air Force Weapons Laboratory (AFWL), has ordered a CRAY-2 supercomputer valued at approximately $20 million. The system will be installed at Kirtland Air Force Base, Albuquerque, New Mexico, in the fourth quarter of 1987.

The CRAY-2 system will be used by AFWL in support of Air Force applications, including the Strategic Defense Initiative. It also will be an Air Force-wide resource via a sophisticated communications network. AFWL will continue to operate a CRAY-1 S/2000 supercomputer that was installed in 1986.

Volkswagen AG orders CRAY X-MP system

Cray Research announced July 16 that Volkswagen AG has ordered a CRAY X-MP/14 computer system with SSD solid-state storage device valued at approximately $8 million. The purchased system will be installed in the third quarter of 1987 at Volkswagen's research and development center in Wolfsburg, West Germany.

Volkswagen AG will use the Cray supercomputer for vehicle research, development, and design. Specific applications will include structural analysis, combustion modeling, computational aerodynamics, and crash and acoustic simulation. This will be the eleventh Cray supercomputer installed in West Germany.

Du Pont orders system

Cray Research announced on July 27 that the Du Pont Company has ordered a CRAY X-MP/24 computer system with SSD solid-state storage device valued at approximately $11 million. The system, which will be purchased, is scheduled for installation in the fourth quarter of 1987 and replaces a CRAY-1 system installed in 1986.

The CRAY X-MP/24 computer system will be installed at Du Pont's Experimental Station near Wilmington, Delaware, and will be used in a number of research areas, including molecular modeling, life sciences, electronics, catalysis, and polymer sciences.

Du Pont is a diversified manufacturer and marketer of chemistry-based products and a supplier of energy resources.

Supercomputer ordered for DOE

On July 27, Cray Research announced that the Department of Energy's Idaho Operations Office is acquiring a CRAY X-MP/24 computer system. The supercomputer will be installed in the third quarter of 1987 by EG&G Idaho, Inc., which is acting as prime contractor for the U.S. Department of Energy (DOE).

The computer system, which will be located at the Idaho National Engineering Laboratory in Idaho Falls, will be used for supporting the scientific and engineering efforts of the DOE.

Daimler-Benz installs CRAY X-MP supercomputer

Cray Research announced August 4 that Daimler-Benz AG, the German automaker, has installed a CRAY X-MP/24 computer system with SSD solid-state storage device. The purchased system was installed in

the second quarter of 1987 at Daimler's research facility in Stuttgart, West Germany.

The supercomputer will be used for vehicular research, development, and design — primarily in the areas of structural analysis, combustion, aerodynamics, crash simulation, and acoustics.

Australian services bureau orders Cray system

Cray Research announced August 25 that Leading Edge Technologies, Ltd. has ordered a CRAY-1/M computer system valued at approximately $1.5 million. The system, which will be leased, will be installed in Melbourne in the first quarter of 1988, pending export license approval.

The system will be used by petroleum, aerospace, automotive, biotechnology, and other high technology companies, as well as by government, education, and research organizations throughout Australia. Melbourne was chosen for the computer center site because it represents the heaviest concentration of companies and industries with a need for large-scale computing in Australia.

John Rollwagen on CNN

John Rollwagen appeared on the June 16 edition of *Inside Business*, a 30-minute program on the Cable News Network (CNN) highlighting the business scene.

John fielded questions from three of CNN's business correspondents on subjects ranging from supercomputer applications to Seymour Cray's relationship to the company as an outside consultant. John also commented on the company's stiff competition and where the company is heading in the future.

Copies of the thirty-minute interview are available on loan from the main region and subsidiary offices and through the Corporate Communications Department in Minneapolis.

Science and Engineering Symposium

From September 9-11, Cray Research will hold its Third International Symposium, "Science and Engineering on Cray Supercomputers," for existing Cray system users and potential customers. The purpose of the symposium is to provide a forum for discussing recent advances in scientific and engineering computing as well as assessing opportunities and requirements for new applications of future advanced computing systems.

