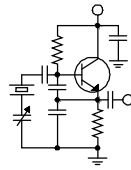


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Cleaning House

Every few years it seems I see a feature article in a newspaper or on the local news about antiquated or obsolete laws still on the books. One of the more memorable from twenty or more years ago in Texas was a law that prohibited whistling in a cemetery after dark. In my humble opinion, such a law is just downright wrong! If I were to somehow find myself in a cemetery after dark, I should be afforded at least the comfort of being able to whistle a tune to keep myself company! But I digress!

The FCC has for years had a bunch of rules on its books that were either not enforced by resolution of the Commission, were regularly and routinely waived, or had no application as a result of subsequent rule changes. Last month, the FCC did some housekeeping, deleting at long last the "Fairness Doctrine" and a number of other rules that fit into one of the above categories.

We are, of course, thrilled to see the Fairness Doctrine gone. It has for more than twenty years been a Sword of Damocles for broadcasters, unenforced by fiat of the Commission but on the books nonetheless where enforcement could, by similar fiat, be reinstated on a moment's notice. A lot of liberals, whose own efforts to launch successful talk radio formats failed miserably, would have liked nothing more, and many were in fact pushing for just such a reinstatement. While there is nothing that says such a rule cannot be brought back to the books, it would take a full and formal rulemaking process, complete with rounds of public comments and reply comments, to make it happen. For the moment, we as conservative and Christian broadcasters can breathe a little easier as did Damocles when he was at long last allowed to abdicate his seat beneath the suspended sword.

From an engineering perspective, however, there is one rule I am just as thrilled to see gone: the Part 101 prohibition on the use of fixed private

microwave links as the final RF link in the path to a broadcast transmitter facility. This particular rule was put in place many years ago to confine broadcasters to their own auxiliary bands while keeping them from soaking up available frequencies in the 11, 18, 23 GHz and other bands in the business microwave service.

What the rule and the related rules in Part 74 did not anticipate was the exploding bandwidth requirements of studio-to-transmitter (and transmitter-to-studio) links that accompany HD Radio, RBDS, transmitter GUIs, remote controls and other uses. Television, while certainly impacted, found itself in much better shape than radio with several microwave bands available with sufficient real estate to accommodate the required bandwidth. Radio, on the other hand, found itself confined to a tiny corner of the 950 MHz band with 500 kHz channel bandwidths that are wholly insufficient to meet our needs. For a short time we had the 18 GHz option available, but that went by the wayside long before radio's bandwidth needs placed a heavy demand on that spectrum.

Our friends at Clear Channel and Greater Media have had some success requesting and being granted waivers of the "Final RF Link" prohibition over the last couple of years. We have never asked for one, finding instead other options. While it was always good to know the waiver option was available, there was never any guarantee of a grant and application processing time was considerably longer than a clean, no-waiver application.

In Denver, Chicago and Birmingham, CBC got around the "Final RF Link" prohibition by stating in our applications that an unlicensed 802.11 link would constitute the final RF link to the transmitter. That was never questioned, and we have so far had good success getting grants within 60 days or less.

The unlicensed 802.11 link served a second, more practical purpose: getting the Ethernet across

the base insulator of AM towers. While I haven't yet seen such an animal, I suppose it wouldn't be too hard to wind a CAT5 Isocoil to couple the network cable across the base insulator, but I didn't want to be the one to pioneer such an effort.

The 802.11 link served yet another very practical purpose: providing a very high degree of isolation between the on-tower network cabling and the network wiring and equipment in the transmitter building. It's hard for even lightning to jump across a 5.8 GHz link a thousand feet long.

Finally, these unlicensed short-haul 802.11 links got us around the 100-meter (328 feet) length limitation on CAT5 wiring. In several cases, the 11 or 18 GHz antenna is positioned 300 feet or more up the tower (400 feet at KLZ). We would have to put a network switch near the base of the tower to repeat the signals and reset the length counter at that point.

All that is to say that we will, in many situations, continue to use unlicensed 5.8 GHz 802.11 links to couple the on-tower microwave radios to our networks in the transmitter buildings. They provide an elegant and reliable solution to multiple problems

in some installations.

But with the final RF Link prohibition now gone, we have some options that we did not have in the past. At present, we are working on commissioning an 18 GHz link in Chicago. With no prohibition in place, we can directly cable to the on-tower radio, eliminating a possible point of failure (two, really, if you consider the on-tower network switch as a possible point of failure) and a bandwidth bottleneck. Of course we will have to pay a lot of attention to lightning/surge suppression that we could have otherwise ignored. We're in the same situation in Birmingham, where we have an 18 GHz link on order. Since the antennas will be in the 200-foot range on both ends, we can directly cable there as well (the AM tower where one end of this link will be mounted is skirted and grounded).

My hat is off to the folks at the FCC for this bit of long-overdue house cleaning. Radio folks can more or less forget about the Fairness Doctrine and routinely employ Part 101 links to connect their studios and transmitter sites. That's change we can believe in.

The New York Minutes
By
Brian Cunningham, CBRE
Chief Engineer, CBC – Western New York

Hello to all from Western New York! It has been quite awhile since we have shared time together here in the pages of *The Local Oscillator*! My August report was postponed due to the passing of my mother-in-law the last week of July. She was in relatively good health, but she experienced a massive stroke which left her paralyzed, partially blind and unable to speak. After five days in the hospital, the Lord took her home, which was a blessing, as she would not have had any quality of life in her current condition. Nora and I miss her immensely, but are assured she is in a better place.

