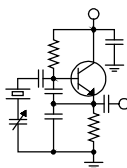


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Change

The past 12 months have been some of the most dynamic of my lifetime. Thinking back to the “normalcy” of the early part of 2020 and the zoo that was the rest of the year and beyond, I am truly amazed.

The pandemic was the catalyst in all this, and many of the changes in our personal lives, our work lives and the world, came about in reaction – many would say overreaction – to that. But there have been other changes as well. Everything is related, I realize that, so one could accurately say that the pandemic has, to some degree, been responsible for most of the societal and many of the technological and infrastructure changes that we are seeing today. Contrast the world around you to, say, February of 2020, and it’s glaringly apparent. Interesting, isn’t it, how we have adapted and now consider as “normal” the things at which we would have been alarmed a little more than a year ago.

Portland Changes

Moving beyond pandemic changes (and I really hope we are), we are dealing with other kinds of change within our industry and our company. The end of last month, on April 30, we shut down KKPZ in Portland, taking it silent as we consider our options for the station and real estate.

Crawford has been on the air in Portland since 1992, when we purchased KLVS (yes, all Elvis, all the time) on 1290. The format was changed to Christian talk and the callsign changed to KPHP, Portland’s Home of Praise, immediately upon closing. We built out riverfront studios and offices and continued to operate from a three-tower directional site shared with a 50 kW station on 1520 (now KQRR). That diplexed operation had its challenges, and at one point the center tower tuning house, which also housed the 1520 phasor and our

transmitter (it was a strange setup), caught fire. We managed to stay on the air at reduced power using one of the towers for months while repairs were made.

In 1995, a very active time for expansion in our company, we acquired KUPL and its unique mountaintop three-tower site. A control room was built out and we began operating under the KKPZ callsign from the new site. That signal was a little further up the dial and transmitted the same power as KPHP, but it’s directional pattern was much more favorable and did a better job of covering the Portland-Vancouver market.

When the expanded band opened, KPHP was nearly at the top of the list of interferers, and that was how expanded band allocations were originally awarded – those existing stations that caused the most interference could, if they were willing, get a CP for an expanded band station provided that they agreed to sunset their analog station after a few years. We agreed and built out 1640, then KKJY, later changed to KPBC (now KDZR), putting it on the air in April of 1998 as a diplexed operation at the KKPZ site.

On the sundown date in 2003, we dutifully took KPHP off the air and submitted the license as required. Many other expanded band station owners petitioned the FCC to allow them to keep their regular band stations, at least for a time, and the FCC went along. That issue is still somewhat pending and was addressed to some degree in the FCC’s AM Revitalization Proceeding in recent years.

In 2003, we sold the KPBC to Disney. They ran it for a number of years with their Radio Disney format with the KDZR callsign, and then sold it in a group sale to Salem in 2015. Salem continues to operate the station, and it continues to share tower #3 of the KKPZ three-tower directional array at the Mt. Scott site.

All that is to say that we gave it a good 29-year run in Portland. No one can say we didn't give it our best. We regret that it has come to the point where we must take the station dark.

While the factors that have brought us to this point, I must say that a major contributing factor is an Oregon property tax that amounts to a money grab by the state and pulls into the calculation revenues for the entire company. That is hardly fair for a little AM station, or any other small business that is affiliated with a larger corporate entity. In this case, the tax grab made it impossible to continue to operate the station economically. I suspect that we will see more and more of this kind of thing in liberal states where huge amounts of tax revenue are needed to pay for social programs.

So where do we go from here with regard to KKPZ? I don't have a clear answer, other than to say that we are looking at all our options.

Computer Changes

Getting a new computer with the latest processor, loads of RAM and plenty of solid-state drive storage, is fun. Or it should be. Actually, it's something that I generally dread, because so many of the important programs that I use are now downloads and obtaining current download links, registration numbers and the like is a major pain (if not impossible in some cases). There are a lot of these, apps that I need to effectively do my job, so it's no minor thing.

And then there are the out of publication apps that we still use. For example, our primary base map source is DeLorme Topo NorthAmerica. DeLorme is long out of business, soaked up by Garmin at some point in the past if I recall correctly. And while I have the installation DVDs for the program, if I have any installation issues, I'm out of luck. Thankfully I did, after some difficulty, get this excellent mapping program successfully installed.

