# The Local Oscillator

*The Newsletter of Crawford Broadcasting Company Corporate Engineering*

MAY 2008 • VOLUME19 • ISSUE 5 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR


**"Conventional" Wisdom**

Leading up to the 2008 National Association of Broadcasters spring convention, I kept hearing that attendance would be down. Indicators of this were announcements from certain groups (CBS and Clear Channel, to name two) that their people would not be attending. A lot of folks saw this as a harbinger of things to come.

Rather than attendance being down, however, the convention was very well attended – over 105,000 people, according to the NAB. While I didn't do a head count, I do believe that I bumped into or was elbowed by at least that many people, so I will testify that they were all there!

For me, it was the busiest show ever. I had a number of SBE commitments that soaked up a good bit of time. I did manage to sit in on a number of sessions in the Broadcast Engineering Conference, but not nearly as many as I had hoped to. I'll have to rely on my copy of the conference proceedings to bring me up to speed on everything I missed.

**The Unveiling**

I did spend a day on the exhibit floor, and a very good day it was. It started at 8:00 Monday morning, an hour before the exhibits opened. Our friends at Nautel had sent me an invitation to a private "unveiling" that was to occur before the show officially opened at 9:00. I was at the flagpole outside the north hall as instructed, along with a number of other radio folks and trade press people. A bagpiper was there playing.

Once everyone was assembled, we all followed the bagpiper into the building and exhibit hall to the Nautel booth. The booth, by the way, was a show-stopper in itself. On the west side of the booth was a mysteriously draped object, flanked by two security guards. Nautel president Peter Conlon made a brief announcement accompanied by a PowerPoint presentation on the giant video screen overhead, and then the drape was removed from the mystery object, the all-new NV40 44 kW capable solid-state FM transmitter.

What's the big deal about a solid-state FM transmitter, you may ask? Several things, actually. First, its single cabinet fits into the footprint of a conventional 30 or 35 kW tube-PA FM transmitter. Until now, it was necessary to combine two 20 kW solid-state rigs to get this kind of power output, and that arrangement took up a lot of floor space – a big deal in space-challenged locations. Another significant advancement is that this rig can produce 35 kW FM+HD, far more than any competitor's single-transmitter product that I am aware of. And there are many other features of this rig that make it very attractive for broadcasters, including an internal harmonic filter, a 17" touch screen interface, a web interface that includes all of the local functions, digital exciter with adaptive pre-correction and a plug-in no-moving-parts HD Radio Exgine.

The interface includes some great diagnostic tools, including a spectrum analyzer display and a constellation display of the digital carriers. You can, without getting your analyzer out of the box, see at a glance how well the transmitter is performing in both the analog and digital domains, and with the web interface you can do it from virtually anywhere.

Another product unveiled by Nautel at the convention is the NX50, a single-cabinet 50 kW AM transmitter that fits into the footprint of a tube-type 1 kW transmitter. We have seen small 50 kW transmitters in prior years, but this one is unique because of its overall design and user interface. It includes most of the stuff I mentioned about the FM NV40 above such as the 17" touch screen and web interface, built-in spectrum and constellation analyzer and adaptive pre-correction (as far as I know, a first for an AM rig).

The NX50It also includes real time load analysis, something many of us out here in the real world have been asking for (see last May's *Local Oscillator*). With this rig, we can quickly ascertain the effects of pattern/load adjustments on the load seen by the power amplifiers. With the past generation of transmitters, in situations where the load orientation is hyper-critical, the only indication that a "touch-up" of the pattern parameters had negatively affected the load orientation was chirps and dropouts in the digital signal, usually observed on the drive back to the studio. With the NX50's real-time Smith chart display, the engineer can know that everything is right before leaving the site or else take action to correct it – all without taking the vector network analyzer out of the case. That's a huge improvement!

The adaptive pre-correction, which includes envelope equalization, AM-AM correction and AM-PM correction, will also be a huge help in keeping the digital performance at its peak, and it will help station engineers keep their AM emissions within the FCC and Ibiquity masks.

Nautel also introduced a remarkable piece of engineering that it termed "HD Power Boost." This technology is a software (DSP) method of optimizing the peak-to-average power ratios, an improvement on the Ibiquity algorithm. This piece of code reduces peak power requirements, allowing any FM transmitter using it to transmit higher digital power levels and improving efficiency.

NAB2008 was about much more than Nautel, but I was really impressed with the company's engineering efforts over the past year, and for several reasons. First and foremost, it was clear from the company's offerings this year that they listened to us. At the last show, I met with Nautel's Tim Hardy and several others, discussing real-world needs and issues. I know that Nautel met with a number of others as well last year, and I had several follow-up visits with them during the course of the year. The Nautel products unveiled at NAB2008 addressed all of the concerns that I raised and then some.

Another thing that impressed me was the speed with which the company developed these concepts and turned them into real-world production equipment. That sort of thing usually takes years, not months. This is exactly the kind of thinking that we need in the fast-paced, rapidly changing technology world we live in today.

None of this is to diminish the fine products that Nautel's competitors offer. I am still perfectly comfortable with BE and Continental products, and we will continue to use those products in legacy installations throughout the company. I am certain, however, that Nautel's big engineering push will be the impetus for smaller and better things from those other companies in the future, and that will be good for all of us.

We ordered an NV40 for WMUZ at the show. I plan to meet Nautel's Gary Liebisch in Detroit early this month to go over the specifics of the installation. The WMUZ transmitter room is another one of those space-challenged locales that the NV40 is designed for. Delivery is slated for December.

We will also be installing an NX50 at KCBC late this summer. I know Steve Minshall is salivating over that.

**Other Observations**

It seems that it is becoming clear to a number of people that the "transmitter" of the future is the streaming encoder. We have felt that way for some time now, and we have invested in some good streaming equipment and partnered with a streaming provider that can provide the kind of bandwidth and availability (i.e. "coverage") that we want for our stations.

The one thing that we have been experimenting with over the past year or so is audio processing on our streams. So far, Stephen Poole has won the contest, but he has cheated by using a six-band Omnia! Clearly that's overkill, and even with the preemphasis/deemphasis turned off it is hardly optimized for an Internet stream.

Several manufacturers have for some time offered stream-specific processors, units with coder-specific processing algorithms that will optimize the audio feeding the streaming encoder for the specific coding scheme used. This type of processing, really "pre-conditioning" of the audio, results in much cleaner decoded audio at the listener's speakers, free of the high-frequency artifacts and other objectionable "stuff" common to Internet streams.

Orban offers an economic and elegant solution with its PC card Optimod-PC. Simply replace the audio card in the streaming encoder with the Optimod-PC and you're off to the races. The problem with this, however, is compatibility. It puts Orban in the unenviable position of having to insure continued compatibility with ever-changing operating systems. But that's their problem, and I'm sure they will do a good job of it.

Omnia offers several excellent products, including the Omnia- 3-NET (which we use in several locations) and the Omnia 8X. We tried to demo an Omnia 8X recently but were unable to

because it requires a LiveWire node (there are no audio I/O connections on the unit).

Wheatstone introduced the VP-8 at the show that includes an HE-AAC processor algorithm. We'll be demoing one of these in Denver within the next month or so. The VP-8 also includes an HDC processor algorithm. We'll probably try one of these on both AM and FM HD streams as well.

Noticeably present this year was Ibiquity Digital. Ibiquity did not have a booth in the last couple of shows, settling instead for a hospitality suite. This year they featured a large booth in the back of the radio hall with a large number of HD Radio consumer products on sale. It was encouraging to see so many choices for the consumer as well as to hear about plans by auto manufacturers to offer HD Radio entertainment systems either as standard equipment or as an option.

There were many other great products and innovations that are worth mentioning, but space does not allow. I can simply summarize with the statement that NAB2008 was a good, well-attended show with many new products and ideas on display. Walking around the show floor, one would hardly know the economy was in trouble.

Everyone's perspective of the NAB convention is a little different. That perspective can be influenced by something as simple as which door that person walked in and what route he took through the exhibits. My take on this year's show was without a doubt "colored" by Nautel's big pre-opening splash. I look forward to reading some of the show wrap-ups in *Radio World* and other trade publications to see what some of those other perspectives were.

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

Hello to all from Western New York! The rollout of HD Radio receivers continues to be stagnant in Western New York. It has been well over three years since HD was first introduced in our region. However, retailers have not bothered to educate sales associates with pertinent information about HD-R, how it works and benefits received from digital broadcasting. Store shelves in the Buffalo market remain void of any HD-R receivers, including retail giants Wal-Mart, Circuit City and Best Buy.

The majority of our listeners that have purchased receivers have done so via the Internet or other on-line stores, and through retailers such as Crutchfield. Radio Shack, which came on board early by stocking receivers in their stores, has all but forgotten about HD-R. I recently contacted three different stores about purchasing an HD receiver, and each one reported that they had no stock available. However, they recommended checking with another store, as they showed inventory on hand (which was incorrect).