WDCX – Buffalo, WDCX (AM) – Rochester

Here in Buffalo, we are preparing for the installation of a new Nautel NV-40 solid-state FM

transmitter and a new ERI SHPX-10AC 10-bay antenna for WDCX-FM. Our current arrangement has



the analog FM transmitter feeding the main antenna and the BE FMi-106 supplying the HD signal to the auxiliary antenna. The NV-40 will combine both the analog and HD-R signals and feed them directly to the main antenna. This will greatly increase our HD coverage, as the auxiliary antenna is located halfway down on our 425-foot tower. ERI will be plotting the new antenna's pattern so we can

position it on the tower to where the main lobe will penetrate the Toronto area more efficiently. We have lost a lot of valuable coverage in and around Toronto in the past few years due to the Canadian government approving several stations to go on at 99.5 MHz, which is WDCX-FM's frequency. I am looking

forward to this project, and I am especially excited with the purchase of the Nautel NV-40. I have heard nothing but good reports on this transmitter, and I am confident that this will greatly improve our coverage and quality of our air signal.

Speaking of our new antenna installation, I had planned for Don Boye of Western Antenna Service to perform the installation, as I have worked with Don for 20 years and found his services to be top notch. On Friday August 26th, Don stopped by the transmitter site and informed me that he will not be able to install the antenna for us. Evidentially, while performing a recent tower dismantling in Jamestown, New York, he was inspected and fined by OSHA for various violations, along with the radio station who owned the tower, the crane company and building owner. As I said earlier, I have worked with Don for 20 years, and never have I seen him or any of his crew do anything that would pose a hazard to property or any crew member. His main concern was always for the protection of his personnel and the station's property, and that the job was performed the right way, so he did not cut corners. Seems the OSHA inspector was out to bring in some money, as the violations he wrote Don up on were: 1. No hazardous materials documentation on site for the products being used on this project (WD-40 and penetrating oil!). 2. The climbing belt he was using did not have over-the-shoulder straps. 3. A safety meeting was not held prior to and after the project ended with all who participated in the tower removal. 4. Not enough space was roped off in the parking lot to keep the public well away from the work area. These, along with several other nit-picky items resulted in a fine of over \$9,000.00, a pretty hefty amount for a small business owner! As a result, Don has indicated that he will no longer perform any big tower or antenna projects; he will limit himself to lighting repairs (re-lamping) and minor maintenance items.

In order to get our project completed, I have secured the services of Alpha Antenna Service to install the antenna. I have worked with Rodney Gifford on several projects for other stations while I was with S & B Communications, and am familiar with his staff and work ethic. I am confident that Alpha will perform the installation according to our strict guidelines and procedures.

On Saturday night August 20th, the WDCX-FM transmitter site experienced a lightning hit from a pretty intense storm that passed through the area. Since installing the new Thermo-Bond building several years ago, we have practically eliminated lightning damage to our facility, due to increased

grounding measures on the tower, feed lines, and internally on the equipment itself. We have a high quality surge protection on the incoming AC, which in the past was the usual path of lightning damage. This time, the lightning came in on the telephone lines, knocking out both voice lines along with the Burk remote control and somehow, the BE digital transmitter. I removed the Burk remote control and began troubleshooting the problem, finding that all of the boards received some damage. In order to get the remote repaired the quickest way, I elected to send it in to Burk, noting how much damage I found. They were able to repair it and ship it back the same day. Luckily, I had saved the current configuration in Autopilot, so re-installation of all the programming took less than five minutes.

As far as the BE transmitter repair, I did not have a manual on the FMi-106 on site, and I was not able to contact technical support for over the phone consultation with both our phone lines out (and my cell does not work well in this area). The next day, I obtained a schematic for the controller section of the transmitter and began the troubleshooting of the problem. The transmitter would come up, but the RF was muted to the four RF modules, and the "raise" button was lit continuously along with the fault button, which would not clear. It has been a while since I had the opportunity to get down and troubleshoot a problem such as this, and it really felt good to use my electronic troubleshooting skills again! I found several ICs blown (an inverter and comparator chips) along with a one-shot 555 timer and transistor in the control circuitry. After replacement of the failed components, the transmitter came right up with no other problems noted. I can only assume that the lightning came in through the remote connections to the Burk.

On the AM side of things, one of our cap-ex projects for this year was to replace the existing doghouse roofs with new shingles and the fascia boards covered with aluminum and the soffits replaced with new vinyl, vented panels. We hired Skyline Contractors, one of our advertisers, to do the work, and they completed the project just as July rolled to an end. I must say that they did an outstanding job. Each doghouse looks brand-new, and the repairs should last for at least the next 25 years. The only other item needed to complete this project is to paint the steel doors with Rust-Oleum paint and seal the frames with new foam sealant. I plan on getting this accomplished before the cold weather sets in around November.

WLGH – FM - Rochester

I have experienced numerous problems as of late with the HD transmitter for WLGH-FM. Several weeks ago, the transmitter went down because of a failure of one of the three switching supplies. As there was no service information available for these supplies, I elected to exchange the failed supply for a new one under BE's exchange program. This would be the cheapest, most economical way to get the transmitter back up, as their repair policy has once again changed, and comparing the time and materials cost against the flat rate exchange cost, we would

come out better cost wise by the exchanging of the supply. A couple of weeks after replacing the switching supply, the transmitter went down again. This time I found the FSi-10 inoperative. I suspected that the hard drive had failed, and a call into BE resulted in my returning the unit to them for repair. As of this writing, I have not heard back from them as to the actual cause of the failure.

That about wraps up another month here in the great northeast, and until we meet again here in the pages of *The Local Oscillator*, be well, and happy engineering!

The Motown Update

By
Joseph M. Huk, Jr.,
P.E., CPBE, CBNT
Chief Engineer, CBC–Detroit

This month we had two thunderstorms pass through the area, each producing lightning strikes that caused damage to equipment in our facilities.

Even though we have considerable lightning protection on our tower, surge protection, and grounding, there was still a lot of damage. This has caused us to review our current protection to see if it needs to be replaced or upgraded.

