

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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#### **TOC or Server Room?**

In addition to this being summer, it is also server replacement season in our company. Or at least server ordering season. You see, file servers and

computers are running 6-8 weeks from order to shipment these days because of parts shortages. No doubt you've heard of the "chip shortage" plaguing the auto industry. Something similar is also a problem for the high-end computer industry, and that has bitten us in recent days. But in the context of this column, with few exceptions, file servers ordered in June won't be coming in our door until the middle or end of August.

But as noted, there are exceptions, and I have run into a couple of late, custom build Dell PowerEdge file servers I have ordered that had promised delivery dates in August but which showed up a week or so after order. Presumably, the components needed for the configurations I ordered were all on hand and Dell was able to get them built and out the door in a hurry.

Amanda wasted no time getting one of those new servers installed in the rack in Denver. That was the new Nexgen file server, and she knew that she had probably ten days of work ahead getting the whole database copied over from the existing server and getting the machine up and running in the system. It was shortly after she racked it that I stopped by the Denver TOC for a look-see.

As I was standing there looking at all those file servers and hearing their many cooling fans

whirring away that it dawned on me – the Denver TOC has morphed into the Denver "server room." It wasn't all that long ago that those

equipment racks were full of audio equipment. The



Wheatstone Bridge Router system soaked up a lot of the real estate, and there were Telos Zephyrs and other codecs, audio processors, distribution amplifiers and all sorts of other more traditional broadcast equipment. But no more. Servers, workstations and blades soak up most of the space these days.

How did this happen? When did this happen? It's hard to pinpoint

exactly when our technical operations center transitioned into the server room... it happened over a period of several years, and it happened in such a way – a server here and a server there – that we didn't notice. But at some point, a critical mass of file servers was reached and the transition was undeniably complete.

Going forward, I see the change continuing. For example, we will, as we upgrade/replace the audio server computers for the four stations, replace them with rack-mount Dell Precision workstations. Those workstations look the same as Dell PowerEdge file servers and they take up a lot less rack space, only 1RU.

So I concede – the TOC is now the server room. No use denying it any longer.

Just for fun (and because I am proud of the installation), I posted the photo above in a broadcast engineering social media group a while back. I got some interesting responses. Most simply posted likes

for the photos, but there are always fault-finders, the Karens of the technical world, and those people offered some criticism.

At the top of their list was the placement of the UPS units at the top of the racks. "Why would you put the heaviest pieces of equipment at the top?" was a frequent comment. There were several reasons for this. One is that when powering the rack during an outage, those UPS units put out more than a little heat. Putting them at the top would keep that heat from soaking the rack equipment (and there is a fan in the top of the rack to exhaust the heat). Another thought was that if there were ever a fire (as can certainly happen with a battery capable of very high current), having the UPSes on top would minimize damage to other equipment.

A third reason for top-mounting the UPS units was that the 20-amp outlets into which they would plug were at the very top of each rack. Putting them up high would allow us to plug in with a short cord that does not have to snake its way up through the rack. The power strips both plug into the UPS units, and they power everything in the rack very neatly.

But beyond those was a selfish reason. Old guys like me do not do well with heavy objects down low. In fact, I don't do well with much of anything down low. If I have to get down on the floor to work on something, getting back up can be a real challenge! Putting the UPSes up high makes battery replacement a snap.

I doubt if this reasoning will satisfy all the critics, and I'm good with that. It's our TOC... er... server room, and we get to configure it however it best works for us. Anyone that doesn't like it can build their own however they want it, and if they post a photo of their work, I'll "like" it and congratulate them on a job well done, wherever they put their UPSes.

#### **BW FM Transmitter Fix**

Once in a while, someone lets me work on a piece of equipment. I've always enjoyed troubleshooting and repair, but I get to do very little of it in this job. When I see an opportunity, I may well jump on it.

KLTT's 250-watt FM translator uses a BW Broadcast TX300V2 to produce its on-air signal. At one point last month, Amanda began getting off-air alarms from the mod monitor, and when she tried to log into the BW transmitter, it was unreachable. Interestingly, a few hours later it would come back on its own... only to disappear again some time later, and then return, etc. etc. There was no rhyme or reason to this, no diurnal pattern.



## The circled item is the regulator bypass jumper that had a bad plate-through.

The transmitter was pulled, opened up, cleaned and inspected. With nothing visually apparent and the transmitter working fine on the bench, she put it back in service. Not surprisingly, it went down again that evening.

