

SCANFAX

December 1998

Volume 50, Issue 9



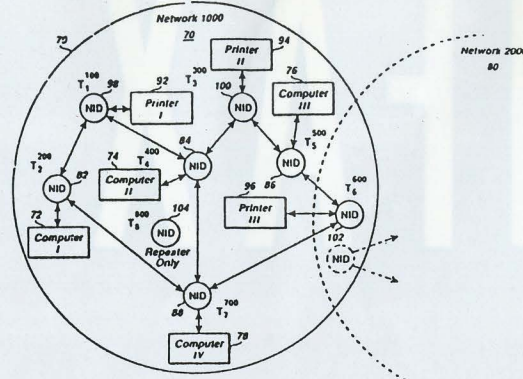
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— Chicago Section —

GOT A PENCIL?

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but what would we do without it?

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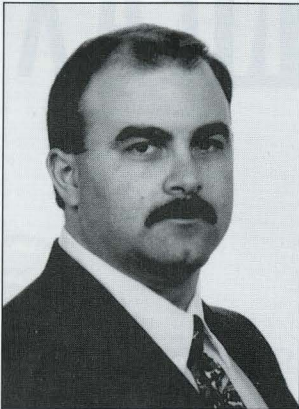
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Chairman's Message



Howard W. Penrose
IEEE Chicago Section,
Chairman

The year is almost over and a great many things have happened. I have enjoyed the first half of my term and look forward to the rest. We are looking for members who wish to get more involved in section activities in 1999. Please contact me if you wish to be a volunteer.

On October 7th and 8th of this year, we were provided with a booth at the Electri '98 show at the Rosemont Convention Center. As part of the deal, the Electric Association was given show registration space in *Scanfax* over September and October. The Chicago Section is to receive \$10 per IEEE member who registered through *Scanfax* and were scanned at the IEEE booth. Unfortunately only a few members were able to make it to the show. However, a number of volunteers handled the booth including: Norm Phoenix, who opened the booth, Jim Fancher, John Waters, Bert Orszula, Bob Pierce, Pat Murphy, and myself. A sincere thank you to those who volunteered their time for the section at Electri '98 and to those members who made the effort to attend.

Also, during the month of October, I noticed something that disturbed me. I came across several talks by high profile IEEE members brought from out of state. The Chicago Section had not been contacted concerning these talks, and opportunities to increase talk attendance, promote the institutions that brought in the speakers, and for the section to announce and take part in the talks were missed. For those members who are involved in these talks or discover them, please contact myself or one of the other section officers so that we may all share in the knowledge made available by these individuals.

The section will be approving budgets

this month. If your chapter has not submitted a budget, you will need to contact myself or the treasurer right away. Once the budget is approved you can only request funding on an individual basis at a section meeting prior to committing to any expenditures. We are expecting the budget to be completed and voted on at the December meeting at DeVry.

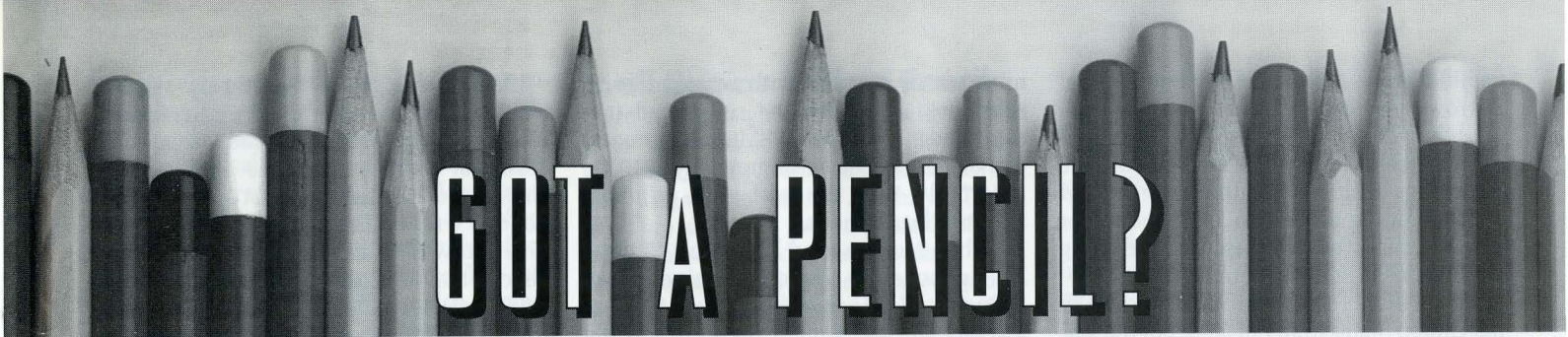
On October 19, 1998, I began work at the University of Illinois Energy Research Center (UIC) as a Research Engineer. In addition to my regular contact number I can also now be reached at 312-355-3480 during the day and at my regular contact number in the evenings and on weekends. Members can contact me on issues concerning the section, recognition for IEEE activities (local or otherwise), and any other appropriate issues. I am also able, on a case by case basis, to attend engineering functions with the intent of promoting IEEE and the section.

