Chapter 24, Inc.
Madison, Wisconsin

Society of Broadcast Engineers *September 2001*

TOWER INDUSTRY PART 9 – GROUNDING FOR LIGHTNING

By Vicki W. Kipp

While humans have 1 in 6,000 odds of being struck by lightning, towers have 1 in 1 odds of being struck. It's basically inevitable.

HOW LIGHTNING WORKS

When the equilibrium of electrical charges between the atmosphere and the earth becomes unbalanced, nature uses lightning to restore the balance. The atmosphere is composed of atoms. Warm air moving upward and atmospheric turbulence from storms cause atoms to dissociate into separate groups of charged ions. Negatively charged ions accumulate at the base of the clouds in the lower atmosphere while positively charged ions ascend to the upper atmosphere (Figure 1). Normally, the surface of the earth has a negative charge. However, when negative charges build up in the lower atmosphere, they repel the negative charges on the surface of the earth. Consequently, the earth takes on a large positive charge.

Since opposite charges attract, the negative ions in the lower atmosphere are now attracted to the positive surface of the earth. Negative ions are very light so they can move towards positive charges with speed and ease. The negative charges move swiftly toward the earth, creating a phenomenon known as lightning. As the negative ions head toward the ground, positive ions on the surface of the earth are drawn upward slowly. Initially, the ions flow slowly because air is a poor conductor. However, the attraction between the negative and positive ions becomes so great that they overcome the resistance of the air. When negative ions move down through the air, their flow is called a 'step leader' or 'pilot streamer' because of the erratic path that electrons take as they seek the earth. The negative ions flow downward until the resistance of the air becomes too great, and then they travel horizontally, followed by

(continued on page 4)

Next Meeting:

Wednesday, September 19, 2001

Mid-West Family Radio Tour

2740 Ski Lane

Dutch Treat Dinner at 5:30 PM

at Perkins 1410 Damon Road

Meeting and Program at 7:00 PM

In This Issue:

Dane County EAS Local Plan Written

By Paul Stoffel

A Local EAS Plan (Emergency Alert System) has been written for Dane County and is available for viewing or printing as a PDF file from the SBE Chapter 24 web site. The plan was written by Dave Janda, Dane County Emergency Management, and Paul Stoffel, WHA-TV, in cooperation with Rusty Kapella, National Weather Service (NWS Sullivan Office), SBE Chapter 24 and local television and radio broadcasters, including WIBA and WOLX.

The purpose of the Dane County EAS Local Plan is to explain and provide procedures for the broadcast stations and cable operators and the emergency management community. The decision to activate the local EAS rests with emergency management personnel. Broadcast stations and cable operators are encouraged to participate in the Local EAS on a voluntary basis.

Broadcast stations and cable operators already participate in National and State EAS plans and often air EAS-coded weather alert messages originated by the NWS. The Local EAS will originate hazard notification messages in response to local emergencies, such as catastrophic power outages, civil disorders, industrial accidents, or any occurrence that poses a danger to life or property.

Local emergency messages would reach the public similar to how the NWS disseminates weather alerts to NOAA Weather Radios. Additionally, broadcasters and cable operators can program their EAS receivers to monitor the area's NWS Weather Radio broadcast, decode the EAS-coded local message, and automatically relay the

(continued on page 11)

CHAPTER 24 OFFICERS

CHAIR:
Tom Smith (WHA-TV)
W - 263-2174
smithtc@vilas.uwex.edu

VICE CHAIR:
Vicki Kipp (ECB-TOC)
W - 264-9631
vkipp@ecb.state.wi.us

SECRETARY:
Tom Weeden (WMTV-TV)
W - 274-1515
tcweeden@nbc15.com

TREASURER:
Stan Scharch (WISC-TV)
W - 271-4321
sscharch@wisctv.com

Past-Chair:
Kevin Ruppert (WISC-TV)
kruppert@wisctv.com

COMMITTEE APPOINTEES

Program Committee:
Denise Maney 277-8001
Steve Paugh 277-5139
Fred Sperry 264-9806
Steve Zimmerman 274-1234

Membership:
Paul Stoffel
stoffel@vilas.uwex.edu

Sustaining Membership:
Fred Sperry W - 264-9806
fsperry@ecb.state.wi.us

Special Events:
Lonnie Cooks W - 264-9631
lcooks@ecb.state.wi.us

Certification and Education:
Jim Hermanson 836-8340
jmh@execpc.com
Tim Trendt (UW-Platteville)

Frequency Coordination:
Tom Smith W - 263-2174
smithtc@vilas.uwex.edu

National SBE Chapter Liaison:
Leonard Charles
W - 271-4321 FAX - 271-1709
lcharles@wisctv.com

August Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Tuesday, August 28, 2001 at WISC-TV in Madison, Wisconsin, for the chapter monthly meeting. There were 21 members in attendance, 16 of whom were certified, one sustaining member, and two guests.

The meeting was called to order at 7:00 PM by chairman Tom Smith. Minutes of the July meeting as published in the newsletter were approved. Treasurer Stan Scharch reported the chapter's bank balance was in the black.

Denise Maney of the Program Committee reported on upcoming programs. In September, the chapter is scheduled for a local radio facility tour, and the October program will be held at the Broadcasters Clinic. Sustaining membership chair Fred Sperry was not present. Membership chair Paul Stoffel reported that Chapter 24 currently has 70 members, 49 of whom are certified. The chapter is sending out 116 newsletters monthly.