And then there are the OS changes that obsolete certain applications. For many years, the FCC used mainframe computers and programs

written in Fortran 77. Much of that source code was made available to the consulting engineering community, including yours truly. Decades ago, I compiled this source code into executable files that ran just fine in the DOS environment and even in 32-bit Windows 7 systems. But Windows 8 and 10 changed all that with the elimination of that DOS compatibility, requiring us to use DOS emulators to run these programs – which still give “correct” answers that the FCC can't really argue with.

One program that I use in modeling antennas, antenna systems and RF circuits uses Adobe Air as its OS, and Adobe has ditched it. It is still available from Harman, but we (Amanda, really – I just nodded, smiled and offered my gratitude) had to figure out a convoluted procedure that included setting permissions and changing the system date to some point in the past to get the program successfully installed.

The list goes on and on, and there are more and more hoops to jump through to get with a new computer to the point where we were with the old computer with each new generation of equipment.

While I speak here of my own experience changing out an office computer or notebook, the same difficulties are in play for replacing/upgrading Nexgen hardware. The support folks at RCS are continually scrambling to keep up with all the continuous OS changes. I can say the same for Wheatstone, and no doubt Axia and others. Even Nautel has been caught by the demise of Flash. Thankfully they have come out with an interim solution as we all eagerly await an html solution. Many more have also had to deal with the discontinuation of Flash and other platforms.

Overall, with each new generation of computer hardware and operating system, we get a better product with more capability and speed, but there is pain in the process of making the change. I'm very glad that I'm through with it for this go-around and won't (or shouldn't) have to mess with it for several more years.

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

Hello to all from Western New York! The month of April seems to be catch-up month, as I have been busy completing several projects that have been lurking for quite some time.

Last year, I removed an Audioarts D-75 console from WPTR in Albany to be re-used in one of our Rochester production rooms. It was to replace a Mackie 24-channel production mixer that had been in service for 19 years. The Mackie served us well for all these years, but we needed to have the ability to provide adequate back-up should we experience a catastrophic failure in the main air studio, and the Mackie just couldn't provide us with everything we needed in a back-up air studio.

The weekend of the 17th, I began renovating the outdated production room and installed the repurposed D-75 18-channel console. I was meticulous in removing the old wiring, hoping that I would not have to completely re-wire the entire console, but after examining the old wiring, I determined that all the 25-pin D-sub connectors would have to be rewired. Luckily, I still had hundreds of the crimp style pins for the 25-pin connectors, so we avoided the cost of a reconnect kit, which is rather expensive.

In my spare time at home, I re-wired all of the I/O connections to save time during the install. As of this writing, we have a good sounding production room, but there are still some items that need to be done to complete this installation and give us peace of mind that we are fully protected in case of a failure in the air studio.

Another project that has been on my plate forever, was the frequency change of the Nautel ND-5 we purchased from the Albany AM station. It took nearly a year to get all the parts to get the change completed, the biggest hold-up being the crystals for the exciter.

Once the parts came in, I began changing them out, which went without any problems. The issues began when I tried to begin the tuning process at the WDCZ transmitter site. With two full-time 5 kW stations on the air at that site, the test equipment being used for the frequency change was being swamped with RF, making the tuning procedure all but impossible.

Fast forward several months... we moved the transmitter to its final location at the WDCX(AM) transmitter site in Rochester to complete the tuning process. There, we

experienced the same interference from the main Nautel ND-5 that was on the air.

Again, for several months, it was hit or miss on getting the process completed. There always seemed that a problem arose elsewhere when I planned to get back on getting this work done, or the site was inaccessible due to deep snow at the site. In April, I got back on the project, and will have this work done by month's end.

It has been a long frustrating journey, and I for one will be glad to finally get this off my plate! I have performed numerous frequency changes on a variety of transmitters over the years, but none of them come close to the complexity of the frequency change procedure of this Nautel. It certainly has been a learning experience, and I now have a lot more troubleshooting knowledge on how this particular transmitter operates.

At WDCX-FM in Buffalo, we lost one of our Bard 5-ton A/C units due to a failure of the condensing coil. When the failure occurred, I removed the access panel on the front of the unit and found oil spewing all over the unit. Solly Industries, our HVAC contractor came out and replaced the defective condensing coil and made modifications to our duct work over the auxiliary Continental transmitter. The old ducting was a 10-inch square



duct, mounted directly to the top of the transmitter that routed the exhaust to the outside. The problem developed that we would get a chalky substance covering the inside of the PA cavity, causing arcing, especially around the door of the cavity. When they removed the old ductwork from the top of the transmitter, the entire honeycomb grid over the exhaust stack was completely clogged with dirt!