Scanfax advertising has just met expectations for this year. Many thanks to those companies who have advertised, members who have promoted advertising, and the efforts of the Slack Attack team. However, we are not there yet. At the October Chicago Section Executive Committee meeting, we had to approve additional funds for the publication for 1999. This is your publication and has been put in place to provide an additional aspect to the professionalism of IEEE and the membership as well as eventually becoming a self supporting magazine, freeing funds for membership and chapter activities. If you know of any companies who may benefit from advertising in your publication, please contact Slack Attack who will pursue the potential advertising.

Merry Christmas and a Happy New Year!

Calendar of Events

DATE	EVENT
Dec. 3, 1998	IEEE Chicago Section, DEIS, PELS, College of DuPage Small Business Development Center, Business and Professional Institute, Illinois Department of Commerce and Community Affairs, EPA Energy Small Business, University of Illinois' Energy Resource Center ENERGY STAR AND SAVINGS PROGRAMS FOR COMMERCIAL BUILDINGS
Dec. 8, 1998	IEEE-Chicago Section EXECUTIVE COMMITTEE MEETING
Dec. 9, 1998	Power Engineering Society THE YEAR 2000 BUG ON THE COMED T&D SYSTEM
Dec. 12, 1998	IEEE Chicago Section, IAS/IES, DEIS, PELS, Electrical Apparatus Service Association, Association of Professional Energy Consultants, College of DuPage Small Business Development Center, and the University of Illinois' Energy Resource Center TOTAL MOTOR SYSTEMS MAINTENANCE AND MANAGEMENT WORKSHOP



GOT A PENCIL?

By Derick Schermerhorn

"Excellent...one of the best productions I ever saw," wrote a Boston lady in 1844 regarding Henry David Thoreau's latest project. Curiously, she was not referring to one of his manuscripts. Her admiration was for another product produced by Thoreau – a pencil. Before he wrote *Walden*, Thoreau was part of the cottage industry that manufactured pencils.

B.P. (Before Pencil)

While writers like Thoreau have relied on the pencil for centuries, writing and erasing were not always so easy. When people began making images of animals on the walls of their caves, they scratched with stones or drew with the ends of burnt sticks. As early as 1500 B.C., Egyptians used tiny brushes made from plants. The earliest form of Western writing was accomplished by moving a stock in soft clay, which was then baked, making the writing permanent. Ancient Greeks, using metal chisels, hammered letters into stone. They and the Romans also used tiny brushes or reeds dipped in crude inks.

The Romans called their brush *peniculus* – meaning little tail, from which our word "pencil" evolved. They also created small, thin disks made of metallic lead, which they used to rule lines on papyrus to keep their lettering even. Roman children wrote with pointed styluses made of metal or bone on small wax-coated wooden tablets. During the Middle Ages, writers used styluses on surfaces coated with a kind of chalk.

By the 14th century, someone had shaped a piece of lead – the metal – into a thin rod, encased it in a wooden shaft, and used it as a writing tool. The instrument might have looked somewhat like a pencil, but the lead it contained was a far cry from today's pencil "lead," which is not lead at all, but a mixture of graphite, clay, and other substances.