Certification chair Jim Hermanson reported that the August test session had ended on the 27th. The next test session will be held November 9-19, with a registration deadline of September 28. Jim also reported that the SBE National web site is now advertising a joint SBE/ATSC program to assist with the rollout of DTV. The program to be held in St. Louis will address ATSC PSIP standards, MPEG-2 and IP multicast issues. Also available on the National's web site are implementation guidelines for data broadcasting.

Special Events Coordinator Vicki Kipp is looking for a new coordinator. Anyone interested in taking over should contact Tom Smith. Frequency Coordinator Tom Smith reported that auto races in Oregon, WI on August 16-18 were successfully coordinated on 2 GHz, and no interference was reported by TV users. The UW football team has purchased the wireless UHF digital "Coach-Com" system, and Tom is working with UW to coordinate frequencies.

National Liaison Leonard Charles reported that the SBE election results have been published, and he listed the new national officers. Tom Smith reported that Chapter 24 won the *Best Newsletter* (class B) award thanks to newsletter editor Mike Norton. *Best Technical Article* was won by Vicki Kipp for her article on the chapter's field trip to Resonance Research.

Newsletter editor Mike Norton announced the deadline for articles for the September issue will be due at midnight, Friday, September 7th. The folding party will be held Wednesday, September 12th at WKOW-TV. In old business, Tom Smith summarized the recent officers meeting which included discussion on this year's program schedule and the upcoming Broadcasters Clinic forum.

Paul Stoffel announced that the Dane County EAS plan has

(continued on next page)

New Special Events Coordinator

By Vicki W. Kipp

Chapter 24 member Lonnie Cooks has volunteered to serve as our Special Events Coordinator. Lonnie is a Media Technician 3 at the Telecommunications Operations Center (TOC) of Wisconsin Public Broadcasting. He brings a lot of enthusiasm and event planning experience to his new position.

If you have any ideas for a special event, please contact Lonnie Cooks at lcooks@ecb.state.wi.us or 264-9631.

Meeting Minutes (continued)

been reviewed and signed, and is now posted on the chapter's sbe24.org web site. The plan was made generic so that other counties could copy and use it. Leonard Charles briefly discussed the "Amber Plan" used by law enforcement in cases of abducted children. State EAS Chair Gary Timm is to hold a meeting to offer input to a possible state plan proposed by the state Attorney General and the Wisconsin Broadcasters Association. Charles also said the updated Broadcasters Clinic program schedule is available on the sbe24.org web site.

In new business, Steve Paugh began a discussion on the new television requirements for captioning emergency messages or any breaking news that interrupts regular programming. Paul Stoffel will post the FCC rule reference on the MSNSBE mailing list. The meeting adjourned at 7:30 PM. Leonard Charles presented this month's program, an overview on installation of DTV antennas on the Madison Community Tower.

Submitted by Tom Weeden, Secretary

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

• The FCC is accepting comments on its proposals to reallocate some spectrum in the 2390 to 2400 MHz amateur segment as well as in the non-amateur 1.9 and 2.1 GHz bands for unspecified mobile and fixed services. The 2390-2400 MHz band is a primary Amateur Service allocation. The FCC has proposed including the band and others to support the introduction of advanced wireless services, including third-generation (3G) mobile systems.

In the case of 2390-2400 MHz, the FCC notes that, while unlicensed Part 15 devices already share the band with hams, the band has been kept free of services that might be incompatible with amateur use. The FCC now wants to know if these sharing concerns still hold and if they would preclude allocating the band for advanced wireless services.

To assess the impact of unlicensed Part 15 devices on amateur frequencies, the American Radio Relay League has inaugurated the Amateur Radio Interference Assessment (ARIA) project. The effort will involve amateur volunteers across the country to assess the noise levels primarily from unlicensed devices in bands above 400 MHz.

ARRL will contribute its results to an overall radio noise study sponsored by the FCC Technological Advisory Council. The TAC study will look into whether noise generated by low-power unlicensed Part 15 devices is on the rise and whether it's adversely impacting other services. ARRL's initial emphasis will be on the band 2400-2450 MHz, where Bluetooth and IEEE 802.11b-protocol wireless local area networks are gaining popularity.

• On Saturday, August 18, hams made the first two-way contact between Texas and Manitoba on 24 GHz using the moon as a passive reflector. Noted microwave enthusiast Al Ward, W5LUA, of Allen, Texas, says his contact with Barry Malowanchuk, VE4MA, in Winnipeg, Manitoba, was a result of several years of effort in trying to optimize antenna gain and receiver sensitivity, and to obtain adequate power to make the roughly half-million mile path to the moon and back. Such accomplishments on 24 GHz are particularly significant because water-vapor absorption of signals peaks at around that frequency. VE4MA used a 2.8-meter offset-fed dish and a travelling wave tube amplifier producing 70 watts. W5LUA has a 3-meter prime focus dish and a TWT amp producing 80 W. Ward was the recipient of the 2000 ARRL Microwave Development Award.

(Excerpts from "The ARRL Letter")

Thanks to WKOW-TV for providing copying and folding facilities for the Chapter 24 newsletter!

Thanks to WISC-TV for maintaining the web server for the Chapter 24 Web page!

TOWER INDUSTRY PART 9 (continued from page 1)

further downward movement. Finally, the downward moving negative ions are met by the upward moving positive ions. When negative and positive ions connect, a conductive path from the cloud to the ground is formed (Figure 2). Negative ions hurry down the path creating an observable stroke. New negative ions flow into the void left by the discharge of negative ions. These new negative ions rush along the path. Additional negative ions come from neighboring clouds. Negative ions continue to flow until equilibrium returns between the atmosphere and earth.