BW support seemed to think the problem was a 15-volt switching supply that was dropping out – the fault log was showing an external power loss as the reason for the outage. Back at the site, the transmitter was dead and stayed dead, which was a good thing. With the transmitter on the bench and the top off, we could see that the 15-volt supply was up and working, but the transmitter did not boot up. The display was blank and the front-panel LEDs were dark. The only signs of life were some green lit LEDs inside the unit and a running PA fan.

Stateside support seemed to think that the control unit was bad and they wanted us to ship them the transmitter for a look. But I wanted to poke around inside it some myself before we gave up and shipped it off. Of course with no schematic diagram, this would be difficult if not impossible, but I figured I didn't have anything to lose if I did a little reverse engineering and tracing of power supply voltages.

It didn't take long – I found that the 15 volts was present on one side of a regulator bypass and it was gone on the other side. I pressed on the bypass, which was just a loop of wire with ferrite beads on it soldered into the through-hole pads for a TO-220 regulator that evidently was not used in that model of transmitter, and saw the control unit and exciter light up. I took my finger off the wire and those things went dark again. Some tracing with a multimeter and I found no continuity across that jumper. I resoldered it and continuity was restored. The transmitter was put back in service and has been working fine since.

Afterward, I told stateside support what I found and they said that this is a well-known

problem. I wonder why they didn't mention it earlier? Not that it made much difference in terms of time to repair.

I'd like to be able to say that after that fix we all lived happily ever after, but alas... a couple of days later it died again. Same issue. Further investigation showed an intermittent plate-through was the culprit. I fixed that by soldering on both the bottom and top of the board, but then other problems showed up in the control board, probably the result of low/intermittent voltage. So having wasted enough time on it, we sent it to SCMS for repair.

Anyway, those of you with these BW TX300V2 transmitters should keep this jumper in mind if you start having intermittent shut-downs.

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

Hello to all from Western New York! Last month, I neared completion of the frequency change

on the Nautel ND-5 transmitter we purchased last year from WPTR in Albany. Getting to this point has been frustrating, as obstacle after obstacle sent the train off the rails.

At the beginning, the plan was to retune the transmitter here in Buffalo, then transfer it to its final resting place in Rochester. The components change was a piece of cake, but the problems started when

tuning began of the output network and combiner circuits.

With two full-time operating 5 kW AMs on site, the RF in the building was way too high and test signals too low to overcome the high RF field. I was able to get the 3rd harmonic nulled with the aid of a broadband amplifier loaned to us by Cris, but the remaining tuning turned out to be all but impossible at this point. We decided to move the transmitter to Rochester and complete the tuning process there. Once I had the transmitter in its final resting place, I installed the fused electrical disconnect and

plumbed the transmitter into the phasor cabinet so the 50ohm dummy load could be used to provide the load to the transmitter while tuning. Tuning the output

network to the correct frequency turned out to be a long, drawn-out process. The combiner tuning required the use of a vector impedance meter, which was loaned to me from Cris.

There are two coils which must be tapped to

provide a specific impedance, in this case, 13.75 ohms. The procedure is difficult, as you have to attach the clips temporarily to the coils, install the housing cover and make the measurement using the jig attached to the output of the combiner. You continue this process over and over until you have achieved the correct impedance.

The biggest issue in the procedure was keeping the small C-shaped clips attached to the coil wires while making the measurement. I eventually





#### Test setup for the ND5 frequency change.

figured out that a small solder tack had to be done in order to keep the clips from falling off.

As I resumed the tuning process using the 14-page instruction sheet provided by Nautel, I was unable to obtain the results expected. Time after time, I meticulously followed the instructions, but each time I failed to complete the procedure.

Now, I must inject here that I have performed successful frequency changes on a number of AM and FM transmitters over the years, but none have ever challenged me as much as this one. Each step of the way, I seemed to fail, which I began to question myself as to my ability to get this project done. I have taken pride over the years with my ability to fix just about any transmitter problem presented to me, and there have been many, but this one rocked me to the core.

Admitting defeat, I contacted Steve Braley at Nautel to assist me with the tuning procedure. After a lengthy discussion with Steve about the printed procedure, we discovered that the instruction sheet was wrong, and that I would have never been successful in tuning the transmitter had I continued to follow the instructions!