It's clearly apparent that retailers in this area have not been impressed with the benefits of digital broadcasting, are not backing it, and consider it to be a dead medium. I believe that as long as analog radio remains available HD-R will not be freely embraced and accepted by the public as the means of preferred audio entertainment. Will analog radio have to go the route of television and turn off the analog carriers to get the listening audience to purchase HD equipment? Time will tell.

**WDCX – Buffalo**

One of the first big projects I lobbied for after joining CBC back in 2002 was to purchase a generator for the WDCX transmitter site. Over the years, we had lost power at this site on a pretty regular basis, which equates to a lot of lost revenue. We purchased and installed a new Gillette 50 kW diesel generator, which has performed superbly each time it has been called upon. By my calculations, it has now paid for itself by keeping us on the air during power outages, some lasting a day

or longer. It is by far one of the best investments we have made for our transmitter site.

Speaking of the WDCX transmitter site, activities are gearing up quickly for the move into our new Thermo Bond building. The building was actually installed back in late October, but delay after delay caused us to postpone the move until after the winter months. The ice bridge has been fabricated and erected, along with all electrical work between the new building and the old one. I have done a lot of the pre-wiring between buildings, as we have to stay on the air while moving the transmitters and ancillary equipment over. I have a good plan in place that will enable us to continue broadcasting un-interrupted during the change over.

On Monday, May 12th, the movers will begin by moving the main transmitter into the new building, along with the BE FMi106 HD transmitter. While this is going on, our tower guy, Don Boye, will be moving the auxiliary antenna feed line from the old building to the new, along with the inter-city relay line, which provides CBC satellite programming and back-up C-band programming. The main transmitter will be temporarily patched into the auxiliary transmission line and put on air while the auxiliary transmitter (which will then be operating into the main WDCX antenna) and main antenna line are moved. Also interspersed within all this activity, the electricians will be busy connecting the AC from the dis-connects, and our HVAC crew will be installing the transmitter exhaust ducting. Cris has offered the services of Rick Sewell to assist in this project, and I am looking forward to meeting Rick and working with him on this project. Next month, I will give a full report on how the project went and include some pictures of the completed facility.

**WRCI / WLGZ – Rochester**

No one is safe from copper theft anymore. On a recent visit to the WLGZ-AM transmitter site, I noticed that the access gate on the fence surrounding tower 3 was on the ground. Upon closer inspection, I found that the bolts on the gate had been removed and the hasp had been pried away from the gate. Also, a couple of the fence panels had been pried off, giving a good look of what was inside the tower enclosure.

We were extremely fortunate that no other damage was noted. All the copper strap and ground screen was intact and undisturbed. However, I doubt that this will be the last we will see of this. All of the other five enclosures were secure, and nothing was noted that indicated any criminal activity around the area. I did, however, discover while inspecting the other enclosures that the roof on the doghouse at tower 6 has a fairly good size hole in it. It appears that bees have eaten their way through the roof decking! I have contacted a contractor to give us an estimate on repairing the roof, but have not received the quote as of this writing.

On another recent maintenance visit to the WLGZ-FM transmitter site, I found that the PA grid tuning capacitor on our Continental 816-R3 main transmitter was seized. I attempted to remove the cap and lubricate the tuning shaft, but was unsuccessful in my endeavor. I ordered a replacement cap which had been modified in recent years due to the old cap causing fires in the PA cavity underneath the tube socket. When I went to install the new cap, it became evident that it would not work with what Continental had sent me. A call to Bill Vandergriff at Continental parts describing the problem indicated that they did not send all of the modified tuning kit. A 1000 pF capacitor was omitted, which they sent right out. On Monday April 28th, I attempted to replace the part but was unsuccessful in doing so. I will have to enlist help from one of the staff members at WLGZ to assist me in getting the part installed. The mounting of the doorknob capacitor is in a location that requires another person to hold down the mounting screw while I attach it to the underside of the tube socket.

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**
**Tom Gardull, CBRE**
**Chief Engineer, CBC–Detroit**

One of the most frustrating engineering dilemmas is the randomly recurring problem. WEXL changed T1 vendors in January and changed T1 terminal equipment last September. We had a good run of trouble-free service between the WEXL studio and transmitter site until early April.

We started to hear an audio pop and fade on the air. We started to see red flashing alarms on the APT Oslo T1 audio codec. My first thought was to reboot the Oslo. The studio unit was closest, so it was turned on/off but the reboot only helped for a few minutes. A trip to the transmitter site was next and it had some better results. The problem would go away after the reboot, but would start up again after about a half hour. To keep good audio on the air, we switched to our ISDN backup audio, which we can remotely switch into the transmitter. Shortly thereafter, the alarms stopped and all was back to normal for a few days.

When the problem started the next time, I went direct to the site after switching to ISDN, but the reboot did not cure the problem this time. I turned the T1 circuit over to the vendor, who ran tests throughout the afternoon but reported back that evening as having found no problem. When I pointed out all the telephone cable problems troubling us over the past months, their tech claimed their test equipment was so sensitive that if a piece of metal was blown across the circuit, they would see the momentary short. McLeod is very certain the circuit is good.

When they were finished with their testing and returned the circuit to us, the circuit performed alright for a few days. Then the problem returned, they tested again with no faults detected, and the circuit started working again.

The next suspect was the terminal audio codec. APT said to swap the E1/T1 modules and see if the problem moved. It seemed as though the problem manifested itself mainly in the direction towards the transmitter site, especially because we got an 'RAI' (Remote Alarm Indication), which says the far end was seeing a problem. But swapping modules made no change.

We had gone seven days with no recurring problems. Then on a Saturday afternoon, the pop and fade audio returned. I discovered the flashing red Alarm while at the station on a different problem. WEXL went back to the ISDN for three hours and then all was clean.

Yesterday, Cris sent us a T1 circuit test device so we can do our own end-to-end analysis. Our vendor's tests were done by splitting the circuit and testing the halves. We might see something different by running different test patterns of the zeros and ones for longer periods of time from one end or the other.

I can also move some older equipment around. I still have the old QEI T1 CAT-Links available. I can change the CSU internal settings so to be compatible with B8ZS circuits instead of AMI and run WEXL audio the old way. It might show the circuit performance. I can also move the digital Oslo over to the new WRDT-Night T1 circuit, which is working without problems. If the Oslo faults then, we will know where the problem resides.
The long-promised Oslo software updates might be available next month. Perhaps the Oslo rep might find something when he visits to make the installation. But I hope the T1 E-Z Tester might show the way sooner.

**News From The South**

**By**
**Stephen Poole, CBRE, CBNT, AMD**
**Chief Engineer, CBC–Alabama**

First, I haven't had the heart to tell Cris this… I'm just going to let him read it here. (Call me a chicken.) The mariachi band at our favorite local Mexican restaurant has disappeared! I don't know where they've gone. The joint now has some guy with an unpronounceable name playing guitar on Wednesday nights, doing what they call "Continental Stylings." No more "Sweet Home Alabama" and "Eee's a small worl' after all ..." with a horrible accent! It's just sad.

But there is compensation for the loss of the Sentient Jukebox with Big Sombreros; to wit:

**Tarrant Calleth All Copper Thieves to Repentance**

The sadness is somewhat mitigated by looking at the images below. As much as any job like this can ever truly be completed, the copper repairs and security work at the 850 AM site at Tarrant are about done. We've got security fences, electric fences and asphalt in place; we have gate switches, all wired into the alarm system; we have additional sirens that are loud enough to scorch eardrums; and to complete the joy, we have strobes that go off when the sirens sound.

**Night security camera view of tower #3: Left -- normal. Right -- FLASH!**

And boy, do they go off! Have a look at these images, which are taken directly from the video system at the site. The one on the left is the normal nighttime view; the one on the right shows the camera's impression of a 220,000 candela strobe – off-axis, mind you. It's not even looking directly at the camera (there's a second strobe, too, looking to the "right" in this image… its effect isn't even visible in this shot).

Now *that* should get the attention of a thief, don't you think? It gets even better: I control the flash by simply using a relay to switch the 220VAC supply to the strobe units. I modified an old sync card to give me about a 1.3 second flash rate, but it's powered up with the units. When the strobes are idle, all power supplies drain off. As a result, when I initially power up the system, the first flash isn't very bright, but the second one gives the effect that you see above. Now, imagine that you're a crooked person who wants to steal copper from this tower base. Imagine that you've made it into the fenced base area – hard enough, what with the asphalt, razor wire and other pleasantries that we've added. Now, imagine that the first piddly flash gets your attention. What are you going to do? Of course! You're going to look up and say, "What was that?" The xenon tubes then fire at *full daytime brilliance*, a total of 440,000 candelas (give or take a few ten thousand), to encourage repentance.

The two strobe units are mounted at tower #3, on a frame that we built using treated lumber. The wood is attached to the ATU to prevent swaying, but the load is actually carried by the timber. Those flash heads are HEAVY and I didn't want to put that much weight on the ATU's support legs. The sync card is mounted in a separate waterproof box on the side. All wiring is in armored "seal-tight" cable to discourage tampering and to protect it from the elements.

In the words of the guy who runs that Oriental restaurant, "Happy! Flower! Sunshine!"