The Pencil's Roots

In 1564, a storm uprooted a large oak tree near Borrowdale, a town in northern England. A wandering mountaineer was attracted by particles of a strange, black substance clinging to the tree's roots. He found that this substance could be used to make black marks on various kinds of surfaces.

Before long, people were cutting pieces of the black material into sticks and selling it on London streets as marking stones for use on crates, baskets and other products. They called the new writing substance *plumbago*, Latin for "that which acts like lead." People also began to give it names like black-cowke, kish, and wad. In today's terms, the mountaineer had discovered a deposit of pure, solid graphite.

To keep plumbago from blackening their fingers, people wrapped paper of wound string around part of it. Or they pushed rod-shaped pieces of plumbago into the end of a hollow twig or reed. However crudely, the pencil was beginning to take shape.

By 1612, plumbago had become famous not only for the black marks it made, but also for the ease with which it could be erased – not yet with rubber, but with bread crumbs. As one writer put it, for those pieces of writing "which you would have faire againe at your pleasure...note them with a pensil of black lead; for that you may rub out againe when you will, with the crums of new wheate bred."

International Competition Spurs Development

By the 1600s, the English Guild of Pencil Makers was searching for ways to make the writing implement more accessible. Members found a way to encase the plumbago in wood. They began to saw plumbago into thin rectangular sheets, cut the sheets into square rods, and then glue the rods into pre-made grooves in wooden shafts. Another strip of wood was glued on top. The shafts were eight-sided and 6 or 7 inches (15 or 16 centimeters) long. This form of pencil, with square "lead" and an octagonal wooden shaft, soon became standard. For a long time, England enjoyed a world monopoly on the sale of pencils.

In 1662, a Bavarian manufacturer set out to break this monopoly by building a factory to mass produce wooden pencils in Nuremberg. Instead of breaking the English monopoly, he made pencils that broke. German plumbago was impure and, as a result, sticks made of it broke too easily. It was not until almost 100 years later, 1761, that the brittleness problem was solved by a Bavarian chemist named Kaspar Faber. Faber mixed powdered plumbago with sulfur, antimony, and resins, and molded the resulting substance into sticks that hung

together even better than ones made with pure plumbago. These German "white lead sticks" could now effectively compete with the English pencil.

Faber's invention came just in time, as the supply of plumbago in England had dwindled. King George seized the mine in Borrowdale and began operating it as a Crown monopoly, making poaching from the mine a hanging offense. (He valued the plumbago partly because it had excellent writing properties, but perhaps even more so because it was useful for casting cannonballs.) Although Parliament greatly restricted mine operations, the supplies soon were depleted.

In 1789, plumbago was given its modern name. A.G. Werner suggested that the material be called graphite, after the Green word *graphein*, which means "to write." His suggestion was adopted, but people continued to think of the substance inside the pencil as "lead."

About 1794, Napoleon entered the pencil race. He found that his war with England had cut France off from both English and German graphite. Since French bureaucracy had come to depend heavily on the pencil, Napoleon commissioned an inventor by the name of Nicholas Jacques Conte to develop a satisfactory graphite substitute. Conte did so by mixing powdered graphite with powdered clay and firing the mixture in a kiln. This process not only produced an excellent graphite, but it also enabled Conte to alter the graphite's hardness by adding varying amounts of clay. More clay produced harder graphite and a lighter pencil line; less clay produced softer graphite and a darker line. Conte received a patent for his process in 1795. His new method spread quickly and was adopted throughout Europe.

Pencilmaking in America

Meanwhile, in America, most people were still using pieces of metal to write and draw. According to Duke University Professor Henry Petroski in *The Pencil*, an American pencil salesman named Horace Hosmer identified a schoolgirl from Concord, MA, as the first person in the United States to make a true pencil. In a short article on early pencilmakers of New England published in 1880, Hosmer wrote that, "She (he did not give the schoolgirl's

Continued on page 4.

name) learned to use the bits and ends of Borrowdale lead used in drawing, by pounding them fine and mixing a solution of gum arabic or glue. The cases were made from twigs of elder, the pith being removed with a knitting needle. So far as the writer knows, this was the first pencilmaking establishment in the country."

