

War Stories

Why did we do that again?

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Nautel



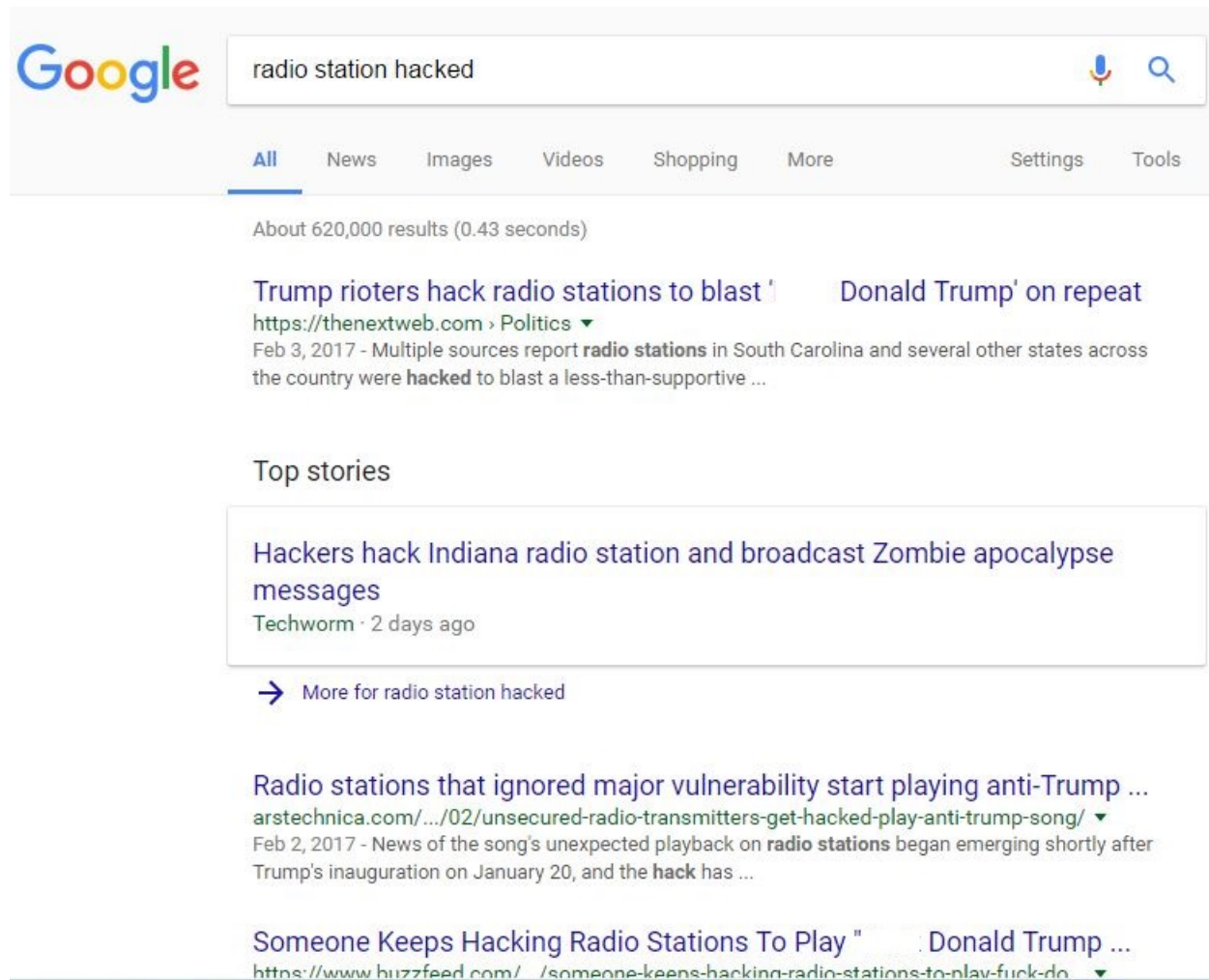
Making Digital Radio **Work.**

Overview

- When bad things happen to good equipment
 - What happened
 - Why it happened
 - How can we keep it from happening again?