There are currently two strobes at Tarrant; to completely cover the site, we're going to add a third later when we get time. It's a beautiful thing, and after seeing how well it works, we also plan to install one strobe each at the WDJC-FM and WYDE-FM sites. A single flash will do nicely for them, because those compounds are so much smaller. I have about six strobes left that still function (as I mentioned in a previous issue, these were removed from the 1,300-foot tower in Cullman). If some of you other guys are interested, maybe we could ship a spare one to you. Just don't look directly at it when it goes off!


**Tower strobes are post-mounted inside the base fence**

Hey, this was Cris's idea, and as promised, I have purchased a NASCAR hat and am sending it to Denver. He is now an Honorary Redneck™, with all the rights and privileges conferred thereby. He even has the right to scream, "Hey ya'll, watch this!" while driving his four wheeler at breakneck speed down a 75 degree incline. BUT... he must wear the hat backwards, or it won't protect him.

**Red Mountain**

Another year, another transmitter building. We have been badly delayed on moving the WDJC FM equipment into its new shelter on Red Mountain, but we have finally started work on that project as I write this. In fact, just today, we were at the site checking the electrical and getting things ready for the move. Several years ago, I got stung when the 3-phase delta's "wild" leg ended up on some outlets at the new WYDE(AM) building on 1st Avenue. Red Mountain is delta as well, so I wanted to (re)-check the phases before I began permanent power-up.

That was especially important in this case because we'd already had a problem: one of the modules in the Scientific Atlanta TVSS exploded when we initially applied power to the building. Since we were so busy at Tarrant, I just killed the distribution panel and let the building lay idle until we had time to investigate. Since this is a delta, there are two 120V modules and one 277V unit. I was already pretty sure of the cause, and I confirmed it: the phases were crossed up and one of the 120V blocks was on the "wild" leg. (For those not familiar with the term, it's called the "wild" leg because the actual voltage depends on the load and can vary in practice from 170V to 240V above ground.) I repaired that today, then checked the HVAC units. They were crossed up, too; the compressors wouldn't come on. We'd prefer a 3-phase "wye" service, of course, but that's not an option at Red Mountain. For one thing, the generator is hard-wired in a delta configuration, so we'd have to spend a ton of money to get everything converted to a "wye" now. Not a problem, but no one should be surprised to see Stephen walking around with a meter in his back pocket, checking each outlet before he plugs anything in!

**Rant: Made in China! (You Pay Five Dollah, Love Long Time!)**

I've been so busy with Tarrant that I haven't had a chance to indulge in a good rant for several months. This one has to do with the quality of the merchandise that we purchase nowadays – from personal items to industrial supplies. "Rebranding" has become the name of the game. It started many years ago. For example, even back in the 80s, if you bought a VCR or a television, it was actually built by one of only a handful of manufacturers in Asia, in spite of the fact that there might be a "famous label" name brand stamped on the case. People would literally buy the identical unit under several different names.

Most people don't realize that the cost to service that unit is built into the price as well. To use the example just mentioned, two manufacturers might sell exactly the same HDTV, but with different warranties. If you buy it under an "off brand" name you pay $600 for it, but with only a 90 day warranty. If you buy it under the major brand name, you pay $900 and get a two year warranty.

Years ago, there was a famous television manufacturer whose slogan was something like, "We're expensive, but worth it." They had a great warranty (5 or 10 years, as I recall) on those TV sets, but in fact, the electronics inside were the cheapest crap that they could find in Asia. Even if they had to exchange the *entire television set* two or three times, they'd still make a profit. The fact that the set had a very long warranty did *not* mean that it was built

better.

Here's the point, and you can take this to the bank: Especially with mass-produced consumer items, the length of a warranty doesn't tell you a *thing* about quality. You see, there are two ways for the manufacturer to do this. He can ensure that the stuff is well-built, well-designed and reliable, in which case his service costs after the sale are nice and low. Or... he can just buy the cheapest thing available, slap his brand name on it, then drown the cost of warranty repairs or replacement in that vast ocean of profit. The hardware that you buy in the little plastic packs from Lowe's nowadays comes to mind; it's called "galvanized," but it rusts in a heartbeat, and the heads will twist off of the screws in a minute. Lovely stuff, made in China, in spite of the fact that a well-known manufacturer's name is on the pack.

(And don't get me started on Chinese condenser microphones.)

This approach to doing business, sadly, has become only too common nowadays – it has even begun infecting the so-called "professional" equipment that we buy. Here's what the vendor misses: yes, you do make a ton of profit. Your stockholders will call you happy names and love you. But the poor customer has to put up with the aggravation of swapping and exchanging your junk several times just to get what he or she (quite reasonably) expected to get in the first place – something that actually works as advertised. In the long run, you will only kill yourself, because people will stop buying your stuff.

This is especially true nowadays, what with Web forums and chat rooms in which ordinary folks can vent their frustrations. In the plainest English that I can type, here's the truth: *Your sales pitch, your claims and your assurances are subject to daily, world-wide scrutiny now.* Before I buy anything, I do a Web search to see what people are saying. You'd be surprised. And *caveat vendor:* if I see a lot of complaints about something, I won't buy it. The most recent example for me is that I'm looking for a new automobile. There are several models that I have decided against precisely because I've seen too many complaints about them online. Those manufacturers have lost me as a customer.

What prompted this rant? Our video security systems are a beautiful thing, but we have had a surprising number of problems – so much so that I honestly have to wonder if our vendor even hooks up the stuff and tests it before selling it. (No, you don't have to answer that.) To start with, the PTZ (pan-tilt-zoom) cameras that we purchased simply wouldn't work with the DVRs (digital video recorders). The vendor apparently didn't know this. To his credit, he allowed us to send them back for immediate exchange for compatible units, but see above regarding "aggravation." We have also had camera failures and we're sending two of them back under warranty as well. We repaired a third camera ourselves to save time: the set screw on the focus ring had never even been threaded at the factory. It was a smooth hole. We just tapped it ourselves and remounted the camera. Finally, I appreciate the fact that the manufacturer includes free software to remotely control the DVR and PTZ, but wow. Just ... wow. I'm being charitable; it will hang in a heartbeat and it's so clunky, the PTZ is liable to spin in some random direction when you try to control it.

At this point, some other vendor will step in and say piously, "you get what you pay for." (Their meaning, of course, is obvious: "You should have bought from *me*, harrumph.") That sounds good, but here's the truth: anymore nowadays, even the "big name" vendors are doing the "buy cheap, re-brand, sell high, replace as needed" thing. I'm talking about some of the top names in the business, too. The only thing I can say in their defense is that they *are* more likely to test and vet the stuff before sending it out, and *maybe* (maybe) their companion software is better. Maybe.

And that's why I do a Web search before buying. You should, too.

I repeat: *caveat vendor!* These things will come back to bite you. Yes, you're under pressure to keep prices down and yes, that's hard to do with costs (of energy, for example, just to name one) going through the roof. But you'd better be careful, or you'll put yourself out of business. Remember: a carefully-crafted sales slogan and the best advertising campaign in the world won't stop the word from getting out -- on the Web, if nothing else. That's just my opinion, so take it for what it's worth.

That's enough for now; until next time!

**Gateway Adventures**
**By**
**Rick Sewell, CBRE**
**Chief Engineer, CBC–St. Louis**

Another month, and surely I am finally done writing about the Canopy project in St. Louis. Well, that was a topic that I thought I was done with as of last month's writing. But just when I thought I was done and ready to move on to other things, the system once again had problems.

As you may recall we began this project back in December in response to the numerous copper thefts that occurred on the Telco line that carried the T1 to the KJSL transmitter site. It was seen as the eventual replacement for the T1. The audio, telemetry, control, and satellite backhaul for both stations would be sent over the T1 to the KSTL transmitter site and then transported through the Canopy system to the KJSL transmitter site. We had hoped that the project would be done in mid-to late-January, but weather delays and issues with the tower crew caused us to have numerous setbacks. When the installation finally did take place in February, 50 mph winds the very next day turned the four foot dish on the KSTL tower, causing the link between the KSTL and KJSL transmitter sites to stop working. The tower crew had lost the hardware to a smaller bracket that contained a stiffening arm that helped hold the dish in place against horizontal movements. Obviously, this was the main issue with their installation at the time. Or so I thought.

We ordered the replacement parts and in early March, we set about getting the dish re-aimed. I really gave strong thought to having another tower crew do this installation. However, I went against my instincts on this one and let the tower crew try to make things right – after all, we had already paid them. They got it installed this time with the missing hardware and we had a useable signal, but it was still not at the level we had hoped to see. Still it worked, and we moved the KJSL Intraplex STL system to the Canopy in part because the KJSL T1 was once again hit by the copper thieves and the phone company left the patch lying on the ground.

Although we didn't have the signal level we had hoped for, the system performed adequately for the next month. Then we started to get some fairly strong winds and I began to see the levels deteriorate. I even heard some dropouts on the air. When these began to increase in number and duration, I knew we had a problem. When looking at the dish on the KJSL building, I could not see that it had moved a bit. It was hard to see a great difference at the dish on the KSTL tower – it is 255 feet in the air – but it appeared to have moved ever so slightly.

