

**Chapter 24, Inc.
Madison, Wisconsin**

Society of Broadcast Engineers

October 2000

MADISON TOWER ACTIVITIES UPDATE

By Ken Dixon

About two weeks ago, when comparing the task list to the calendar, it became obvious that tasks completed have not kept up with those planned. Although the weather hasn't been bad, over a week has already been lost due to rain and high winds. There seems to be some hesitancy to remove guy cables when the wind is blowing over 20 mph. Further, with November inching ever closer, and lots of tasks remaining, it seemed to all that perhaps the original construction schedule was overly optimistic.

Several meetings were held with the Kline Tower people, the construction crew, tower tenants, and others, to re-evaluate the situation and change course as necessary to assure a safe and practical completion of the project. Out of those meetings and conversations came an unanimous agreement that work at the candelabra tower top should not be started this fall, but should be delayed until late next spring-after May sweeps. The possibility of being forced to operate on standby antennas all winter is not an option viewed with great favor by any of the tenants. Once it became clear that the original plan could not be shoe-horned into the remaining fall work period, the installation plan was modified to accommodate the completion of the guy cable change-out and installation of the WISC-DT temporary channel 50 standby antenna at 950 ft. along with the installation of 7-3/16 in. Transmission line to the same height. When work resumes next spring, this antenna will be re-tuned to channel 47 and will become the temporary standby antenna for WMSN, and the 7-3/16 in. transmission line will be extended to the tower top to feed the new WISC-DT channel 50 antenna in the South-East arm.

Hopefully the first part of the revised construction plan can be completed and the tower site secured for the winter before the tower crew goes into hibernation on November 10th. The project is scheduled to resume on 15 May 10 with completion on or before 6 Aug 01. More later...

Next Meeting:

**Wednesday,
October 18, 2000**

**Regional SBE
Meeting and
Broadcasters
Clinic**

**Reception
at 6:00 PM**

**Meeting and
Program at 7:00 PM**

**at Marriott West, 1313
John Q Hammond Dr.**

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CHAPTER 24 STUDENT NIGHT

By Kevin Ruppert

Chapter 24 enjoyed another successful student night this September with a very interesting tour of NBC 15, WMTV in Madison. Chief Engineer Tom Weeden and his seasoned crew took Chapter members and 8 guests through the facility on Forward Drive in Madison to see their newsroom, control rooms and studio.

Tom admitted to the gathering that he was "out of his territory" during the newsroom part of the tour, but presented a clear idea of the goings on there anyway. Tom was much more

comfortable explaining to the crowd how the 6 o'clock newscast is produced while it was actually underway. The tour group was able to peer through the window of the air control room to see what was going on.

The NBC origination of the 2000 Olympics presented an excellent opportunity for a tour of the station due to the extended early news block and late start of the 10 o'clock show.

Before it was over, the tour got to see every nook and cranny of the station, including the transmitter room and tape room. This area featured

NBC 15's new short form video server, which is used for opens and bumpers for the newscasts as well as commercial insertion throughout the day.

Before it was over, the students that took part in the meeting had a chance to see our monthly meeting. Afterward they got to look at themselves in the chromakey normally used by staff meteorologist David George and his staff, and to speak informally to the chief engineers from three of the city's television stations. The students were amazed to realize that, although the

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CHAPTER 24 OFFICERS

CHAIR:

Kevin Ruppert (WISC-TV)
W - 271-4321
kruppert@wisctv.com

VICE-CHAIR:

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

SECRETARY:

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

TREASURER:

Stan Sarch (WISC-TV)
W - 271-4321
sscharch@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 and Past-Chair:

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

Special Events:

Vicki Kipp (ECB-TOC)
W - 264-9631
vkipp@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

September Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Tuesday, September 19, 2000 at WMTV NBC Channel 15 in Madison, Wisconsin. There were 17 members in attendance, 14 of who were certified, and 5 guests.

Chairperson, Kevin Ruppert, called the meeting to order at 6:48 PM. Minutes of the August meeting, as published in the September newsletter, were approved as published.

Secretary and Special Events Coordinator, Vicki Kipp, issued last minute reminders about the special event for the open house at Resonance Research, Inc. on Wednesday, September 20. Vicki also announced that she continues to seek volunteers to staff the SBE booth at the Broadcasters Clinic for one-hour shifts on Tuesday, October 17 from 4:30 PM to 7:30 PM and on Wednesday, October 18 from 10:00 AM to 1:30 PM. If you wish to volunteer for a shift, please refer to the Chapter 24 web site for the shift schedule and sign up.

On behalf of Treasurer Stan Sarch, Kevin Ruppert reported that the chapter treasury is in the black. Newsletter Editor, Mike Norton, reported the deadline for the next newsletter as midnight on Friday, October 6, with the folding party the following Wednesday, October 11 at WKOW-TV beginning at 5:30 PM.

Membership Coordinator, Paul Stoffel, was not present. Sustaining Membership coordinator, Fred Sperry, announced that Chapter 24 remains at 23 sustaining members. Both WMSN Channel 47 and Norlight Telecommunications recently renewed their membership.

Program Committee, Denise Maney, announced that the guest speaker for the October meeting at the Broadcasters Clinic has been confirmed. The speaker will present the topics of communication styles and dealing with management and other personnel. The focus of the November meeting may be subject to change because the details have not been confirmed. Denise informed the group that Chapter 24 will hold a follow-up student night meeting in March of 2001. Denise welcomed the students attending tonight's meeting to attend any future Chapter 24 meetings. Student dues remain very reasonable at just \$10 per year.