IT Security



The image shows a Google search interface. The search bar contains the text "radio station hacked". Below the search bar, the "All" tab is selected. The search results show "About 620,000 results (0.43 seconds)". The first result is titled "Trump rioters hack radio stations to blast 'Donald Trump' on repeat" with a URL of "https://thenextweb.com > Politics". The snippet for this result reads: "Feb 3, 2017 - Multiple sources report radio stations in South Carolina and several other states across the country were hacked to blast a less-than-supportive ...". Below this is a "Top stories" section with a highlighted result: "Hackers hack Indiana radio station and broadcast Zombie apocalypse messages" by Techworm, dated "2 days ago". Below the top stories is a link: "→ More for radio station hacked". The next result is titled "Radio stations that ignored major vulnerability start playing anti-Trump ..." with a URL of "arstechnica.com/.../02/unsecured-radio-transmitters-get-hacked-play-anti-trump-song/". The snippet reads: "Feb 2, 2017 - News of the song's unexpected playback on radio stations began emerging shortly after Trump's inauguration on January 20, and the hack has ...". The final result is titled "Someone Keeps Hacking Radio Stations To Play 'Donald Trump ..." with a URL of "https://www.buzzfeed.com/.../someone-keeps-hacking-radio-stations-to-play-fuck-do-".

Google

radio station hacked

All News Images Videos Shopping More Settings Tools

About 620,000 results (0.43 seconds)

Trump rioters hack radio stations to blast 'Donald Trump' on repeat
<https://thenextweb.com> > Politics
Feb 3, 2017 - Multiple sources report radio stations in South Carolina and several other states across the country were **hacked** to blast a less-than-supportive ...

Top stories

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Someone Keeps Hacking Radio Stations To Play "Donald Trump ...
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IT Security...

Facebook x barix - Shodan Search x B Barix Instreamer KCCU-FI x Search Results ~ Salesfor x

Not secure | [redacted].index.html

Apps salesforce.com - Cust Tech Stuff Sales Imported Winter Time - Govern SNMP stuff Other bookmark

HOME CONFIGURATION STATUS DEFAULTS UPDATE REBOOT Instreamer 100 MAC: 00:08:E1:01:64:1E FW V04.04

INSTREAMER

BARIX
THE VOICE OF SIMPLICITY

Listen Online	Stream	Streaming Mode	send always	Help			
Active Connections		Format	MPEG1 / 32 kHz	Listen Online Click the link to get the online Shoutcast stream of the Instreamer (as M3U playlist) to play on your PC. For proper operation make sure you configure MP3 encoding and send always.			
	Audio Input	Peak Left	-63 dB	Active Connections Lists all active TCP and BRTP connections to the Instreamer. All TCP connections are listed. That includes web page access, Internet radios, raw TCP, Shoutcast and Icecast connections. A TCP connection is listed if and only if it's in the "established" state.			
		Peak Right	-66 dB				
	Input Source	LINE mono	LINE stereo		LINE ext ADC	MIC	
			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Status	ENCODING	<input checked="" type="checkbox"/>				
	RS-232	CTS in	<input type="checkbox"/>	set	clear		
		RTS out	<input checked="" type="checkbox"/>	set	clear		
	Contact Inputs	1	2	3	4	5	6
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Stream

Streaming Mode

- "send always" - the device streams permanently
- "send on CTS" - the device streams if

IT Security

- Use a firewall, block any ports that aren't essential to operation.
- CHANGE DEFAULT USERNAME / PASSWORD!!!
- For critical devices (most of them) consider a VPN – or put them all on a non-internet connected local network, then use a VPN to access it.
- Alternately, use a product such as TeamViewer or RealVNC to access.

