

SCANFAX

September 2000

Volume 52, Issue 7



IEEE

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A publication of the
Institute of Electrical & Electronics Engineers
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Diane Turek Area Director OSHA Des Plaines

2000 City of Chicago Electrical Code Changes

Tim Arendt, Chief Electrical Inspector, City of Chicago



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CHICAGO SECTION EXECUTIVE COMMITTEE MEETING
Tuesday, Sept. 12, 7:15 pm
DeVry DuPage, Room 230, 1221 N. Swift Road, Addison, Ill.
No Registration Needed

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Chairman's Message

Greetings Fellow IEEE Members

My name is Patrick Murphy and I am the new Chicago Section Chairman for the 2000/2001 term. I am pleased to have the opportunity to serve our Section and its members for the coming year. Some of you may know me through my years working at the Society and Section level. For those who do not, I will give you a brief introduction.

I am an Electrical Engineering graduate of the Illinois Institute of Technology and a Licensed Professional Engineer in the State of Illinois. I am 59 years old, married, a father and a grandfather. I have been a member of IEEE since 1979 and a member of the Industrial Applications, Power Engineering, and Vehicular Technology Societies. I have

been active as an officer in the Section and IAS.

I am a member of the Standards Association and work with the Rail Transit Vehicle Interface Standards Committee. I also participate as a reviewer for ANSI C37 Switchgear Standards (PES). I have been a member of the Section Executive Committee since 1997 and an officer since 1998.

Before discussing my ideas for this term, I want to thank Ed Bogus for his service during the 1999/2000 term. He was very dedicated to the work and his leadership will be missed. This year he has moved on to a new post as Section Past Chairman.

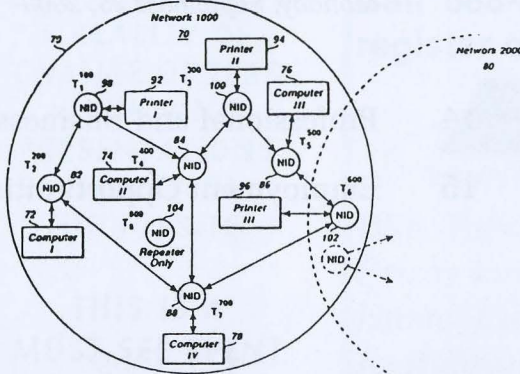
During my term as Chairman, I would like to address the following issues:

Patrick Murphy, E.E., P.E.
IEEE Chicago Section, Chairman

1. Declining membership and membership participation
 2. Financial stability and adequacy
 3. Professional advancement and recognition
 4. Officer development
- Watch future columns where I will discuss these items and what I believe we can do to improve them.
- I encourage you to support the IEEE through your participation in Societies, Sub Sections and the Section. I believe this is important because it will enable us to strengthen our professional networks, expand our knowledge and enjoy the benefits of a strong community.

The Chicago Section Executive Board meets the second Tuesday of every month at 7:15 p.m. — usually

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Understanding Plasmas:

From the stars to fluorescent lights

By Terri Biloff

From manufacturing to environmental conservation, plasmas are being used in numerous engineering applications where control is needed or when special sources of energy or radiation are required.

Any attempt to understand plasmas and their uses must begin with the physics of a plasma, which is often called the fourth state of matter after solid, liquid, and gas.

Plasma is defined as a collection of charged particles containing about equal numbers of positive ions and electrons that exhibits some properties of a gas, but differs from a gas in being a good conductor of electricity and in being affected by a magnetic field.

In the universe, plasmas are what stars are made of, and on Earth we have the ability to create our own plasmas by collecting neutral gases in a sealed container and adding heat or other sources of energy such as ultraviolet or thermal lighting. This heat or energy eventually strips the atoms of their electrons. When that happens the electrons move freely with the positively charged nuclei in a fury of electrically charged particles — a plasma.

Electric and magnetic fields can also accelerate plasmas, which allows them to be controlled and applied to various aspects of daily living.

