

## DON'T DO THAT:

The Great Flood

By: Gary Minker



It was a typical day, like many other days in the office when the phone rings and a voice on the other end says, Hi Gary, Whatcha Doin? The well meaning social call is the kind precursor to the real root of the reason for the season.

Hey, this is Ferd and you know, I am with The Aardvark Channel and we have an issue here that I think I need your help with. Ferd is a pretty sharp guy and I know that anything that he tells me is only going to come popping out of his Mensa IQ after some considerable thought and then here comes the money question. Can you come out to the transmitter site, STL-1, you know,,, our only STL, is down hard with -99dBm showing and the fiber is having an old home reunion with a back hoe from the new water main installation since they took away our well and septic system. Ouch!

## DOWN HARD:

These are not the words spoken lightly by anyone who is now resorting to keeping his station on the air with videos from his Smart Phone. Fortunately for Ferd, I am just itching to get out of the office and go save the world. Poor Ferd, only one STL, and only one TSL and nere do the two cross functions in their unidirectional worlds.

It only took me 30 or so minutes to get out to the site and on my surprise there was a tower crew there waiting for me. I guess the jig had been up for a few hours and Ferd having gone through troubleshooting with me before on his Main 8" line knows that I like a climber to be there.

I learn that the system had been fading for several days and then bang, down it went. There is a small but pervasive air leak that has smoked the toy dehydrator often used on short runs of Elliptical, and the climber thinks he hears sloshing in the first low spot dip in the line at the base of the tower that is about ten feet in length before it climbs up hill in elevation to run in the ice bridge toward the transmitter room.

## WOW:

Who can argue with having so much great information handed to you right when you arrive? Ferd and his eager group have gathered up as many "T" size bottles of Nitrogen that they could steal from the other suites in the facility, and I send the climber up to the business end of the system with a short and a termination.

Radio in hand, I finish my calibration of the Vector Network Analyzer (VNA) and off to the races we go with several tries of let's see the short. OK, let's see the termination, hmmm. OK, back to the short. OK, hmmm, back to the termination, and all with zero change in either the Return Loss, or Time (frequency) Domain test screens which I am watching in a dual channel overlay configuration so I don't miss anything.

This line is Down Hard. Infinite insertion loss and no audio traverses through the blow hole like an old tug boat to the engine room. The collective decides that there could likely be up to a half gallon of water in the line from the magnitude of the sloshing and we decide to strip a few inches of Vinyl off the low spot and with pressure on the line to keep chips from entering the line, drill a very careful 1/32" hole in the bottom of a high spot annular ridge. With 5 PSI on the line, I could hear the shriek of joy from the climber hanging in his harness when the suspected half gallon of water came spitting out in to his lap. After about 4 minutes of hurricane force leakage, the line stopped peeing and started to just hiss. We applied a suitable hole repair to the holy spot and went on to continue testing.

#### JUST 1 CUBIC CENTIMETER:

In microwave 7GHz service just 1 vaporized CC of water can bring a good system nearly to its knees. With the majority of the blockage now gone, I could communicate with the climber through the Elliptical and with radio in hand a new insertion loss test revealed about 50dB of insertion loss which was a step in the right direction from infinitely toasted.

A search for a source of warm dry highly pressurized air was set upon around the facility and we found a shiny new shop vacuum. The climber installed a sock with tape to the top of the line and covered it with a bucket to insure that rain was not our enemy, along with a hose connection made to the line down below. The vacuum was set up to blow warm air through the line ,and after three hours of this treatment. On the three hour mark, was tested for insertion loss once again



Happily, a new and improved value to 23dB was seen, and the warm purge continued for another four hours. With fingers crossed and the senior staff still in frightened disbelief that I could be related to Lazarus of the R.F. world, the line popped up with only 4.3dB greater loss than the factory specification for brand new line and this was still not fully dried out.

#### NITROGEN IS A WONDERFUL THING:

With a savings of over \$23,000.00 in the bag as compared to replacing the line and being off the air playing smart phone videos for a month while waiting for a new spool and connectors, a Nitrogen purge protocol was initiated that I have designed. This protocol continued for a week with a 1.5 PSI popper valve at the top of the line to continuously bleed Nitrogen and moisture out of the system. Yes Matilda, we still have a leak to find but that can be done once the line is dry and time is on our side.

#### FULLY RESTORED:

With a week of purging at 1.5 nominal PSI using industrial grade Nitrogen from a Liquid Dewar and precision regulator, the line returned exactly to factory specifications and the leak was found. Pinched gaskets can take years to become problematic.

You're Welcome