Cris Alexander, my supervisor, indicated that we should have the tower's lightning protection checked by our tower riggers. Initially, the tower riggers used their Ω megger's resistance meter to verify that the resistance of the tower with respect to ground was low. The first measurement before any work was done showed 0.7 ohms of resistance. Subsequently, one of the tower climbers went up the tower to check the static discharge array to make sure it was properly grounded and in good condition. Everything appeared to be intact, but after reviewing the photos he made of the array, it showed that we have some missing and melted pins. Therefore, the array has lost its effectiveness to discharge the tower and make it an unattractive target for a lightning strike, something borne out by the increasing frequency of strikes on our tower lately after having zero strikes for many years.



At the foot of the tower, all of the transmission lines were clamped with a ground to divert any current from making its way into the

building. These connections appeared to have been arcing at one time. All the connections were cleaned and reconnected. In addition, we found a wire, intended to ground the ice bridge, hanging from the tower. The wire was then cad-welded to the ice bridge to help redirect the current to ground when a strike occurs.

When the cleaning was complete and the additional ground was welded to the bridge, the resistance was re-measured. The resistance measured was about 0.3 ohms.

Therefore, the resistance was improved by 0.4 ohms with respect to ground. Even though we made this improvement, any static charge built up on the tower will still not be effectively dissipated. Therefore, we are consulting with Nott, Ltd., the manufacturer of the static discharge arrays, to determine if the array should be replaced or can be repaired by selectively replacing only the defective parts. Next month, I will report back on our progress with the anti static array and ground improvements to our facility.

Until next time, be safe, and if all goes well, we will be reporting to you from the pages of *The Local Oscillator* next month. Best regards.

News From The South

By
Stephen Poole, CBRE, CBNT, AMD
Chief Engineer, CBC-Alabama

This past month in Birmingham hasn't seen a major project. The closest was perhaps replacing one of the guy wire insulators (i.e., a "Johnny Ball") on tower #2 at the WXJC(AM) array in Tarrant. Southern Broadcast Services did this with their usual dispatch and skill, making it a non-issue in short order. We didn't even take photos, though I will confess to a little relief when the come-along that they'd put in place to keep the guy tight finally came off. That thing looked odd from the ground and made me nervous.

I also installed a new ABR202A receiver for the Crawford Satellite services and wrote a little command-line utility that will set the "FS" (Format Select) for you. If any of you are interested in it and have an IP-enabled ABR202A, let me know.

Rather than run photos and commentary of all of the little fires that we've put out the past month, I'd rather allow Art Reis to inspire me. I shall engage in a rant most sincere and heartfelt. Do me a favor: I know that mostly engineering-types read this newsletter, but please pass this on to your programming folks, whether you work for us at Crawford Broadcasting or for someone else. I'd try to keep it brief.

Hurricane Hype and Missing The Point

Having lived through several severe storms (the most recent being the tornadoes of April 27th of this year), I pray for those who've lost loved ones or property in such storms. I won't make light of their losses for a moment. And personally, I think that radio really shines when something like this happens. I'm proud to be part of the business, and I'm even prouder that the early reports from the East Coast in the wake of Irene are that radio *rocked* during that hurricane, keeping folks company throughout the storm. That's how it should be! Good job!

Having said that, though, it's time for our television brethren to get their minds right. We'd

start with the most obvious: they'd interview a public safety official who urges people to evacuate and/or find a safe place... then switch to a reporter on the beach so that they can get nice shot of him or her being blown around in the wind. (Jim Cantore of the Weather Channel is the poster child for this, but he's by no means the only offender.) Can you say, "mixed message"?

And if can digress for a moment to speaking as someone who has sat in the dark, power out, candles flickering, looking for information of what I need to

hear most is what the storm is going to do *next*. When Fran came through NC years ago, Sandy and I had actually bought one of those battery-powered television sets and were watching it as the wind howled outside. The channel we were watching spent all sorts of time on storm damage, human interest stories and all other sorts of stuff ... but only a few minutes per hour, at most, telling me *where the blasted storm was and where it was headed next!*

Please pass that on to your programming folks, and this fact as well: the real danger from a hurricane isn't the wind. With the exception of those poor souls who experience the actual landfall, most of the damage and loss of life comes from *flooding*. Even a weak tropical storm can drop *megatons* of rain in a short time and can cause terrible flooding.

This is what actually hammered those poor folks in Vermont. They don't particularly care whether Irene was as "true" tropical storm at that point, either (more on that in a moment). They just know that rivers and streams are overflowing and everything is literally being washed away as they watch. Likewise, there are people on the Outer Banks of NC who, as I write this, must depend on boats and airlift because NC 12, the only available highway, has been destroyed in several places. By *flooding*.

But The Recriminations Have Started

If I worked for the National Hurricane



Center, I might be tempted to wonder at times why I even bothered. Remember the furor after hurricane Charlie hit Florida in 2004? At the last moment, Charlie öjinkedö from the predicted track (but still within the margin of error) and put on a sudden burst of intensification. Punta Gorda, FL was within the watch/warning area, but the residents thought that the eye would hit well away from them, so they didn't adequately prepare. They suffered catastrophic losses, then complained that they öhadn't been warned!ö And you wonder why the NHC always tries to err on the side of caution? People don't listen!

We have the opposite with Irene. Several days before it hit, we were being warned that it could be öcatastrophic.ö Now that it's over and New York City didn't get blown away or washed out to sea, fingers have begun to point. Ironically, a lot of the pointing and recrimination is coming from the news media, who felt that they were ömisledö about the storm's size or potential. *They* are the ones who overhyped the story, not the NHC!