Manufacturing Use

We are surrounded by many products manufactured using plasmas or plasma jets. Some of the more common products include:

- Computer chips
- Electronics
- Medical implants and prosthetics
- High-efficiency windows
- Anti-scratch surfaces for eyeglasses and other optics



Every time you turn on a neon sign or fluorescent light, you are revealing plasmas.

UNDERSTANDING PLASMA

These plasma technologies are important for many industries seeking more efficient methods of production and lower processing costs.

Household Use

Every time you turn on a neon sign or fluorescent light, you are revealing plasmas. Inside every fluorescent lamp there are hundreds of plasmas. These plasmas convert electrical power (from the power source) to a form that causes the lamp's phosphate coating to produce the light we see. The gas properties inside both light sources (neon and fluorescent) shift very quickly from neutral to plasma with the flip of a switch.

National Security

Plasmas for national security have an enormous range. Although not widely publicized, we know plasmas are used in inertial fusion. When inertial fusion happens, laser beams energize the inside of a small cylindrical target, X-rays rapidly heat the capsule (causing the surface to blow off). The force then compresses the plasma's fuel and increases the temperature to 100 million degrees Centigrade,

which ignites the plasma fuel and produces fusion energy.

This fusion energy can then be applied to various defense applications (nuclear tracking and targeting) where the need for high energy is greater than those available in today's lasers.

In Space

Scientists are studying how the environment of interplanetary space affects astronauts, satellite operations, and communication systems. The sun constantly emits plasma that moves about freely in the solar system. Beneath the solar surface these plasmas often erupt resulting in awesome colorful striations of plasma not seen from earth. If any of this solar shrapnel collides with the magnetic field that embraces the Earth (magnetosphere), the result could mean geomagnetic storms that could destroy satellite equipment. Scientists continue their research of "space weather" to better understand how and what impact this phenomena may have on earth baring satellite communication systems and national defense systems.

Launching a spacecraft that would

become the first to leave the solar system using energy from plasma is on the NASA drawing board. The hope is to propel the craft using man-made and solar-generated plasma to create an electromagnetic force field which would then drag the craft via solar winds and eventually launch it past the solar system.

In Medicine and Health Care

More than half a billion medical devices from catheters to artificial hips are implanted every year. Researchers at the University of Washington are using plasma jets in biomedical research to coat medical implants in a ways that will prevent the body from rejecting them as foreign material.

The coating process attracts and binds specific proteins that trigger the body's natural healing process, which aids in accepting foreign material.

Aside from the coating process, plasmas are also routinely used in cleaning and sterilizing surfaces, destroying bacteria and fungi in seconds versus the standard heat sterilization that is very time consuming.

Energy

The United Nations and the Department of Energy projects an increasing population and thereby increased energy demands. In order to meet these needs, researchers are challenged with creating new energy sources, which ideally will be comprised of a mix of energy technologies from inertial fusion to solar generated magnetic energies. The University of Rochester has been experimenting with both inertial and magnetic confinement fusions. Hotter than the suns core, physicists have learned how to confine plasma with the hope of powering large facilities such as power plants, removal of hazardous chemicals and pollution control.

Some excerpts were obtained from the University of Rochester Plasma Research Team, the University of Washington, and the Plasma National Society.

Next month:
SOCIAL IMPLICATIONS OF TECHNOLOGY

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What do you want to read about?

The *SCANFAX* staff is planning the editorial calendar and is looking for your input. What topics would be of interest to IEEE members? What current trends need to be addressed? We also welcome existing articles and papers. If you have authored material of interest to *SCANFAX* readers, please consider submitting your work for publication.