Obviously the dish needed to be re-aimed again. Another obvious thing was that we were not going to have the same tower crew come back and fail again to get this right. I called True North Tower Services, a local company that came recommended by our contract engineer, Bruce Cavins, who does work for us from time to time.

I asked them to re-aim the dish and see what they could do strengthen the installation. When they got up the tower, they once again found missing hardware. One of the main brackets U-bolts had no nuts or washers on one side. The large stiffening arm used for vertical holding and aiming had no nuts or washers where it attached to the dish. I do not know if they were just not there after the last re-aiming or if they were not tightened enough and vibrated loose during the weeks that followed. Either way, the prior tower crew had done a lousy job. The new crew did their best to re-aim it under the circumstances, but we needed to get new hardware and not just nuts and washers because the U-bolts had some stripped threads as well, most likely done by the previous tower crew.

I felt fairly confident that the current tower crew had a good knowledge of what they were doing. They felt different U-bolts would work better with the size of the tower legs, and they wanted to install an additional stiffening arm that would bracket to the horizontal cross member of the dish on one side and to the back tower leg on the other. The KSTL tower has three legs. It took a week for them to get everything they needed, so I decided to take the Intraplex STL system back to the T1 in the interim.

When the tower crew got back up the tower and replaced the hardware, we set about trying to get the dish aimed as well as we could before they attached the new stiffening arm. The best way to aim these dishes is to put the radios, mounted closely to the dish, into installation mode. In this mode, they emit tones that get higher in pitch the better they are aimed. The one problem in this particular installation is that crew aiming the dish on the tower had a lot of trouble hearing the tones with the winds at that height and a major highway bridge running right next to them.

They did their best, but could not seem to get the signal as good as we wanted. I had Bruce Cavins aiming the dish on the other end. He was better able to hear and made some major improvement to the signal level. But that still left us with trying to improve the aim of the dish at 255 feet on the KSTL tower. We decided that since Bruce could hear the tones better, he would relay back to me what he heard as the tower crew made gradual movements both vertically and horizontally. So with a cell phone in each ear, within 20 minutes, we had the dishes aimed better than we had ever had them before. In fact, the minimum data levels the system would pass increased by about four-and-a-half times what we had been able to get before.

With an excellent signal now obtained, the tower crew set about installing the new stiffening arm. This new arm was a two-inch diameter pipe, and with the way it is installed, I do not believe the dish will move again. The tower would probably come down first before this installation moves.

With the Canopy system running better than ever and in a stable position, one thing left to do was to move the Intraplex back to the Canopy system. I decided to do that the next evening, so as not to interfere with any satellite feeds. However, the next morning, the T1 once again had an issue. This time it was not due to copper theft, although you could say that played a part. The phone company still had that patch lying across the ground. A mower took out the T1. Fortunately, the ISDN wire that was running across the ground was not hit by the mower, and we were able to stay on the air using that. Well, waiting until that evening made no sense anymore. I first took the Intraplex at the studio back to the Canopy by changing its T1 card for an E1 card. I then headed to the transmitter site to do the same there, only to find that the E1card was completely dead. So I again reversed all of this back to the T1 because it was going to take awhile for the replacement card to get here from Harris. I then gave the phone company and earful about the fact that this line had been lying along the ground for almost two months.

At the time of this writing, that cable is still lying on the ground. I am waiting for the new E1card to arrive. Once that is installed, I believe we will have a stable system for years to come, and we will be able to cancel the T1 that goes to the KJSL transmitter site.

However, we still have one T1 in use, and that is the one that runs from the studio to the KSTL transmitter site, and both stations have their STL run through this. While this has yet to be hit by the copper thieves, you could presume that it is only a matter of time before it happens here. That is why the next task at hand is to set up a wireless Internet feed to both transmitter sites as an emergency audio backup. I am hoping to have all that accomplished by next month’s publication.

**Valley Notes**

**By**
**Steve Minshall**
**Chief Engineer, KCBC**

Stealing copper is nothing new to the broadcast industry. It has been going on for decades. The difference now is the degree to which it has escalated and the increasing boldness and sometimes stupidity of the culprits. I have had tens of thousands of dollars worth of Heliax stolen in the last ten years. On one occasion, the crooks were bold enough to unroll 350 feet of 1-5/8" Heliax down the street and cut it up in pieces.

My defense for Heliax thefts is simple. I never leave the stuff unattended until it is installed or moved to storage. It is a royal pain in logistics to get 500 feet of 3-inch Heliax to arrive at the same time as the tower crew. Do the calculations – the chances of delivery and a tower crew arriving at the proper time is almost astronomical.

We broadcasters just love to use large amounts of copper for grounding. It occurs to me that lightning has no problem whatsoever traveling down 500 feet of steel. So why do I need copper to take it the extra few feet to the ground? We don't seem to care that we radiate an RF signal off of a steel tower, and I have yet to see a tower with copper plating.

I think we use copper because it is really neat stuff. It conducts electricity well, that is obvious. It is easy to bend, drill and punch. It is easily soldered, silver soldered, brazed, even TIG welded. It lasts virtually forever under most conditions.

I think the broadcast and communication industries need to develop a new line of products to use for outdoor grounding and bonding. Heavily galvanized steel straps, grounding plates, cables and rods. Galvanized ground rods are already used in many localities.

Galvanization is a double-edged sword. The very attribute it has that provides corrosion resistance is also its own vehicle of demise. Galvanization is a plating of zinc. Zinc is the most giving of metals. It will give up itself to protect the metal around it. Zinc protects and disappears from metal do to electrolysis.

Think about how stupid we are about grounding techniques. We build a big steel tower and then ground it with copper wire, straps, and rods. Then we have galvanized rods anchoring the guy wires. The guy wires connect to the tower and make a complete connection between the zinc and the copper.

When you put a zinc rod and a copper rod into moist soil, you have made a battery. Connect the rods together and you have shorted the battery. Now we have current flow. With current flow we have electrolysis. Zinc, being the loving metal that it is, gives itself up to protect the steel under it. After awhile, the zinc is gone and the steel is left exposed. The electrolysis continues until one day, when the wind blows really hard, the weakened steel yields to the strain and the tower falls down.

I have seen this happen three times in my area. Once was an FM tower, once was a studio STL tower, and once was an AM tower. Yes even an AM tower with insulated guy wires. It is common practice to drive a copper-plated rod next to the guy anchor and "ground" the anchor rod. Let's see, we have a one inch diameter rod going ten feet into the ground and into a giant concrete block *and we need to "ground" it???* We use a copper plated rod? Can we say *"battery?"* Perhaps we should say *stupid, stupid, stupid!*

Maybe we should copper plate the anchor rods and "ground" them with a zinc block buried in the ground. In this case the zinc could still do the sacrifice thing and protect the copper and steel.

At one time I worked for a company, "Marine Radio Service." This company manufactured corrosion control systems for vessels. While working there, I had the unique opportunity to learn some of the concepts of corrosion control.

Have you ever wondered how a steel ship

can sit in salt water and not rust? The answer is corrosion control, and it is a process of electrolysis. Ships have zinc blocks bolted to the hulls to form a steel/zinc battery. The zinc disappears instead of the steel. More sophisticated systems have the zinc insulated from the hull and connected through a control system to keep the current at an optimal level.

What our industry needs is for standards to be set for grounding and corrosion protection especially in the light of the need to reduce the amount of copper exposed for potential vandalism and to provide better structural longevity to our structures.

The marine industry has experts in metallurgy and corrosion protection; maybe it is time to invite them into our world. Food for thought.

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**Catalina Tales**

**By**
**Bill Agresta**
**Chief Engineer, KBRT**

Greetings from Santa Catalina Island!

We are *still waiting* for some kind of physical response from our satellite Internet provider. You may have read my article in last months *Local Oscillator*, and well, basically nothing but more broken promises have happened since then. I inquired about us finding our own installer and paying him ourselves, but was then promised that someone would be here "first thing Monday or Tuesday of next week." Well, that has now passed and everything is still sitting in the same place it has for months.

The issue here is that even if I get an installer up here and we pay him ourselves, he still needs to work with the service company to get the system set up. This is one of those things that just drives me nuts. I'm reminded of this all day long as I look at this dish that I could easily align, but my hands are tied. So here everything just sits, unused.

Now, I must prepare for the next probable situation as the phone company has finally, yet very slowly, begun repairing the phone lines that were damaged in last year's fire. Yes, AT&T is just one more of the snail's-paced services I must endure here on a daily bases. The entire island west of Avalon has been dealing with intermittent phone service since the fire, and they are only now beginning to repair the lines. I have been keeping an eye on them and noticed that it took them one whole week just to set three poles, so this is going to take quite a while to complete. I expect to lose what is left of our phone service sometime soon, and I was really hoping to have our new satellite Internet service up and running before then, but for now, I've got to begin planning around that not happening. Never a dull day here on the island!