The symposium will be held at the Radisson South Hotel in Bloomington, Minnesota.

John Aldag, Applications Department manager and symposium chair, says that Seymour Cray and a variety of other speakers will highlight supercomputing and high-performance computation in both traditional and new application areas.

Avoiding terminal strain

If you find your eyes feel tired after working at a computer terminal, try these simple methods of reducing eye strain.

- Place your reference material as close to the screen as you can. This will reduce eye and body movement that causes muscle fatigue.
- If possible, sit higher than the screen so your eyes are looking down.
- Check with your eye doctor about your glasses and how well they are suited for computer terminal use. Bifocals, for example, don't work well with computer screens. Special tints on lenses can be helpful in some cases.
- Take a break if you are at a terminal for two hours or longer.
- Sit up straight with the body bent slightly forward at the hips. Have forearms resting over the keyboard to form an "L." Don't let the wrists bend.
- Reduce glare by changing the tilt of the screen or pulling window shades.
- Lower the office lighting where possible. Bright lights designed for reading or writing may tire the eyes. Dr. James Sheedy, director of the Berkeley Clinic at the University of California, says he sometimes tells patients to wear a hat with a visor to block overhead light.

Cray Research supports education in local communities

Cray Research is encouraging elementary and high-school instructors to improve teaching skills in the areas of science, math, and high technology.

To promote better education in public and parochial schools in Wisconsin, the Cray Research Foundation is offering $500 stipends to teachers from Chippewa Falls, Rice Lake, and Eau Claire who participate in advanced teaching seminars in the fields of math and science. In addition, the company is inviting over 80 teachers to tour the company and see firsthand the fruits of science and math education.

"The program encourages teachers to learn advanced skills and convey these skills to their students," says Edna Bunn, executive assistant, who is coordinating the tours. "And someday, these students may reciprocate the effort when they come to work for Cray Research.

"We would like to encourage other companies in the area to follow our lead," says Edna. "We at Cray Research hold a large responsibility to the community. Part of that responsibility is taking interest in the education of our children. This program gives us closer ties with the educational community and is an investment in our childrens' futures."

Holiday Schedules

Below is a list of the remaining 1987 holidays for U.S. employees and the planned holidays for 1988.

Remaining 1987 Holidays

Date	Holiday
November 26	Thanksgiving Day
November 27	Thanksgiving Friday
December 24	Christmas Eve Day
December 25	Christmas Day
December 31	Cray Day

1988 Holiday Schedule

Date	Holiday
January 1	New Year's Day
April 1	Cray Day
May 30	Memorial Day
July 4	Independence Day
September 5	Labor Day
November 24	Thanksgiving Day
November 25	Thanksgiving Friday
December 26	Christmas Holiday
December 27	Christmas Holiday
December 30	Cray Day

Interns meet with John Rollwagen

On July 23, Cray Research interns from Mendota Heights, Minneapolis, and the regions had the opportunity to meet with John Rollwagen at the Minneapolis Omni Northstar Hotel.