With Steve's help, I was able to get all four PA modules bench tuned along with tuning of the PA

amp. The voltage probe, which is located in the back, top right of the output network housing, was next to be tuned, but again, I was not able to provide enough signal at operating frequency to get the probe properly tuned. Steve explained that he has a procedure to tune the probe using the transmitter's forward and reflected power meters, so we opted to do so after final tuning.

The next step was to bring the transmitter up into the load with reduced power. I turned the low power adjustment pot all the way down and pushed the RF On button. The meter was indicating PA voltage, so I used the 10-turn adjustment pot to slowly begin raising the power to about 100 watts output. As I began turning the pot, watching the PA current meter, I saw no drive being applied to the PA modules! Now what?

I began by checking the exciter configuration, verifying all taps were set correctly and checking test points for correct voltages. Not finding anything out of the ordinary, using my frequency counter, I checked the operating frequency at the frequency BNC connector on the controller board. No signal was detected there, indicating a bad crystal in the oscillator!



Twin ND5 transmitters, main (L) and aux (R), at WDCX(AM).

This crystal was installed new from components in the frequency change kit, and the saving grace was that there were two crystals sent in the kit, assuming this transmitter had dual exciters, which it doesn't. I popped out the bad crystal and replaced it with the spare and turned the transmitter back on. Success at last! We were making RF!

However, there was no indication on the forward power meter! At this point, I had PA voltage and PA current but no output indicating on the forward power meter. I checked the input test point of the meter with my VOM and found that there was voltage getting to the meter board. I rocked the adjustment pot back and forth, but nothing would make the meter movement move.

Just to satisfy my curiosity, I shut the transmitter down, switched the phasor input from dummy load to antenna to verify there was indeed current showing on the common point meter. There was, so I adjusted the transmitter output pot to 5 kW and measured the voltage on the input of the forward power meter. It read 12.5 VDC, which is equivalent to 5 kW of output power! We now have a working auxiliary transmitter again!

Nautel is in the process of locating a new forward power meter to replace the bad one, and once

the new meter is installed, the final procedure of tuning the voltage probe can be done.

In the event of a failure of our main transmitter, the axillary in its current condition can be used to keep us on the air.

This has truly been a learning experience, although I can honestly say that I don't want to do it again unless I have the proper procedures in hand. There's no telling how many hours I wasted performing inaccurate procedures, not to mention all the sleepless nights thinking about it. I see daylight at the end of the tunnel, which is a far cry from the train wreck I had in the beginning.

I can't thank Steve Braley enough for his insight and assistance on this project. This just confirms my beliefs all along that Nautel has the absolute best transmitter technical support team out there!

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

#### Security at Monroe

Unfortunately, people with ATVs and dirt bikes find the open expanses of an AM transmitter site too attractive to ignore.

As I wrote last month, our site in Monroe Michigan is approximately 43 acres and is mostly wide open. Recently a group of young riders has been trespassing there, despite having received at least five verbal and escalating warnings from me, the last of which was a respectful but stern promise to call the police the next time I catch them there. As usual, they promise to

comply then resume riding before my taillights even disappear down the road.

Last month, I mentioned adding cameras at this site, which we've done. We added cameras to the front and rear of the transmitter building, but the one that is out at tower 2 is the most interesting and has proven the most effective.

The tower 2 cam is an IP and PTZ unit with motion detection and tracking capability. I've



mounted it on a ten-foot pole high above the tuning house. As you can imagine, the tuning houses lack

any infrastructure that can support high-speed networking, so I extended our network from the transmitter building using a pair of Ubiquity airMAX PowerBeam AC, 5 GHz Bridges. A POE injector powers the dish and the camera.

The NVR and cameras communicate more than just video too. The NVR can be used to set up and initiate the PTZ 'tours' and will ignore motion detection while the camera repositions itself. The camera itself uses AI to detect human and

vehicular traffic, so false alerts are kept to a minimum.

Effective it is, too. Almost immediately after installation, I received an alert on my phone that motion was detected by the PTZ camera. I was at dinner with my wife at the time and was able to review the video and summon the Sherriff's Department to the site. When the deputy arrived, he witnessed the riders scatter and leave. Making good with my threat to call the police sent a powerful message to the riders, who now know that I can detect them remotely. I've not seen them since.

#### Lightning!

Why am I so busy? We got zapped (again)! Springtime is my favorite time of year because we can finally get back outdoors and turn our attention to things that have been piled up all winter.

