

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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KBRT Translator

Okay, I'm almost done with translators. Or maybe not.

Last month we did get the KBRT 100.7 MHz translator on the air and the license application filed. This is the last of the original group of four translators, so in a sense the project has come to a close. We're far from done, however, at KBRT and elsewhere.



KBRT translator weatherproof temperaturecontrolled equipment cabinet (Kintronics) populated with all the translator gear. Note the two fiber-optic cables at the bottom right, providing network connectivity for all the equipment.

The coverage of the 13-watt horizontal-only KBRT translator is about what you would expect – spotty. In some areas with a clear line of sight, the signal is quite good, but in many other areas it is hit or miss. There are a number of reasons for this.

First, the spectrum in Southern California is really, really crowded. We share the frequency with San Diego powerhouse KFMB-FM. While terrain obstructions effectively block the KFMB-FM signal into much of the Corona-Riverside area, there is still enough residual signal bouncing around off the mountains to make it audible in a lot of locations.

There are also a number of other stations on that frequency, including a WAY-FM translator up north and another co-channel signal in the desert to the west. So the long and short of it is, wherever the KBRT translator signal is weak, there are other signals there ready to capture a receiver.



This Kintronics isocoupler was used to couple the FM signal onto the 275-foot tower on which the FM antenna is mounted near the top. The ground wire has since been replaced with a piece of copper strap.

The next issue is terrain. Our translator is sited at right about 3,000 feet AMSL, which puts it at some 1,600 feet above average terrain elevation. The problem is that there are mountaintops close by that, while not higher than our antenna, nonetheless obstruct the line of sight into a lot of populated areas. We could fix this by moving to a different site, but a different site would require expensive site rent, a microwave shot and other costly infrastructure. For now, anyway, we'll stay put at our own site and live with the shadowing.

Third, the initial hurry-up filing specified horizontal-only polarization for this station. This was necessary to protect all the co- and adjacent-channel stations in the area. I simply didn't have time to engineer a CP or horizontal and vertical solution before the January 29 filing "deadline."

That lack of vertically-polarized signal means that we experience up to 20 dB of signal reduction to receivers employing vertically-polarized antennas. That includes the rent car I used to drive the signal as well as our company truck and probably at least 50% of all the other vehicles on the road. The other 50% employ in-glass and "rubber duck" antennas that are somewhere between horizontal and vertical and as such still suffer probably 10 dB or more of signal reduction.

This is a situation we can remedy fairly quickly. We have filed for a pattern modification that specifies a 60/40 H/V power ratio with the vertical antenna oriented 40 degrees clockwise from the horizontal. Even a small amount of vertical power will help. We hope to get this work done later this month.

All these factors aside, we see the KBRT translator as a "foot in the door" that we can build upon as the allocation picture changes. As LPFM signals leave the air or CPs expire, we will be ready to jump on their spectrum and increase power, broaden our directional pattern or both. And who knows? The right off-site situation may present itself and we just might move the translator to a more advantageous location. We'll be watching and ready.

I am proud of the installation, and my hat is off to KBRT ops manager Todd Stickler and transmitter engineer Fred Folmer. They did a great job of laying the groundwork for this installation as I noted last month.

When I arrived at the station on May 11, I was able to hit the ground running, rerouting and extending the fiber optic cables in seal-tight conduit to the new FM cabinet at the base of tower #1. We then installed insulators on the isocoupler to get the bottom section grounded and ran a piece of 1/2-inch "superflex" transmission line from the bottom of the isocoupler to the FM cabinet.

After that we installed all the translator equipment and tested it. Everything worked perfectly. I measured the base impedance of the tower and noted that it had not changed outside the ± 2 ohm $\pm 4\%$ window, so we were able to file the translator license application without waiting on a new AM MoM proof. The touch-up of the KBRT array parameters took me just a few minutes to complete.

Denver Translators

Last month we filed for some vertical power on the 95.3 MHz translator in Denver. It took the FCC only 11 days to grant the application from the date filed.

We are now waiting on delivery of a 10element vertical Kathrein Yagi antenna that will be added to the existing 10-element horizontal Yagi. We also have a power divider and phasing harness coming. Once they arrive, our friends at Mauna Towers will install the new antenna and reconfigure the mounting of the horizontal part of the array.

This will provide a huge improvement for our 95.3 signal in Denver. The station is sited up at the Lookout Mountain antenna farm, some 2,100 feet above the market with a clear line of sight to most of the market. The translator is on a clear frequency, so giving it a 20 dB boost into vehicles with vertical antennas will make a night/day difference.