Certification, Jim Hermanson, announced that the next local exam period will be November 10 – 20, with the application due by September 22. Phil Mikalofsky, Vicki Kipp, and Mike Norton received congratulations from the group for passing their Certified Broadcast Network Technologist (CBNT) exams. Jim brought up a clause in the Certified Broadcast Technologist (CBT) exam that says high school or technical college students with a 'B' average or higher are eligible to take the CBT exam.

Frequency Coordinator, Tom Smith, reported that ABC coordinated frequencies with him when they were in Madison for a recent UW-Badger football game, but that other entities such as MSC and ESPN2 did not coordinate frequencies during their Madison

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Meeting Minutes (continued)

productions during the past few weeks. Tom noted that the failure of some entities to coordinate frequencies during sports productions is not unusual. When the University of Ohio-Cincinnati team opposed the Badgers last weekend, the Cincinnati team used Telex Coach Com. Tom has contacted Ed Walsh, the staff electrician for the UW-Badger Football team, about the Badgers' potential future use of Coach Com. Tom is concerned that frequency use could become very messy at the end of the football season if the Badgers enjoy as much success this year as they did in 1999. Tom cited potential problems stemming from uncoordinated frequency use by the many entities that may come to Madison to report on the Badgers success. According to Smith, the NCAA is beginning to get serious about the issue of frequency coordination. One of the student guests asked for the meaning of "frequency coordination," and Tom Smith offered an explanation. An abridged definition would be 'the voluntary sharing of frequency plans.'

National Liaison, Leonard Charles, mentioned that the FCC is beginning to make changes that would result in loss of the 2 GHz ENG band for broadcasters. The national SBE web site can provide useful information on this topic. On another note, the SBE 2000-2001 national election is over and the ballots have been tallied. Results for National Office are James (Andy) Butler from Alexandria, Virginia for his second term as President, Richard Edwards from Coral Springs, Florida for Vice President, Raymond Benedict from Washington, D.C. for Secretary, and Robert P. Hess from Boston, Massachusetts as Treasurer. The six contested board seats were elected to Thomas Daniels from Fort Worth, Texas, Samuel Garfield from Raleigh, North Carolina, Al Grossniklaus from Indianapolis, Indiana, Mark Humphrey from Media, Pennsylvania, Vincent Lopez from Syracuse, New York, and Jerry Whitaker from Morgan Hill, California.

There was no old business and no new business.

For Professional Announcements, it was announced that WOLX-FM is

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

- Amateur radio's long-awaited next-generation "Phase 3D" satellite is set for launch at the end of this month. The launch agency Arianespace said that in addition to Phase 3D, an Ariane 5 rocket would attempt to orbit the PAS 1R communications satellite and two other payloads on Tuesday, October 31. The launch will take place at the European Spaceport in Kourou, French Guiana. AMSAT-Germany Executive Vice President Peter Guelzow, DB2OS, who's heading up the launch campaign, was a bit more tentative about the launch date, calling October 31 "the start of the launch window." Guelzow reminded operators planning to use Phase 3D after launch that it could be a few months after launch before the satellite is ready for routine operation. The actual time depends on several factors including orbital parameters and the work needed to nudge P3D into its final elliptical orbit. Phase 3D will be available for use worldwide and will include transponders on amateur frequencies from 21 MHz through 10 GHz.

- The American Radio Relay League has advised the FCC to put its ultra-wideband (UWB) technology proceeding on hold until more evidence is available on UWB's interference impact. Saying the technology could have enormous benefits for public safety, consumers and businesses, the FCC last May proposed amending its Part 15 rules to permit the operation of ultra-wideband on an unlicensed basis. UWB proponents claim the devices are capable of operating on spectrum that's already occupied by existing radio services without causing interference. The FCC says UWB deployment could permit scarce spectrum resources to be used more efficiently. The ARRL said that while it does not object "as a general principle" to authorizing UWB devices under Part 15, "UWB devices cannot be authorized on a blanket basis at this point without making assumptions which could very well be erroneous, and with potentially disastrous results for licensed radio services." The bulk of the League's comments focus on the potential for interference from wideband noise to Amateur Radio allocations, "something not likely to occur with most presently authorized Part 15 devices." And the ARRL said it wants the FCC to consider extending the protections it's considering for safety services--such as GPS--to the Amateur Service.

(Excerpts from the American Radio Relay League's "ARRL Letter")

seeking a chief engineer. Former chief engineer Erik Barklow has joined broadcast engineer Doug Campbell at WCCO. The new chief engineer at WIBA is Tim Wagner.

Chairperson Kevin Ruppert adjourned the business meeting at 7:06 PM.

The evening's theme was student night. The program for student night focused on exposing high school students to careers in broadcasting engineering. It included a tour of WMTV given by chief engineer Tom Weeden.

Submitted by Vicki W. Kipp, Secretary





615 Forward Drive
Madison, WI 53711

Phone 608-274-1515
Fax 608-271-5193

www.nbc15.com
feedback@nbc15.com

Resonance Research Corporation: High Voltage and Bright Light

By Vicki W. Kipp,

When WISC-TV engineer Steve Paugh called to tell me about an open house at Resonance Research Corporation, it seemed like a great opportunity to hold a Chapter 24 special event. Steve had read about the open house in the amateur radio journal *Badger State Smoke Signals*, edited by radio engineer Ken Ebnetter.