The downside of that same outdoors is the thunderstorms that deliver their wicked lightning to our towers, wreaking havoc and destruction. Even with lightning dissipation halos on them, towers are magnets for lightning strikes, and our studios and FM transmitter building are parked not ten feet from the base of the 500-foot lightning rod we use for our 50 kW FM. With every strike I can count on a random set of problems, both nuisance and critical.

This time the destruction included two EAS ENDECs, three Wheatnet console blades, a pair of KVM extenders, and a purpose-built UPS that powers our Trango STL radio among other things.

One never knows what a strike will take out exactly how to be completely prepared for one. In response to this one, I'm stocking up on the line driver chips Wheatstone uses in their console blades, re-grounding our KVM transmitters, and ceremoniously sacrificing an Optimod 8000A and two Sony DAT recorders.

#### **Big on HD Radio**

For most of my career, I've had the great privilege of being Chief Engineer of a group of radio stations in the direct vicinity of the world's auto capital, Detroit – "The Motor City." Prior to joining Crawford, I worked for Greater Media's Detroit cluster of three FM stations. In the early 2000s, USADR as it was then known was a small startup from Columbia, Maryland working with Lucent Technologies and seeking to find a stronghold in the automobile, acceptance with broadcasters, and critical FCC approval. To do this, they needed a robust signal in Detroit to demonstrate their technology to automaker and broadcasting brass.

Luckily for me, one of Greater Media's Detroit stations was chosen to host "IBOC," becoming just the second FM station to have what we know as HD Radio technology (a station in Columbia being the first). Even with the generation one experimental gear, I became a big fan of the crisp, static-free sound. As a participant in the experimental process, I learned about construction of the sidebands, the -20 dBc mask, and countless other aspects of their system.

Since then, the owner of the HD Radio brand and many facets of the technology has



As they say in Birmingham, "Gotterdid!"

changed, solidified, and gained FCC acceptance. It's also, according to hdradio.com been installed in over 50 million cars, the primary place for radio listening, and is broadcast all over North America.

I've since become the custodian of three AM stations, all of which have HD Radio technology, as does our FM. Crawford Broadcasting has deployed HD Radio technology widely, and the generation two gear – our importers, exciters, exporters, etc. – has reached an age where it has begun to coincidentally fail, necessitating round trips to their respective manufacturers.

Avid listener Eric now calls weekly to check on when our HD Radio broadcasts will be restored. In one case I returned HD to a station only to have it fail less than a week later due to a different component turning toes up. I'm naturally anxious to get the status of our HD Radio broadcast signals back to 'up and stable'

with the benefit of having a refreshed set of gear – lest it get hit by lightning!

#### News from the South by Stephen Poole, CBRE, AMD Chief Engineer, CBC–Alabama

Hey, wanna hear about our weather? I hope so, because I'm gonna tell you anyway: it has been hot, stormy, wet, more stormy, and ... well, you get

the idea. Tropical Storm Claudette came through a few weeks ago, but she was a relative non-event compared to the flooding rains that we'd already received. All she did was add water on top of water. As I write this, another storm (Danny) is possibly going to make us wet. Yay.

But as usual, I thank God for all of his blessings, including my job working for the best company (and the best management) in broadcasting.

Our Director of Engineering is one of the best in the business; I've learned so much from Cris – and I thought I was an engineer when I started here in



Figure 1 - Todd used his PhD to install a hole, Jack and I slipped the post in place.

December of 1998. Shows

what I know.

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more efficient, it's hard to list all of the changes. The big thing now (also of course) is digital audio and Internet delivery. Websites were initially

> just static, dry pages that were updated infrequently; now, they're an important part of our operations. As I write this, I'm working with Cris, Amanda and Keith Peterson on a brand spanking new, shiny, hot rod web server. Zillions of files have to be transferred, dozens of accounts set up, and then Keith gets to go in and change a bunch of stuff in EACH WordPress site for EACH of our many stations. Lots of work, but also lots of fun.

#### **Spectrum Internet**

We've had Spectrum cable internet service at the 101.1 (WXJC FM) site since April, and it is surprisingly solid. AT&T couldn't even keep reliable dial-up phone service to the top of that hill (the appropriately-named, "Schmuck Mountain" – no, I'm not kidding). We had a DS1 (a "T1") for a while, but they couldn't keep that up and running, either. It was constantly failing, leaving us scrambling for a reliable backup. With a prayerful heart and fingers crossed, it looks like Spectrum might be just that.