We also filed for a new antenna for our 100.7 MHz translator. The existing antenna is a broadband stainless steel model that is simply not performing well. The translator is co-channel to a class C station in Cheyenne, Wyoming which gives it a lot of grief (much as the many co-channel signals do the KBRT translator). Our 100.7 signal is not strong where it should be and is listenable where it shouldn't be, so something is definitely not right.

We filed for a PSI single-bay brass/copper antenna with a custom directional pattern. Hopefully this will make a big improvement in the performance of that translator.

Finally, at this writing we eagerly await the final turn-up of a T1 circuit to the Lookout Mountain site. We currently use a Comcast 30 mbps internet service to get our audio up there and provide for remote control, RDBS, etc., but that service has been problematic. We plan to put the two secondary "SureStream" streams for the Worldcast IP codecs on the T1, providing them with a completely independent path from studio to transmitter. That should get us clean audio at least.

Pirate Update

I heard from the local FCC field office last month that they found the Boulder 95.3 pirate right where we said he was. They told me to be patient, that there is a process they have to go through to get a pirate shut down. I certainly understand due process, so we'll wait and watch.

Online Public File

Several months ago the FCC released a report and order announcing a rule change regarding the public inspection files of radio stations. As with television stations several years ago, this year radio stations will be required to follow suit, moving their public files to the FCC's online database.

The middle of last month the FCC announced the effective date – June 24. Beginning on that date, radio stations in the top 50 markets that have five or more full-time employees must begin placing their new public file documents in the FCChosted online public database. We then have until December 24 to move our existing public file documents into the database with the exception of existing political file material and letters from the public

This announcement has been circulating in the trade press as well as in various state association and trade group email messages, so I have been getting questions about it from our various markets.

We are at press time making certain that all of our facilities are equipped with both document scanners as well as software that will produce a PDF documents. These will be in place before the June 24 date. Then, as soon as the database opens on June 24, we will create login credentials for each of our stations. A single person in each market will be identified and tasked with beginning the process of moving public file documents to the database.

Uploading documents is a fairly easy task. First, anything filed with the FCC, such as ownership reports, applications, mid-term EEO reports and the like will be automatically linked in the database, so we need not upload those items ourselves. This leaves just EEO reports, issues and programs lists that must be uploaded.

To be clear, any new documents that must be placed in the public file will have to be uploaded beginning June 24, and existing material with the exception of existing political file material must be uploaded by December 24 of this year. In short, we have six months to get everything but existing political material and letters from the public uploaded, an ample amount of time.

While a number of our stations are exempt from this requirement until some future date because they are in a market below #50 or they have fewer than five full-time employees, we will nonetheless require every station in our company to make the move to the online system in the first wave. That will keep the entire company on the same schedule and will allow our smaller stations to take advantage of the benefits of the online system.

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 some time since we visited through the

pages of *The Local Oscillator*. Last month I had scheduled some vacation time near the end of the month, and intended to submit my report while enjoying some R & R. Unfortunally, the best made plans sometimes fall short of good intentions.

Not long after my wife and I arrived to visit my parents in Kentucky, we received a call that my wife's brother passed unexpectedly.

Needless to say, our visit was cut short, as we had to turn around and come back to Buffalo for the funeral. It was a hectic time, and I just didn't have an opportunity to submit anything for the month. However, events of the past two months will be covered with a *Reader's Digest* condensed version this month.

We have had numerous equipment failures in several of our markets these past two months, beginning with a NexGen switch failure not long after I returned from vacation. On a Wednesday morning, the board operator noticed that everything in the NexGen Control Room window had frozen, and an angry face showing on the screen. A mouse click on the

face reported a network connection loss, as was the same on all of the production workstations and audio servers.



A reboot of the 24-port switch resulted in no change to the network connection problem. A quick run to the local Office Depot to purchase a new gigabit switch had us back up and running within an hour. The failed switch had been in service since we first installed Nexgen some 10 years ago, so I was not really surprised that it failed. Hopefully, it's replacement will last as long!

Another failure we had was the loss of our fiber optic T1 link in Rochester for WDCX(AM) and Legends 102.7. The problem began as little 'blips' on the air, not lasting any longer than a second each time. We would have 3-4 within an hour, and it would clear up for a day or so, and then start again. Each time it started again, the 'blips' would last a little longer than the previous incidents.

By the time I placed a call into Frontier (our T1 provider) to open a repair ticket, the circuit died completely. It took Frontier several hours to determine where the problem was and to get the issue resolved. Seems we had a defective copper pair that runs from our studio building to the "slick" (copper/fiber interface) about 1,000 yards away. We have had this problem numerous times in the past, but it has been at least two years since the last incident.