On Wednesday, September 21, 2000, members of Chapter 24 assembled at WISC-TV Channel 3. We used a set of General Electric PCS two-way radios to communicate between the two vehicles driving to the event. Channel selection was cleared with frequency coordinator Tom Smith. We drove 46 miles from Channel 3 to Resonance Research Corporation in Baraboo. As is the tradition for any special event that I plan, we started our trip with less than ideal weather conditions. Tumultuous gray clouds loomed and big rain drops fell as we began our trip. Just as the fog had lifted during the Lambeau Field HDTV truck special event last fall, the clouds began to lighten by the time we reached Middleton, and we were pleased to see several rainbows. In fact, the engineers in my vehicle observed a double rainbow.

In the absence of an open house, it would be very easy to drive by Resonance Research Corporation without noticing their building. The facility is located at E11870 Shady Lane Road in rural Baraboo, very close to the International Crane Foundation. Resonance Research Corporation is nestled in a wooded residential and agricultural zone. There is no business sign posted by the road. From Shady Lane, all you see is a fire number, a 'No Trespassing' sign, and a gravel driveway. If you are able to locate the address, you will find a large forest green metal pole building which houses Resonance Research Corporation.

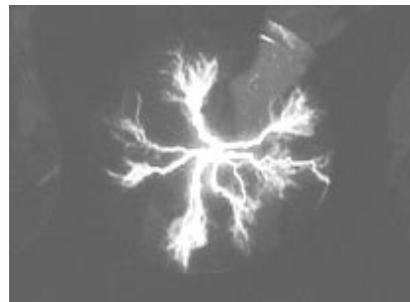
The Society of Broadcast Engineers was well represented at the Resonance Research Corporation open house. Chapter 24 had ten

members present, eight of whom were certified. Our group included Bob Dischler, Ken Ebnetter, Jim Hermanson, Vicki Kipp, Dan Maney, Denise Maney, Mike Norton, Steve Paugh, Tom Smith, and Steve Zimmerman. SBE Chapter 80 members Jim Sheetz, Mark Hoenecke, Dean Andrewjeski, and student member Ian Andrewjeski also attended.

All of the science demonstrations on display at the open house have a final destination of a science center in Detroit, Michigan. Another set of the same science demonstrations is already on display at the Discovery World Museum in downtown Milwaukee.

PLASMA GLOBE

The Plasma Globe setting on a pedestal showed bright blue plasma streamers over a dark background. Trekkies may recognize the plasma globe from when it appears behind the heads of the "Borgs" in *Star Trek*. After admiring the bright streamers, the next logical thought for most engineers would be, "How does it work?" Further research yielded an explanation.



Inside the plasma globe, electrons are traveling from the electrode to the outer surface and there is also an oscillating electromagnetic field present. This electron motion is required to generate the plasma. Plasma is defined as an electrically neutral gas that is intensely ionized with charged particles such as electrons and ions. When electrons separate from a parent atom or molecule, that atom or molecule becomes an ion. The negatively charged electron and the positively

charged ion move about within the plasma, thus changing the local characteristics of the electromagnetic field. This change along with the oscillating electromagnetic field from the electrode will excite ions, molecules, and atoms. Upon becoming excited, these particles (charged or uncharged) will swiftly radiate photon (light) energy. The photon energy is what makes plasma so visible. The overall appearance of the plasma globe is determined by the characteristics of how the electromagnetic fields combine.

While observing the plasma globe demonstration, one might wonder what determines the appearance of the bright blue streamers. It is actually the pressure in the globe that decides the characteristics of the streamers. The distinction should be made that the pressure inside of a science demonstration plasma globe is significantly higher than the pressure in most plasma chambers used by scientists for experiments. It is essential that pressure within a plasma globe be quite high in order to see the streamers. Due to the tremendously high pressure, the plasma gets hot when it is generated. Based on the principles that hot air rises, the hot plasma streamers tend to move up the side of the globe. The hot region of plasma is highly conductive, and so the streamers remain intact until broken by instability.

The pressure in the globe is very important for the success of the plasma globe display. If the globe pressure is too high, the potential of the electrode will not be sufficient for the electrons to generate plasma and there will be no streamer. The result would be a dark globe with no light. Conversely, if the globe pressure is too low, the "fluid" effects of the streamers will be absent. The globe would be illuminated overall with a low intensity light, but it would not have any streamers.

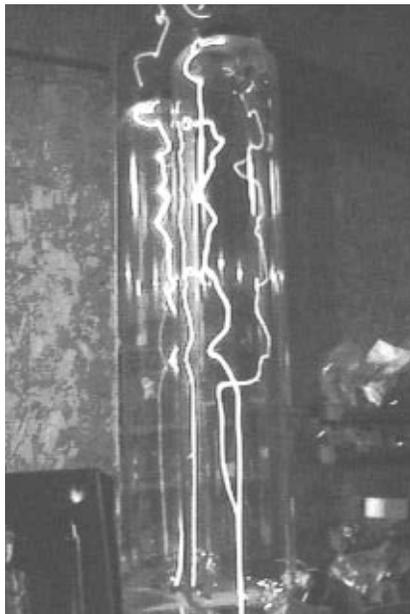
AURORA BOREALIS TUBE DISPLAY

A plasma tube is a vacuum tube containing colored gasses that are

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High Voltage and Bright Light (continued)

influenced by an external magnet that a person holds up to the tube. The plasma tube contains high voltages. Vivid streamers of electrified plasma demonstrate what electric discharges look like at various gas pressures.



Plasma is the fourth state of matter. With a solid, liquid, or gas, electrons are tightly bound to an individual atom. However, electrons in a plasma can roam freely from atom to atom, carrying electricity.