I had them cut the duct 12 inches above the transmitter and install a hood with an opening between the transmitter and outside ductwork. This

way, filtered inside air can circulate, and the opening can be cleaned periodically as needed.

I will need to perform a thorough cleaning of the entire PA cavity to ensure that all of the dirt and debris that collected in the stack is cleaned out, allowing the exhaust air to freely exit the cavity as designed.

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

The Motown Update
by
Mike Kernen
Chief Engineer, CBC–Detroit

LXE 4

Crawford's Detroit cluster has had a completed Wheatstone AOIP system in place and fully functional for a couple of months and counting. The system has been super stable and above all, it works and sounds great! I'm more than pleased with it and absolutely love the functionality and flexibility it brings to our studios.

We've nearly completed removal of the old Wheatstone TDM system, having verified that it in fact serves no less than obvious function. With it in use for sixteen years, I was worried about the possibility that something unknown was still meandering through it to get to a transmitter site, logging computer or whatever.



me to remove an ancient equipment rack that is, with its ridiculous complement of five UPSes, placed directly in front of our backup transmitter! Wonder whoever thought that would be a good idea??

Fouled Inspection

Winter is now in the rearview mirror, and it's time to inspect everything that is subject to it. Apart from a few downed limbs, a waterlogged security camera and 53 acres of new swampland, we emerged nearly unharmed. Unfortunately, during this inspection, I discovered a leaking oil tank that's used for heating our transmitter building at the 560 daytime site. I'm not worried about getting it replaced, and thankfully there is a containment basin, but it underscores how important annual inspections are. Every tuning house, every tower base, every transmitter building, every rooftop, and every ATU should be examined in the spring. You can never tell if a hunk of ice or an animal or the wind has damaged something that could ultimately lead to even greater damage.

TX Tidy-Up

I've extended our WheatNet IP network into the FM transmitter room. Having it there has allowed me to relocate an audio processor and to pick up the output from a trio of off-air tuners located in the transmitter rack.

I'm also using it to feed an MPX generator connected to our analog 950 MHz STL link to the distant WRDT daytime site, replacing an Orban 8000A from the '70s with the terrific Omnia SG. It's remarkable how much you can do when you have any signal available anywhere that you can drop a network cable. I don't take it for granted!

Also made possible by AOIP is the relocation of a transmitter for a translator and its companion audio processor, which will finally allow

Phony Baloney

Our 50 kW 10-tower array for 1200 AM has a super reliable carrier grade Trango Networks point-to-point microwave system, giving us more network connectivity than we could wish for. It's terrific, but not perfect, and has unfortunately yielded to issues with power-over-ethernet (PoE) inserters and UPS systems in the past. These and other vulnerabilities

mean that some form of redundancy is an absolute requirement.

We meet that need now with a leased T1 circuit that uses AT&T copper for the “last mile.” AT&T has informed us that they are sunsetting their last mile copper services in the area without offering any alternative.

This is a serious issue because aside from electric, AT&T owned copper is the only utility on site.

Compounding the problem is that the transmitter building is about a half mile back through the woods from the main road. I invited the only cable internet provider in the area to survey

installation, but their quote using directional boring was the cost of a small Buick.

Ideally, we could bury RF coax and let the cable company hand off service at the road, but that would require a us to dig a half-mile-long trench alongside the road. Also being considered is a direct burial multimode fiberoptic cable, but that would require power out at the road, as would a short hop point-to-point microwave system at the handoff point.

As an alternative, I’m thinking about a solar panel with a converter/charger to power the system. I’m a bit skeptical of trying to shoot a point-to-point microwave through the woods. More on this as it progresses.

News from the South

by

Stephen Poole, CBRE, AMD
Chief Engineer, CBC–Alabama

It has been over a year since the COVID shutdowns, lockdowns and quarantines began. Hard to believe, but it’s true. As a result, I’ve spent a good bit of the past year working at transmitter sites, traveling all over central Alabama from one tower to another. To be honest, I enjoy working, and I like being outdoors. I’ve never been the kind of fellow who would hike somewhere (why bother when motor vehicles – with air conditioning! – are far more convenient), but I’ve never wanted a desk job. Stephen needs fresh air and sunshine.