Following a luncheon, John shared his thoughts on Cray Research and answered questions concerning the company's mission and its future. "The luncheon gave all of us an opportunity to learn more about Cray Research from a key source," comments Dewi Tjokrosetio, an intern in Marketing. "Not many companies provide such opportunities."
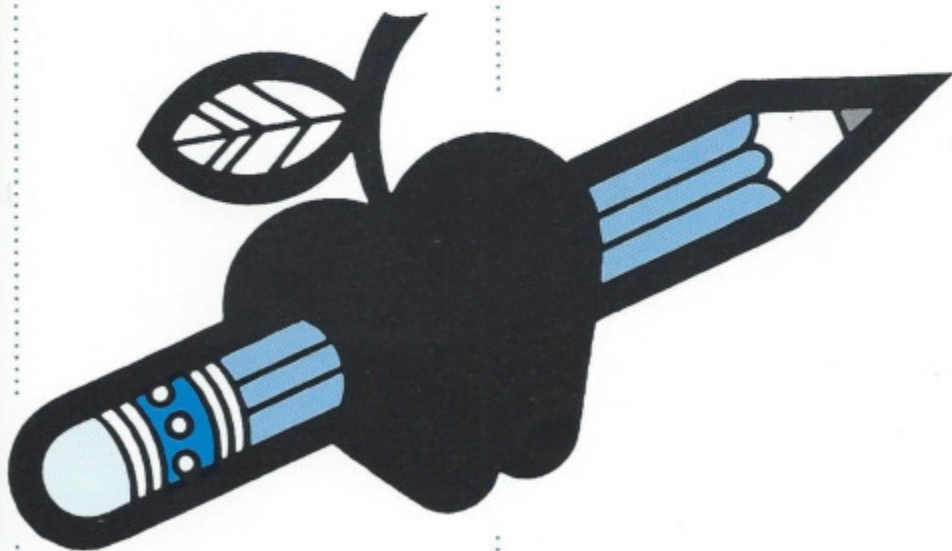
⊞BenefitsPlus

The Tax Reform Act of 1986 made many changes to U.S. tax law. Recently, BenefitsPlus received some questions concerning payroll deductions and tax withholding under the new law. If you have specific questions concerning your taxes, it is best to consult a qualified tax advisor.

Q. How will payroll deductions change as a result of the new tax law?

A. Changes to payroll deductions under the 1986 tax law are minimal. The only major change is that 401(k) investment savings contributions are limited to $7,000 per year. Payroll deductions stop once a person reaches $7,000. The Cray match is not included in determining the limit. All other deductions, such as health insurance and United Way contributions, which come directly out of your paycheck, remain the same.

Q. Does tax withholding change under the new law?

A. Tax withholding has changed significantly under the new law. Therefore, all employees must file a 1987 W-4 form before October 1, 1987. Calculating the withholding amount using a previous W-4 form will not be correct, and there are penalties for incorrect withholding amounts.

Q. How does the change in the W-4 affect my number of exemptions?

A. If you are in the same financial situation as you were when filing your last W-4, under the new tax law you will probably claim fewer exemptions with the new W-4. However, this will vary with individual situations.

Q. How do I calculate my 1987 withholding?

A. There are actually two forms that can be used to file for withholding: the 1987 Form W-4 and the 1987 Form W-4A, issued in April 1987 as a simplified version. Both forms include a worksheet for calculating your tax withholding. Completing either form correctly should result in tax withholding closely matching tax liability for the year. Therefore, the IRS recommends that you claim all withholding allowances as dictated by the worksheet. After your withholding changes appear in your pay, the IRS also recommends that you check to see if the new amount of tax withheld is correct. This is especially important if the change takes place midyear. IRS Publication 919 titled "Is My Withholding Correct?" should be used to determine if the withholding is accurate.

Q. What are the penalties for incorrect tax withholding?

A. Employees should be aware that the new tax law imposes a penalty if total withholding for 1987 is less than 90 percent of your 1987 tax liability. However, a penalty will not be assessed if your 1987 withholding exceeds your 1986 tax liability. The guidelines governing these penalties have been simplified for the purposes of this column. If you need specific advice about your tax situation, you should consult a qualified tax advisor.

Q. What happens if I don't make the October 1 deadline?

A. If you do not file a 1987 W-4 by October 1, Cray Research must ignore any previously filed W-4 and change your exemption status to single with one exemption or married with two exemptions, depending on the marital status claimed on your last W-4.

Q. Where can I file a 1987 W-4?

A. The 1987 Form W-4 and W-4A are available from your local human resources representative, and Publication 919, "Is My Withholding Correct?", is available from any IRS office.

If you have any questions about this column or any benefit plan, contact your local human resources representative, or write to this column c/o Kate Neessen, Ginger Hagen, or Cindy Kimmel in Minneapolis. ●

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