There is a long-standing argument about whether lightning strikes up or down. Although the negative charges are moving downward, it is the fast-moving charges that create the light. Hence the visible lightning stroke in fact moves upward.

LIGHTNING SEEKS TOWERS

Observing an NTSC antenna from the Candelabra as it lay on the ground during tower work, I noticed that the antenna grounding rods were covered with sizzle marks where they had been branded by the tips of lightning bolts. According to Winton Wilcox of ComTrain, "Towers are struck by lightning more than any other man-made structure." Towers are frequent targets for lightning because they are so high above ground level. For an optimum coverage area, broadcast towers are intentionally designed to be taller than neighboring buildings. Besides the height factor, towers attract lightning because they are built of conductive steel. Positive ions from the earth can travel up a steel tower much easier than they could travel up through air alone. The highest point at the top of the tower is where the positive charges will accumulate.

LIGHTNING DAMAGE

When lightning strikes a tower, various types of damage can occur. Under certain circumstances, a lightning strike could lead to collapse of the tower structure. Lightning can melt the insulation on the guy wires or cause cracks in the concrete guy anchor. Transmission lines and voltage sensitive devices can be damaged by large peak voltages from lightning. Electrical current from lightning can generate heat and transfer energy.

Guyed towers can tolerate lightning better than self-supporting towers because guyed towers deflect the lightning charge down the guy wires to the ground. Assuming that the guy anchors are grounded properly, a great deal of energy is dissipated into the ground away from the base of the tower. For proper grounding, grounding components should be attached to the guy wires above the preforms, turnbuckles, and anchor heads.

MINIMIZING DAMAGE

Grounding allows some control of where energy will go when lightning strikes a tower. Experts remind us that grounding is meant to be a lightning protection system, not a lightning prevention system. Grounding involves applying a system to allow an electrical surge to pass through a conductor rather than lingering at and causing damage to the conductor. Grounding also shields tower structures, such as a fence or site building, from the antenna's radiation pattern. This prevents the tower accessories from absorbing and then re-transmitting RF, causing a skewed signal pattern.

Believe it or not, there are some people who are opposed to grounding systems. They argue that installing a grounding system provides a path to the top of the tower for positive charges to climb. The anti-grounding faction feels that grounding almost guarantees that the tower will be struck by lightning.

Grounding advocates point out that if a tower is struck by lightning and a grounding path has not been provided,

(continued on next page)

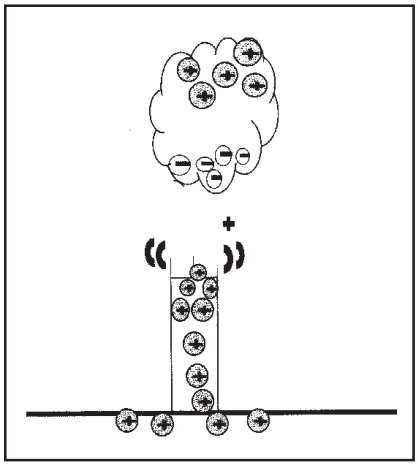

Figure 1. Ionized atoms separate into groups of charges.

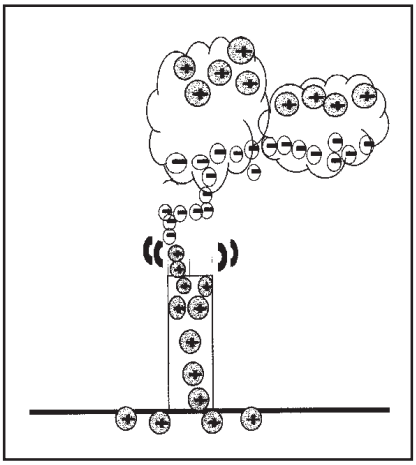

Figure 2. Negative and positive ions connect, causing lightning.

TOWER INDUSTRY PART 9 (continued)

the tower will be subjected to the excess charges. They claim that it is easier and more cost-effective to build lightning protection and grounding into a tower site than to repair lightning damage.

GROUNDING SYSTEM

A successful lightning grounding system needs to rapidly disperse large quantities of electrons from a strike over a broad area. A tower grounding system must meet the specifications set in the 1996 TIA/EIA-RS-222-F standard. To be effective, the grounding system requires a low impedance path to earth, and a low resistance interface with earth ground.

A tower grounding system (Figure 3) usually includes a lightning rod or lightning dissipater, secondary ground, primary ground, and ground rods.