Persistence pays off! For some time now, we have been experiencing VSWR faults on our Harris DAX-5 transmitter at our 5 kW AM in Buffalo. Ironically, the issue seemed to begin right after I replaced the exciter board in the transmitter. That board was replaced by Harris under warranty. Evidently, it should have been done by the previous owners, but somehow slipped through the cracks. A change in the design warranted the exchange, and the replacement went perfectly.

Not long after I installed the board, I noticed we were logging numerous VSWR faults on the transmitter. The only way to keep the transmitter from faulting out was to lower the modulation to positive peaks near 110% and negative at 90%. Anything above would result in the faults. Since the only thing that had changed at the time was the exciter board, that was the first thing I suspected as the cause. I thoroughly went through all of the settings, connections, and levels that I could, and came up empty handed.

On a hunch, I switched the transmitter's output into the dummy load, and was able to produce 125% positive peaks, 99% negative peaks with no faults on the transmitter! This told me that the problem did not lie in the transmitter, but something in the antenna network was causing the VSWR trips!

I began my search by checking all the components in each doghouse for connection tightness and heat build-up on the components. Finding nothing, I was at a loss as to what could be causing this issue. I contacted Harris technical support, and we went over everything I had tried up to this point, and the support engineer was also clueless as to which way to progress.

After thinking the situation over for several days, I decided to employ the help of a fellow engineer, and look at towers and networks under the cover of darkness. As I got to each tower, I would have my friend raise the modulation until the VSWR trips began regularly, and I would inspect all of the network's components, looking for any sign of failure. Towers 5, 4, and 3 showed nothing, however, when I performed the same inspection on tower 2, I noticed arcing between the ball gaps on the tower's lightning arrestor!

I placed a rubber shield between the balls, and was able to raise positive peaks to 130% with no faults! The next day, I went out and found that one leg of the arrestor was a little loose, enough to close the gap a little too close. I adjusted the gap, tightened the mounting nut, and everything has worked perfectly since! I was determined to find the problem, and I was not going to give up until I could find the problem and resolve it!

We have several projects beginning soon, and lasting through the summer months. The first project will be a studio swap at WDCX-FM in Buffalo. We have simply outgrown our talk studio, and as our floor space is limited, the best option to increase the studio size was to swap the main control room with the present talk studio. This will almost double the square footage of the studio, enabling us to comfortably have more guests on our live talk programs. We do not need as much room as we have for the control room, so switching the two made the best sense.

Other projects that we will be undertaking this summer include a roof replacement at the WDCZ transmitter site, tower painting at WDCX-FM, and new fencing around our six-tower array at WDCX(AM) in Rochester. These, combined with my normal summer duties, will keep me rather busy during the summer/fall months. There's no time to dawdle around – winter will be here before we know it!

That about wraps up another month here in the Northeast. 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

WheatNet-IP/RCS NexGen Audio Issues

For some time, we have been experiencing intermittent dropouts in our Nexgen audio through

the WheatNet-IP system. The audio played back would drop out or sound distorted at times. It was weird - if you played the audio element again, it would sound just fine.

During the investigation, we kept an open mind, not concluding what was the likely root case immediately but waiting until we had enough data or evidence to substantiate our decision. Our engineering, operations and on-air teams collaborated to come up with

ideas on how to approach the issue. These are some of the possible root causes and activities we examined:

- The audio delivery computer
- The network switches or router
- Network cabling
- A defective "Blade"

Each of these areas was examined, one at a time, to observe the effect and to determine the correct root cause. At first we looked at the delivery computer by cleaning it up and turning off services and programs that were non-essential. Then we upgraded to gigabyte switches on the Nexgen network to improve its speed (the WheatNet-IP network was gigabyte from the start).

The cabling that was in common to the machines that are communicating for playout were checked and verified as CAT 6 cable. Then we checked the blade that was used for playout on the machine in question by swapping it with another blade we had in stock. None of these improvements addressed the issue.

Early in March, Jay Taylor from Wheatstone paid me a visit to bring me up to speed on the new WheatNet-IP system. During the visit, he mentioned that Wheatstone had designed a new WheatNet-IP driver for audio delivery computers. Some computer hardware configurations require the use of this improved driver.



After updating the driver and extensive listening, we determined that the issue was completely fixed. Not only did the audio dropout

> issue disappear, but the headroom of the audio was significantly improved. The audio is more open and transparent.

Going forward, we have noticed other playout machines in our facility with the same issues. With the other playout computers in our facility, the issue does not seem to happen with the same frequency as with the WMUZ main playout machine, but to maintain audio excellence throughout the plant, they

will need an upgrade to the new driver too.