In the early 1800s, some pencils came to the United States from England, but the war of 1812 soon cut the states off from that source. A cabinetmaker by the name of William Monroe, also from Concord, decided to try his hand at pencilmaking. "In 1812," wrote Hosmer, "William Monroe... pounded some plumbago with a hammer,

mixed it in a spoon with some adhesive substance, and filled the compound into some cedar wood cases." Monroe's process worked and his business grew. By 1819, he reportedly was the best and principal maker of lead pencils.

While Monroe used hand tools to make his pencils, a fellow cabinetmaker, Ebenezer Wood, was developing the first machines in the United States that could mass-produce pencils - six at a time. He created such devices as a glue press, a pencil trimming machine, a circular saw, a mechanized groove cutter, and a circular blade for giving pencils their octagonal shapes.

Before long, other Americans started manufacturing pencils, mostly as a cottage industry. Henry David Thoreau was so successful at it that by 1844 his pencils were considered among the best to be had. Fellow writer and friend Ralph Waldo Emerson was so enamored with Thoreau's pencils that he often gave them as a gift. It was Emerson who sent the Thoreau pencils to the lady in Boston.

How They Get the "Lead" Inside the Pencil

The modern pencilmaking process begins as logs are cut into 3- by 3- by 16-inch (8- by 8- by 41-centimeter) blocks. A popular wood for pencil casings is incense-cedar, found mainly in the High Sierra mountains of northern California and southern Oregon. Distinguished by its familiar fragrance, the wood has a straight grain, uniform texture, and relative softness, which makes it ideal for precision sawing, as well as for staining, waxing, and sharpening.

Once the wood blocks have dried, they are cut into slats as long as one pencil, as wide as nine pencils, and as thick as half a pencil. Further drying in an oven, or kiln, follows and then the slats are stained and waxed. Afterwards, nine shallow parallel grooves are sawed lengthwise into each slat. A thin coat of glue is applied and the slats are now ready for the leads.

Pencil leads are prepared by mixing chunks of graphite and clay together in exact quantities to determine hardness. This mixture is then crushed into a fine powder by flint pebbles inside a huge rotating drum. (colored pencils contain clay and wax that are mixed with colored pigments and dyes, rather than with graphite.) Water is added, and the mixture is reduced to a soft paste. A billet press compresses the paste into compact cylinders, and then a hydraulic piston pushes the paste cylinder through a metal tube. The paste exits the tube as one long, thin string that is cut into pencil-length pieces called "leads." After drying, the leads are heated to a high temperature in a furnace, a process that makes them smooth, hard, and durable. To improve their writing ability, some leads may be steeped in hot oils and waxes.

One pencil-length lead is placed into each of the nine grooves cut into the wooden slat. Another identically grooved and glued slat is then placed on top of the first slat to make a "lead sandwich," and the sandwich is dried under pressure in an oven.

After the glue dries, revolving steel blades trim the wood into round or hexagonal shapes. The same machine cuts each slat into nine separate pencils. The pencils are sanded, varnished, and painted. They are then stamped with the manufacturer's

name, along with a number giving the pencil's hardness (usually from 1 to 4, the highest number indicating the hardest lead).

The typical wooden pencil has a small rubber eraser attached at one end by a piece of aluminum called a ferrule. It is rubber's ability to "rub" out pencil marks that, back in the 1700s, gave rubber its name. The rubber is usually mixed with pumice, a powdered lava, to enhance its erasing power.

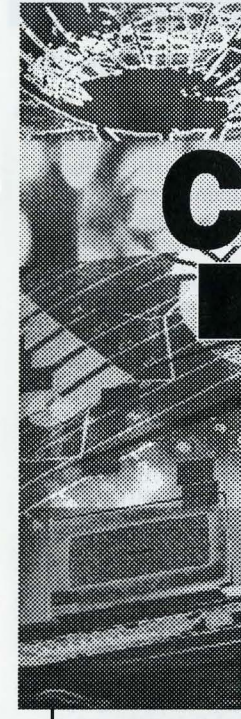
The standard 7-inch (18 centimeter) pencil produced today can draw a line 35 miles (56 kilometers) long, write at least 45,000 words, and last through 17 sharpenings, down to a 2-inch (5-centimeter) butt.

