

Leaky Line, Leaky Life

Where Does The Water Come From?

AN ARTICLE

BY

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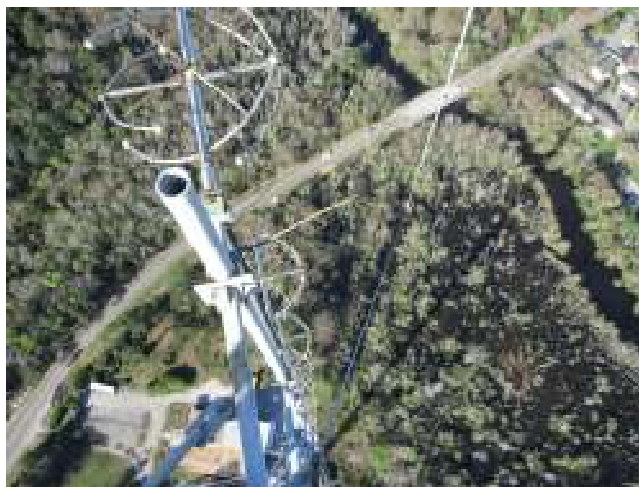
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Antennas have been called a lot of things over the years. When they perform their intended duties, they are dearly beloved members of the family. When they turn in to hateful, life ruining goldfish bowls, they are called quite something else. Many of you know the scenario but the longer that I fix broken stuff, I find that many of you have never enjoyed the experience of a line or antenna failure. To work in the biz and to have never observed good quality Line Sweeping, or if you have never gotten covered with soot from a line or antenna fire, you just do not get to claim that you have seen it all. It doesn't matter how old you are, or how long you have been in the biz, if you are not covered in greasy black Teflon soot, you are missing out on some very valuable life lessons. Perhaps one of the most important is to realize that the factories build these parts and deliver them to you but they Do Not Clean Them.

Here you are, your 12 bay shiny radiator is humming along with perfect numbers and for once this month Mr. Mangler (or Ms.) is off your case and you settle in for a coffee. The time is 13:48 and all is well. By 13:49 the air monitor becomes eerily quiet and there is a buzz of panic in the hallway. The bouncy and otherwise perky program people are suddenly milling toward you nervously confronted by the Jock on the air who is,, Wait for it,, NOT on the air. Sure you've seen this one before but the best is yet to come. This is not the usual power failure.

The transmitter site is an hour's drive that-a-way and the transmitter is mostly not responding to the remote control. Every time you hit run, it just won't. OK, from previous experiences you



believe that there is plenty of time to panic later and you hop in the ride and head to the hinterlands. An hour later and a few bugs on the wind screen you glide in to the mountain top retreat to hear all of the normal noises. The only item out of place is the locked on V.S.W.R. light. That panic that you reserved for later suddenly kicks in.

Press a few buttons, lower the drive and hit run while gritting your teeth. Ker-clunk once, Ker-klunc twice and klunk klunk a third time and you get locked out for real. Ok, panic is nipping at your heels. 37,000

Watts racked back to 3,000 Watts is not soothing the savage Watt meter and this is not looking good as your phone begins to ring.

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Congratulations you have a line or antenna problem.

Three kinds of fear grips your mind plus that panic you've been putting off grabs you as you ignore the ringing phone and you start to clammily step through your choices for a Line Sweeper and a Tower Crew.

Should you call the Mangler and let him know that you are about to spend \$10 to \$15 thousand dollars just to diagnose the problem while minimizing his rage by using the notion that this is not a combined site where you need everyone's mothers permission for a massive shut down, or should you just get on with solving the problem? Broadcasting is a pay to play game and sometimes management forgets this.

You call the Mangler and tell He or She that this is going to hurt and that you would appreciate if they would stop calling you which does not go over well as they screech that they are on their way out to the site as you hang up on them.

What in the Sam Hill is going on here? You notice that the line has no pressure in it. You notice that the pressure alarm is not working. You notice that you are out of Nitrogen and the dehydrator hasn't worked since dirt was invented. Nothing about this or your job is looking good.

When you inherited the job years ago, you found no data on the antenna. Shame on you. The factory claims no knowledge of this thing with your call sign, and during the last inspection when the millennium rolled over, the hardware was tight but you noticed that the antenna has not only a four port tuner in front of it. There is also an extra 6 foot long section with a big wrap of black tape on it. This usually means slugs to change the frequency of an antenna from a frequency no where near yours, but you have never had a reason to take it off to find out. What is this weird configuration and what went wrong.