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☐ I suggest the following topic(s) for future issues:

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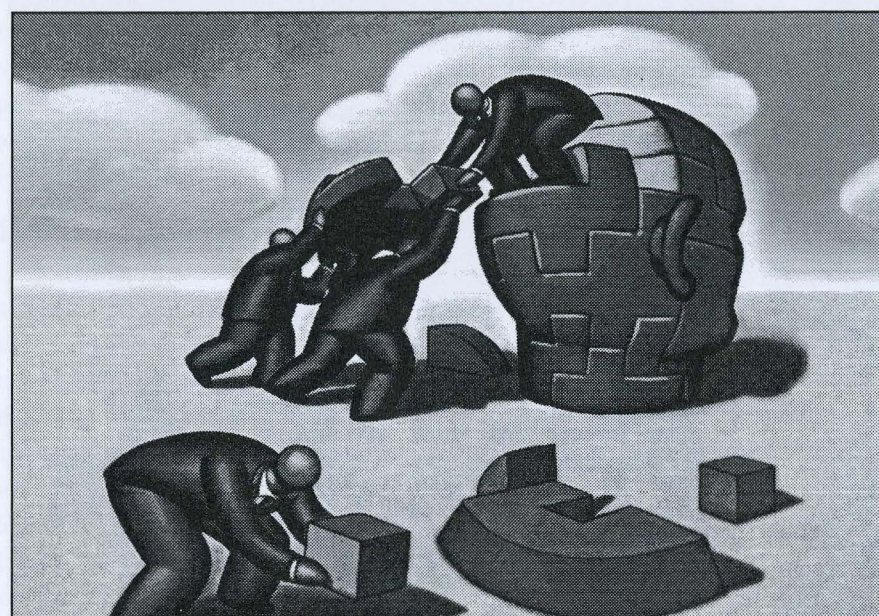
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CHAIRMAN'S MESSAGE

Continued from page 4

at DeVry Institute, Addison Campus. The Executive Board consists of the Section Officers and the Society, Sub Section and Standing Committee Chairmen. The meeting is open to all members and you are welcome. If you have something you want to discuss, please call the Section Secretary or me so your topic may be placed on the agenda, for consideration.

If you have any questions or helpful suggestions you may contact me via e-mail at patmurphy@ieee.org or call me at (312) 578-2377 during business hours.

I also encourage you to contact your Society Officers for information or with any suggestions you have for them. Here are the other Section Officers and their contact information:

VICE CHAIRMAN/TREASURER

Pat Hennelly
(847) 398-4510
phennelly@weldy-lamont.com

SECRETARY

Dennis Lamont
(847) 398-4510
dlamont@weldy-lamont.com

Hope to see you at the IEEE meetings & events.

Pat Murphy, Chairman

Calendar of Events

Date	Event
September 12, 2000	Chicago Section EXECUTIVE COMMITTEE MEETING
September 20, 2000	IAS / IES MEDIUM VOLTAGE PREDICTIVE MAINTENANCE-PARTIAL DISCHARGE MONITORING
September 25, 2000	Chicago/Rockford IEEE CONSULTANTS NETWORK MEETING

ATTENTION: IEEE Chicago Section Chapter Chairpersons

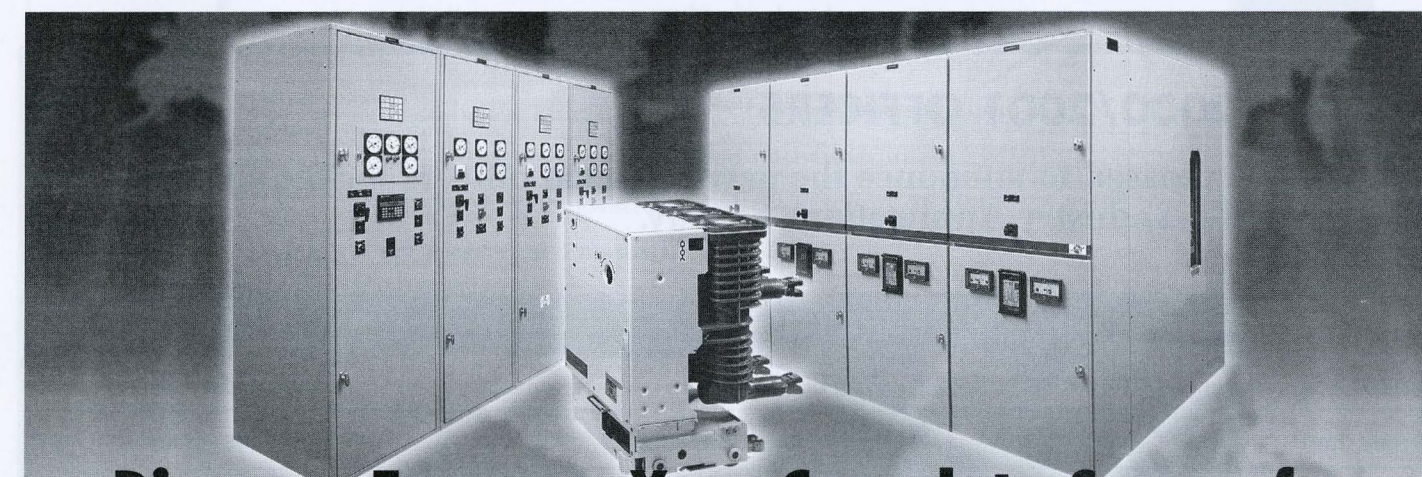
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DEADLINES: September 25 for November Issue
October 25 for December Issue