It all Begins With a Pencil

In a world where writing with a computer keyboard and drawing with a mouse are considered superior, the pencil has not only managed to survive, but thrive. Today, there are said to be some 300 kinds of pencils. These include pencils that write underwater, as well as pencils used by doctors to mark their patients' skin before surgery. More than 17 billion pencils are produced each year throughout the world. The United States alone, which annually sells over \$200 million worth of them, manufactures some 2.5 billion pencils a year - enough to circle the earth 11 times at the equator.

The numbers show that the "low-tech" pencil refuses to be erased. "It is often said," comments Professor Petroski, author of *The Pencil*, "that everything begins with a pencil."

Derick Schermerhorn, a freelance writer, provides writing services for various companies and contributes articles to technical and business publications. He has held management positions in corporate communications with Citizens Utilities, Chicago Pneumatic Tool Company, and International Paper. He lives and works in West Palm Beach, FL."



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3-8pm both days

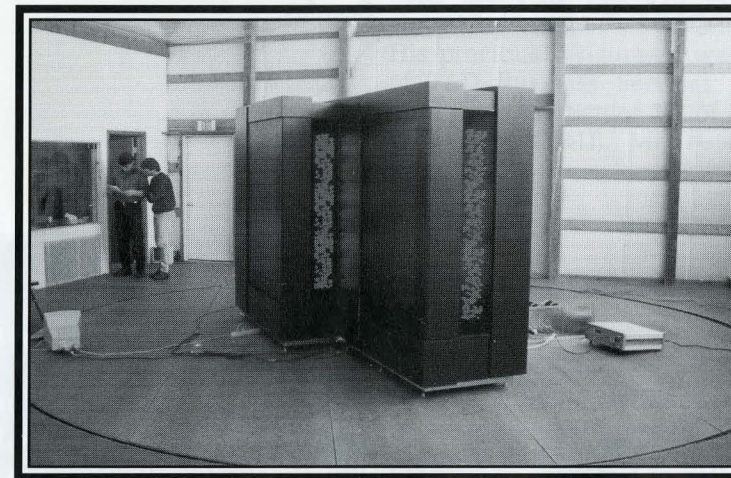
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December 3, 1998

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Overview:

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Presenters:

Wade Minster is an Energy Management Specialist with the Chicago Programs Bureau of Energy

and Recycling, Illinois Department of Commerce and Community Affairs. Audrie Washington works for the U.S. Environmental Protection Agency (EPA) in Chicago. She serves as the Regional Coordinator for the Energy Star Program.

Location:

Open Campus Center (OCC), Room 128A, College of DuPage, 425 22nd Street, Glen Ellyn, IL 60137.

Time: 8 am until noon

Registration:

Cost: \$10 per person. You may register by phone by calling (630) 942-3984. The course code is 17225. Please identify yourself as an IEEE member or that you are registering as a result of IEEE Scanfax.

IEEE PES CHICAGO CHAPTER

The Year 2000 Bug on the ComEd T & D System

Wednesday,
December 9, 1998

LUNCH MEETING

David Petersen, T&D Y2k Project Manager, Commonwealth Edison Co.

About the topic:

David Petersen will provide information on the Year 2000 Bug on the ComEd T&D system. His presentation will be given from a project management perspective including information about the process, findings, key focus areas, problems, current status, and contingency plans.

About the speaker:

Mr. Petersen is the T&D Y2k Project Manager and he also doubles as the ComEd Contingency Planning Coordinator. He has been a ComEd employee for over 16 years and has been the T&D Y2k Project Manager since May 1998.

His previous assignment was Director of T&D Business Services, reporting directly to the Senior VP of Regulated Operations (T&D). Mr. Petersen has

prior ComEd experience in Engineering, Construction and Customer Operations.

Location:

Chicago Bar Association, 321 South Plymouth Court (near Jackson and Dearborn), Chicago, IL 60604.

Time: Social: 11:30am.
Lunch: 12:00pm.(optional)
Presentation: 12:15pm.
Meeting Adjourns: 1:00pm.