I provided some technical support for the Earth Day festival here on the island, and once again realized that more people talk and put on this kind of religious facade about how *green* they are, but that not many really make the necessary sacrifices to make any kind of difference to the environment. It's like this whole green thing has become some kind of fashion statement rather than a lifestyle. From what I have seen, the majority of these "earth friendly" folks put their environmentally-friendly faces on for special events, but they fail to follow through in their daily lives. Sadly, though, I also know a lot of "Christians" who live like this, so I guess this is human nature in a sense. It just seems like there is so much talk and big production pushing all kinds of ideas, agendas and methods lately, and yet there are very few who lead by example.

I will be getting back to finishing the installation of the new Nautel "B" exciter that Joel Saxburg and I started last month. With the NAB convention and all, we found it was better to wait until Nautel was back to normal operation and done with the excitement of the trade show floor.

From a technical standpoint, KBRT has been running extremely stable over the past six months – so much so that 90% of my work has been non-

transmitter related. With the fire of last year and the rains that followed, I now have plenty of weeds to clear and lots of general maintenance that needs to be done to and around our building and antenna field. In fact, it looks like I am now the mechanic up here as well, so I have begun some tractor repairs and will soon begin making some repairs to our truck.

Usually when I get into this mode, I find it hard to switch back and fourth between office stuff, air-chain maintenance and general property upkeep. Once I am out in the hot, sweaty and dirty field, covered with dirt and weeds, I just like to get it done before thinking about anything else. The thing is, once I begin this kind of work up here, the list always grows and never seems to end. Even as I write, I am remembering some more projects that will need to be done this summer, like the rebuilding or major maintenance of all three of our ATU shacks, several electrical repairs, and on and on. Just as I said earlier, there is never a dull day here on the island!

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

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**The Chicago Chronicles**

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

There is a date that, to me at least, will live in infamy in my mind where the FCC is concerned: November 23, 1964. That was the cutoff date for, among other things, grandfathering FM stations for operation close-spaced to second-adjacent stations, particularly class Bs. That date, and the FCC policy to which it is attached, needs to change, and I'll explain to what and why as the column unfolds.

One of our beloved Chicago market stations is WYCA. That call sign goes back to the beginning of this company. It started life, and for its first 42 years lived, at 92.3, with class B status here in Chicago (although licensed to Hammond). In 1997, Mr. Crawford acquired two other stations, WJPC-FM in Lansing, previously long known as WLNR on 106.3, and WEMG, previously long known as WTAS, licensed to Crete and operating on 102.3. Across time, both the religious format and the call sign have moved from 92.3 to the 106.3 frequency, and for the last few years to 102.3.

106.3 and 102.3 have histories which are not much different except that each station went on the air on different sides of that November 1964 date. That alone has made a huge difference in what has happened with them. WLNR went on the air in 1960 and has always been at the same location on the north side of Lansing, some 23 miles from downtown Chicago. It shared the air with two other stations operating on second-adjacent channels on either side and rather close by, in Elmwood Park, just west of Chicago, and in Des Plaines, about 40 miles up the road to the northwest. Such was WLNR's position as a grandfathered class A station that when WXFM in Elmwood Park on 105.9 moved its transmitter site up to the Sears Tower from its original short tower, a new location which was not only a lot higher (ya think?) but closer. The bigger station was then required to go directional to protect the smaller WLNR – and it still operates that way.

WTAS, on the other hand, also was short-spaced to two Chicago Class B FMs, being some 43 miles outside the Loop, but went on the air in late September of 1965, a few months *after* the above-mentioned date.

WLNR was able not only to stay at 3,000 watts ERP circularly polarized, but was actually able to raise its antenna height from 260 feet to 420 feet as late as 1986, staying at around 2 kW. Then in 2003, as WSRB, it was able go directional and increase its power (in the lobe direction) to 4.1 kW horizontal and vertical. Its pattern protects a station in South Bend, Indiana and in Gibson City, Illinois. But not the second-adjacent stations in and near Chicago. WSRB's signal is potent enough to make it a bona

fide Chicago station.

Another more stark example of a grandfathered station is WRZA at 99.9, now known as "Nine FM" and licensed to Park Forest, a south suburb of Chicago. WRZA started out life in about 1960 as WBIG, with a 6.1 kW signal on the north side of Kankakee, even though it's on a class B/C channel. Some time in the 80s, it changed to a full 50 kW operation at 500 feet with a transmitter site eleven miles north of Kankakee, this despite the fact that it had short-spacing issues with not one but *two* other stations on 99.9, in Benton Harbor, Michigan, and Janesville, Wisconsin. Under FCC rules at the time, all three stations were required to employ directional antennas that protected the other two stations---meaning no Chicago coverage for 99.9. About a decade ago the three stations reached an agreement that cleared the FCC and allowed each of them to go non-DA and accept mutual interference from the other two. Now, here's the joker in the deck: WRZA's main transmitter site is located *eight miles due west* of WYCA's Beecher transmitter site, and about 50 miles from the loop—and two second-adjacent class B FM stations, one located on the Hancock Center and one on Sears. This facility is the poster child for short spacing, and yet no Chicago station figured into the placing of this facility where it is, at its power level.

But wait, there's more! Come with me now to Joliet, Illinois, where there are not one but two grandfathered class A FM's, WSSR on 96.7 and WVIX on 93.5. Both were on towers in Joliet for over 40 years, the last ten years diplexed on the same local AM tower on the east side of Joliet, and, even then, short spaced to their second-adjacent Chicago neighbors under the 1964 FCC rule changes for FM. Recently, both stations moved off that AM tower to new, separate locations even closer in to Chicago. Again, second-adjacent interference to downtown didn't matter a whit where these moves were concerned. The fact that both were grandfathered was all the argument they needed to make the short spacings even shorter. Let the record show that WSSR, at its Joliet site, was operating directional. I don't know if that's the case with their brand new site, or what their new power is, since the FCC database is yet to be updated to reflect the new facility.

The most extreme case (I'm not saying "egregious" here) is that of WLEY in Aurora, which for years was content to have its transmitter site in Aurora, there running 17 kW ERP at 750 feet on Aurora's biggest tower. However, for over ten years it has operated with 21 kW at 740 ft. (still a full class B) a mere 23 miles from downtown Chicago, on the AM transmitting tower of WSCR, a 50 kW clear channel blowtorch, by the way. And yes, Virginia, there is a second-adjacent station on 107.5, WGCI, operating from the Sears Tower, itself at fairly low power of 3.7 kW ERP. Well, yes, La Ley, as it calls itself, *is* directional all right, but not to protect WGCI, but rather to protect a first-adjacent station up in Milwaukee, WVCY. Even more eye-opening, WLEY has an auxiliary site located even closer to Chicago, at Oak Brook, with 10.5 kW at 130 meters or so of antenna height. That's about 17 miles away from WGCI.

The point is that *all* of these stations are operating with substantially greater ERP than is WYCA, and with shorter spacing to their class B second-adjacent neighbors than is WYCA, but yet WYCA is only allowed to operate at less than 1100 watts ERP at 500 feet, at the present state of the rules. Note that none of these stations I have mentioned seem to have interference issues with their second-adjacent neighbors. Or maybe, nobody is paying attention. Maybe the public doesn't know how to complain. I don't know. For my part, I've not had an interference report on WSRB in years by a listener to Fresh 105.9. I get more gripes on WPWX with its 50 kW power and no second-adjacent issues. Well, almost. Read on.

It is clear to me, at least, that WYCA could and should be allowed to operate at full class A power for its antenna height, which means something like 2.65 kW ERP at 500 feet. Or, in the alternative, it should be allowed to operate with its presently-licensed power and antenna height at its community of license, Crete, which is eight miles closer to Chicago than is Beecher, from which the facility operates now. Note that, due to terrain issues, signal coverage to the south is unlikely to be affected by a move from Beecher to Crete. Crete sits on an area which is about 100 feet higher than is the ground in the area around it. It is apparently not a question of second and sometimes third adjacent interference. It is a question of a rather arbitrary Commission-imposed deadline, and the inability of a station to adequately serve its entire coverage area because of it.

Understand that WYCA's coverage area has been diminished across the last few years by both tropo ducting of the signal of co-channel station WXLC from Waukegan, across the atmosphere above Lake Michigan, and even more so by the digital signals of the two second-adjacent stations on either side of it, on 101.9 and 102.7 MHz. I'm not knocking that part of it. My column last month

alluded to the fact that the major interference issues have to do with the consumer-type radios, rather than the station transmitters themselves. However, I truly believe that those factors could be mitigated if WYCA could be allowed to increase its power to just get its original coverage area back. How many other stations are affected by this rule the way that WYCA is? I don't know, but it is probably more than a few. I'm sure that you, observant reader, can think of at least one or two in your neighborhood.

How could this changed be affected? Well, not by eliminating the deadline date, because I don't think that the FCC would go for that. However, how about moving said deadline up to, say, the date of the final report and order of FCC Docket 80-90, the Rule making which allowed the licensing of class A stations on class B and C channels, and also allowed certain stations on class A channels to attain class B or C power, depending on their location. The stations in my circle which now operate under those rules don't seem to be suffering to the extent that WYCA is. I know. I've built a couple of them. Still, it's an idea we could likely live with. Hopefully, the time has come to talk it up, especially now, in the era of the dawn of HD Radio. Pass it on. And look for a possible rulemaking petition on the subject sometime in the future. I'm not sure from where, but I hope that this article inspires one.