While Irene was still rampaging through upper New England, the Drudge Report had already linked to a story from a guy claiming that it was all a fraud: Irene wasn't a hurricane at all, but at worst, was a weak tropical storm. My geek friends at Slashdot picked up the story a few days later. Briefly, the critics in question were unable to find any online records of hurricane force winds in the path of Irene. öErgo and therefore,ö they concluded, öit was a sham.ö

Um, no. Irene was a very real hurricane that posed a very real threat to the Atlantic coastline. Just for the record, the Cedar Island Ferry terminal recorded a sustained wind of 90 MPH as Irene came ashore, and other buoys did in fact note hurricane force winds. Besides, the ögold standardö is the Hurricane Hunters, those loveable maniacs who actually fly into the storm and make dozens of careful measurements of the wind speed (among other things).

Irene was a hurricane, in spite of what the naysayers and conspiracy theorists might try to say.

So What Happened?

Hurricanes are large, chaotic engines that cannot be predicted with 100% accuracy. The NHC clearly warns about this, too, with each and every forecast. They urge everyone not to focus on the exact track of the storm, because hurricanes are very large and you can be in significant danger even if you're many miles away from the eye.

Now, I'm not a meteorologist. I'm obviously not qualified to go into detail here, but I can share a

link that might help:

www.weatherunderground.com/blog/JeffMasters/show.html. Dr. Masters used to fly with the Hurricane Hunters, and he provides great insights into each NHC forecast, why they might have reached their conclusions and what he thinks the real dangers are for each storm. You can look through the archive of his posts for Irene and see that he was never really worried about the wind; he was far more concerned about flooding.

He also detailed, with each post, what was happening with Irene. As I understand it: Irene began an eyewall replacement cycle just before hitting the NC coast. This can occur at any time in a strong storm; when it does, the eye falls apart and the storm begins building a new one. While the replacement is in progress, the peak winds weaken, but the wind field also öspreads outö over a much wider area. (In plain English, the storm becomes weaker but larger while the eyewall is being rebuilt.)

Normally, if conditions are right, the storm will eventually finish the new eyewall and be even stronger than it was before. But Irene was being östretchedö into an oval by strong upper level winds (called öshear,ö which tends to disrupt intensification) as it approached NC. Then it hit land, which further disrupted development, before the eyewall replacement could complete.

Perhaps this is why the Hurricane Hunters who investigated Irene found a very odd vertical structure. It's normal for a hurricane's high-altitude winds to be stronger, and the speed normally drops by a predictable amount as you move down toward sea level. But Irene was acting almost like a disc slipping on a turntable: the upper level winds (the öturntableö) were spinning at strong hurricane level, but the winds at the ground (at the ödiscö) were still playing catch-up. The central barometric pressure was also that expected for a hurricane; normally, it goes up as a storm weakens.

To be safe, the NHC kept Irene at hurricane intensity much longer than they probably should have, but they did so out of an abundance of caution. And you know what? *They were right to do so.*

So What Should We Learn From This?

Two things: first, as I've already said, *take the warnings seriously*. Yes, the NWS and NHC will tend to be pessimistic and will err on the side of caution, but you know how I look at it? If you evacuated and then came back home to find no damage, so what? You enjoyed a little time off and thank God nothing happened!

Second, remember what I said above: if

you're covering a disaster, try to put yourselves in the shoes of your listeners. What they want to know is *what to do*. They need information: where is the storm now, where is it going, how much longer will it be unsafe for me to go outside and check on things? After the storm, they need to know where to find

help, or, if they can pitch in and assist others, where they need to go to do just that.

Give them that information and you'll be a hero to your listeners.

Until next time, pray for America!

Valley Notes
By
Steve Minshall
Chief Engineer, KCBC

Life at KCBC has been pretty quiet lately, but we did have one big adventure, the installation of a new HVAC unit for the office side of the building. The old unit was a Trane, installed in 1987, and it ran for 24 years without a problem. The replacement project started back in 2010. The job was really quite simple: just replace an old 5-ton HVAC unit with a new one.

A year or two previous, we had a new 12.5-ton A/C unit installed for the transmitter. Our local contractor installed a beautiful York unit, did a great job, and did it quickly. The same contractor came in with a reasonable bid for the new office unit, so we chose him based on our previous experience. After we placed the order, we did not hear from the contractor for a long time. We inquired and found that he had been injured and could not work for six weeks or so. More than six weeks went by, many more in fact. We contacted him several times and now we were getting new excuses, but he seemed sincere and promised to get the job done. Time ticked away until spring was around the corner, time to get a new unit in before the weather turned hot.

We called another, well-respected company and received a good bid for a new unit. Within days we had a crew working on site. You would think that removing one 5-ton unit and replacing it with another 5-ton unit would take about 90 minutes. Not so. As it turns out the old Trane unit had the intake and exhaust ducts reversed from the way all of the new units are configured. To further complicate the issue, the new unit had an external economizer, which meant that we really needed a new or extended concrete pad to accommodate the extra size.

The contractor's installation team shoved some plastic foundation thing under the end of the unit that was hanging off the edge of the concrete

pad. This was ugly and obviously not functional. In the end, the unit was lifted and the concrete pad was enlarged. The duct work was reversed in the ceiling of the office. This, too, had several unexpected problems, but eventually it was working. Then they installed the wrong thermostat. The correct thermostat was installed and

then the economizer did not work. They sent out their economizer expert and the job was finally finished.

The latest project is installation of the new Telos NX-12 studio telephone system. This is really a neat piece of equipment. It is going to both simplify and greatly improve our phone capability. One glitch I have is that the old DIM routed all of our lines through it before going to the business system; the NX-12 does not do that. It looks like a handful of bridge clips will put us in operation in a parallel mode.

I am also moving the new phone system higher up in the rack. One of my new installation protocols is to no longer install things that require getting on your knees to adjust. I am also taking the opportunity to clean up the phone wiring in the studio.