This has unexpected compensations. Cris has been here in the past and has been amused with some of the signs that he’s seen. Because 92.5 and 101.1 are located in remote communities, I suspect that I’ve seen even more of such ... and have been even more amused. Figure 1 is just one example, from my own hometown of Hayden, AL. Elvis lives!

Alabama does have its downsides, though. The severe storms that seem to roll through, one after another, leave something else in their wake: lots of standing water, and hence mosquitoes that seem the size of velociraptors (and with nastier personalities). You can actually hear these things buzzing when they approach, looking for a quick meal. We also have more than our fair share of wasps, bees and other not-so-friendly insects. But it is what it is.

Mail Server Troubles

Many of our key personnel have been migrated to accounts on an Office 365 (“O365”) server. As I write this, most of

them are forwarding the old email addresses to the new O365 server. If that remote server becomes busy – which seems to happen at least once a week – all of our email slows down. It’s worst for those who have migrated, of course, but it affects all of us. Our Barracuda Spam Firewall send me desperate messages around the clock, warning that the “outgoing queue” has backed up.

Fortunately, once the O365

server wakes back up and starts accepting mail again, the queue quickly flushes and Barracuda quits complaining.

Incidentally, a quick Google search on “O365 Server Busy” returned page after page of complaints about this. It’s apparently a common problem. Microsoft has sold everyone on the idea that Office 365 is a “one stop shop” for everything having to do with corporate communications, and when it works, it’s a dandy system. The problem is, when you have many, many users, all trying to upload megabyte and gigabyte files at the same time, it’s going to slow down. We have no control over that server, so all I can do is warn everyone that from time to time, your email could be delayed.





Figure 1 - Maybe he'll come out of hiding for the food trucks.

The problem with Barracuda can be exacerbated when we're being spammed, too. We have an OpnSense firewall in front of our entire mail system, and I've set it up to block known spammers' IP addresses. The problem is, spammers are a constantly-moving target. In the old days, they might register a single public IP address, spam with it as long as possible, and then just discard it for another. Nowadays, they'll use (or hack – or even steal) a group of addresses. This means that we have to block a large number of IP addresses.

One such spammer, to give you an idea, had a group of IP addresses that mapped to France; we were being hit with tens of thousands of spam messages. Both our Zimbra server and the Barracuda firewall have rate-limiting: if they see an account trying to send a bunch of messages in a short period time, they'll throttle that account or IP address.

This particular French outfit managed to hit us with about 42,000 spam messages in a period of a few hours. Once I blocked them, they went away. But while we were being hammered with that spam, the O365 server was also reporting "busy," so our mail delivery slowed to a crawl. Fortunately, Barracuda was able to cache and queue the in-house messages, and they were eventually delivered. But if you're wondering why you didn't get certain email until a day after it was sent, well, there you go. Blame the spammers, and blame O365.

Spectrum Internet

Figure 2 is a happier sight: Spectrum installing 200 Mbit access at the WXJC-FM (101.1) site in Cullman, AL. They ran their coax up the hill and pulled it into our building, which made us quite happy. We were prepared to put a demarc box at the bottom of the hill and use a NanoBeam (or the equivalent) to get the signal to the transmitter building, but they ran wire all the way.

It seemed to work at first, but within a day or two, it just stopped working. Of course, this had to happen when we had a massive STL failure, but more on that in a moment. A Spectrum technician met Todd at the site and checked everything carefully. The modem was fine, but we were actually getting too much signal in the transmitter building. The tech put an attenuator on the line and we're back in business.

The purpose, of course, is to provide backup access and STL service to our transmitter sites. We're still pondering on some way to help poor 92.5, which is so far in the woods that we barely get phone service, much less internet. But for our other stations, having Spectrum will be a huge blessing. If, for whatever reason, we lose one of our primary STL links, we can at least monitor the transmitter site and, if need be, feed audio over the Internet.