**Tax stuff**

In the last issue of *The Local Oscillator*, Cris mentioned that there are a *lot* of things we need to know in the process of being broadcast engineers, including accounting. That includes some knowledge of tax law, which wasn't included in the list.

For instance, I just learned, although Cris swears I should have known this by now, that there is sales tax on *shipping*, for crying out loud. Shipping is a service, not goods.

For as corrupt a state as Illinois is, they still haven't figured out to tax for services such as shipping, or for things such as software, or repairs to such things as computers. That's right, in Illinois, none of the above are taxed (yet).

Not so in Indiana, our home base, where both are. And it doesn't help that Indiana very recently raised its sales tax rate from 6% to 7%. Which means that our PORs here have to be modified, somewhere between Denver and Corporate.

Cris said that I should mention this in the Local Oscillator, so I have. A word to the wise....

**Telco stupidity**

A lot of us have had our rounds lately with the telephone company in its various incarnations. I'm certain that in other pages, you've seen the machinations of recent problems in Detroit, Catalina Island, and St. Louis. We've had our issue with telco here in Chicago as well, including a serious reluctance on the part of not one phone outfit but two to give us the ISDN circuit we need to meet our legal obligations in our new Rockford studio. In that case, we couldn't get an ISDN line at either a reasonable time frame or price from one company, and another one wanted to sell us *twelve* ISDN circuits (the equivalent of an entire T-1) instead of the one we needed. That company required a detailed justification of why they should lease us the line (answer: because not only do we want it – it's a legal requirement, jerks!). I'm sure we all could add a few other such examples of our own. I'd like to add one more, and this one really shows the phone company for the reputation of incompetence it deserves.

Copper prices are at an all-time high, as if we needed reminding. A couple of our AM stations have lost ground systems to thieves. Just as important, at least one station has lost its T-1 line to the thieves multiple times. Now, and this is for the benefit of any phone company folks who might be reading this, I have a dirty little secret: A fiber optics line, properly installed, has no intrinsic value to thieves, at least nothing near as valuable as copper, and has many times the signal-carrying capacity of copper in any case.

And what about the cost of fiber installation? Well, what about it? By the time all of the copper which a single fiber line would replace is recycled at the current market price of $3.00/lb., I'll bet that it would pay for the installation of the fiber line and make a tidy profit to boot! And the savings in having to replace the stolen copper and the cost of the loss of service to the client becomes merely a side-benefit. To that end, we've been campaigning with our telco rep to get the copper pairs going to our building replaced with a fiber optic line. That's over 100 pairs of wire we're talking about here. Think of the cost of the copper going way back to the CO, especially if it's the old 20 or 22 gauge stuff. And that doesn't count the copper pairs going to our near neighbors.

But hey, that's just me talking. What do I know?

**Phillip Dunlap**

As I was writing this column word came to us in the office of the passing of a dear friend to all of us here at Crawford in Chicago. Phillip Dunlap was as beloved a fellow employee as one could wish for

in any organization. Though he only worked here part time, and for only a couple of years, his attitude and work ethic endeared him to everyone around him. A more pleasant fellow worker no one could ever imagine.

Phillip was never in robust health in all the time we knew him, which wasn't long enough, as I said. When he was found to have cancer some time in the middle of last year, we prayed for the best but braced for the worst. Phillip underwent a bunch of painful procedures, but though they slowed him down, we never once heard a complaint from him. He kept on keeping on until he couldn't keep on anymore. More than a little reluctantly, and with a lot of sadness on the part of all of us, Phil was forced to retire near then end of the year.

We saw him once more, some time in February, seventy-five pounds lighter, walking only with a cane, very obviously frail. It was impossible to escape the obvious. This man, who had worked so hard on his way through life, was now about to get his rest, his comfort, though it was little comfort to all of us left behind.

Phillip died on April 22 of cancer of just about everything. He's at rest now, at Home. No one in my recent experience deserves to be at Peace more, and he's the kind of fellow who inspires the rest of us to live well, just so that we may be with him again, come the day.

May the souls of the faithful departed, through the Mercy of God, rest in peace, and let light perpetual shine upon them. Fare well, my friend, and may we meet again.

Until next month, blessings.

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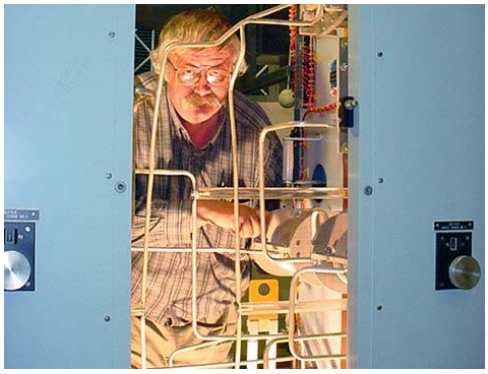
**The Portland Report**

**By**
**John White, CBRE**
**Chief Engineer, CBC–Portland**

On April 11, 1911, a record was set that they said would never be broken. Never again would it snow so late in the Western Oregon Willamette Valley. George Taylor, director of the Oregon Climate Service, said, "It was the latest recorded snowfall ever, which was a record I thought would never be broken." Just the same, on April 20, 2008, a 97-year-old record fell along with the snow. Records for the Hyslop station go back to 1889, one of the oldest long-term weather stations on the west coast, making April 20 the latest snowfall in 119 years.



The weather used to be one of the "safe" topics of discussion. Everyone had an opinion and no one was offended if your thoughts were different. So… I can hear you asking, "What does the weather have to do with radio?"

Weather impacts our business on a regular basis. Weather reports, local temps and time announcements are the required and seldom thought about program content for every radio station, only recently challenged for prominence by the ever-present traffic report.

For KKPZ, the snow also accumulates on three satellite dishes, none of which have heating or snow protection. Of course every time I have to go to sweep out the dishes, I think about adding heaters. The problem is that with snow once every few years, it's hard to make a reasonable justification for the expenditure. This year, I lost track of the number of snow events, something like eight or nine I think. Even so, that's still hard to complain too much about in comparison to Colorado or the upper eastern seaboard.

Snow in the satellite dishes pales in comparison to how weather impacts tower work. All the KKPZ towers are self-supporting structures, including the 170-foot communications tower (which is the runt of the bunch).

Work on the big towers is highly weather-dependent. The three main directional towers are all of the classic angle and bolt construction. A peg-leg ladder is placed on one of the tower legs. The pegs are placed on alternate faces of the outside angle of

the leg. The result is an extreme duck footed climb posture. Years ago, tower climbers would free-climb to the top, a trip of about 30 to 40 minutes in reasonable weather. That doesn't happen anymore. A while back, a fatality on one of the west hills broadcast towers focused Oregon OSHA on the tower industry. At first, a lanyard looped around the tower leg satisfied the safety requirement. Now, continuous two-point fall protection and full-body harness is required. Obviously, the time and cost to climb a tower has greatly increased as safety has been improved.

What does the future hold for tower safety? Safety cable tether systems are the latest push. All new towers are required to have a safety cable installed at the time of construction and retrofit is being strongly encouraged for any but the most infrequently climbed tower.

When weather is added to the mix, tower work is even more complicated. For whatever reason, the red band paint is very slippery when wet. I have experienced just how slick it is at the tower pier only eight feet up, it's very easy to slip on when the tower is wet. Now add wind to the mix. Mt. Scott is directly in line with the Columbia River Gorge, a natural wind tunnel. After rain, wind is a high safe working condition issue. I have seen absolute calm at ground level while part way up the tower, tag and load lines are at a 45-degree angle to the tower.

Temperature is another lesser safety issue. So far, there doesn't seem to be regulations imposing temperature limits. They may well come as ability to work for extended periods at low temperatures is limited. Just the same, if a climber doesn't feel safe, it isn't safe.

This winter, I have had personal experience with all those factors. We received new LED side lights last summer and scheduled the first available slot to install the new lamps. Wind plus an early and harsh winter took over (harsh relative to western Oregon, not Colorado). Then finally we had a break for two days a month ago. Loss of a tower guy on the coast took precedence on the scheduling.

So, as Paul Harvey says, now for the rest of the story. "What could happen next," you ask. Well, in early April, one of the beacon lamps failed. Not really a disaster – the other (working) lamp should provide time to get the lamps replaced. And then – you guessed it – April 20, 2008 was the latest snow on record. And now you know why I noticed the late snow fall record for Oregon.

I should add this post script. Last week we had one day of good weather followed by a day of acceptable weather with wind. The new beacon lamps are in and the LEDs are on.

**Rocky Mountain "Hi"**
**The Denver Report**
**by**
**Ed Dulaney, CSRE, CBNT, AMD**
**Chief Engineer, CBC - Denver**

**The Surgery Saga**

Well, this column wasn't even supposed to appear this month! Originally, I was scheduled to go in for surgery the third week of April. At the last minute, however, the surgery was canceled.