Thank fully your favorite Line Sweeper is bored to tears and jumps at the chance to drive for hours to come and play. On his arrival, the line is opened in a convenient place in the room over top of the Aux Transmitter where a slip fitting adaptor is installed. Access to the line is gained and after a wide band and narrow band calibration is



performed, it becomes quickly and painfully obvious that the problem is upstairs. You actually say out loud that the antler was fine, everything looked great and at some point in your life, you had hair and wore Bell Bottoms. Famous last words.

The tower crew shows up just after dark and armed with tools and headlamps up they go.



With a rope in tow they put some test adaptors in the bag along with a small load and a jumper to bypass the tuner and slug section. 984 feet of climb just never goes one two three and when they arrive at the top, the testing begins.

Your mixed bag of three strange sizes and flavors of line reveals a great Time Domain and wonderful loaded line Return Loss of nearly 30dB with only 1.14dB of insertion loss. Whew, it's not the line. You didn't have any spares of the three kinds of coax anyway. The crew pops off the tuner and the slug section and jumps the trunk line up to the mid line feed Tee of the antenna with the fittings and short cable they took up, and you are greeted with the stunning 9dB Return loss that you had previously. Ok, the problem is the antenna and you have no aux or spare.

Externally the antenna seems fine. There are no heat marks, lightning burns, funny colored metal, or cracks. All of the insulators are in place and looking good. The manual purge valves are rusted shut and can not be opened but all the hardware is still in place. As you get right with your reality you realize that you have never had this thing apart, and you have never purged what ever gasses you stuffed in to it. You always figured that slow leak was enough to keep the gasses fresh and that water intrusion was not in your future. You never planned for a total pressurization failure because you had a working pressure monitor. Even though you kept asking for one of those neat new Nitrogen makers, you might be so fired for this.

Your Line Sweeper gives the instruction to pull the feed elbow at the middle Tee and you are greeted by photos of metal flakes and Teflon ash.

With bay 1 up top and 12 at the bottom, you tell the crew to pull the arm tubes off of bay 6 and 7 to see where the chunks are coming from. With the arm tubes from bays 4,5,6, and 7 now removed it is apparent that the chunks and water is coming from the top half of the antenna and the crew notices that all of the gaskets are flat with no grease. There is a lot of moisture along with some puddles in all of the now photogenic arm tube flanges. OK, let's pull bay 12's arm tube and see what happens. Wrratchet, wrratchet wrratchet and then there is screaming. There is something about it not being bath Saturday and antenna is full of water.

Bay 12 and its inter-bay tube reveals 5 column feet of water marking the inner conductor with a green crusty slime and every gasket is flat, brittle and greaseless. Replacement "O" rings we have, grease and hardware we have. Can we salvage enough bays, arms and inter-bay tubes to build a 6 bay?? We now take the entire antenna off if the tower.

With parts laid out all over the ample transmitter room and dawn approaching we believe that we have enough parts to build a 6 bay and with the amounts and types of trash that we cleaned out of the system we vote on limiting the TPO to 4kW instead of 37,000. 10 minutes spent with the tuner and plungers and with the slugs removed from the slug section we were able to go back on the air with an antenna tuned to below 30dB with some sort of symmetry.



To read the progress all seemed to go so fast and progress was so simple but of course the several hours of screaming is tough to write up.

WHAT DID WE LEARN:

Sailing along on the clear blue is a great thing but knowing that your monitoring and safety systems work for you, and not against you, is so often overlooked. Visual inspections are critical, but inspections are more than this. You need to look for that perfect storm of cascade failures that can spell the end of your job. Base line data on antenna systems is important. Proper documentation about EVERY piece of hardware in your purview is critical. Knowing that your monitoring ALL works. Test everything once a year. Touch everything once a year. Know that you performed a mechanical and electrical inspection on all of your systems at least once per year and then,, if it breaks, you can tell the Mangler that you did try. If you don't get what you put in the budget, you can carefully remind him that you did ask. At least you will get a Christmas card from your Sweeper and Tower rats. You might survive to go to another Christmas party.