ELECTROMAGNETIC SODA CAN CRUSHER

The electromagnetic soda can crusher may not be entirely practical, but it sure is an impressive display of electromagnetism and capacitors. The can crushing effect results from the repulsion of two magnetic fields. Initially, a very large 50 microFarad 25 kilovolt capacitor is charged to 10

kilovolts. There is a direct relationship between the voltage level and the crushing force. Once the desired voltage is reached, a spark gap connects a small coil to the very large capacitor. As a frame of reference for the size of the capacitor, consider that the capacitor took up one quarter of the space in the marble column in which it is enclosed. The coil is a thick wire which circles the center of the soda can.



The can crusher built by Resonance Research Corporation has timing controls for push button charging and firing. When the spark gap switch fires, the capacitor discharges a tremendous amount of current through the coil (roughly 100,000 amperes.) This current discharge creates a magnetic field around the coil. Flux lines pass through the cross section of the can causing current to be induced and to flow around the can.

The induced current creates its own magnetic field which opposes the magnetic field from the coil. Between the two magnetic fields, the can is now subject to one magnetic field pushing inward on the can and one magnetic field pushing outward on the coil. When the force becomes strong enough, the can is crushed. Steam emitted from the soda can as it was crushed.

JACOB'S LADDER CLIMBING ARC DISPLAY

Commonly seen in older science fiction movies such as Frankenstein, the dramatic looking high voltage arc of the Jacob's Ladder travels upward between two wires. The arc, which is a plasma of hot ionized gas, grows longer as it climbs up the wires.

For the operation of Jacob's Ladder, a transformer generated arc of ionized plasma strikes at the small gap at the bottom of the rods, which is the point of lowest breakdown voltage. The heated plasma arc climbs up the diverging rods. Even when the arc reaches a width on one inch or greater, it still provides an easier path for the current to follow than the surrounding air. It works on the principle that the ionized air in the arc is at a lower resistance than the air around it and also the principle that hot air rises. Warm air pushes the arc up the ladder. The arc's climb is also affected by the expected 'high leakage' or reactance curve of the transformer. For as long as Paschen's Law will allow, the transformer arcs electricity across the bottom of the two wires. Paschen's Law states that the breakdown voltage is constant as long as the product of gas density and gap length is constant. Once the arc is established, the current in the arc will increase to the transformers preset limit. The arcs heat causes increasing resistance. We might expect that the transformer would try to decrease the voltage as the current increases. However, just above the arc there is a path that the transformer can easily maintain and which will lower its current. The arc climbs until the gap between the rods becomes too great. At the pinnacle of the two-rod course, the arc has reached the upper limits of

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David Thormodsgaard
Broadcast Sales Engineer
thor@alphavideo.com
800-388-0008 • (612) 841-3308
Cellular (612) 860-2813
7711 Computer Avenue
Edina, MN 55435
(612) 896-9898
FAX (612) 896-9899
www.alphavideo.com



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GROUP
NETWORK SERVICES
Mark Durenberger
General Manager 90 South 11th Street
Minneapolis, MN 55403
Phone 612 330.2433
Fax 612 330.9020
Cellular 612 840.6665
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High Voltage and Bright Light (continued)

the transformer's power. Arc current is very low at the crest of the rods, and so the arc extinguishes only to re-ignite at the base of the two rods.

The construction of a Jacob's Ladder is not terribly complex. The climbing arc display only requires a high voltage power source (such as a DC-AC inverter using a television set flyback transformer) and a pair of metal rods arranged in a V configuration on an insulated and fireproof stand. Despite the ease of acquiring the two major parts of the Jacobs Ladder, caution should be exercised if you decide to build your own Jacob's Ladder. The first concern is the dangers associated with high voltage applications. Another issue is that a Jacob's Ladder (and Tesla Coils, also) are broadband RF sources when operating. The Jacob's Ladder could potentially cause interference to radio, TV, cellular phone, cordless phone, and other communications equipment. There are unconfirmed rumors of the FCC tracking down and issuing fines to people who cause such interference. So it goes without saying, that you should proceed with caution if you construct your own Jacob's Ladder.

VANDEGRAAF STATIC GENERATOR

Invented by American physicist Robert Jemison Van de Graaf in the early 1930s, the Van de Graaf generator is a high-voltage electrostatic device that serves as a type of particle accelerator. The generator is used for producing a very high electrostatic potential. It produces this potential by moving an insulated-fabric belt inside of a column to convey a charge into a smooth, spherical, well-insulated metal dome. The dome increases in potential until an electric breakdown occurs or until the load current balances the charging rate. As

the charge builds up on the dome, the electricity seeks a way to ground itself. The urgency for grounding occurs because the dome is collecting a lot of negative charges that want to get away from each other. The charges will jump to any conducting object near the metal dome.

For this demonstration, we would witness a human body being used as a conductor for the static electricity generated by the Van de Graaf generator. To demonstrate, DC Cox asked a volunteer from the audience to stand on an insulated platform several feet from the generator. It is essential that the demonstrator stand on a platform insulated from ground so the electricity would not just ground itself before the demonstration could occur. If too much static electricity is lost to ground, not enough electricity will go through the hair. Before the generator was powered up, the volunteer was asked to hold on to a conductive rod connected to the generator by a cable. The volunteer could not remove her hand from the conductive rod once the generator was turned on without receiving a shock. The generator was turned on and the volunteer's hair began to rise. The longer the generator ran, the higher her hair stood. The negative charges from the Van de Graaf generator accumulated on the volunteer's skin and hair. The electrons in the hair repel each other, causing the hair strands to try to space themselves far apart from each other. When the charging period had ended, DC Cox used a discharge electrode to remove the charge on the generator before the girl released the conductive rod.