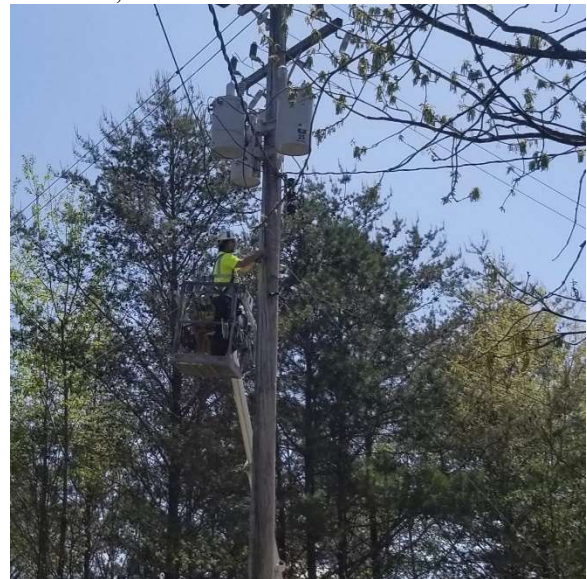


Figure 2 - Spectrum installing the coax for our 200Mbit access.

I'm not sure what's up with Spectrum, and how they can make their service pay in more rural areas, but so far, they've agreed to all of our sites except for the aforementioned 92.5. They're even running buried coax in my neighborhood, which has

been stuck with 6 Mbit AT&T service for years. It's a work in progress, and I don't know when they'll offer it at my house, but I plan to jump on that with both feet when it becomes available.

And speaking of STL failures ...

Every engineer's nightmare is having more than one station off the air at the same time. On Saturday, April 24th, everything that we own in Alabama was off air. We were unable to get into anything remotely (and the Spectrum to 101.1 wasn't responding, as mentioned above), so I started at the studios.

After driving in (rather frantically), I immediately saw the problem: one of our older APC UPS units had given up the ghost. All of the lights on the front panel were flashing, and I had a dead rack. Of course, this just had to be the rack with all of our STL stuff in it ... as well as the ClearOS firewall for remote access to NexGen. Resetting the UPS brought it back up and within a few minutes, almost everything was back on air.

I say "almost" because we had one holdout: 92.5, WYDE-FM. The tower in the remote location that I mentioned above simply will not support a data link; it's too small. We're still using an old Moseley DSP6000 system to send audio out there. We also use a DSP6000 as a backup STL from our studios to Red Mountain; given that WDJC-FM had gone off air, I decided to run to Red Mountain from the studios. Sure enough, when I arrived, the DSP decoder had locked up and required a reboot. Once I did that, everything was back on air and I breathed a sigh of relief.

Mike Kernan in Detroit has reported good results with the Eaton UPS units; I've put in PORs to begin replacing these ancient APCs with those. We've replaced the batteries in those APCs too many times to count. We test them frequently, and make sure we don't overload them as well. But I supposed it's time for those old things to become doorstops or boat anchors (haven't decided which yet).

Mt. High

We're still working on the Mt. High relay link for WXJC-FM's primary STL. This is the one that, as I reported last time, was damaged by a strong storm and/or possible tornado. A number of cables on

that tower had been ripped loose, and we had lightning damage as well.

Todd and a tower crew have managed to restore the north end of the link (Mt. High to Cullman), but we still don't have a link from the WDJC-FM site on Red Mountain to Mt. High. We've ordered a couple of ethernet surge suppressors, and hopefully I'll be able to report success in the next issue.

In the meantime, once the Spectrum access was repaired, Todd did his usual magic and got our two digital CODECs on that link. There's a bit of a delay, but the audio quality is much better than trying to rebroadcast an HD multicast from WDJC. We're getting there!

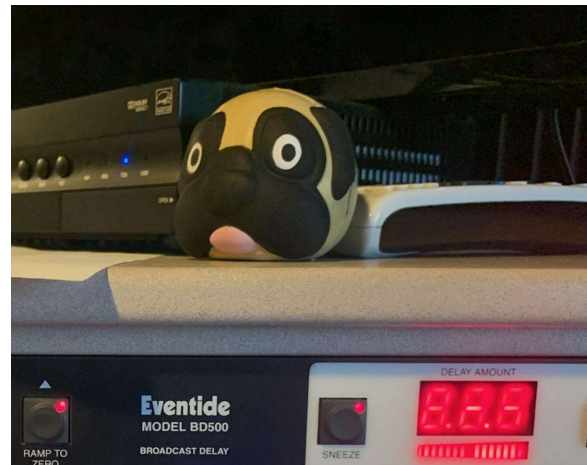


Figure 3 - SCREECH ... it's staring at me!

The Creature™!