KCBC had, for many years, an RCA BTA-50 transmitter in back-up service. Back in my early days with that beast, we had problems with the rectifiers. Evidently, rectifier diodes made in the 1960s don't last forever. This transmitter had three 12 kV, 37.5 kVA pole pigs (transformers) feeding the rectifier stacks. With those rectifiers just on the



other side of the glass window of the power supply cabinet, I would cringe a little every time I turned the plate switch on. More than once I had turned that switch when some of the diodes decided to short and created an arc-over like all you-know-what broke loose in that cabinet! A complete rebuild of the stacks would probably have fixed that problem, but the cost of doing so was quite high. Peter W. Dahl had a solution that made more sense. He custom built a rectifier stack using modern parts and modern thinking that was bullet proof. Once that pretty assembly, with his signature red fiberglass boards, was installed, our rectifier problems were gone.

I am sure that most if not all the people who read this column know that Peter W. Dahl died recently. Mr. Dahl was a great help to many of us broadcast engineers over the years, particularly with the old tube transmitters. I did business with him a number of times. He provided a unique service of providing replacement transformers, chokes and other components at a reasonable price. There's a good chance that if you look in an old tube transmitter you will see one of his transformer or chokes with the red fiberglass insulating boards. He was good to all of us and he will be missed.

Catalina Tales
By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island! I am slowly beginning to trust my Nautel XL12 transmitter after long-overdue repairs were completed last month. That transmitter has had me on my toes a good part of the time since it was installed due to all the intermittent issues we continued to experience with it. Here's another big thank you to Nautel's Steve Braley for making the trip to the island and tearing into this thing with me. After the long list of repairs that he made, this XL12 is running far better than it ever has before. Though I do still favor our ND10 auxiliary transmitter, I am feeling better about our XL12 with each passing day.

Our electrical power at the KBRT Ranch transmitter plant seems to be my next issue to deal with. For some strange reason, Edison seems to always be in a state of flux here, with voltage and even frequency varying by as much as 10% on a regular basis. My latest issue involves our voltage falling below our emergency generator automatic transfer switch settings, thus triggering a generator start and transfer cycle. I set the low point on the

transfer switch it a bit lower, but there it went and fired up again! I don't feel too good about opening our window more than 10% high or low, so I guess it is time to start calling around again until I can find someone who can actually do something about this. The nice thing is, our XL12 is purring through all this so I have not had one glitch thus far.

Though the madness slowed down through August, giving me some recuperation time that I really needed badly, this month I will be very busy again

as I tackle our brush clearance once again and do some tree trimming. I'm sure that I will find a small list of things needing maintenance while I am outdoors working, as this old facility needs more and more TLC. I keep telling myself, "Two more years! Just hold this old place together for two more years!"

Until next month, the Lord bless you and keep you; the Lord make his face shine upon you and be gracious to you; the Lord turn his face toward you and give you peace.



The Chicago Chronicles

By
Art Reis, CPBE, CBNT, AMD
Chief Engineer, CBC–Chicago

Last month, my column was devoted to events happening at CBC-Chicago Operations, which is a departure for me. At the end of each segment, I also promised that I would let you know this month how things came out. As I write this in very late August, the score is one project down, two well not quite. Here's the rundown.

WPWX Antenna

This one is done. Well, almost. By the time you read this in early September, we should be at full tilt boogie power on Power 92. Only the FCC blessing awaits.

The project went pretty well, really, with only a modicum of Murphy involved. The feed line arrived right on time on August 8th, the antenna and crew a day later. Nothing got damaged in the job, and nothing was stolen from the site, but on the first night in town, all the windows on both of the tower crew's trucks were broken by thieves at their hotel and bunches of stuff were ripped off. By the time the crew phoned the home office about the incident, finished the police report, and filed the insurance paperwork, they'd lost a half work day, and that had a domino effect on the project. What should have been done by Thursday night had to wait over until the next day. The antenna was in and surveyed by Thursday afternoon (remember, FM directionals must have this done *and* certified), but then Murphy Weather stepped in, making winds too high for a safe installation of the transmission line on Friday, so the project's completion was left for after the

weekend, during which time the weather *really* did its thing. Monday, however, dawned sunny and almost windless, so the feed line went in almost as planned. Then the antenna tuner guy was called in to do his thing. Ultimate upshot: The project was pretty well wrapped up by sundown on Monday, the 15th.

As I said, almost. With directional antenna license application filings, the FCC rules state that stations have to operate

at half power output until the FCC grants Program Test Authority. That application was filed on August 15. So we wait. We *were* going to run the aux system during drive times, but the coverage of the new antenna is so good, even at half power, that we kept it

on the air throughout. But the big drive-around won't happen until we can turn that transmitter power up. And that brings up another nice thing about the antenna. So efficient is this antenna compared to the old one, because of the better management of the vertical pattern, that at full ERP, the transmitter will be operating at over 2 kW *less* than it did with the old antenna. Wow!

One more note: We dodged Murphy pretty big-time on the morning of Sunday the 14th, when disaster almost hit. I happened to be working an all-nighter at the site, alone, swapping out coaxial line detector sections for our two transmitter watt meters, when I discovered (by burning myself!) that the aux transmitter connection to the RF patch bay was too hot to touch. Uh-oh! Before I could get to the aux transmitters to shut them off, the rigs did it by themselves ó



Ain't she just beautiful? The new WPWX main antenna makes her debut into the world. Even at half power, she's already making an improvement in our coverage. (Photo by Len Watson)

VSWR fault. The FM-30 actually shut down right to the filaments! I quickly pulled the patch off the bay, only to find that the inside of the patch was burned to a crisp! The miracle is that the "bullet" in the patch bay, to which that U-patch had been attached, was hardly damaged at all, just needing cleaning with a dry green scrubber. I'm still replacing it when I get the chance, just to be safe. Just as fortunate, we had a spare U-patch on hand to replace it. Note that the real damage was deep inside the U-patch, where the female receptacle meets the inner conductor. The cap screw was melted beyond saving. Remember, this is a 3-1/8" job, so this means more than usual. We had to scrap that U-patch out and order a new one.