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IAS/IES

Medium Voltage Predictive Maintenance- Partial Discharge Monitoring

Wednesday,
September 20, 2000

EVENING MEETING

Gabriel J. Paoletti, P.E., Product Line Manager for Predictive Diagnostics

About the Topic:

The presentation will review partial discharge monitoring as an effective on-line predictive maintenance test for MV motors, MV generators and MV switchgear at 4160 volt and above, as well as other MV electrical distribution equipment. The benefits of on-line testing allow for equipment analysis and diagnostics during normal production. Corrective actions can be planned and implemented, resulting in reduced unscheduled downtime. In addition, this presentation will review the root-causes of MV equipment failures such as corona damage and surface tracking, and their relationship to partial discharge activity. The results of recent EPRI research work, involving the comparison of various partial discharge technologies, will also be presented.

About the Speaker:

Gabriel J. Paoletti, P.E., received a BSEE degree from Drexel University, Philadelphia, Pa., in 1976. Mr. Paoletti has over 23 years of engineering service experience with Westinghouse, ABB, and currently as Product Line Manager for Predictive Diagnostics with Cutler-Hammer Engineering

Service. His electrical distribution equipment experience includes field testing, predictive and preventive maintenance, applications engineering, failure analysis, and power systems studies. Mr. Paoletti is a Registered Professional Engineer in Pennsylvania and Delaware.

Location: The Como Inn is located at 564 N. Milwaukee Ave. in Chicago, just off the Kennedy Expressway (I-90/94) near Grand Ave. and Halsted St.

Time:

Social: 5:30 p.m.

Dinner: 6:00 p.m.

Presentation: 7:00 p.m.

Cost: Your cost includes the presentation and your choice of chicken (\$25 IEEE member/\$30 non-member) or pasta (\$20 IEEE member/\$25 non-member) four-course dinner.

Reservations: Please call the IEEE Business Office at (800) 898-IEEE or (630) 724-0200 with your entree preference on or before Sept. 15th.

IEEE-IAS 2000/2001 OFFICERS

The IEEE is pleased to announce the newly elected officers for the Chicago Chapter of the Industry Applications Society.

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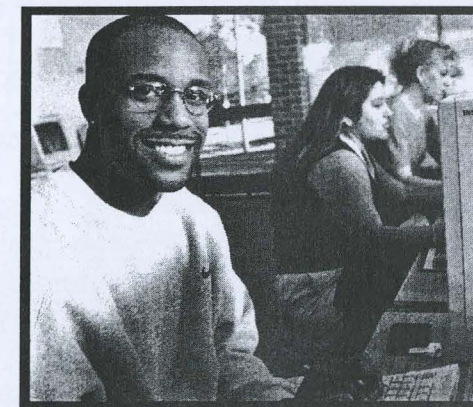
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CHICAGO/ROCKFORD IEEE

CONSULTANTS NETWORK MEETING

**Monday,
September 25, 2000**

The Chicago/Rockford IEEE Consultants Network will be meeting on Monday, September 25, 2000, 7:30 - 9:00 PM at the Palatine Public Library, 700 North Court, Palatine, IL 847-358-1216.