We also have Spectrum service at the 1260 transmitter site in downtown Birmingham; it's proving to be just as reliable.

At WXJC AM's transmitter site (Tarrant), coax has been run and a demarc has been provided, too. All we have to do now is put the Spectrum equipment in a weatherproof, shielded and grounded box, then shoot the signal about 500 feet to the transmitter building with something like a Ubiquity wireless link.

Todd took his PhD (Post hole Digger, not the degree) and ate a hole in that hard ground at the site. We planted a pole in that hole (Figure 1), and we



## Figure 2 - Cutting a trench with a tractor. Next time, I'll just rent a trencher.

have a trench waiting for the AC cord, which we're going to pull from tower #5 nearby (Figure 2). We're itching to get that done ASAP, weather permitting.

#### **APT Codec Fun**

We have several of the APT Horizon Nextgen codecs in use at our facilities. Some of them have been chugging along for years; I noted the other day that one of them had a sticker saying, "Warranty expires in 2013." They're not the most reliable in a high-RF environment and they certainly have their quirks, but we've been able to stay on the air with them – mostly.



## Figure 3 - All of our systems, easily accessed in one place.

I say "mostly" because as they've aged, we're running across some odd problems. If you've worked with these for any time, you already know that both ends of each link must be running the exact same firmware version. If the one at the studio is version 5.0.1a, then the transmitter end must have 5.0.1a as well. The real hilarity, and when we first discovered this the hard way, was when we sent an APT back to the factory for repair. They upgraded it to the latest firmware, and when it came back to us, it simply wouldn't work until we upgraded the other end as well.

The problem that we're seeing now, though, is that from time to time, almost at random, the firmware will become corrupted. The codec will become stupid and just won't work. We always see the power LED, but that's a hardwired connection. Sometimes a unit won't boot at all; sometimes it will hang with the audio level meters "wide open." In a normal, successful boot, the LEDs will flash and the meters will peg for a moment, but you'll soon start seeing normal operation.

Todd has usually been able to resurrect these units by reflashing the software. In a couple of cases, we've replaced the power supplies, figuring that they had probably aged and were making hum and noise. But the most recent event, which resulted in 101.1 being off air for almost 45 minutes, was corrupted firmware. One unit was resurrected pretty quickly, but Todd said that the second one required several attempts before the flash would "take." Go figure.

I'd be curious to know if anyone else has run across this.

#### MeshCentral

Things are slowly returning back to pre-COVID normality, thank the Lord. But we weren't idle during the shutdowns by any means. I've mentioned here before that Todd absolutely loves to search for free and open-source software that will do amazing things, and he and Jack have come up with one that I think will be a real winner: MeshCentral.



## Figure 4 - MeshCentral will let you zoom out to see both screens on a dual-monitor workstation!

You install the MeshCentral module on each computer that you want to control remotely; it uses OpenSSL to fully encrypt the link, much like a VPN (but MUCH simpler to set up!). It's similar to VNC, but much faster, and the main "MeshCommander" screen basically shows you every connected system. You simply click on one of them to open a remote window. I love it (Figures 3 and 4).

Contact Todd if you're interested in this. We're still testing it, but it looks like this could be another winner.

### (Re)Covering A Pre-Installed Hole

That particular phrase comes from my



## Figure 5 - Todd says: 'It ain't pretty, but it keeps out the rain.'

younger days. I was installing an aftermarket stereo in my car, and the badly-translated directions said, "install a hole in you dash" (or something like that). I enjoyed that one.

In the case of WDJC-FM's transmitter building, the factory installed some vent holes for us. Todd was checking the site after a storm and noticed that one of the plywood covers had been damaged, and that moisture was getting into the building. He ran to Lowe's and bought some materials to seal the hole (Figure 5). As he says, it ain't pretty, but we're sure that no rain will be coming into building now!



Figure 6 - Spotted this on Alabama Highway 91 coming back from 92.5 one day.

#### And Finally ...

I love my job. When the COVID lockdowns started, I mostly did transmitter site work. It wasn't make-work, either; we've had one storm after another, and all three of us have spent plenty of time keeping everything on the air. But given that some roads can be blocked after a bad storm passes through, I've found alternate routes to all of our sites.