The doctor that was going to perform the surgery noticed that the MRI they had taken showed many more tumors in my foot and leg than they originally had seen. He was concerned that I might have "neurofibromatosis," which is a disease that causes out-of-control growth of tumors in the nerves. If that was what I had, then no amount of surgery was going to help.

Thankfully, with the help of a *lot* of prayers I'm certain, subsequent tests showed that I didn't have this disease. However I still do have at least eight tumors in my foot and leg, and they need to be dealt with. So, for the time being, they are going to try dealing with them using various medications instead of surgery.

And this is a good thing! I hate surgery, and I really wasn't looking forward to being laid up for six to eight weeks.

**Something Different**

I'm not much of a gadget geek. In fact, I usually avoid the latest gadgets like the plague! When I see things like the iPhone (which can now be bought for as little as $199 – compare that to the initial $599 sale price!) and the plethora of MP3 players, I usually just run the other way.

But I decided to go out and buy myself a gadget last month. However, this gadget will end up saving me a ton of money over the next year.

There is a device out there called a ScanGauge. It retails for around $179, though it can be bought for a lot less than that through places like Amazon and other online retailers. What it does is plug into your cars OBD-II port (that diagnostic port that sits near your knees) and gives you insight into the performance of your vehicle. It monitors quite a few different engine parameters, like RPM, intake manifold temperature, water temperature, throttle position and many others. But that's not what gives it the ability to help you save money...

Besides all those parameters, it will also monitor fuel flow, which translates into monitoring how many MPG you are getting. Then it has a built-in calculator that translates MPG into exactly how much money you are spending on your drive. For that feature, you need to input the amount you spent per gallon of gas when you last filled up the tank.

The unit does require that you take it through a few steps to calibrate it to your vehicle, but that was about as painless as it could be. You install the unit, fill up your tank, and tell the unit that you've just filled up. Then you drive around as you normally do. When your tank is down to about one-quarter full you fill up again and then tell the unit exactly how many gallons of gas you just put in. Bingo, it's calibrated!

One of the most interesting things about my Kia that I noticed was the difference it makes when you drive 65 on the highway instead of 55. For instance, at 55 I got about 24MPG... not bad for a 4WD SUV! However, when I increased my speed to 60 it dropped to 22MPG. At 65 it went down to 21MPG. Finally, at 75 it was a miserable 18MPG. So if I drive at 55 on the highway, I get 33% better gas mileage than I would by driving 75! At today's prices, that translates into just over $1.00 per gallon. Or, looking at it another way, if I would normally get 300 miles on a tank of gas, I would increase that to 400 miles on a tank of gas.

What fascinated me is that 50 MPH seems to be the break-even point for my Kia. Below that, the gas mileage didn't change much. At 50 the mileage is around 25MPG and it stays that way down to around

40.

So for us engineers that end up driving all over the place, something like this will show you the most efficient way to get from point A to point B. And it even saves you money on the drive to the office. For me, if I were to go the way I always went, taking the Interstate from my house to the office, I would spend $1.80 on gas. But if I take surface streets, that drops to $1.41. Yes, I have to deal with traffic lights, but apparently that's better than poking along at 20 MPH on the Interstate in a traffic jam!

So if that was the only thing I took into consideration, I'd be saving roughly $8.40 per month. I don't know about you, but I wouldn't mind having a little extra cash in my pocket at the end of the month! However, the savings will add up. Combine the $0.39 per trip to work with the savings you get from knowing the "sweet spot" for your engine. That could add up to over $20.00 in savings every month.

And you get a cool gadget that sits on your dashboard. For you gadget lovers (and you know who you are), that makes it all worthwhile!

**Listen!**

Last month, I played around with the audio processing on a couple of the Denver stations, in order to see what would happen if certain parameters were changed. I'd love to say that I found out something new and exciting from my tests, but that's not the case.

The results are exactly what anyone would expect from any sort of audio processing. As Frank Foti – or that other guy that shall remain nameless – will tell you, the harder you process audio, the more distorted it becomes. It's even possible to make an Omnia 6 sound grungy if you drive it too hard!

But I'm not telling you all this because I want to talk about audio processing. No, in fact I'm sharing this little story with you to illustrate a completely different point.

During my tests, I paid a lot of attention to what we were broadcasting on the station. I found out that certain songs sounded strange because of the processing. I learned that some of the PAD data that we were sending out was entered into NexGen wrong. I even noticed that the processing that I was using on the microphone was not "playing well" with the Omnia processor.

The key here is... I listened! I listened, not with an ear critical to the way the music flowed or to the way that the operator handled the segue, but with an ear to what made the audio sound "bad." And even though I really changed very little (with the exception to the input AGC on the Omnia), I spent a few days really listening to how the station sounded. I also know that 99% of the listeners aren't tuned into our HD audio, so I also listened quite a bit in analog. I paid attention to how different voices sounded and how well they mixed with the intros and outros of music. I listened to the "dry voice" segments to see what else I could hear. And I was surprised to learn that every mouse click and every chair squeak can be heard on the station (although I never heard any mouse squeaks... but I digress!).

This is a good exercise for every engineer to do. Just listen to your stations for a while. Try to pick up things that wouldn't normally be heard. Will it matter to a listener? Maybe not. But who can really say that for certain?

All I know is that I'm content with the way we sound right now. But I'll continue to look for ways to improve it.

**Lightning Season**

I'm rather surprised that we're not already into the lightning season here in Colorado. Usually by the end of April, we've had one good lightning storm. Perhaps that means that this year will be much quieter than usual.

But now is the time to make sure that your spark gaps are set properly at the towers. We've been in the middle of annual maintenance here in Denver, and I've taken a look at the spark gaps at the base of the towers. So far they've all looked like they're in excellent condition. But you can never be too careful. Those are, after all, the first line of defense against lightning strikes.

That's all for May from Colorado. Until next month... press on!

**Product Review**
**JVC AHD39**
**By**
**Amanda Alexander**
**Staff Engineer – CBC-Denver**

As many of you may remember, I bought a Dual XHD6420 late last year. This was a good HD Radio, and in my opinion, that's about it. I wrote about having issues with the CD player not working properly. After the article in *Radio World* was published, more things happened. I ended up calling Crutchfield and they allowed me and my fiancé to return our radios and get full credit back.


By this time, I had been looking around for a new HD Radio. I like Kenwood the best; however, they have not made a radio yet with a built-in HD Radio tuner. I noticed a "Sold Out" JVC KD-HDR30 radio. It is the upgrade to the KD-HDR1 that Ed Dulaney currently owns. This radio had everything I wanted: an auxiliary input on the front panel, easy display buttons and MP3/WMA compatibility. The only problem was… it was sold out!

It had been sold out for a month when I finally started talking to the sales manager at JVC. I was surprised he took the time to talk to me via email. I am sure he had more important things to do than talk to some girl in Colorado who wanted a radio. He told me they were making the HDR30s, but demand was too high for them to keep up. He sent me a link to JVC's "Arsenal" line and told me about the KD-AHD39. It was basically the same radio as the HDR30, except it was slightly better.


After doing some research, I realized the Arsenal line was for higher-end cars. I own a Ford Escape – nothing fancy. This radio, at the time, was only $159.99. They hadn't been released just yet, but he said they had recently shipped it to Crutchfield. I didn't see it on their website, so I called. They told me they did not have it but gave me the price. I went ahead and paid for it, not expecting to get it for a few more weeks. I guess that very day, they must have received the shipment. The next day I got my shipment notification and before I knew it, I finally had a new HD Radio to install.

The installation of the radio is very simple. Connect the Crutchfield-supplied vehicle-specific wiring harness to the harness supplied with the radio, and then just put it in the hole left by the other radio.

I was eager to play with it to see how it worked. I will admit I have never liked JVC all that much because I find the radios confusing. I would play around with Ed's radio every once in a while and just get confused. I don't know if it is the "blonde factor" or just because the radio isn't logically laid out. So, yes, I got the book out. I did not see anything anywhere about bass and treble controls as you would find on most radios. I found the balance and fade controls easily. I showed my dad the book and he quickly found it. I was looking for the wrong thing. JVC does their treble/bass controls with what amounts to a seven-band graphic equalizer. I am still not entirely sure how the frequency bands provided correspond to the sound I am looking for. I tend to tweak my settings from time to time to get just what I want.

I have had the radio now for about a month and I must say I love it. No problems yet. The AHD39 has an easy display button. You just push it and it comes up with what you want: time, station

frequency, title. The thing I really like is when an artist tags their CD with the music info, the CD player will read it and it will scroll just like it would for an MP3 CD. There is an AUX jack on the faceplate to make for easy connection of an MP3 player. There is also an easy-access SRC button to switch between the radio, a CD or the AUX input. There are 18 FM presets and 6 AM presets. This radio, unlike the HDR1, stores HD-2 and -3 presets. The faceplate is detachable so you can keep your radio secure when you are not in your car. There is also a surround sound decoder for HD Radio for those stations that transmit surround. It certainly makes the sound fuller, even if you only have four speakers like I do. The radio also comes with a small remote control, but it's so small that it could easily get lost.