Meetings are held on the last Monday of odd-numbered months. Preceding the meeting, we will be getting together for our group dinner. You are invited to join us for the optional informal dinner. We will meet at Bakers Square at 6:15 PM. It is located at 270 E. Northwest Highway and North Court, just south of the library. We order individually from the menu.

We plan to finish dinner by 7:20 PM. The meeting is two blocks from Bakers Square. Reservations are not required. There is no charge for attendance at the meeting.

In addition to networking and sharing leads and referrals, there is usually a guest

speaker. On September 25, instead of a speaker, we plan to have an open discussion on "How To Deal With Clients Whose Contracts May Not Be Acceptable To You". (Bring along a copy of the Sample Consulting Agreements you will find at <http://www.ieeeusa.org/BUSINESS/aicn.menu.html>)

Members and non-members are invited to both the meeting and the optional dinner.

Information about the network can be obtained by e-mail: g.l.blank@ieee.org and at our web site <http://www.drblank.com/coaction.htm>

See you on September 25, and bring other consultants and those who aspire to be consultants.

Sincerely yours,

Dr. Gary L. Blank, Chairman

EVENING MEETING

EDUCATION UPDATE: UIC Power Supply Short Course

When SCANFAX reported on continuing education opportunities in June, we concentrated on degree and certificate programs. Short courses are also available, and one we found out about is a two-day advanced engineering design course at the University of Illinois at Chicago called, "Power Supply Design for Performance and Reliability." It will be offered in November, 2000 by Krishna Shenai, Ph.D., and his graduate students.

Dr. Shenai was formerly with COMSAT Laboratories, GE R&D Center, Intel, and the University of Wisconsin-Madison. He is a professor of EECS at UIC and Director of the UIC

Power Electronics Research Laboratory and the UIC MicroSystems Research Center. He also directs the Power Electronics Reliability Group, an industry research group on power electronics that is hosting the course.

This two-day short course provides a detailed top-down approach to power supply optimization for performance and reliability.

The first day will begin with the fundamentals of power electronics and the design of application-specific power converters.

The second day will continue with a comprehensive discussion of the design, performance, and modeling of

passive components — magnetics and capacitors — that are used in power supplies. The course will culminate in a hands-on training session that provides a step-by-step approach to the development of power converters while accounting for device non-idealities.

The course will be held at the University of Illinois at Chicago, 1043 Engineering Research Facility, 842 West Taylor Street, Chicago.

For more information, contact Dr. Krishna Shenai, Tel: (312) 996-2633; Fax: (312) 996-0763; E-mail: shenai@eecs.uic.edu; Internet: www.eecs.uic.edu/~shenai.



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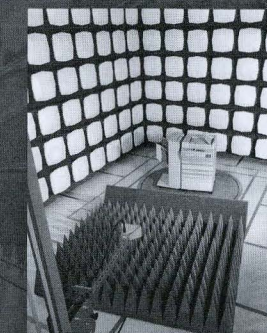
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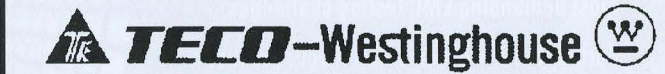
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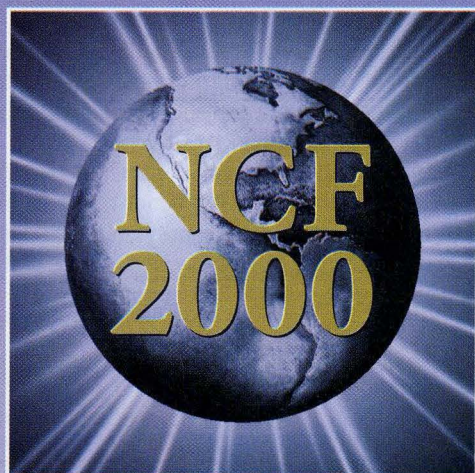
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