RESONANCE TOWER/TESLA COIL

Serbian-American inventor Nikola Tesla is credited with inventing the

telephone repeater, the rotating magnetic field principle, the polyphase alternating-current system, the induction motor, alternating-current power transmission, the Tesla coil transformer, wireless communication, radio, and fluorescent lights. Tesla built on Thomas Edison's discovery of Direct Current electricity to create alternating current or AC applications. Tesla was not a promoter of his discoveries, but rather he was a pure scientist. George Westinghouse joined Tesla, and together they built the first power plant. The power that we draw in our homes today resulted from Tesla's earlier work.

Invented in the 1890's, Tesla coils were originally meant for use in the wireless transmission of electricity. Tesla coils are among the most effective means of producing ultra-high voltages. Today, Tesla coils are widely used in radios and television sets.

At Resonance Research, we saw a demonstration of the Tesla coil. The larger Tesla coil in the facility was capable of emitting a 25 foot shock when charged with 6 million volts of electricity. This performance is reserved for when the Tesla coil is set up in an open outdoor area.



Tesla Coils are actually air-cored transformers that convert electricity into
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27
abc
WKOW
Madison

5727 Tokay Boulevard
Madison, Wisconsin 53719

(608) 274-1234
Fax: (608) 274-9514

Michael Schetter
Sales Manager

800 West Thorndale Avenue
Itasca, Illinois 60143-1356
Fax 630.787.0805
Video 700.737.5253
Web www.swid.com
Email mikesetter@swid.com

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High Voltage (conclusion)



Arcs jump from the top terminal of the Tesla Coil.

a high frequency, high voltage form, and then pump that converted energy into the air. If there is a conductive, grounded object near the Tesla coil, then the coil will discharge to the object instead of discharging into the air.

If you look closely at the picture, you may notice that there are many separate but similarly shaped arcs layered vertically, rather than one solid arc. This is because arcs from a Tesla Coil are not continuous. The arcs usually pulse hundreds of times each second. Each electrical pulse ionizes and heats the air that it travels through. The ionized and heated air is more conductive than the surrounding cool air. Therefore, later electrical pulses tend to travel through the same heated trail of air. Since heated air rises and the arcs are not continuous, each separate electrical pulse causes the air that it travels through to send out light from a slightly different location.

Although the high frequency, high voltage energy may seem intimidating, it is considered a reasonably safe form of electricity. This energy follows the skin effect, and it has a very low current. It is reported that Nikola Tesla would hook himself up to the Tesla coil and have sparks rushing from his hair and fingertips.

In conclusion, by attending the open house at Resonance Research members of Chapter 24 were able to enjoy vivid science demonstrations first hand. I think that everyone in our group learned something new. The tour of Resonance Research Corporation was followed by a visit to Culvers Frozen Custard in Baraboo.

To view the complete set of color photographs from this Chapter 24 Special Event, please refer to the web site at <http://www.sbe24.org/>.

FCC RAISES \$839,344,385 IN AUCTIONS

By Tom Smith

The FCC raised \$839,344,385 from two auctions of spectrum carved from the TV broadcast band. The first auction raised \$329,451,810 for licenses in the 800 MHz Specialized Mobile Radio Services (SMR). This band is located in the spectrum formally occupied by TV channels 70 to 83 and is used by SMR and cell phone services. The licenses auctioned are for unapplied and unlicensed spectrum in this band.

The second group of frequencies is located in TV Channels 60 to 69 and raised \$519,892,575. The FCC offered 104 licenses in 52 Major Economic Areas. There was a four-megahertz and a two-megahertz license in each area. Of the 104 licenses, 96 were auctioned with 8 licenses to be auctioned in the future.

The winning bidders are: Nextel Spectrum Acquisition \$337.8 million, Pegasus Guard Band LLC \$91.4 million, Access Spectrum LLC \$69 million, Dominion 700 Inc. 6.3 million, PTPMS II Communications \$6.2 million, Motorola Spectrum Inc. \$6.2 million, Black Rock Partners LP 2.5 million, Harbor Wireless LLC \$42,750.

The FCC had planned for the winners to be band managers and lease the spectrum to multiple users. There is a feeling that the FCC will now be asked for waivers for use of the band, particularly from Nextel and Pegasus. Some of Nextel's spectrum may be adjacent to their existing Specialized Mobile Radio spectrum.

From FCC Release (www.fcc.gov) and *WIRELESS WEEK* (www.wirelessweek.com)

CTI

<http://www.CTIinfo.com>
email - cti@CTIinfo.com
Phone - 608-831-4636
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Steve Paugh is the editor for the HTML Version of this Newsletter, available monthly on the SBE Chapter 24 web page.

NAB Vice President Sherman Delivers DTV Reality Check

By Vicki W. Kipp

Recently, I had the opportunity to listen to a presentation by Charles E. Sherman, Ph.D., the Executive Vice President (Television) for the National Association of Broadcasters (NAB) and President of the NAB Education Foundation. On October 4, Charles (Chuck) Sherman addressed a room full of broadcast engineers and broadcast content professionals at Iowa DTV Symposium 2000 in Des Moines. The Iowa DTV Symposium is an annual DTV conference hosted by Iowa Public Television. Chuck Sherman shared his thoughts on the current state of affairs for the transition to DTV. In my opinion, Mr. Sherman spoke very frankly when he recognized the difficulties and challenges that broadcasters, manufacturers, Congress, and consumers are facing. Sherman shared the blame for DTV transition problems between all of the players - broadcasters, the FCC, the cable industry, and digital television receiver manufacturers. The title of Chuck Sherman's presentation was "The DTV Transition- Does anyone have a pair of jumper cables?"