Finally, Jack was doing some work in the WDJC-FM studio the other day when the old Eventide delay that we've been using just locked up. Jack had unplugged it to install a new UPS unit in the control room. When he plugged it back in, it was stuck in initialization mode: all the blinkies were on solid and it never would crank up. He sent me a picture (Figure 3); the dead delay didn't particularly worry me, but I still don't know what that thing is doing on top of it!

Until next time, keep praying for this nation!

The Chicago Chronicles
by
Rick Sewell, CSRE, CBNT, AMD
Engineering Manager, CBC–Chicago

I just had a reminder that the effects of lightning and surges don't always show up immediately. As I was sitting down to write this very article, I ran to the rack room to discuss some new cables with our IT Coordinator.

I immediately noticed that one of the three satellite receivers had no RF level showing on it, despite the fact that it was tied into the same L-band distribution amplifier that the other two were and both of those had solid levels. The unit was still playing audio at the time due to the fact that it will get audio through the Internet connection.

Once the morning program was done playing, I rebooted the receiver hoping that it would take care of the problem. It didn't. Before calling the satellite provider technical line, I wanted to try putting the RF cable on another port of the distribution amplifier.

Playing it safe, I turned power off the distribution amplifier and the receiver before moving the cable. Once the cable was moved to another port, I powered the distribution amplifier and satellite

receiver back up. Now *none* of the receivers showed RF levels! I just took a bad situation and made it worse!



All four stations in the cluster have a morning program on one of these receivers, so the importance of the connection is fairly high. We did have an older distribution amplifier, which had been taken out of service because we felt the amplifier was weakening. Once we tracked it down and connected it to the receivers, the RF level was returned.

My best guess in this situation was that the distribution amplifier took a static hit or a surge and the one port went bad immediately. After the power was removed and restored, the damage to the rest of the unit showed up. It's been a while since I have seen this kind of scenario where a unit is working fine until it was power cycled.

As much as we reboot equipment in order to resolve problems, the fact remains that sometimes those reboots can represent a bigger problem that could be like a snake lying in the grass that can bite you.

Valley News
By
Steve Minshall
Chief Engineer, KCBC -- Modesto

It has been quiet times at KCBC of late, and that is a good thing. It's nice when things run smoothly.

So far, the COVID has left us at the station alone too. My wife and I will get our second dose of the Moderna vaccine by the time you read this. Being vaccinated comes with a sense of freedom and a feeling of an approaching end to the crisis.

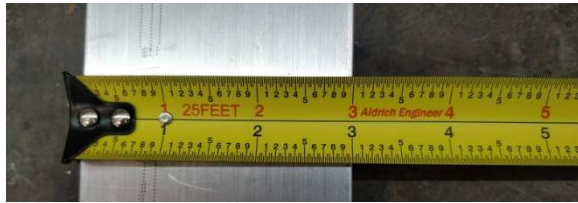
Some of my well-informed friends told me that the vaccines contain nano-bots that will upload all my health information to giant

computers located in the Utah desert. I doubt that the nano-bots are a real thing, but since getting my first shot, I have had an almost uncontrollable urge to get an extended car warranty.

A while back, I was presented with a decimal tape measure. It was a small one, and only 12 feet long. It has been a Holy Grail quest to find a man-sized decimal tape measure, but the search is over.

Aldrich Engineering now makes a decimal tape measure for the full-grown engineer. It is an inch wide and 25 feet long. It's pretty much like a standard tape measure except that it has decimal parts to every inch. It's available on Amazon. I highly recommend one for your next rigid transmission line installation.

Next month I hope to delve into a topic of heat management and how I am being paid to heat my hot tub. It's even more exciting than a tape measure.



Aldrich Engineering now makes a decimal tape measure for the full-grown engineer!

Rocky Mountain Ramblings
The Denver Report
by
Amanda Hopp, CBRE
Chief Engineer, CBC - Denver

Tower Lights

It's not often we send our tower climber up with two brand spanking new beacon bulbs that look perfectly fine only to find one of them not working. That is what happened at the beginning of last month.

My husband drives by the KLTT tower site daily on his way to work. One morning in late March, he texted me letting me know the top beacon was out on one of the towers. I called it in to the FAA and



got a NOTAM and that night I drove out to verify.

I was a bit confused because our status indicator showed no outage. We set our Burk TLM's up years ago and have left them. It's somewhat hard to adjust it so that you get notified with even one bulb out on a tower. So that night I sat on the floor, with a small screwdriver, and made adjustments. It was a fine line between showing green (on) and showing red (off).