Wheatstone's Jay Taylor and Jerry Jacobson are dedicated to making sure we achieve audio excellence with our installation by supporting the upgrade or swap of these audio drivers for free. I really appreciate folks who stand behind their product. In addition to thanking the Wheatstone team, I would like to thank members of our Crawford team. Vito Faletti and Chris Stevenson provided the needed data and the coordination and support of the driver update.

Law Day Remote

It's that time again for the Goodwin & Scieszka "Law Day" remote. Every year this client law office provides free legal advice to folks and gives away safety helmets and bicycles to children in the community.

In preparation for the remote, as we always do, a site survey of the law office building and parking lot where the remote will take place was conducted to determine the location of the stage, food vendors and children's activities. Every year we need to Gaffers tape about 350 feet of data cable from their law office on the 3rd floor of the complex to the parking lot below to provide an internet data connection to our Telos Zephyr IP and computer.

To avoid the task of running the unsightly cable through the building, we are going to set up a

wireless Ethernet bridge using a pair of the Ubiquiti NanoBridge NB-5G25 radios. We already use a pair of these radios to extend our LAN from the ATU (Antenna Tuning Unit) building to the transmitter building at the WRDT-AM site. They are a proven product determined by our experience and others throughout the broadcast industry.

Prior to my coming back to Crawford, my predecessor, Brian Kerkan, had purchased a pair to be used for remote events like Law Day. During our site survey, we found a location where we could see the window of the office where the AP (Access Point) of the bridge connection will be located. The location is close to the carport or garage where our stage will be set up. This will be ideal for accommodating our proposed parking lot layout.

During the meeting with the law firm I plugged in my laptop to determine if their router used static, dynamic, or a combination of both protocols, as part of its IP addressing topology. It appeared to be dynamic IP addressing, so all I should have to do is plug in the AP first. It will then obtain an IP address from their router and establish the AP portion of the bridge. Subsequently, it will then link to the Station portion of the bridge and obtain an IP address from their router, too. This visit determined the ideal configuration (dynamic IP addressing instead of static) of the Ubiqiti bridge, ahead of the testing, so that time on site for implementation should be minimized.

Since the remote is the first week in June, we will follow up on the results of the bridge in next month's column.

Dayton Hamvention

The 2016 Dayton Hamvention is in the books. Every year, this event has become more of a social event to meet and spend time with friends and fellow amateur radio operators ("hams"). The attendance seemed to be down from previous years. I am not sure if it was due to the weather (rain on Saturday) or perhaps the venue. It's a universal discussion among hams as to condition of Hara Area. Many think that a face lift of the facility may help attendance.

Many of the attendees to the Dayton Hamvention also attend other ham conventions like the Friedrichshafen Hamfeast in Germany or the Hamcation in Florida. I think that some of these premium Ham events maybe competing with Dayton. However, despite some of the chatter, Dayton is still one of the greatest experiences for a ham radio operator and electronics enthusiast.

This year, I found a great deal of information on an entry level DMR (Digital Mobile Radio) hand held UHF radio. I am totally new to DMR, so I have been trying to get up to speed on how it works. Many if not all of the DMR repeaters are networked through the internet. Therefore, it is possible to talk around the globe with fellow hams. It is based on the Motorola standard called MotoTurbo.

The digital signal is TDMA or Time Division Multiple Access. Each digital signal is made up of time slots. Each of the time slots can be assigned for different purposes like local, regional, or international traffic. Also, repeater stations are organized into zones or geographic areas. So far I have only touched the surface. It is ham radio's answer to trunked radio.

I found many booths at the show providing information on the technology. Most importantly, you must register your call sign before you communicate with a DMR station. The registration only takes about 24 hours and can be accomplished by visiting the DMR/MARC website (<u>http://dmrmarc.net/</u>). In time, I should be able to navigate better and hopefully catch you on the air!

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

In 1996, Hurricane Fran came through NC and did billions of dollars' worth of damage. At the

time, I was running our family's insurance agency, with some contract radio engineering on the side. That experience really soured me on the insurance business.

I went back into software for a while, but contract programming was just like contract engineering: it can take forever to get paid. People would promise you some work, then back out at the last minute. After struggling for another year or two, in 1998, Sandy and I prayed about it. I strongly

considered going back into radio engineering full time. Sandy said she'd support me ... but she wanted me to get a salaried, full-time position with a large market broadcaster. Let's get out of that part of NC, she said.