Chuck Sherman appraised us of the availability of digital signals and digital content. As of early October 2000, 158 television stations in 55 markets are broadcasting a digital signal. In the US, 64.5% of all households have a digital station that they could watch. Chuck Sherman updated us on what digital content to expect from each of the four major commercial broadcast networks this year. According to CBS executive Marty Frank, CBS will produce 17 out of 18 prime time hours in HDTV. Panasonic will be backing CBS's HDTV efforts in 2000 - 2001. In addition to their high definition prime time lineup, CBS will be doing some high definition sports coverage. ABC will not be carrying Monday Night Football in high definition this season, nor did they list any other digital content for this year. NBC will continue to broadcast *The Tonight Show with Jay Leno* in high definition. FOX does not plan to have any high definition productions this year. Chuck Sherman speculated that FOX may

plan to broadcast movies from their vast film library on four standard definition channels instead of broadcasting one high definition signal. Sherman called attention to the stand out broadcast station KOMO channel 4 in Seattle, Washington which is broadcasting 30 hours per week of 720p high definition news.

Although few audience members needed any reminder, Chuck reviewed with the group that commercial broadcasters have just 20 months remaining until their May 1, 2002 deadline and public broadcasters have only 32 months left until their May 1, 2003 deadline. Chuck Sherman said that the FCC is in a state of "watchful waiting." The FCC may delay the deadline for when they will take back the NTSC spectrum.

In the debate of 8-VSB versus COFDM, the NAB is trying to remain neutral. Chuck Sherman expressed the opinion that COFDM is better for mobile applications due to multipath issues with 8-VSB. Sherman speculated that the DTV transition could take "forever" if the FCC were to adopt the COFDM system because the digital channel allotments would have to be reassigned.

Chuck Sherman observed that when color television was introduced, it took 24 years before there were more color television sets than black and white sets in American homes. His point is that it is going to take some time for Americans to replace NTSC sets with DTV sets. According to Sherman, the first generation of digital television receivers had some serious shortcomings. Neither the FCC, nor the manufacturers had set performance standards for the first generation digital receivers. For perspective, Sherman cited that to date roughly 202,586 DTV receivers have been sold in the US. Of those receivers, only about 17% (33,788) can actually receive a digital signal over the air. Interoperability of DTV sets is a significant issue. Chuck Sherman mentioned that current DTV receivers cannot work with a cable signal. There is a limited, but not binding agreement

in place between the National Cable Television Association (NCTA) and the Consumer Electronics Association (CEA.)

The policy of voluntary DTV carriage for the cable industry may be a serious problem for broadcasters. Two networks have reached agreements with AT&T and Time Warner, but only one network O & O digital broadcast station is being carried on cable now. The NAB has no expectation that the Kennard FCC will adopt digital must carry regulations for cable television. It is NAB's position that cable (digital cable, in particular) has ample capacity to carry both standard definition and digital television signals. They feel that the 1992 Turner Cable court decision regarding analog must carry fully applies to DTV coverage, just as it does to NTSC. According to Chuck Sherman, the NAB feels that cable should carry all non-subscription portions of DTV signals, including datacasting.

The cable industry, on the other hand, does not agree with some of NAB's expectations. Cable providers are opposed to any requirement to carry DTV signals before the FCC transition deadline. The FCC has not made any digital must carry mandates for the cable industry.

There are other DTV issues being hammered out by the FCC. In March of 2001, the FCC will auction off channels 60-69. It is expected that the FCC will allow voluntary agreements for stations that wish to clear their NTSC spectrum early. Consensus on DTV standards has been reached in some cases. In September 2000, the FCC mandated 1394 fire wire on some digital television receivers. Recently the disagreement on PSIP standards was settled.

In June 2000, the National Association of Broadcasters wrote a letter to the FCC stating that "the DTV transition is faltering." Early adopter stations jumped into the DTV transition on their own, way ahead of the FCC deadlines, but not all broadcasters have followed at the same pace. The

(continued on next page)

Reality Check (continued)

rate at which new stations are going digital is slowing. To date, build out has been in the larger markets. Smaller markets are beginning to ask if the 2002 deadline can be extended. Chuck Sherman warned, "broadcaster position is tenuous!" In America, 80% of homes receive broadcast signals from cable or satellite providers.

Sherman commended FCC Chief of the Office of Engineering and Technology Dale Hatfield for making some progressive suggestions for smoothing the transition to DTV. Speaking independently (not as a FCC official and on his own time), Hatfield has requested the following: Effective by 2003, Congress should require all television receivers that are 13 inches or larger be capable of receiving DTV. Effective by 2006, Congress should require the cable television industry to use the same standards for digital television, as the broadcast industry is required to use. Congress should ramp up the must carry rules for all network owned and operated broadcast television stations. Congress should provide funding for public television stations to transition to DTV. In Chuck Sherman's opinion, the ideas suggested by Dale Hatfield made good sense.

Chuck Sherman concluded his Power Point presentation by remarking that analog television may continue for quite a few years past the original FCC end of simulcast deadline.

DO YOU HAVE AN IDEA FOR A SBE MEETING?