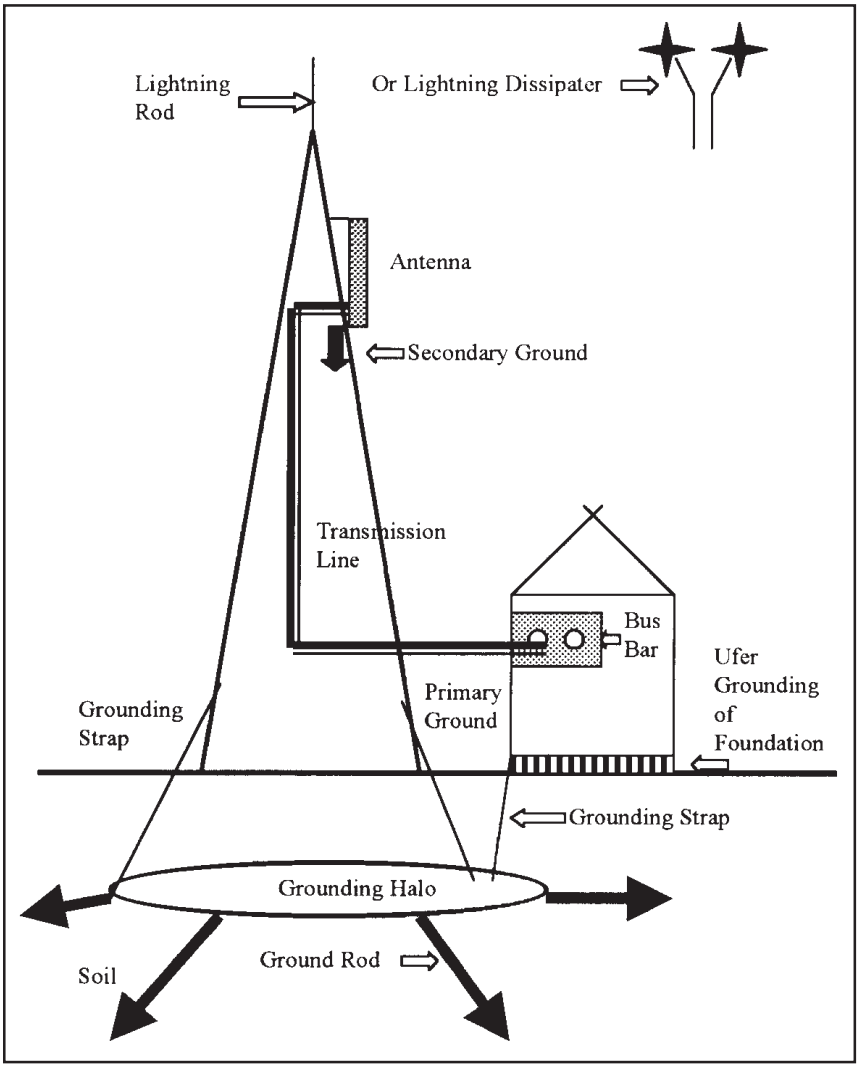

Figure 3. Various tower grounding components.

LIGHTNING ROD

A lightning rod, or collector, is placed at the top of a tower to extend at least two feet above all other tower hardware. The purpose of the lightning rod is to receive a strike and pass it through to the next element of the grounding system. The rod is usually made of copper clad steel.

LIGHTNING DISSIPATOR

An alternative to placing a lightning collector on top of the tower is to place a lightning dissipater on top. A dissipater acts as a shield by reducing the potential between the tower and a storm cloud. Performing controlled leakage of the positive charge, it transfers the positive electrical charge to nearby ionizing air molecules. In theory, this action reduces the likelihood of a strike.

If the electric charge accumulation rate at the top of the tower significantly exceeds the dissipation rate and lightning strikes, the dissipater will redirect the lightning away from equipment toward a safe, planned path to earth.

SECONDARY GROUND

A conducting connection should be run between any tower appurtenance such as an antenna, bracket, or platform and the tower. For transmission line, a grounding connection should be made at the top of the tower, bottom of the tower, at the entry port to the building, and at every 200 feet of run. This connection is called the secondary ground. The

(continued on page 6)

TOWER INDUSTRY PART 9 (continued)

secondary ground provides a low resistance path to ground. It discharges static charges, lightning, or other electrical phenomena away from the tower structure. The term "down lead" is often used to describe the wire that runs between tower attachments and the primary ground. Copper wire is often used for the secondary ground. Unfortunately, rain can cause a reaction between the copper strap and the steel tower that leaches away the copper.

PRIMARY GROUND

The primary ground is the link between the tower and the earth or a conducting element used in place of earth ground. Grounding straps (Figure 4) run as radials between the tower structure and the ground halo. Flat wire is more effective than round wire for grounding straps since it has greater surface area.

Figure 4. Grounding straps on Candelabra.

BUS BAR

A bus bar is a piece of highly conductive copper or copper-clad steel that collects energy from numerous sources and conducts it down a common path to ground. With dimensions of ¾ inch thick, 4 inches wide, and 18 inches long, a bus bar is connected to the ground with a ground strap.

A bus bar should be mounted to the exterior of the building where transmission lines enter the building and to the interior of the building just below the entry ports. The exterior bus bar is insulated from the building and grounded to the ground halo. Transmission lines are grounded to the exterior bus bar. The bus bar that is mounted inside the building is called a ground window. The repeater equipment; entry hatches for transmission line (if they are a conductive material); door frames, window frames, ventilation louvers, and any other sheet metal surfaces; cable trays; AC power line and breaker panel box; telephone lines, blocks and related parts; any peripheral conductive item within 6 feet of any other conductive surface; metal battery racks; utility conduit and pipes; transmitter combiner; receive multicoupler; and any surge suppressor equipment should all be grounded to the common collection point of the ground window.

GROUND HALO

The purpose of a ground halo is to allow single point grounding. Single point grounding directs all charges down one path to one exit point. A ground halo is often built around a site building and is also built below ground to connect the ground rods. The underground ground halo connects to and transfers energy to all of the ground rods.

FOUNDATION GROUNDING

Controversy surrounds the premise that reinforcing bar in the foundation of site buildings should be grounded. Some argue that rebar is insulated inside the concrete, and does not need to be grounded. The debate centers on the conductivity of concrete. Under normal circumstances, concrete is not conductive. However, when the ground is wet and lightning strikes, rebar that is close to the surface could collect energy. There is a risk that the energy passing through concrete could turn the water portion of the concrete into steam, cracking the concrete. Ufer grounding, named after the engineer who originated the concept, can protect against this risk. With Ufer grounding, the rebar is grounded inside the concrete block, and a ground strap is run along the underside of the foundation to a ground rod. Charges in the concrete are dissipated down into the earth.