The first job offer came from Dallas. They agreed to pay for the trip. They were a noncommercial station, listener supported, but they didn't seem to have a problem with my salary request, either. But when I arrived, they only offered me about 60% of what I'd told them I would need. They started poor mouthing. "We're a ministry! Ask God if He wants you to be here, then trust Him to meet your needs!"

That was one of the lowest points in my life. The drive back from Dallas to NC was a very somber one. I was about ready to give up when I saw an ad from a guy named Cris Alexander. I'd seen his name in Radio World and figured if nothing else, he was legit. After several phone and email conversations, he wanted me to drive out to Birmingham. Sandy and I went prayerfully. It was hard to get our hopes up after all the disappointments over the past few years, but we were trusting God.

The meeting went splendidly. At the time, Birmingham had 93.7 FM and 1260 AM here, but both seemed well-kept and cared for. The people at the studios were as nice as could be. I hate to say it,



but I contrasted the treatment that I got on that first meeting with what I had experienced in Dallas. These

were commercial stations, but run by some very fine people.

That left the salary. We had dinner at Red Lobster and I was praying silently the whole time. Cris agreed to the money that I'd need, we shook hands and I left exhilarated. Sandy was just as happy. Birmingham was getting ready to expand to five stations – three FM and two AM, including a 50 kW directional.

I'll never forget something that Cris told me over dinner that night. I said

that I was looking for a job that I could do until I retired; I was weary of moving around, chasing checks from contract work and dealing with crooks. Cris told me to do the job to the Glory of God, to the best of my ability, and everything would be fine. He finished with, "Stephen, if you are loyal to Don Crawford, he will be more than loyal to you."

That has proven to be very true. Cris Alexander is not only the best Director of Engineering in the country, he's the best boss I've ever had. Don Crawford is the uber-best. Laura, Mike and the rest of the gang are top notch as well. We have some great people in this company and I'm proud to be at least a small part of The MissionTM.

Shocking Resignations

As usual, I said all that, not only because it's heartfelt, but to make a point. Several people left our company in Birmingham in April and May, including the station manager for WYDE-FM, who was also doing a very popular afternoon talk show. He wanted to go back to the large broadcast group that owns several stations here in Birmingham. He took a couple of other people with him, leaving us in a bind.

On the one hand, I certainly wished him (and the others) nothing but the best. But I still thought that he was making a big mistake. If you read the trades, this particular large broadcast group isn't

doing well financially (no, not that one; the other one). More to the point, the loyalty from one of these giant, thousand-station monsters can be non-existent, too. They'll bring you in, complete with the ol' wine and dine, give you a nice office and a salary ... and then decide, at the drop of a hat, that they want to change formats or sell the station. No thanks.



Figure 1 - Cory lugged all of that onto the roof at WYDE FM by himself. I felt guilty. A little.

WYDE-FM has a monstrous signal. I'm still trying to figure out why our new Nautel GV40 should make a difference; it would seem that 28 kW TPO is 28 kW, whether it comes from a tube or from solidstate devices. Maybe it's just me. But even on the old BE FM-30, the signal was amazing. We would routinely get calls from listeners in eastern Mississippi and southern Tennessee. The ERI antenna that Cris selected is just incredible. It is noticeably and audibly better than the old Shively that the previous owners had been using.

Before this guy left, he had lobbied for 1260 to fully simulcast WYDE-FM in Birmingham. We were in the process of canceling several of the satellite programs on 1260, further leaving us in a bind. Plus, as I mentioned last month, we just put a translator on 1260 at 95.3. If simulcast with WYDE-FM, it would help fill in our coverage south of Birmingham.

Instead, this guy left while we were working on this, opting to go back to a nearly bankrupt company to do his show on a multicast-plagued FM signal in Birmingham. That was his choice, of course. But honestly, it makes me sad that he couldn't see The Mission.

CAPS and IPAWS and Such, Oh, My!

Larry Wilkins, a splendid old-timer who has been in broadcast engineering since the appearance of the first electron, is also the state director for Alabama's EAS. He regularly works with the Alabama Emergency Management Agency as well as the FCC, ensuring that listeners here are informed in the event of an emergency.



Figure 2 - The satellite receiver for ALERT FM. Considerably smaller than a Comstream or an XDS.

I had heard of the ALERT FM system, but wasn't really that familiar with it. In late April, Larry asked if we'd be willing to host the specialized RDS encoder and satellite dish for this at WYDE-FM in Cullman. I ran it past Cris and we told him, "Yes, of course."

AEMS, operating with a federal grant, sent a guy named Cory to do the installation. He installed a small Channel Master dish on the roof, with an even smaller receiver inside the building. AEMS provided a new RDS encoder to handle everything. It allows us to transmit our normal RDS data, but is capable of broadcasting emergency info as transmitter by AEMS or other authorities. If we wanted to, we could even use it to send messages to our own employees(!), though I haven't had time to look into that.