One other thing I have found that I like about this radio, since my MP3 player audio is low when connected, there is an input level control that you can set from -10 to +10. By adjusting this, I was able to make the audio from my MP3 player the same as the rest of the audio from the radio. There is a "Hold" button that you can use when the station you are listening to switches back from analog to digital constantly (such as in a transition area). You can have it set on "Auto," which means if there is an HD signal it will decode it, "Analog," which locks the analog signal only so if the digital is weak, it won't switch back and forth, and "Digital" which – you guessed it – locks only on digital signals and keeps it from going to the analog signal. This feature has proved useful for me as there are a few places around Denver where the signal jumps back and forth due to power lines and terrain.

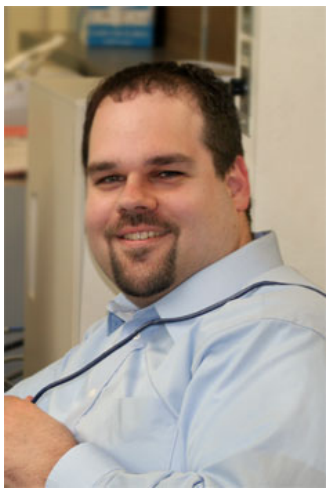
The radio has some optional add-on features such as the optional JVC iPod adapter, a Bluetooth adapter, Satellite Radio, and a CD Changer.

So far I have had zero problems with this radio. I have been very pleased with how it works. The audio quality is great. Everything was relatively easy to figure out. I would definitely suggest anyone who wants a good HD Radio and is willing to spend a little extra cash to go out and buy the JVC KD-AHD39. I don't think anyone will be disappointed. I know I'm not.

**Digital Diary**
**by**
**Larry Foltran**
**Corporate Website & Information Technology Coordinator**

**The Sign of Things to Come**

Be it mentions of copper thieves in *The Local Oscillator* or the leading story on the evening news, theft and crime seem to be an increasing problem in our everyday lives. This month, I've decided to take a quick side-step and focus on a type of theft that can strike everyone who reads this, but very few give it a second thought… identity theft. I've hinted in past months that I was a victim of identity theft a little over a year ago and just last month found myself in the crosshairs of thieves once again. Both cases were as unpleasant as can be, and I often try to spread the word about prevention and damage control. As much as advances in technology have increased the speed in which criminals can use your information, technology thankfully also helps you strike back just as quickly.



First the statistics. In 2007 alone, approximately 8.4 million Americans fell prey to identity theft. That equates to about $49.3 billion in money stolen as a result of identity theft. These types of thieves strike quickly and are able to do a lot of damage in a short amount of time.

As in most crimes, there are several different levels of identity theft and degrees of potential damage. Unfortunately I have experienced two different types, the most recent simply being credit card number theft. The first and most serious was the theft of my Social Security Number. Despite the fact that a person's SSN is a sensitive piece of personal information, many merchants and organizations have been using this in place of setting up their own tracking numbers. It's already established, everyone has one, and is unique to each person.

One thing I must say is that I'm not the type of person who freely hands out or exposes his SSN. Despite my caution, my SSN number did get into the wrong hands, and the authorities have a theory on how the thieves obtained my number. Once the wrong person gets a hold of your SSN, they are able to open lines of credit, cell phone accounts, utilities and a variety of other services without you even knowing about it. In my case, they were able to add themselves to my credit card account, increased my credit limit for their convenience, and even had an extra card sent to them with their "name" on it. Yes… I was quite amazed as well.

Although the details of my experience from that point on would make a great script for a made-for-TV movie, I don't intend to go over each thing that happened. In summary, I was able to close that credit card account just to find several more opened using my information. Their adventures consisted of trips to Las Vegas and Washington DC, both complete with rental cars and shopping sprees. The total dollar amount would make you sick.

So what can you do to prevent this to begin with? Quite honestly, I wish I would have known this before it happened. But looking at the silver lining, now I can hopefully save you some grief.

1. One of the most important things you can do is to regularly monitor your credit report. There are three credit reporting agencies from which you can request a credit report. These are Equifax, TransUnion, and Experian. Each will give you one free credit report per year, allowing you to check your credit report once every four months for free. This is one of the best methods for you to find out if someone is using your SSN fraudulently. Question any accounts you don't recognize or any credit checks performed on your history that you were not aware of. In most cases, a credit check will be performed prior to someone opening a new account using your identity. You also have the option of subscribing to a number of credit checking services online. These services allow you to check your credit history 24/7, provided you have a secure internet connection.

2. Refrain from giving out your SSN to merchants, organizations, or where it will simply be used as a tracking number. Most companies will be happy to provide you with an alternate tracking number if you request it. If they won't, than perhaps you should consider if you truly need to do business with them. Keep in mind that only in extreme circumstances will you be able to request a new SSN once yours is compromised. I was told by a representative at the Social Security office that new numbers are only issued if the person's credit is ruined to the point where they can no longer obtain loans. Even at that point, the new number will still be linked with the old number. Needless to say, you will most likely have the same SSN until the day you go to meet your Maker.

3. Assign a password to all credit card accounts. Credit companies typically require a SSN or personal information (mother's maiden name, etc) to gain access to your account. To prevent ease of access, you may assign a password to your account that should be very specific to you and, of course, secret. When accessing your account, you will be required to provide your SSN as well as your password.

As I mentioned earlier, Internet technology has made identity theft a crime that can strike at lightning speed. Thieves are able to use the Internet to quickly purchase items using their new identity or apply for new credit cards, doing plenty of damage before the victim can even react. But the Internet can also be used by the victim to limit the damage and react accordingly if certain triggers are set in place prior to the criminal ever getting his hands on your information.

Beyond checking your credit online, most credit card companies feature their version of alert systems than can be set by the customer. These systems allow you to set specific alert triggers, such as transactions over a certain dollar amount, the total balance exceeding a set level, or a variety of others, and have the system automatically alert you via email, text message, or an automated call to your phone number of choice. If a reported transaction is suspect, you can quickly contact the credit card company and close the account, limiting the amount of damage the thief can do.

Credit reporting services also have automated alerts that can be set. You may choose to be alerted of any change in your credit report, such as when a new account is opened or even if a credit check is done. Keep in mind that the faster you are alerted to a potential problem, the faster you can fight back.

Although these are only some of the ways to prevent and fight back against identity thieves, I hope I've been able to provide you with some valuable information to ensure your entity stays safe. The internet has provided thieves with the ability to strike quickly, but it also gives you the power to fight back.

…until next month!

**KBRT • Avalon - Los Angeles, CA**
***740 kHz, 10 kW-D, DA***
**KCBC • Riverbank - San Francisco, CA**
***770 kHz, 50 kW-D/1 kW-N, DA-1***
**KJSL • St. Louis, MO**
***630 kHz, 5 kW-U, DA-2***
**KKPZ • Portland, OR**
***1330 kHz, 5 kW-U, DA-1***
**KLZ • Denver, CO**
***560 kHz, 5 kW-U, DA-1***
**KLDC • Brighton - Denver, CO**
***1220 kHz, 660 W-D/11 W-N, ND***
**KLTT • Commerce City - Denver, CO**
***670 kHz, 50 kW-D/1.4 kW-N, DA-2***
**KLVZ • Denver, CO**
***810 kHz, 2.2 kW-D/430 W-N, DA-2***
**KSTL • St. Louis, MO**
***690 kHz, 1 kW-D/18 W-N, ND***
**WDCX • Buffalo, NY**
***99.5 MHz, 110 kW/195m AAT***
**WDJC-FM • Birmingham, AL**
***93.7 MHz, 100 kW/307m AAT***
**WEXL • Royal Oak - Detroit, MI**
***1340 kHz, 1 kW-U, DA-D***
**WLGZ • Rochester, NY**
***990 kHz, 5 kW-D/2.5 kW-N, DA-2***
**WLGZ-FM • Webster - Rochester, NY**
***102.7 MHz, 6 kW/100m AAT***
**WRDT • Monroe - Detroit, MI**
***560 kHz, 500 W-D/14 W-N, DA-D***
**WMUZ • Detroit, MI**
***103.5 MHz, 50 kW/150m AAT***
**WPWX • Hammond - Chicago, IL**
***92.3 MHz, 50 kW/150m AAT***
**WSRB • Lansing - Chicago, IL**
***106.3 MHz, 4.1 kW/120m AAT***
**WYRB • Genoa - Rockford, IL**
***106.3 MHz, 6 kW/65m AAT***
**WYCA • Crete - Chicago, IL**
*102.3 MHz, 1.05 kW/150m AAT*
**WYDE • Birmingham, AL**
***1260 kHz, 5 kW-D/41W-N, ND***
**WYDE-FM • Cullman - Birmingham, AL**
***101.1 MHz, 100 kW/410m AAT***
**WXJC • Birmingham, AL**
***850 kHz, 50 kW-D/1 kW-N, DA-2***
**WXJC-FM • Cordova-Birmingham, AL**
***92.5 MHz, 2.2 kW/167m AAT***

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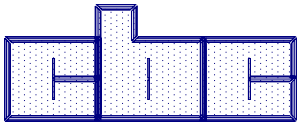

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