GROUND RODS

Ground rods are conductive metal poles placed in the ground for the purpose of dissipating electric charges to the soil. They are made of steel and coated in a stainless cover of copper cladding or galvanized coating. The coating on the rod prevents rust. This is important since rust is a poor conductor of electrical charges.

A typical ground rod has a diameter of one-half inch to one inch, and length of eight to ten feet. Most ground systems contain at least four ground rods. The successfulness of a ground system is influenced by the depth of the ground rods, conductivity and resistivity of the soil, and distance between the rods. Ground rods are inserted horizontally underground at a depth of at least two

(continued on next page)

TOWER INDUSTRY PART 9 (conclusion)

to six feet below ground level. Moist clay bearing soil is desirable for setting up a grounding system. The conductivity of the soil can be improved with soil treatment techniques such as electrolyte fill.

Installation of ground rods requires that the rods be driven into the ground forcefully instead of placing the rods in pre-drilled holes. Pressure must be used when inserting the rods so that the soil will be compacted to form a connection with the surface of the rod.

When ground rods are installed, the correct distance between the rods must be determined for proper placement. Traditionally, the minimum separation between rods should be greater than the sum of the lengths of two adjacent rods. The "sphere of influence" (Figure 5) of a rod is the amount of soil used in dissipating the charge from one rod. The area of the "sphere of influence" has a radius and depth equivalent to the length of the rod. For example, the sphere of influence of a 10-foot ground rod would have a diameter of 20 feet around the rod and would be 10 feet deep.

It is essential to determine the correct separation distance between rods. When rods discharge they will saturate the soil in their immediate area. Inefficiency will result if a rod tries to dissipate charge in soil already saturated by another rod. If the charge being dissipated by a ground rod is too great for the soil to absorb, the rod could actually fuse into glass. A glass ground rod makes a great insulator, and a poor conductor of charges.

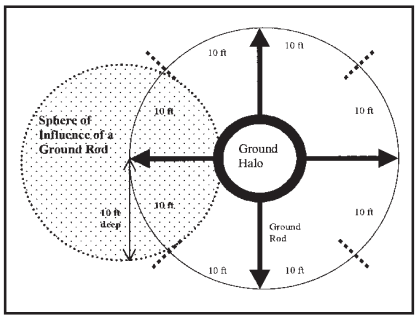

Figure 5. Sphere of influence of a ground rod.

CONCLUSION

Humans face a relatively slim risk of being struck by lightning. If such misfortune should occur, there is a lightning strike survivors support group that they can join. Towers have an extremely high risk of being struck by lightning. There isn't a support group for towers, but there is a multitude of grounding hardware available to make a lightning strike less harmful.

Next month, we'll continue our discussion of the tower industry by taking a look at tower maintenance.

Information for this article came from the following sources: ComTrain Basic Tower Technology, Winton W. Wilcox; http://www.eriinc.com/; http://www.polyphaser.com.

NEXTWAVE SAGA CONTINUES

By Tom Smith

The FCC's problems with the licenses that were granted to Nextwave Telecom Inc. continue. These problems are the result of a 1996 auction in which Nextwave bid nearly $5 billion for a number of licenses. The FCC later rescinded the licenses because Nextwave failed to make further installments after paying the FCC $500 million of the bid, then filed for bankruptcy. The FCC then reauctioned the licenses last January for $17 billion.

For the last 5 years Nextwave has been challenging the FCC right to rescind the licenses, and on June 22nd a Federal Appeals Court ruled that Nextwave could retain the licenses, and that the FCC could not rescind a license that was under bankruptcy protection. On August 6th, the FCC appealed the ruling to the US Supreme Court.

In late July, the companies that won the January auction asked the Government to offer Nextwave $4 billion to $5 billion to give up it's claim to the licenses. These companies include Verizon Wireless, Alaska Native Wireless (which has ties to AT&T), Salmon Wireless (which has ties to Cingular), VoiceStream Wireless, and Dobson Communications. During this time, Nextwave had gotten $5.5 billion in new capital and signed a number of agreements with other partners and suppliers to start the roll-out of their wireless system.

On August 30th, the winners of the January auction petitioned the FCC to deny the reinstatement of Nextwave's licenses, stating that Nextwave had given control to larger companies from whom they had received investment capital. As such, the petitioners claimed, Nextwave was no longer qualified as a small business, which had given them extra bidding credits and the right to make installment payments. Alaska Native Wireless was one of the petitioners and was subject to a similar petition because of its connection to AT&T.

Finally on the same day as the petition from the January auction winners was filed, August 30th, the FCC fulfilled the Appeal Courts order and returned the licenses to Nextwave, subject to the final outcome of the appeal to the US Supreme Court.

From FCC press releases (www.fcc.gov) and The NY Times (www.nytimes.com)

DO YOU HAVE AN IDEA FOR A SBE PROGRAM?

Is there a topic you would like to see covered at one of our local Chapter 24 meetings? Is there a technology that you would like to learn more about? Or, better yet, is there a topic that you are qualified to speak on at an upcoming meeting?

Please forward your ideas to one of the Program committee members, or to one of the Chapter 24 officers. They are listed on page two of this newsletter.