Engineering

Todd is on vacation as I write this, so I guess I'll give a shout to Jack "The Dangerous Man" Bonds. I've said this before: we are called "engineers," and not "repairmen," because we often have to craft custom solutions for which no off-theshelf component exists. We do *engineering*. That's our job.

Well, Jack now owns that title. Some years ago, I purchased a bunch of AKG Perception condenser microphones for use in our studios. These were side-address mikes that came with a nice hard case and a springy shock mount. They sounded good and were reliable, but they had a problem: at high frequencies, they were essentially omnidirectional. We needed unidirectional.



Figure 3 - Courtesy of Jack "The Dangerous Man" Bonds.

We still use them in production and as spares, but we haven't been able to make them daily

workhorses for on-air work. That leaves me with not only a bunch of AKG mics, but with a bunch of nice springy shock mounts. Jack applied his Dangerous Engineering skills to it and figured out how to make those mounts – for side-address condensers, mind you – work on the (front address) RE-20. It took a little rigging and engineering, but they work like a champ.

As I write this, he's also repairing a Shure SM-7. I ordered a replacement cartridge for it and installed it, but there's an intermittent connection somewhere. I figured that was right up Jack's alley, so he's all over it.

Until next time, keep praying for this nation!

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

It's June and the cottonwood trees will soon be filling the air and our air conditioning coils with their cottony seeds. If you are like us here in

Chicago, we've already had our AC techs out for the spring checkups, so we can't count on them to clean it up. That means we have to take water out to the sites and clean the coils ourselves after the spring cottonwood season.

Between all our sites, which include studios/office building and four transmitter sites, we have nearly 25 outdoor condensers to clean. One of the most difficult kinds of air conditioners to clean the coils on is the infamous self-contained Eubank systems that hang on the

side of the pre-fab buildings most commonly seen at cell sites.

Our Burnham transmitter has five Eubank systems between the transmitter building and the flywheel UPS building. The coils on the Eubank systems are just hard to get to with the hose cleaning method. Now add in the fact that the site sits next to a swamp inside a forest preserve. Not only do we have to worry about the onslaught of the cottonwood seeds, but we have water-loving weeds that grow tall enough to hide Bigfoot. These also just happen to



have flowers that end their life in a cotton type airblown seed.

So we get an entire growing season of stuff

in the coils of these units. We can clean the coils and two weeks later they look like they have been neglected for years. So it becomes part of the summer time chore – to keep them clean and the buildings and their contents clean.

While playing like a firemen hose crew every couple of weeks isn't the worst thing we deal with as engineers, after my second summer of this last year, I began muttering to myself that there has to be a better way to do this.

The thing that kept coming to my

mind last summer was not necessarily a better way to clean them but perhaps a way to keep them clean in the first place. I got the idea that the Eubanks have rather small openings on their side to allow air to flow into the coils. There is not much of a grate in place to stop anything but large items from getting into the coils.

I had planned that before the start of the worst part of the season to put some sort of prescreen in place to catch all the fluffy stuff before it

got into the coils, but still allowing air flow across the coils. I was going to purchase the materials to build my own screens and put them in place over the openings on the sides of the units.



This screen project was going to be a lot of work to make and then fabricate a way to hold them in place. Then it dawned on me that there was already something manufactured that would work perfectly. It was also rather inexpensive, which is always a plus.

The adjustable screens would be perfect for the job. I just needed to find the right height which would translate to the width of the Eubank th for the height of

A/C unit before modification.

opening and then adjust the length for the height of the opening. In my case, for the Eubanks at the Burnham site, the 10" by 37" size were nearly perfect.

To hold them in place, I found that two powerful magnets were perfect. When we get some high winds in the area, we might find we have to add a few more magnets to keep them through those events.

Now we have something that will keep the nasty fluffies out, but that will also be easy to maintain and keep clean. Probably the most

important aspect of using something like this is to make sure it is checked and cleaned regularly or you'll end up having clogged screens that will be just as bad as having clogged coils. For us,

this site is only a few miles away from the studio, so we are at the site at least once a week; we plan on this being on the weekly checklist. It may be that we



A/C unit with pre-screens installed.

find that during the worst part of the season we need to check and clean the pre-screens twice a week. We're still trying to figure out how quickly they will get clogged.

For me, this is worth a try for this year. I have the expectation of closely-timed maintenance for them but also expect that to pay off with a lot less cleaning of the coils. Time will tell.