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

Please forward any ideas to one of the Program committee members or to one of the Chapter 24 officers.

Broadcast Clinic 2000 Schedule

The 2000 Broadcasters Clinic and Upper Midwest Regional SBE Meeting will be held at the Madison Marriott West on October 17, 18, and 19. In addition to the equipment exhibits, there will be numerous presentations which cover audio, video, data, RF, and other topics.

Tuesday October 17

- 7:45 am Registration and Continental Breakfast
- 9:15 am Fiber Optics as it Relates to High Speed Internet Technology, *Charles Burger*, Consultant
- 10:00 am T1 Technology for Broadcasters - A nuts and bolts approach, *Chris Singleton*, Harris Intralex
- 11:00am LPFM-TRANSLATORS AND IBOC - PERSPECTIVE AND UPDATE *Ben Evans*, Evans Associates
- Noon Luncheon
- 2:00 pm Linux for the Broadcaster *Jay Mielke*, Bliss Communications
- 2:45 pm MP-3 and Linux for Audio Storage and Automation, *Jim Hammond*, Scott Studios
- 3:45 pm POWER-POWER-POWER *Chuck Forster*, Forster Engineering
- 4:30 pm EQUIPMENT EXHIBITS OPEN (Everybody is welcome)
- 7:30 pm Looking Back with *Mike Dorrough* and Others

WEDNESDAY, OCTOBER 18

- 7:45 am Registration and Continental Breakfast
- 8:30 am FM BOOSTERS AND TRANSLATORS -HOW TO CHOOSE *Jeremy Ruck*, D.L. Markley Associates
- 9:15 am COFDM over Analog Transmission in the 2 Ghz BAS ENG Band *Andrew Larsen*, MRC Video/Adaptive Broadband
- 10:00 am EQUIPMENT EXHIBITS OPEN (Lunch is available)
- 1:30 pm How Star Quad Works *Steve Lampen*, Belden Electronics
- 2:15 pm AES Audio Technology *Randy Hall*, ADC/N VISION
- 3:15 pm PSIP TUTORIAL *Michael Isnardi*, Sarnoff Corporation

- 6:00pm RECEPTION
- 7:00 pm Upper Midwest Regional Society of Broadcast Engineers Meeting

THURSDAY, OCTOBER 19

- 7:45 am Continental Breakfast
- 8:30 am On Channel Boosters as Gap Fillers *Richard Schwartz*, ADC Broadcast Systems
- 9:15 am The Role of 601 in a Sensible Transition Plan to DTV and HDTV *Ian Caldwell*, Miranda Technologies
- 10:15 am New Generation of High Power IOT Transmitters *Andy Whiteside*, Acrodyne/Sinclair
- 11:00am CONSIDERATIONS IN DEFINING DTV SERVICE AND COVERAGE *John EX Browne*, P.E. Noon Luncheon
- 1:15 pm Real World Solutions to Adjacent Channel Combining *Bob Plonka*, Harris Corporation
- 2:00 pm MPEG Recording and Networking in a Production Environment, *Craig Beardsley*, Sony Broadcast
- 2:45 pm Computer Networking comes to Television, *Phil Livingston*, Panasonic Broadcast
- 3:30 pm COFDM for DTV *Nat Ostroff*, Sinclair Broadcast
- 4:00 Adjournment - THANKS and see you next fall!

Registration fees are \$155 for any two days, or \$180 for all three days. To register by phone call (608) 255-2600.

Student Night (continued from page 1)

stations are indeed quite competitive, the engineering staffs themselves are able to cooperate from time to time when it comes to education opportunities as well as providing a helpful hand when one of them is off the air.

Thanks to Tom Weeden, David George and the rest of the staff at WMTV, NBC 15.

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FCC AND CEA RELEASE DTV LABELING STANDARDS

By Tom Smith

The FCC and the Consumer Electronics Association both released labeling standards for digital television devices.

The FCC adopted rules concerning the labeling of DTV receivers and their compatibility with cable TV devices. The rules specify labeling of three levels of Cable-DTV connectivity.

- "Digital Cable Ready 1" is a receiver capable of receiving both basic analog and digital programming as well as digital premium programming. The set must be able to accept a security card or Point of Deployment module provided by the cable operator for encrypted programming. These sets do not have 1394 digital connections or two-way capability.

- "Digital Cable Ready 2" has all of the features of "Digital Cable Ready 1" as well as a 1394 connection and the ability to support advanced and interactive digital services from a cables system via a set-top box.

- "Digital Cable Ready 3" is a set with all of the features of "Digital Cable Ready 1" as well as supporting advanced and interactive services by direct connection to the cable without using a set-top box. The FCC is keeping this standard open to additional development from the cable industry.

The Consumer Electronics Association (CEA) expanded and detailed its definitions for DTV products. This is in response to new products being introduced into the market at many different price points.

They have designated three levels

of DTV labeling for displays and tuners. They are HDTV or High Definition, EDTV or Enhanced Definition and SDTV or Standard Definition.

- A HDTV receiver, monitor and tuners must decode and output all ATSC Table 3 formats and display them in 16:9 1080 I or 720 P scanning formats or higher with Dolby Digital Audio from a terrestrial digital transmission.

- A EDTV receiver, monitor or tuner must be able to decode and output all ATSC Table 3 formats and displays them in 480 P or higher scanning format with Dolby Digital Audio from a terrestrial digital format. Transmissions in 480 I can be displayed in that format. No aspect ratio is specified for EDTV.