At the beginning of April, our guy was able to come out and climb, and he replaced one bulb and it showed green again, so I adjusted it to show red. Then he put the other bulb in, and nothing happened. No light. He tested it and it was a bad bulb, despite being visibly okay. He came back the next day and did a second climb for that one bulb and got us going.

Thankfully my adjustment to the tower light status comparator was good, and as soon as that second bulb went in, it was green again.

I am thankful to my husband for keeping an eye on these for me. Had he not notified me, I may have gone a while longer until I did my quarterly inspection and finally noticed what had happened.

KLZ Project

And I'm not talking about the KLDC move to KLZ. We have a two-lane road that goes by our property. It is the road we must use to access our site. Because of residential development to the north of our site, this road has become a major thoroughfare in recent years. At rush hour, it is stop and go.

We found out last year that Adams County has plans to widen the road. They know this road is an issue and the only way to fix it is to make it wider.

This will be a major project for them, as there is an irrigation canal that runs parallel to the road down much of it. It even goes through our property. They will also have to take some property, including some from KLZ. I shouldn't say take, more like acquire part of the land from several owners. We are fine with this, as it will mean most likely capping off the canal, cutting down rotten cottonwood trees which will open visibility to our property and putting in a jogging trail to run next to the property. And they will install a new fence along the frontage, which we need. This will help us keep our site more secure.

Part of this project has required us to locate our ground radials from the west tower within the proposed easement area. The tower is 430 feet high, and the radials are 430 feet long, so some of these radials will be where the county plans to have a temporary easement for storing equipment and materials during the project. The ground gets very soft when it rains and even when it doesn't rain, so if someone drives a heavy truck or piece of equipment through, it will likely dig in and grab a radial and risk damaging it.

My dad and I went out there with a FIM last month and located the radials as best we could for Adams County and marked them. Not an easy task, especially when the ground radials were replaced in 2005. We had some false readings and some of the

current radials look like a drunk person laid them, but at least we have them marked so they can be repaired if needed.

Inovonics

We first purchased two AM modulation monitors from Inovonics back in 2016. At the time, we placed these orders, their 525-N (networked) models weren't out yet. Not a big deal. Later that year, we purchased two more, except this time they were 525-N units. Over the years, I have begun to rely on these more and more. I can log in, see levels, and listen in. Very helpful when a station goes off air. I don't have to find a radio and work to get the antenna positioned just right to hear the station.

I thought I'd check with Inovonics to see if they have a trade-in program, and sure enough, they did... sort of. It was a base price of \$1,000 per unit plus shipping. I asked corporate, and they approved it. I sent in both the KLTT and KLZ units and Inovonics worked their magic and sent me the same units back, like new, with networking capability. They made the 525s into 525-Ns.

I am thrilled to have all my sites equipped with network modulation monitors. It has helped me to keep a better eye on what's going on at the site and find issues a bit quicker at times.

Another Upgrade

Speaking of upgrades, Burk also has a trade-in program. At KLZ and KLTT, we have newer Nautel transmitters that have SNMP capabilities, so we made the request to corporate to trade in our two ARCPlus units and get the ARCPlus Touch, since it has SNMP capabilities.

What is so great about SNMP you ask, well in short, I don't have to run tons of wire to be able to see various parameters on the transmitter. We have long found issues with not having enough room for this or that at the transmitter sites and adding this capability will allow us to see the entire transmitter.

I look forward to getting these units in and installed and learning how it all works. I am hopeful it will allow us to even better track what is going on with the transmitters daily.

Spring

Spring is finally upon us and the weather in Colorado is finally beginning to act like it some. There is nothing I enjoy more than when I begin to see the storm clouds forming. I know that means the snow will stop, and the rain will prevail. Daylight comes earlier and stays later, enabling these storms to be able to build.

I am noticing the transmitter sites greening up some which is beautiful. It also means that soon enough we will have to begin mowing and working hard to keep growth down. This is something so critical for fire mitigation and to keep plants from interfering and causing other issues. We have a creeping vine that grows along the ground at several sites, and it will move up anything it can including ATUs and towers. The last thing we want is for a plant to short out a tower.

Education

Continuing education has been on my mind a lot lately. As engineers we must constantly work to keep up with what's new. I've been a radio engineer since 2004, and in that time, things have changed tremendously, and for the better, I think.