Valley Notes By Steve Minshall Chief Engineer, KCBC

KCBC was re-licensed using Method of Moments in May 2010. It is required that recertification of the sample system and field strength Fortunately, the manual had a very thorough description on the theory of operation of the output network filter. I used a signal source and an FIM,

measurements be done every two years. I have just completed the sample line measurements, toroid current transformer calibration check and the required field measurements. I am amazed at how quickly time goes by; this was my fourth time taking the round of field measurements. It was also

the quickest. I spent more time organizing routes to take and less time running around in the country side.

My very first job in radio started in 1980 and waiting for me was a brand new Potomac Instruments FIM-21 Field Intensity Meter. Over the last 36 years, I have used a number of FIM-21s and FIM-41s. It is one of the few constants I have had in broadcast engineering. Almost every aspect of radio broadcasting has changed, but the FIMs remain unchanged. They are expensive to purchase, and they are expensive to repair and calibrate, but that is to be expected with precision equipment.

Normally the FIMs are used for measuring monitor points or doing proof-of-performance measurements. I have found them to be useful for other jobs as well. One interesting use I found for the FIM was in changing the frequency of a Collins "Power Rock" transmitter.

The output network of the transmitter was not the typical sort of thing found in tube transmitters. This transmitter used a three node band pass filter to match the tube plate to the transmission line. It was a neat way to make an output network, but changing the frequency of it appeared daunting. The factory told me it *had* to be done with a vector network analyzer. That was not an easy way to go back in those days.



used as an RF volt meter, to set each node of the filter to the correct voltage transformation. The transmitter worked perfectly on the new frequency, no VNA required.

At one time I was interested in building dish antennas, and I built a few. I wanted to plot the antenna

patterns, but how do you measure microwave field levels precisely? My answer was to build a downconverter to take the microwave frequency down to the range of an FIM. This worked perfectly, and I was able to make some very precise antenna pattern plots. I have also used FIMs as detectors with impedance bridges and to track down electrical interference in my neighborhood. They also make great DX receivers.

The Potomac Instruments FIMs are precise, rugged, and reliable. I think we tend to take them for granted, but they are really a joy to work with, and for many of us they have been our companion on many a journey. An FIM has even helped me find my way back to civilization on a couple of occasions.



The one downfall is the color. They are hard to see if they are left sitting on the ground when you are backing up a truck, but that is another story.

The Portland Report by John White, CBRE Chief Engineer, CBC–Portland

This spring, KKPZ has been doing some spring cleaning. Seems simple, right? A little painting, new lunch room cabinets. Ought to be

simple, right? Wrong.

I knew that finding contractors can be problematic, so I began by calling and visiting cabinet firms, 37 at last count, although I am sure I missed a few I contacted. There are lots of outlets selling DYI cabinets. The results were disappointing.

First, lets consider what the requirements are.

• New laminate cabinets

- Installation of the cabinets
- The work to be done at the station

Now that seems simple, although I soon learned that simple is a state of mind. I was quickly informed that granite is the new minimum. Then I was informed that, "We don't do commercial," followed closely by, "We don't install."

Great, I know what you don't do, so now what? So its off to the home show where I find ONE vender that will do commercial, and his bid is high. Very high. Altogether, I found only one other vendor that does commercial with a high fee for estimate.

Moving on to a different project, I had some carpentry work that I needed done. Same sort of experience. I copied out every carpenter firm from the Portland, Clackamas, Gresham, and Beaverton yellow pages. I added all the listings from the net and called all. I got one live answer and was told, "We don't do commercial." I got two call backs. One said he was no longer licensed to do business, and the other, after considerable phone tag, agreed to give an estimate. I asked for tips at a local SBE chapter and was able to get one possible carpenter.

The conclusion is obvious: finding contractors for commercial work is becoming difficult if not impossible. Contractors who can do satellite dish installation and maintenance work are



no longer available in the metro area. What's it like for rural areas?

The first thought is that 20 or 40 carpenters

aren't a lot of carpenters for a metro area of two million. To mis-turn a phrase, instead of crying in my root beer, I thought it would be good to touch on the reasons why. The problems are multi-fold.

The ongoing economic downturn takes some of the blame. Marginal firms failed or were merged with more efficient

vendors. Many of the older proprietors took the option to retire, further reducing number of vendors.

Starting with the downturn, local government tightened regulations, which became barriers to new proprietors wanting to start new business.

During this same period, the education establishment promoted college as the only path for students. The Portland school system abandoned its nationally known trade oriented high school, another loss to the trades. Meanwhile, state regulation demanded college for carpenters, plumbers, and construction workers, which further raised barriers for workers entering the trades.