SBE Short Circuits – September 2001

By John L. Poray, CAE
SBE Executive Director

PENNINGTON ELECTED NATIONAL PRESIDENT

SBE national election ballots, received from members around the country, were counted August 9 in Indianapolis. Results of the election were as follows:

OFFICERS

President: Troy Pennington, CPBE - Birmingham, AL
Vice President: Raymond Benedict, CPBE - Washington, D.C.
Secretary: Keith Kintner, CPBE - Urbana, IL
Treasurer: John Batson, CPBE - Birmingham, AL

DIRECTORS

Ralph Beaver, CBT, Tampa, FL
William Denne, CPBE, Ormond Beach, FL
Donnie Driskell, CSTE, Brandon, MS
Clay Freinwald, CPBE, Auburn, WA
R.J. Russell, CBTE, Chico, CA
Conrad Trautmann, CSRE, South Setaukey, NY

More information is available at www.sbe.org and in the September issue of the SBE SIGNAL.

FELLOWS & NATIONAL AWARDS ANNOUNCED

Three members have been elected by the Board of Directors to receive the Fellow honor at the SBE National Awards Dinner, September 13 in Verona, NY. The dinner is part of the SBE National Meeting which is being held in conjunction with the Central New York SBE Regional Convention.

The recipients are:

David Carr, CPBE, The Woodlands, TX
Linda Godby, Sheridan, IN
John W. Soergel, CPBE, E. Syracuse, NY.

The National Awards Committee has announced the winners of the 2000 SBE National Awards. These winners will also be recognized at the SBE National Awards Dinner.

Broadcast Engineer of the Year

Kenneth J. Brown, ABC, New York

Educator of the Year

Michael P. Scott, CPBE, Bates Technical College, Puyallup, WA

Best Regional Convention or Conference

Chapter 16, Seattle, WA. - Electronic Equipment Expo

Best Chapter Newsletter (Class B)

Chapter 24, Madison, WI

Most Interactive Chapter

Chapter 70, Northeast Ohio

Best Chapter Frequency Coordination Effort (Class A)

Chapter 112, Western Wisconsin

Best Chapter Frequency Coordination Effort (Class B)

Chapter 16, Seattle, WA

Best Chapter Web Site

Chapter 53, South Florida

Technology Award

Andrew Corporation - STACKER

Best Technical Article or Program by an SBE Member

Victoria Kipp, CBTE, CBNT

Most Certified Chapter Class A:

Chapter 112, Western Wisconsin
Class B: Chapter 131, Inland Empire, Riverside, CA

Highest Member Attendance %

Class A: Chapter 135 Middle Tennessee
Class B: Chapter 58, Northeast New York

Greatest Growth in New Members

Class A: Chapter 129, Wyoming
Class B: Chapter 131, Inland Empire, Riverside, CA

NEXT ENNES WORKSHOP - NASHVILLE, TN

The next Ennes Workshop will be held in Nashville, Tennessee at Travecca Nazarene University on Friday, October 12. Sessions will be held on DTV Transmission Facilities, Video Transport Considerations Outside the Digital Studio, An Overview of ATSC Activities, Implementation Recommendations for Data Broadcast, Real-time Broadcast Control and A Super Efficient Five-Segment Multi-stage Depressed Collector IOT. To register, call the SBE National Office at (317) 846-9000. Cost for SBE members to attend is $69 and non-members are $85. Fee includes speaker workbooks, breaks and lunch.

SBE OFFERS HELPFUL TUTORIALS

SBE Tutorials continue to be presented around the country in cooperation with state broadcaster associations. Upcoming programs will be held in Kentucky, Nebraska and Indiana. Two different programs are being offered. The first is on broadcast networking technology and is titled, "Putting the Pieces Together." Participants may sit for the SBE Certified Broadcast Networking Technologist (CBNT) certification exam following the tutorial. The "FCC Boot Camp" tutorial walks participants through what a FCC inspector looks for and how to prepare your station for a successful inspection. Both tutorials are presented by Terry Baun, CPBE, President of Criterion Broadcast Services. For more information, contact the SBE National Office at (317) 846-9000 or the sponsoring state broadcasters association.

Upcoming SBE Tutorial Schedule September 19, Louisville, KY - "Putting the Pieces Together" September 21, Omaha, NE - "Putting the Pieces Together" October 2, Indianapolis, IN - "FCC Boot Camp"

LISTINGS AVAILABLE TO CONTRACT ENGINEERS

Members of SBE who offer their services on contract or as a consultant can advertise their availability with a low-cost listing in the special Contract Engineers section of the Annual SBE Membership Directory and Buyer's Guide. However, the deadline of August 31 is fast approaching. Call or e-mail Angel Bates at the SBE National

(continued on next page)

FCC Rulemakings

Compiled By Tom Smith

PROPOSED

ET Docket No. 00-258, Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems; ET Docket No. 95-18, Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use By the Mobile-Satellite Service; IB Docket No. 99-81, The Establishment of Policies and Service Rules for the Mobile-Satellite Service in the 2 GHz Band; RM-9498, Petition for Rule Making of the Wireless Information Networks Forum Concerning the Unlicensed Personal Communications Service; RM-10024, Petition for Rule Making of UTStarcom, Inc., Concerning the Unlicensed Personal Communications Service

The FCC has issued yet another proposal in its search for spectrum for Third Generation wireless systems (3G). The FCC is under a mandate to come up with 300 MHz of spectrum for auction by fall of 2002. This notice affects many existing and potential spectrum users, including users of: the 1910-1930 MHz unlicensed band; the 2390-2400 MHz band that serves both amateur radio and unlicensed services; 2150-2160 MHz used by Multipoint Distribution Systems; the 1990-2025 MHz band which is currently user for TV remote pick-up by broadcasters and is being reallocated to Mobile Satellite Service (MSS) for satellite uplinks; and the 2165-2200 MHz band which is paired with the 1990-2025 MHz band for MSS downlinks. This spectrum amounts to 110 megahertz, and not all of the spectrum can be used for 3G systems.