Burnout in RF patch

WSRB STL

This project should have gone just as well as did the WPWX antenna project. It didn't, and it still isn't finished, even after four months. Remember from our last episode that we had gotten as far as sending the transmitter site unit back to Trango systems for repair under warranty. That's the unit which the factory had decided we would send back. "Guessed" might be a better word for to use. Well, they couldn't find anything wrong with that one, so they sent it back. The same situation again. It was the *studio site* unit which had apparently been bad all along, not transmitting. And worse, the tower crew reported that another piece of stainless steel hardware has seized up on the studio site unit. The company just issued a service bulletin on that little situation. Far as I'm concerned, they should instead issue all new galvanized hardware for these things, with a note of apology. But, that's just me.

As I write this, the studio unit is back at the hospital and the doctors there finally found the problem: a corrupted software table. C'mon, not the

software! So now, as write this, we're waiting for the studio unit to return, *with the galvanized hardware*, and without that note of apology, so we can get this project off the dime and into bed.

My question is, why didn't the geniuses back at home base want *both* units sent back at the same time, so they could check out the STL as a system? At 18 GHz, that seems the only choice which makes any sense. But again, that's just me. Hopefully, by the time you read this, the Trango project will be on-line, and everyone can then start praying that in six months, all of this will be forgotten. Not the way to bet, but definitely the way to pray.

Generator Radiator Situation

This one has not yet gotten off the dime, either, because frankly I don't know what we have. In our last episode, the generator maintenance folks had told us that we were in for trouble due to a leak in the radiator of our Hammond studios emergency power generator. The cost estimate from them was around \$6000 (!!), so we went in another direction. Well, wouldn't you? The estimate from our non-OEM supplier was about a sixth of the earlier bid, so we gave them the nod. They've yet to come out to do the work; they're waiting for a string of at least three pretty days during the week. They don't want us down in case of a power failure. I get that. In the meantime, I've been having my crew check the coolant levels every few days to see how it's working. The thing is, that level isn't receding to any extent. Hmmm! what *is* going on here? So, the next plan is to get that winning bidder out here to do a pressure test on the cooling system. Maybe we won't need the repair after all. Which bothers me. Did our maintenance folks see us coming? This is not like them. I don't want to have to replace them again, because the last time we did that, we ended up with a disastrous situation with their incompetent competition, which was a real cost burner. We may end up doing some of this maintenance stuff ourselves, or finding yet another third party. What else would *you* do in such a situation?

Finally, Two Notes

First, as we think about these things now, evil is often its own undoing. For instance, enough folks are getting ticked off with copper theft that they're doing something about it. The ideas abound, and many of them have appeared on these very pages. But nothing solves the problem quite like when copper is stolen from the government. My source is again my buddy Len Watson, who relates

how one of his FM transmitter sites down south got broken into the other month and a whole bunch of coaxial line and other copper got stolen along with a couple of driver tubes..

His site is also home to a NOAA weather station, and the jerkweeds ripped that installation off big time without knowing who the victim was. Len found the carnage and dropped a dime to the FBI instantly. *Those* guys are now on the case, and another criminal will soon enough discover the existence of that obscure set of laws regarding heavy fines and hard time in the Federal Cross-Bar Hotel which comes with destroying radio equipment. All of us who do this know that it *is* a *Federal* crime to

vandalize radio equipment, punishable by all of the above, so local law enforcement shouldn't handle it alone. If your site is hit and the damage is big enough, bring in the feds to help. A few high-profile copper theft cases prosecuted at that level, and maybe the monsters will get to the point and not do that anymore.

Second: I had promised you a rant about "The Government That Couldn't Shoot Straight, and the Pointy-heads who Love Them," but too much has been going on this month, and that article deserves more attention than I can give it right now. Next month. I promise.

Until then, blessings to you all, de Art.

The Portland Report

By

John White, CBRE
Chief Engineer, CBC-Portland

Hear ye, hear ye, come one, come all. Step right up ladies and gentleman and little children. Step right up and see the eight wonders of the world, only one dollar. Inside this tent see the seal balance a ball upon its nose. See "Tower Jack" hold up the tower. Step right up and see the wonders of the world, only one dollar!

With much fanfare and after months of waiting, that was my feeling as the crew from P&R Towers rolled onto the antenna field, ready to do battle for the continued life of tower number three, ready to do battle to vanquish old ugly broken insulators, "Tower Jack" ready to transplant previously used insulators to give our patient new life.

In every good movie serial, each segment opened with a recap of the events of the last segment. When we last saw our intrepid tower, it was in the process of a makeover, receiving new paint of international orange and white to renew its youthful appearance.

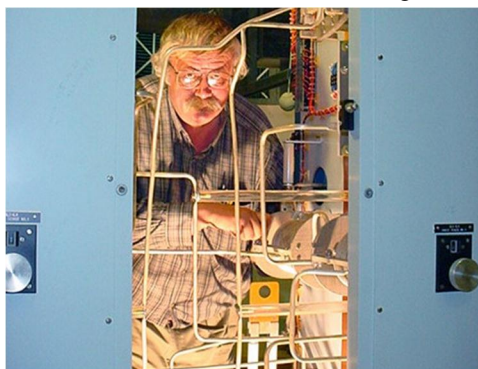
A process involving newfangled water-based paints was used, as the old reliable oil-based paints were outlawed by the EPA. The march to failure continued step-by-step as fog rolled in. Fog condensed, providing a constant low-volume source of water to wet the tower and insulator surface, the combination of paint and water creating a conductive

path on the surface of the base insulators. That conduction produced intense localized heating of the insulators until two insulators cracked from thermal shock. (A word to the wise: bag the base insulators if there is any chance of fog or light rain.)