- A SDTV receiver, monitor or tuner must be able to decode all ATSC Table 3 formats and produces a usable picture with a scanning frequency less than EDTV's 480 P scanning. The device must produce usable audio and there is no aspect ratio specified.

The CEA resolution states that no analog only TV with a scanning frequency of 15.75 kHz (480 I) should not be marketed as having any DTV compatibility or attributes. The goal of the FCC and the CEA actions is that the consumer will be able to make a more informed choice when purchasing a TV.

(From FCC and CEA Releases.)

The *Chapter 24 Newsletter* is published monthly. Submissions of interest to the broadcast technical community are always welcome. You can e-mail your articles to: MNorton@ecb.state.wi.us

SBE Listserver Info

Chapter 24 members are invited to join the chapter listserver. To subscribe, send an e-mail message to the following address: majordomo@broadcast.net

In the body of e-mail message type: subscribe msnbe. (The subject line can be left blank.) Instructions and a confirmation message will be sent to you. To post to the list, address you e-mail to: msnbe@broadcast.net

Also, join the Wisconsin SBE Chapters listserver. To subscribe, send e-mail to: majordomo@broadcast.net
Body of e-mail message: subscribe sbe-wi
To post to the list, send e-mail to: sbe-wi@broadcast.net

The SBE National also has a listserver: To subscribe, send e-mail to: majordomo@broadcast.net
Body of e-mail message: subscribe sbe.
To post to the list, send e-mail to: sbe@broadcast.net

There are also various other listservs of technical interest, such as the following discussion groups:

Digital Television (dtv), Electronic News Gathering (eng), Low Power FM (lpfm), Broadcast Radio Technical (radio-tech), SBE EAS (sbe-eas), Broadcast Television Technical (tv-tech), as well as others.

For more information on the operation of the listserver, send a e-mail message to majordomo@broadcast.net In the body of the message, type: help. The system will automatically reply with additional information.



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FCC RECEIVES 473 LPFM APPLICATIONS

By Tom Smith

The FCC received 473 applications from eleven states and territories during the second filing period for low power FM stations. The filing period occurred from August 28 to September 1, 2000. The FCC has received over 1200 applications in the first two filing periods.

The FCC received the following number of applications from the these states and territories; Connecticut (38), Illinois (84), Kansas (36), Michigan (87), Minnesota (63), Mississippi (22), Nevada (23), New Hampshire (28), Puerto Rico (20), Virginia (58) and Wyoming (15).

The applicants are listed in the Broadcast Application Public Notice of September 15, 2000. The applicant make-up is similar to the first group with a great many religious groups and rest of the applicants were made up of groups from city and town governments and state, city and town agencies to colleges, schools and civic groups such as Boy Scout troops. There were still some individual and multiple applicants, both which are not allowed by the FCC to apply for LPFM stations.

The next group of applications is scheduled at the end of October and include the states and territories of American Samoa, Colorado, Delaware, Hawaii, Idaho, Missouri, New York, Ohio, South Carolina, South Dakota and Wisconsin.

From FCC Releases (www.fcc.gov)

Special Thanks to Denise Maney and Tom Weeden for arranging the September Youth Night program at WMTV.

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FCC LOCAL LEGALS

Compiled by Tom Smith
GRANTED

WBEL-AM South Beloit, IL

The FCC has granted assignment of the license of WBEL from WBEL, Inc. to Good Karma Broadcasting, LLC. Good Karma Broadcasting owns WBEV-AM/WRXO-FM, Beaver Dam, WTLX (FM) Columbus, WTTN-AM Watertown, and WKPO(FM) Evansville. All stations are in Wisconsin. WBEL operates on 1380 kHz with 5 kilowatts output. FCC action on September 11, 2000 and announced on September 18th.

From FCC notice (www.fcc.gov)

EMPLOYMENT OPPORTUNITY

Media Technician 3 - Television
Video Engineer

Work on LIVE productions, including Badger Sports and WeekEnd. This Engineer position within WHA-TV's Engineering department must set up and maintain technical standards for broadcast color cameras, color correctors, frame synchronizers, picture monitors, and other related equipment. This individual performs corrective and preventive maintenance at the component level on electronic systems and devices. FCC General Class license and SBE certification preferred. We prefer at least two years experience. Work schedule will include evenings and weekends.

Contact Sandy Baker,
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432 N. Lake Street Room 201,
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SBE CHAPTER OF THE AIR:

HamNet meets the second Sunday of each month at 0000 GMT on 14.205 MHz. Hal Hostetler WA7BGX is the Control Station.

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

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

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Society of Broadcast Engineers, Inc.
8445 Keystone Crossing
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Indianapolis, IN 46240



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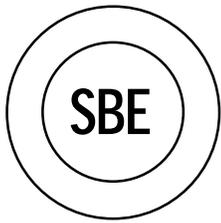


FIRST CLASS MAIL

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

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OCTOBER MEETING and PROGRAM



**Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Wednesday, October 18, 2000**

Broadcasters Clinic and Upper Midwest Regional SBE Meeting

During this month's meeting, presenter Nancy Gray will talk about Interactive Communication Styles. Make sure that you do not miss this opportunity to learn how to be better at your job as a member of your station's staff.

**Reception
at 6:00 PM**

**Business Meeting and Program
at 7:00 PM**

**at Marriott West
1313 John Q. Hammond Drive
Middleton, WI**

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

2000/2001 UPCOMING MEETING/ PROGRAM DATES:

Day	Date	Program
Tuesday	November 21	To Be Announced
Wednesday	December 20	VBI Info
Thursday	January 18	RF Measurements

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