Most things are networked now, which means I must know some IT stuff. Transmitters are easier than ever to repair, in most cases. Things just don't operate like they used to, and for me at least, it makes troubleshooting a bit easier at times.

It's not feasible to stay in a school forever to keep up. That is why I am so glad the Society of Broadcast Engineers (SBE) exists. This group works hard at providing content monthly. They have webinars, live YouTube events, their own "university" and many other ways to help keep us up to date on new things.

I think it should be a requirement for every TV and Radio engineer to be a part of this group and to hold a certification. I even think employers should require employees to go through webinars and course materials and prove they are continuing their education. With each webinar you can request a certificate showing you went through it.

I can't tell you how many times I have heard of an engineer who knows his stuff, but that stuff is old and when the newer equipment comes out, he can't figure it out. This is a problem.

Now the SBE won't teach you how to work on your new Nautel transmitter, but you will still learn about new things. I am currently going through the webinars the current president of SBE, Wayne Pecena, CPBE, 8-VSB, AMD, ATSC3, DRB, CBNE (wouldn't it be fun to have all this after your signature?) is doing on IP Networking. Each month he is doing one and for May, it will be part 5. Some of this stuff goes way over my head, but it is good information and I have to believe it is in my brain

somewhere and at some point, as I go through other courses, it will click.

Why wouldn't you join this amazing organization. You can join for \$85 or pay extra (\$175) and get the MembersPlus option which will get you all the webinars, including new webinars, free! FREE education. With the cost of each webinar, by the time you go through three, the membership is paid for and anything after that is a bonus.

I encourage anyone who reads this, who is a broadcast engineer, to join. If you have joined but have not participated, do so. Find a local chapter and join in. Many of us are doing online meetings. But before Covid and I'm sure after, we get together to fellowship and catch up as well as to do more learning.

The SBE is such a great tool for any engineer. It's such a great tool that our company, Crawford Broadcasting Company, is a sustaining member of the SBE, supporting the organization and its educational efforts.



Upcoming

May will bring flowers, I hope, at least at my home and other places. But here at Crawford in Denver, it will mean taking time to work at the towers. Going through, making sure things are tight, replacing anything that may be broken, making sure there are good connections. We have already fixed the KLZ towers which were constantly drifting. We found several loose screws, some coils where the clip was nearly off, some broken insulators and some J-plus that were loose.

We will go to each station and make sure all the towers are good to go, as well as doing some cleaning inside those ATUs. I hope to get some more security cameras installed along with some IR lights to help better protect a couple of sites a bit more. And most importantly, I plan on participating in a couple of webinars the SBE is having on IP networking and Broadcast tower maintenance.

I pray you all continue to stay safe and well.

The Local Oscillator
May 2021

KBRT • Costa Mesa - Los Angeles, CA
740 kHz/100.7 MHz, 50 kW-D/0.2 kW-N, DA-1

KNSN • San Diego, CA
1240 kHz/103.3 MHz, 550W-U

KCBC • Manteca - San Francisco, CA
770 kHz/94.7 MHz, 50 kW-D/4.3 kW-N, DA-2

KKPZ • Portland, OR
1330 kHz/97.5 MHz, 5 kW-U, DA-1

KLZ • Denver, CO
560 kHz/100.3 MHz, 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/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2

KLVZ • Denver, CO
810 kHz/94.3 MHz/95.3 MHz, 2.2 kW-D/430 W-N, DA-2

WDCX • Rochester, NY
990 kHz/107.1 MHz, 5 kW-D/2.5 kW-N, DA-2

WDCX-FM • Buffalo, NY
99.5 MHz, 110 kW/195m AAT

WDCZ • Buffalo, NY
950 kHz/94.1 MHz, 5 kW-U, DA-1

WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT

WCHB • Royal Oak - Detroit, MI
1340 kHz/96.7 MHz, 1 kW-U, DA-D

WRDT • Monroe - Detroit, MI
560 kHz/107.1 MHz, 500 W-D/14 W-N, DA-D

WMUZ-FM • Detroit, MI
103.5 MHz, 50 kW/150m AAT

WMUZ • Taylor - Detroit, MI
1200 kHz, 50 kW-D/15 kW-N, DA-2

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/95.3 MHz, 5 kW-D/41W-N, ND

WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

WXJC • Birmingham, AL
850 kHz/96.9 MHz, 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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