Next came the cat-and-mouse game called "weather-guessing." The insulator replacement required low or no wind. With many occasions where wind was predicted to be low, the crew schedule was canceled at the last minute as conditions deteriorated. An equal number of occasions occurred where bad predictions turned good at the last minute and too late to be useful. Then finally came the day as the tower crew rolled into town and the work began. We now join the next episode of "Tower Jack and the Eighth Wonder of the World."

To allow replacement of the base insulators, the first task is to provide support for the leg of the tower while the insulator is removed. Here, Jack uses jacks to provide the support needed. Yes, Jack is actually the name of the crew boss from P&R Towers. The jacks provided lift at each side of the tower leg. At the tower leg, a strengthened lift bracket provided the lift points for the leg.

The following steps seem minuscule, although they are critical to the successful completion of the job. The foundation pier could have shifted



over the years, and that had to be checked prior to replacement. Referring to the photograph for reference, the next steps were as follows:



1. The cap nuts of the insulator base bolts were removed.
2. Next, the nuts securing the bolts carrying

the structural load were backed off a half inch or so.

3. Any subsidence or shift of the foundation would show as movement of the insulator while the load nuts still provide positive control of the insulator. Ben Dawson has told me that he has seen insulators lift up under these circumstances. Any shifting of the base would show as movement of the insulator to the side.

4. If all is well, the jacks can now be used to lift the tower leg and insulator slightly ($1/8$ to $1/4$ at most.)

5. During the lift, the insulator base is monitored for any indication of shifting. In our case, the lifting of both insulators went well and we were able to proceed to replacement.

Since we were installing previously used insulators, we had an additional problem to deal with. The hole pattern of the insulator to leg attachment was specified by the user at the time of manufacture. The hole pattern was usually dictated by the size of the leg elements of the tower the insulator was to be attached to.

Of course the hole pattern of the used insulators was different than we had on this tower. As a result, we needed to use an adapter between the insulator and the tower leg, so we had the added step of cutting off a small portion of the existing tower leg to allow installation of the adapter. The adapter can be seen in the attached picture.

Now that the replacement is completed, I am much relieved.

Rocky Mountain Ramblings The Denver Report

by
Amanda Alexander, CBT
Chief Engineer, CBC - Denver

ARC-16 Update

Some time back, I made the jump from Blackberry to iPhone4. With this change came an anomaly with the ESI in the Burk ARC-16. It would not read the touch tones from the iPhone. I would dial in, wait for the tone, then key in the passcode, but the ARC-16 would respond with, "Enterí numberí dummy," repeated over and over; it would not let me in.



After some experimentation, I found that if I called in and counted the rings and immediately entered the passcode after the third ring (when the ESI should answer the call) before the screeching began, it would pick up and work fine. Evidently when that "fax tone" was coming in, the iPhone4 would not output touch tones, undoubtedly an "undocumented feature" from

Apple.

After testing and discussing this in detail with Burk Technology, they were able to find a fix for us. Burk found that if we lift one leg of R9 on the ESI card, it would eliminate the ðfax toneö altogether and fix the problem. I ended up just cutting it since we didn't want to take the whole unit out of the rack. This worked at KLZ. I am slowly making my way to the other transmitters to get this done.

More KLTT Tower Light Issues

After getting the boost transformers installed at KLTT, about a week or two later I began getting alarms saying towers three and four had a beacon out. I had to do my quarterly check anyway, so one night I drove out and found both towers three and four had a level of side lights out. We sent Derek Jackson up the tower and he found 120 VAC right at the connection to these LED sidelights. Evidently something had gone wrong with them.

We contacted TWR Lighting and they sent us out warranty replacements. I was on vacation at the time, so Keith had Derek climb the towers to install them. The lights were fixed, but we were still getting an alarm. We knew it was a sensor calibration issue that we needed to do adjust. After

several attempts, we opened up our tower light monitor unit and decided to use the measured sample voltage at the comparator input to determine where the reference voltage, which determines the trigger point, should be set. We adjusted all four towers and had one night of bliss. No alarms.

The next day, however, I had logged onto Autopilot to look at something and noticed the status indicator for tower 4 was lit during daylight hours. I drove out to look, since I thought maybe having the Trango (microwave system) on the tower was messing with the sample. The lights were indeed on. The next morning, Keith replaced the photocell and all has been well since, thank goodness.

Inventory

There isn't much more to report on. As all CBC engineers know, annual capital assets inventory time is upon us again, and that has kept me busy. We seem to have a lot of *stuff* in Denver.

Hopefully I will have more exciting things to write about next month. Until thení that's all folks!!!

Digital Diary by Larry Foltran Corporate Website & Information Technology Coordinator

The Thunder Rolls and the Lighting Strikes

During the last few months, I have developed distaste for the sound of thunder. This is mainly because where there is thunder, there is lightning. Our most recent significant lightning strike occurred in late August. With silence alarms blaring, we scrambled to get the programming back on the air. Once we were back on the air, it was time to determine what was damaged and to what extent. Some of the damage was quite obvious. In certain cases, you could simply follow your nose to the casualty. These included wireless routers, a modem, various power supplies, a color laser printer, and several others.

In other circumstances, the crippled

equipment died a slow death over the days that followed. Most notably was a large amount of networking equipment which included almost all of



the network switches, small network hubs, network interface cards, and a few other pieces of network-related equipment. Network connections that were working before abruptly stopped working. Blinking connection LEDs continued to blink when no Ethernet cable was plugged into a port. You get the picture.

I'll be the first one to admit that I certainly don't know everything, and this most recent lightning strike provided me with a good learning opportunity. The first lesson learned from this experience is that the path of a power surge isn't limited to only electrical lines. I have seen RJ45 ports

on surge suppressors, but have generally considered them added gimmicks of sorts to draw consumers. They won't be ignored in the future. In fact, my research has clued me into a number of products on the market specifically designed to protect networks from surges, perhaps worthwhile purchases where network connectivity is critical to operation. Some resemble basic 4-port network switches or hubs but have built in surge suppression to protect from network based surges.