For more information, visit:
http://www.ece.iit.edu/~flueck/chicago_pes/

Dr. Alexander J. Flueck: email: flueck@ece.iit.edu, Electrical and Computer Engineering: phone: 312-355-3480, Illinois Institute of Technology, fax: 312-567-8976, Chicago, IL 60616-3793

WORKSHOP

About the topic:

A full day seminar on the development of Electric Motor System Maintenance and Management Programs for the Modern Industrial Facility. Includes hands-on U.S. Department of Energy MotorMaster + Version 2.01 and Version 3.0 (networkable) software and lecture on the development of maintenance programs and application for industry. Attendees will receive MotorMaster + software, other decision making materials, and handouts. Lunch and snacks are included. As space is limited, additional days may be allocated on following weekends or weekdays, as necessary.

About the Speaker

Howard W. Penrose with the University of Illinois' Energy Resource Center, the present chair of the Chicago Section IEEE, and a U.S. Department of Energy MotorMaster Certified Professional will be presenting. He has over a decade of experience in the development of

Electric Motor System Maintenance, Management, Repair, and Research and Development.

Location:

Open Campus Center (OCC), Room 125A, College of DuPage, 425 22nd Street, Glen Ellyn, IL 60137

Time: 9 am to 5 pm.

For reservations

Cost: \$50 fee will be collected at the door, checks to be made out to the COD Small Business Development Center. Please contact the IEEE Business office no later than December 9, 1998.

Lunch and snacks are included. As space is limited, additional days may be allocated on following weekends or weekdays, as necessary.

For more information contact Howard Penrose at (312) 413-7516 or motor-doc@ix.netcom.com

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December 12, 1998

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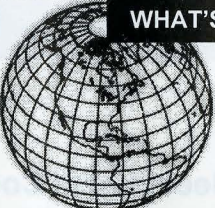
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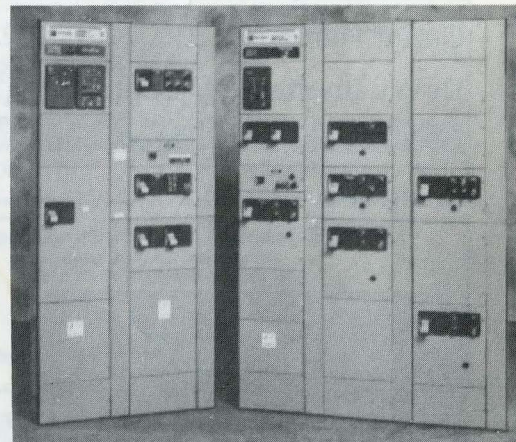
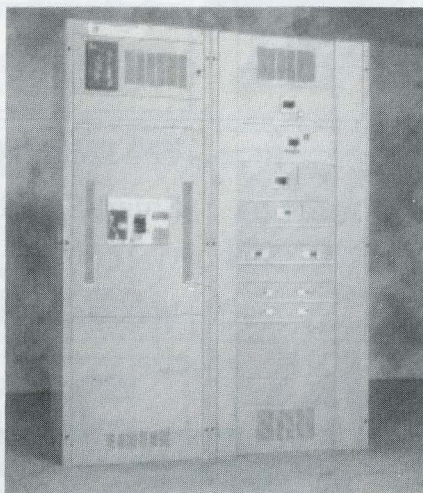
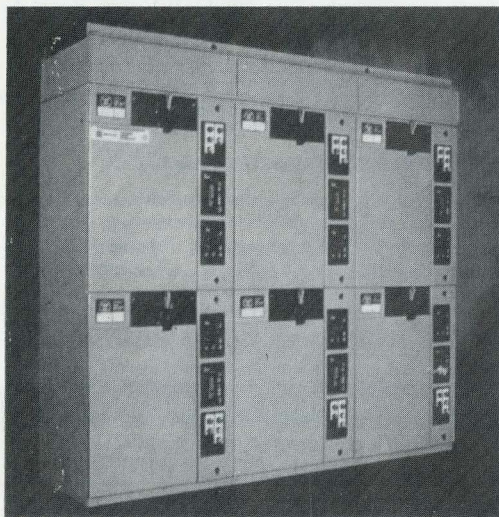


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