This means that I get to drive through some of the most beautiful scenery to be had in Alabama. In particular, one my alternates for WYDE-FM (92.5) is Alabama highway 69, with a shortcut to head back home down Alabama highway 91. You get to drive through little towns with big names like "Boldo," "Empire" and "Colony." You also get to see some truly weird stuff way out in the sticks like that. I have no idea what or where Coopy's JMart used to be (a Web search found a single mention on an old Facebook page), but I desperately hope that it wasn't the location shown in Figure 6!

Until next time, keep praying for this nation!

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

At the Burnham, Illinois, transmitter site, we have a somewhat unique setup as broadcast sites go in that we have a 150 kVA 480-volt flywheel UPS

that will keep the site up and running during short power outages, like a quick drop in voltage on a leg of the three-phase utility power, or during a low utility outage. The UPS will take over until the generator is up and running.

The last part of the previous sentence comes with a caveat: the flywheel UPS, like any storage device, comes with a limited amount of storage. It's designed to hold the full load for 45 seconds. So it will not cover the time it takes to get the generator online if it takes longer than that for the generator to start and the transfer to take place.

If the generator is not going through a normal start and transfer time, it is possible the UPS will shed the load and go into bypass mode. In our setup with the load running about 80 kilowatts with the transmitter and air conditioning, the expected time for the UPS to fully lose stored energy is, as noted, about 45 seconds.

That doesn't happen very often. But when it does, it means something is not functioning correctly and needs to be checked out. This happened recently. We had a power outage and shortly thereafter, I received a call from the remote control reporting the transmitter off the air. My attempts to get the transmitter back on were not fruitful at first, and it was almost a full five minutes of off-air time before I got us back on.

Later, I checked the log on the remote control. It showed the UPS discharging and then the generator running about eight seconds later, followed by the transfer to generator two seconds after that. However, the flywheel UPS fully discharged at 54 seconds and went into bypass mode. Once the UPS is in bypass, it is essentially a wire that connects the output of the generator's automatic transfer switch to the rest of the distribution equipment in the building.

Keep in mind, as I stated above, we didn't get the transmitter back on the air for another four minutes. So, essentially the flywheel UPS was no



longer in play and power from the utility company was still out. So the equipment in the building was getting its power directly from the generator and it

didn't seem too happy with it. As stated earlier, I had access

to the logs of the remote control system, and I could get into the logs of the UPS on its display screen. What I didn't have access to were the logs for the generator and the automatic transfer switch. There is no display screen on that switch, and you need a laptop with proper software to access the logs.

We had a tech from Cummins come to the site on the day of this writing; he put his laptop on it and accessed the logs. The logs, of course, showed a perfect transfer and then

later re-transfer without a single alarm. He seemed to be satisfied that the generator and transfer set was not the issue.

I showed him the flywheel UPS logs that showed many voltage range errors with some instances of over voltages and under voltages. Then finally coming to the conclusion that there was not an input source and going into bypass mode.

The Cummins tech then stated that perhaps the calibration on the flywheel UPS was off. I reminded him that once the UPS bypassed, it was like a wire, and that our equipment didn't seem to like the generator power at all.

While there is no way for sure to tell from these logs what really happened, I have in my mind that the generator was on and online, but struggling, thus the wild voltage swings that the UPS was recording. The voltage swings were as much as 100 volts per leg within a few seconds of reading them.

The way to get to the bottom of this will be to do a load test with the laptop connected to watch in real time what is happening. The tech will also connect pressure gauges to the fuel lines to see if the pressure is dropping significantly when the load actually is engaged by the generator. I suspect that perhaps the fuel pressure from the LP regulator is too low, starving the generator of fuel when it gets hit with the 80 kW load.

We have this load test scheduled for the next

week following the holiday weekend. In the meantime, we hope the storms stay away.

The good part is that we have an aux site now for this station, so we can do the testing without

much interference to the programming of the station, and we won't have to be out there late at night. In preparation for this load test, we did a test of the aux site, and everything worked perfectly.

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

#### **Tractor Woes**

After waiting a few weeks, we finally heard news on our tractor. The differential box is shot, as is

the entire PTO. We are having to wait on parts, which no one in the US has, so they will have to come from overseas. At this point, it is looking like end of August before we get our tractor back.

Because of this, we had to figure out what to do to get our sites mowed. After calling around with no responses, I remembered we have a long-time radio host on KLZ that owns a

business that does this is the type of thing (he say's they're "outdoor janitors"). He immediately had one of his guys call me, and after some back and forth, we got them scheduled to mow the KLVZ tower site. This site was priority because we get into trouble with the county if we let the Canada Thistle go to seed. They bloom and the seed gets into the adjacent South Platte River and then onto farmer's fields irrigated with river water. That gets the farmers upset, and, well... we get it.