On July 17th, the FCC authorized eight companies to provide MSS service. The companies are The Boeing Company; Celsat America, Inc.; Constellation Communications Holdings, Inc.; Globalstar, L.P.; ICO Services Ltd.; Iridium LLC; Mobile Communications Holding, Inc.; and TMI Communications and Company, Limited Partnership. They were each given a pair of frequency bands for up and down links totaling 3.5 MHz each, with the possibility of more spectrum in the future.

As part of this notice, the FCC proposed a rulemaking that would allow for terrestrial service in the 2 GHz band and the L-band that are allocated to MSS. Both MSS and other operators would be allowed to provide service mainly in urban areas were satellite signals are obstructed. There is also a petition before the commission to reallocate the MSS bands for cellular or PCS service.

As part of this notice, the FCC is requesting more information on the moving of broadcasters out of the 1990-2025 MHz band, including timetables and reimbursement.

The notice also concluded from comments from a earlier notice of proposed rulemaking that because of the cost of moving the ITFS and MMDS users of the 2500-2690 MHz band to another band, it is unlikely that band will be reallocated to 3G use.

In a related action, the Commerce Department on September 6th sent a request to Congress to delay the auction of 3G spectrum until 2005.

This notice was adopted on August 9, 2001 and released on August 20th.

From FCC Notice (www.fcc.gov) and Wireless Week

Short Circuits (continued)

Office to include your listing. Phone: (317) 846-9000. E-mail: abates@sbe.org. Listings are also available on the SBE web site.

CERTIFICATON EXAM SESSION DATES ANNOUNCED FOR 2002

The SBE National Certification Committee has announced exam session dates for 2002. Check the SBE web site to find the exam period that is best for you. There is still an opportunity to take a certification exam this year.

For more information about SBE Certification, see your Chapter Certification Chair or contact Linda Godby, Certification Director at the SBE National Office at (317) 846-9000 or lgodby@sbe.org.

Chapter 24 Web Site

http://www.sbe24.org

Steve Paugh is the editor for the HTML Version of this Newsletter, available monthly on the SBE Chapter 24 web page.

WBA/SBE BROADCASTERS CLINIC 2001

For nearly half a century, the annual Broadcasters Clinic has been regarded as one of the best-run and best-attended regional events designed solely for the benefit of broadcast engineers. With this, its 47th year, the tradition will continue. This year, the Broadcasters Clinic will once again be held at The Marriott in Madison – the dates being October 9-11.

It is absolutely imperative that engineering staff be technically competent in all of these new technologies - this is the goal of Broadcasters Clinic! As you can see from the agenda, this year's Clinic promises to once again be a terrific educational opportunity for members of the Society of Broadcast Engineers from all across the upper Midwest.

Registration fees are $155 for any two days, or $180 for all three. For a brochure or to register by phone, call the WBA office at (800) 236-1WBA. For more information, visit the WBA web site at www.wi-broadcasters.org.

PROGRAM SCHEDULE

TUESDAY, OCTOBER 9

7:45 am .... Registration and Continental Breakfast
9:15 am .... All Digital Studios – Klotz Digital America, Inc.
10:00 am .... The State of IBOC – Ibiquity
10:45 am .... Break
11:00 am .... What's Happening Now - Summary of FCC rule changes with technical demos using propagation prediction software – Doug Vernier, V-Soft
Noon .... Luncheon
2:00 pm .... Audio Processing for DAB – Frank Foti, Omnia/Telos Systems
2:45 pm Integrating Studio and Office Systems Through Linux – Jay Mielke, Bliss Communications
3:30 pm .... Break
3:45 pm .... The IBOC-FM Injection Filtering System – Robert Surette, Shively Labs
4:30 pm .... EQUIPMENT EXHIBITS OPEN – (Everybody is welcome)
7:30 pm .... History of Cabling – Steve Lampen, Belden Electronics

WEDNESDAY, OCTOBER 10

7:45 am .... Registration and Continental Breakfast
8:30 am .... Wide Area UPS – Buzz Menz, CDP/Liebert
9:15 am .... Proper Maintenance of Your Antenna Systems: AM/FM/TV – Jeremy Ruck, Markley and Associates
10:00 am .... EQUIPMENT EXHIBITS OPEN – (Lunch is available in exhibit hall)
1:30 pm New Technologies in Coaxial Cable Design – Steve Lampen, Belden Electronics
2:15 pm .... Grounding Presentation – Chuck Forster, Phasor Labs
3:00 pm .... Break
3:15 pm .... DTV Update – John F.X. Browne P.E., Browne and Associates
4:00 pm .... Quantum Enabling Technologies – Mark Aitken, Acrodyne
6:00 pm .... RECEPTION
7:00 pm .... Upper Midwest Regional Society of Broadcast Engineers Meeting and Program

THURSDAY, OCTOBER 11

7:45 am .... Continental Breakfast
8:30 am .... Structural And Design Considerations of a Triple Antenna Stack – Joe Zuba, Dielectric
9:15 am .... Trinity Filter Implementation for N+1/N-1 Channel Combining – Dan Fallon, Andrew Corporation
10:00 am .... Break
10:15 am A Look Back on 100 DTV Stations; What Lessons Have Been Learned – Dave Sparano, Harris Corporation
11:00 am .... 8VSB Field Testing and Receiver Update, Gary Sgrignoli, Zenith
Noon .... Luncheon
1:15 pm .... Assett Management – Craig Beardsley, Sony Corporation
2:00 pm .... MPEG Transport Stream Monitoring – Bill Cohn, Tektronix
2:45 pm .... Understanding Adaptive Equalization for DTV Transmitters – Richard Schwartz, ADC Broadcast
3:30 pm .... Liquid Cooled Solid State Transmitter for Television Broadcasting – Steven Kalis, Thomcast Communications
4:00 pm .... Adjournment – THANKS and see you next fall!