Lesson number two is that even when plugged into an uninterruptible power supply, equipment is not completely surge-proof. Exhibits #1 and #2 are the power supplies for one of our production boards and the laser printer respectively. The latter was apparently hit so hard, the front door panel was blown open according to those near it when we were hit. The printer was in fact plugged into a surge protector as well, which I've recently discovered is a bad idea! Lesson number three. Apparently, if the UPS runs on batteries, it will usually generate a steep sine wave which may destroy surge protectors. I suppose a power strip without surge protection would be the solution, but good luck finding one these days.

The days following the lightning strike consisted of non-stop troubleshooting throughout the building and helping chief engineer Joe Huk in any way possible. Even a week later, we were discovering individual instances of crippled equipment mostly in areas that aren't utilized on a daily basis.

Windows 8 Primer

It feels like it was just last month that I was beta testing Windows 7, which at the time provided significant encouragement that there would be a suitable upgrade from Windows XP for those who had moved back after the Vista debacle. Although I haven't had the opportunity to experience Microsoft's new OS beta in person, there is a good amount of information circulating in the blogosphere along with small nuggets released by Microsoft. In a presumed effort to build user interest in W8, Microsoft has put together a blog called "Building Windows 8" which they have been using to release very current information regarding their latest project. Launched in mid-August, it has been a great source of information for those eager to see what they have in store for Windows users. One of the posts I've found most interesting covers the evolution of Windows Explorer from Windows 1.0 to Windows 8, complete with screenshots. Definitely a trip down memory lane for those who have used Windows

based systems for some time.

It should come as no surprise that development of Windows 8 is more focused on the mobile market than Windows 7 was. Specifically laptops, netbooks, and tablet devices. From the overall look of W8's start-up screen to the enlarged command buttons, it's quite obvious that Microsoft wants to appeal to the mouse-clickers of the world as well as those using touch screen enabled devices. For those who have used Windows Phone 7, the Windows 8 start-up screen will look somewhat familiar.

They are also focusing more on the increasingly varied array of screen resolutions used by the general public. Based on telemetry data they have collected through Windows 7, the vast majority of users - over 40% - utilize a widescreen resolution of 1366 x 768. Surprisingly, even 1280 x 800 has been left in the dust at a mere 12%.

Users who have upgraded to the latest versions of MS Office and can't stand the user interface system they call the Ribbon, prepare for more of the same in Windows 8 based on the large number of screenshots released of their revamped Windows Explorer. I really enjoy the cleaner look of W7's explorer and really don't feel that it requires significant change. Apparently the folks at MS don't share my opinion.

Some of the significant enhanced features I'm most excited about thus far are their improvements to filename collision resolution, full support of USB 3.0 and their approach to multiple copy jobs. For those of you who commonly move or copy large number of files from different locations or to different locations simultaneously, you know that you could easily end up with several different dialog boxes scattered on your screen, each with the slowly moving green progress bar. The new and improved system within Windows 8 collects all of those jobs into a single dialog box. If that isn't exciting enough, the ability to pause a specific job has been added so you can prioritize which action you would like to complete first. The icing on this cake is the ability to view the transfer rate of each job as well as a more accurate completion time estimation.

It's also apparent that Microsoft is focusing on the use of keyboard shortcuts, which I use quite a bit. Further, the developers claim that advanced users will have more ability to customize the interface and add specific commands to the Quick Access Toolbar. Another tool that I use quite often is the command prompt button, which they have added to the Quick Access Toolbar as well. This has been expanded into two separate features which include the ability to

simply open a command prompt as well as open a command prompt as the administrator. A thumbs up as far as I'm concerned.

As I mentioned earlier, the Windows 8 development team has been great about keeping their blog regularly updated complete with in-depth information as well as screenshots. I've been visiting the site quite regularly and have been pleasantly surprised to see something new each time. Based on the information I've gleaned from their blog and other sites, I believe Microsoft has learned important lessons from both their Vista and Windows 7 releases

which should propel Windows 8 to the ðwinö column in terms of MS Operating System versions. Coupled with the initial minimum system requirements being equal or even lower to that of W7, and you'dl be seeing a lot of smiling faces in the PC community. I for one look forward to checking out their 64-bit version once released. Although I haven't heard of any public beta testing opportunities as of yet, I'dl certainly provide more information about Windows 8 once I do have the opportunity to take the OS out on a hands-on test drive.

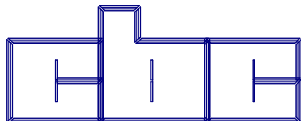
í until next month!

The Local Oscillator
September 2011

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA
KCBC • Manteca - San Francisco, CA
770 kHz, 50 kW-D/1 kW-N, DA-1
KJSL • St. Louis, MO
630 kHz, 5 kW-U, DA-2
KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz, 5 kW-U, DA-1
KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND
KLTT • Commerce City - Denver, CO
670 kHz, 50 kW-D/1.4 kW-N, DA-2
KLWZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2
KSTL • St. Louis, MO
690 kHz, 1 kW-D/18 W-N, ND
WDCX • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2
WDCX • Buffalo, NY
99.5 MHz, 110 kW/195m AAT
WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT

WEXL • Royal Oak - Detroit, MI
1340 kHz, 1 kW-U, DA-D
WLGZ-FM • Webster - Rochester, NY
102.7 MHz, 6 kW/100m AAT
WRDT • Monroe - Detroit, MI
560 kHz, 500 W-D/14 W-N, DA-D
WMUZ • Detroit, MI
103.5 MHz, 50 kW/150m AAT
WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT
WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT
WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT
WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND
WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT
WXJC • Birmingham, AL
850 kHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT

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