KLZ and KLTT needed some mowing as well, so my husband asked his dad about borrowing his tractor. He agreed to rent it to us, along with a trailer and truck. My husband then proceeded to give up an entire weekend and we spent time at KLTT getting a small portion mowed and a full day at KLZ getting a specific area behind the building mowed so we could get some needed work done. Both sites still need mowing, but they are good enough for now and we do not expect to hear from the county. If we do, we will figure something out.

#### **BW Broadcast Transmitter**

I began noticing audio loss alarms for one of our FM translators. It would happen randomly and



be off for hours. I began investigating and realized when the audio loss happens, I would have no transmitter access. The transmitter would shut itself

off. We spent a couple days going over things.

We were first told it was most likely a power supply issue. When we benched the transmitter, we found it caked with dirt. This is located in a field at the tower and, unfortunately, is very difficult to keep clean. We cleaned the transmitter really well, getting rid of the dirt, and did some troubleshooting. All seemed

okay, so we put it back in. Later that evening the transmitter went off again and thankfully, this time it did not come back on, so we could actually see what was happening.

This time, we brought it back to the office and really dug into it. Having it stay down really helped us track the issue. We found a jumper that was most likely not soldered well. When pressure was applied to it, the transmitter would come on. Trying to get to the bottom of it to re-solder it proved difficult.

You can read more about this issue and where we are now with it on pages 2 and 3 above.

### **Swamp Cooler**

On Monday the 14th, KLZ had a power outage. Thankfully, we have a generator that got us through the time we were down. It was a good 3-4 hours. We had no equipment issues when things came back up, which was great.

However, on Tuesday, I was in the office and decided I wanted to look at my AcuRite app. It may have been raining on and off that day and I was checking rain totals at home. I do not really remember. While on the app, I remembered to look



# Can you spot the security camera in the front room at KLTT?

at KLZ. I was wondering why it was getting close to 80 degrees in the building. As I was sitting there staring at the app, the lightbulb came on and I remembered that when the power fails, the swamp cooler turns off and does not automatically come back on. I went to the site and got it back on before it got too hot.

This made me think that there must be a way to turn it back on remotely. I took the controller apart and sent pictures to my dad, and we found a way to wire it in to the Burk ArcPlus Touch remote control system. We have no status on it, but I at least know I can turn it on or off. With the AcuRite app, I can see humidity levels and if the humidity is low, chances are the unit is off.

#### **Security Cameras**

We have finally installed the indoor security cameras at KLTT and KLZ. At KLZ, we still have one more to do. We are just trying to decide where and how to mount it.

The installation process of the three we did was rather easy. We have the cameras looking at the front and back doors at KLTT, and the back door and front entrance at KLZ. This is just another way for us to see if/when someone does break in. We may get a better look at them. Plus, it gives us piece of mind, and I can spy on Keith when he is at the sites doing work.

#### New Lights

KLTT had, in the back room, two, 8-foot fluorescent lights. These things are a pain to deal with as the bulbs are 8 feet long – hard to transport and dispose of. And they didn't do a great job of lighting up the area behind transmitters, phasor and racks.

We had been talking about installing LED lights in that room. I ordered the same lights we used in the KLZ barn last year. That barn is very bright now, and we really like it. We want the same brightness at KLTT. The fixtures are four feet long each, so we bought four total fixtures, two for each existing fixture.



The new LED fixtures, mounted to the frames of the old 8-foot fluorescent fixtures, really light up the back room at KLTT.

We were able to remove the old tubes and the "tombstone" brackets that hold them as well as the ballasts. We then mounted the new LED fixtures directly on the old fixtures and were able to use the wiring from the old fixtures to power them. If you did not know, you would never tell that these lights do not really belong on the fixture. They look great, and the installation was very easy.

### Upcoming

I need to find time to clean at the transmitter sites and do some maintenance in the ATUs at each site. I have yet to decide if I am going to wait until fall when it is a bit cooler or not. We still have one security camera to install at KLZ, and I need to find time to work on the PTZ camera at the KLVZ transmitter site. It has been giving us grief as of late, not allowing us to use presets or tours. It will most likely require a lengthy wait for support, and I am sure, in the end, a trip to the factory in Florida for repairs.

I pray you all have a happy Independence Day weekend and that you stay safe and well.

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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