All of this is a problem for broadcast engineering. Few young engineers are entering the profession. Currently attracting new engineers has been a focus of the SBE nationally. Oregon's trade contractor experience demonstrates that this kind problem is complex and widespread.

On another front, Oregon broadcast engineers have recognized the need to keep local broadcast stations operating during a disaster. Experience during hurricanes Katrina and Sandy demonstrate the need for some kind of recognizable credentials to assist engineers when access is needed to declared emergency areas to maintain broadcast facilities. In other states this has taken the form of an industry-issued credential that has limited recognition. The Oregon legislature adopted an approach of promoting a partnership between engineers and the Oregon Office of Emergency Management (OEM).

That's a lot more complicated approach, and one which can benefit both the broadcaster and emergency managers. There is good news, as we are making progress in discussions with OEM. Discussions have been improved now that the liaison position at OEM has been filled. Our immediate goal is to reach agreement with OEM and produce procedures to issue credentials that meet the needs of both engineers and emergency managers. Once we have agreement with OEM we can begin selecting a vendor to manufacture the credentials and get volunteers in place to process

applications.

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

Mowing

May seemed like a fairly slow month. Things at the AMs were quiet. The only thing that

has been loud is the growth. It is crazy how fast things grow once the rain starts. It is already at an almost unmanageable state at the three AM sites and we still don't know when we will be able to get the mowing done. It's either raining or we are just busy with other things. I'm hoping that we can get at least one site done the first week in June.

We are also looking to have neighbor and friend Jerry Ford come back out to the KLVZ transmitter and spray the site to kill everything off. If we had safe storage at the other two sites we could easily drop the tractor off and Keith could spend several days mowing. Instead, we have to take it out in the morning, do as much as possible and at the end of the day take it back to KLZ to store in the barn. Not ideal, especially since we have to factor in traffic and want to avoid it.

FM Central

The two FMs are doing better. After weeks of me calling and complaining to Comcast about the fact that their internet service was dropping packets like crazy, they sent someone up and they looked at



the entire line. Sure enough, they found some node issues and fixed them. We haven't had issues since, praise God!

> Now, if we could get their modem/router to port forward consistently. Things work great at first, then after a day or two, we lose the porting to some equipment, which isn't good. We have been working to try to find a solution with little luck. Until then, it is almost weekly trips up the mountain to reset things so we can have

access. We are getting a T1 up there. The loop is installed but we're waiting on the router before we can start using it working. It will provide our codec SureStreams with a completely separate and redundant path.

Talk Studio

The KLZ talk studio has long had a small tabletop. That was okay once upon a time, but in this day and age when the majority of hosts have either tons of papers or even their own computers they are bringing in, there just wasn't much room. We had to do something to increase the size of that tabletop.

We redid the tabletop in the KLDC talk studio a couple years ago and it made a huge difference for that station. We wanted the same tabletop in the KLZ studio, but due to the size and shape of the room, we couldn't do it exactly the same way.

In KLZ, we ended up making the new tabletop a bit smaller, but ran it all the way to the wall (as opposed to having seating all the way around).

We also moved the mic booms to the center and mounted the cough buttons directly to the tabletop.

While I was at it, I decided it would be a good idea to redo all the wiring to the room since we've had some issues. That became a project all its own. Thankfully I got it done with the help of my wonderful husband, got everything tested and called it a day. It looks great and the hosts are loving it.



Amanda installs new mic, headphone and Ethernet wiring in the KLZ talk studio.

Coming Up

Mowing, mowing and more mowing. That will be my life in June, weather permitting. We also would like to get the T1 finished up at the Lookout Mountain site so we can have a backup of sorts. It definitely looks like a busy month here in Denver. That about covers it for this edition, so until next time... that's all folks!!!

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, 550W-U KCBC • Manteca - San Francisco, CA 770 kHz, 50 kW-D/4.3 kW-N, DA-2 KKPZ • Portland, OR 1330 kHz, 5 kW-U, DA-1 KLZ • Denver, CO 560 kHz/100.3 MHz, 5 kW-U, DA-1 KLDC • Brighton - Denver, CO 1220 kHz/95.3 MHz, 660 W-D/11 W-N, ND KLTT • Commerce City - Denver, CO 670 kHz, 50 kW-D/1.4 kW-N, DA-2 KLVZ • Denver, CO 810 kHz, 2.2 kW-D/430 W-N, DA-2 WDCX • Rochester, NY 990 kHz, 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, 5 kW-U, DA-1 WDJC-FM • Birmingham, AL 93.7 MHz, 100 kW/307m AAT

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