To register by phone, please call the WBA at (800) 236-1WBA or 608-255-2600.

TRISTANI TO LEAVE

By Tom Smith

FCC Commissioner Gloria Tristani has resigned from the FCC effective September 7, 2001. She has served at the FCC since November 3, 1997. She was appointed by President Clinton and leaves FCC Chairman Michael Powell as the only other Clinton Appointee on the FCC. She held one of the two Democratic seats on the Commission and with her leaving, the FCC has one Democrat and three Republicans including Chairman Powell.

Tristani previously had served on the New Mexico State Corporation Commission beginning in 1994 and became its Chairperson in 1996. She plans on returning to New Mexico.

From FCC Press release (www.fcc.gov)

Dane County EAS Plan (continued from page 1)

local emergency alert to viewers or listeners. Thus, the public benefits in two ways by receiving local alert messages from either area broadcasters and cable operators or from NOAA Weather Radios.

The NWS will originate local alert messages by using both the familiar 1050 Hz alert tone and EAS/SAME encoding. SAME (Specific Area Message Encoding) compatible Weather Radio receivers, sometimes called "All-Hazards" radios, can be programmed to receive only the warnings for a particular county, for example, Dane County.

The Local Plan directs the NWS to use the EAS event code CEM (Civil Emergency Message) when originating a local emergency alert message. Broadcast stations and cable operators who choose to participate in the Dane County EAS Local Plan are asked to program their EAS receivers to decode a CEM from Originator WXR.

(On March 20, 2001, the FCC adopted a Notice of Proposed Rulemaking on EAS Rules seeking comments on amendments to the Part 11 Rules, including expanding the list of EAS event codes for emergency conditions not currently addressed and changing originator code WXR to NWS.)

The Dane County EAS Local Plan will be updated as necessary. The current version is July, 2001. Other counties are invited to use this local plan as a model. At this time, the Dane County EAS Local Plan does not include any references to Amber Alert, a notification program to help locate abducted and endangered children. Presently, the City of Madison Police Department has an Amber Alert plan in place.

AUCTION DELAYED

By Tom Smith

The FCC has once again delayed its auction of the 747-762 MHz and the 777-792 MHz bands. These are the bands that are being reallocated from what was TV channels 60-69. The latest auction date that the FCC had set was September 12, 2001. No new date has been set.

The FCC said this action is the result of the FCC's reconsideration of a number of rulemaking dockets. The real reason may be the uncertainty over the transition to DTV and the return of the spectrum to the FCC. There have been articles in the press that commented on the reluctance of some to bid on the spectrum without knowing when the existing analog TV stations in the band will be shutting down.

A new date may not be set until the FCC can be sure that it can maximize the bids in the auction of this band.

CHAPTER 24 SUSTAINING MEMBERS

LATEST RENEWAL:

WMSN-TV 47

THANKS TO ALL OUR SUSTAINING MEMBERS:

Alpha Video
Belden Wire and Cable
Broadcast Richardson
CTI
Clark Wire and Cable
Fujinon Inc.
Graybar
Harris Corporation
maney-logic
National Tower Service
Norlight Telecommunications
Panasonic Broadcast
Pinnacle Systems
Roscor Wisconsin
Ross Video
Scharch Electronics
Sony Broadcast
Swiderski Electronics
Token Creek Productions
Video Images
Wisconsin Public TV
WISC-TV 3
WKOW-TV 27
WMTV-TV 15

The *Chapter 24 Newsletter* is published monthly by Chapter 24 Inc, Madison, WI. Submissions of interest to the broadcast technical community are always welcome. You can mail articles to:

SBE Chapter 24 Newsletter, 2029 Greenway Cross #11
Madison, WI 53713-3000
or e-mail your articles to: MNorton@ecb.state.wi.us

SBE Chapter 24 Newsletter
2029 Greenway Cross #11
Madison, WI 53713-3000

FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton
Contributors this month: Vicki W. Kipp, Tom Smith, Paul Stoffel, and Tom Weeden.
Thanks to Leonard Charles for his work on the Chapter 24 WWW page.

SEPTEMBER MEETING and PROGRAM

Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Wednesday, September 19, 2001

Mid-West Family Broadcast Group Tour

Join us for a tour of the Madison studios of WHIT-AM, WTDA-AM, WTDY-AM, WJJO-FM, WMGN-FM and WWQM-FM. We'll discuss and see some of the unique technical challenges faced in a consolidated studio facility.

Dutch Treat Dinner at 5:30 PM

at Perkins
1410 Damon Road
(W. Beltline and Fish Hatchery Road)

Meeting and Program at 7:00 PM

at Mid-West Family Radio studios
2740 Ski Lane

(Take S. Park Street to McCoy Road and turn left, then turn left on Hwy MM. Ski Lane will be on your right.)

Visitors and guests are welcome at all of our SBE meetings!

2001 UPCOMING MEETING/PROGRAM DATES:

Day	Date	Program
Wednesday	October 10	Broadcasters Clinic
Tuesday	November 27	IBOC Digital Radio
Wednesday	December 19	T.B.A.

Program Committee:	Denise Maney	Steve Paugh	Fred Sperry	Steve Zimmerman
	277-8001	277-5139	264-9806	274-1234