Get Well Grounded...

- Grounding is important
 - Not just the installation, but the actual type of connection.
 - If you do it right, you won't have to redo it at night!



Get Well Grounded...



Ground rods are good – but they work better if they are driven straight into the ground. Preferably into the water table, or a chemically augmented ground point.

Get Well Grounded...



Good grounding can help to prevent the transmitter equivalent of a toe tag.

Grounding...



- What's wrong with this picture?
 - How can it be fixed?
 - What's missing?

Trim Around the Edges



This transmitter was always shutting back with VSWR alarms



Antenna System Maintenance



Ground Loops

Clean up excess wiring

- previous installs
- broken connections that were replaced

Keep ground connections to a minimum

- one per piece of equipment



Something Wicked This Way Came...

The purpose of grounding is not to prevent lightning (you can't), but to use voltage divider theory to help reduce the potential for damage.

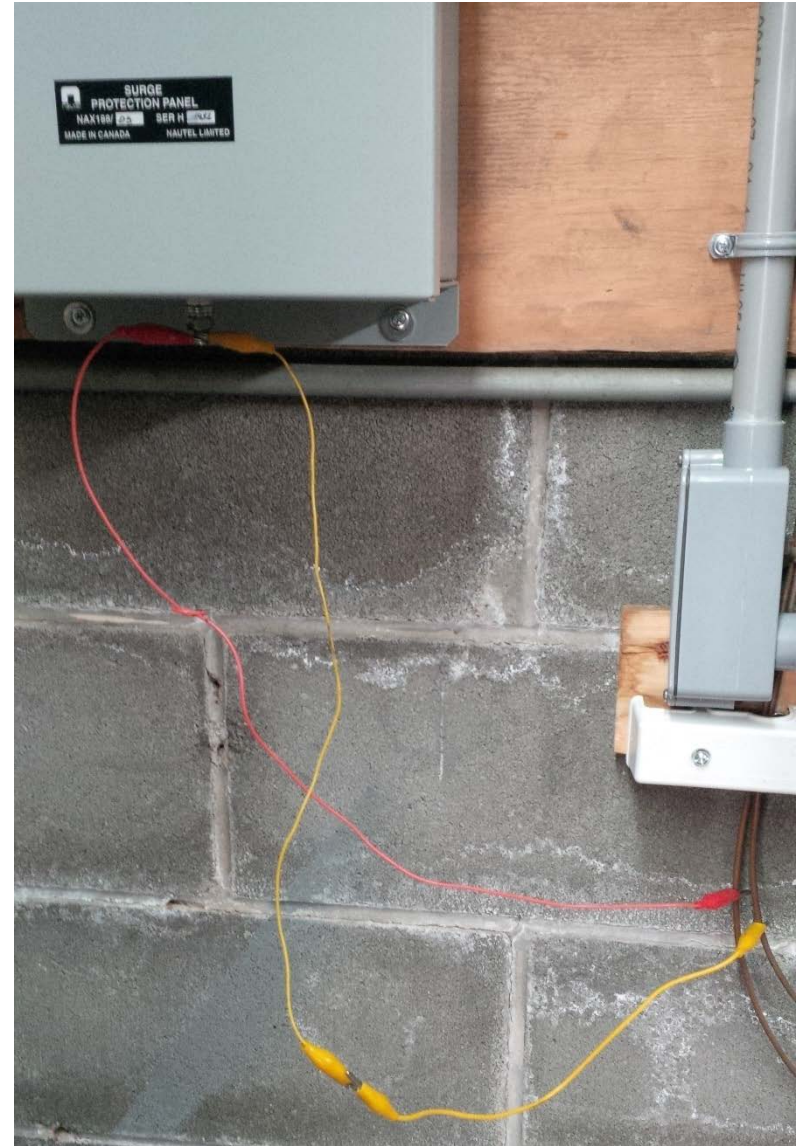


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Good Engineering Practices



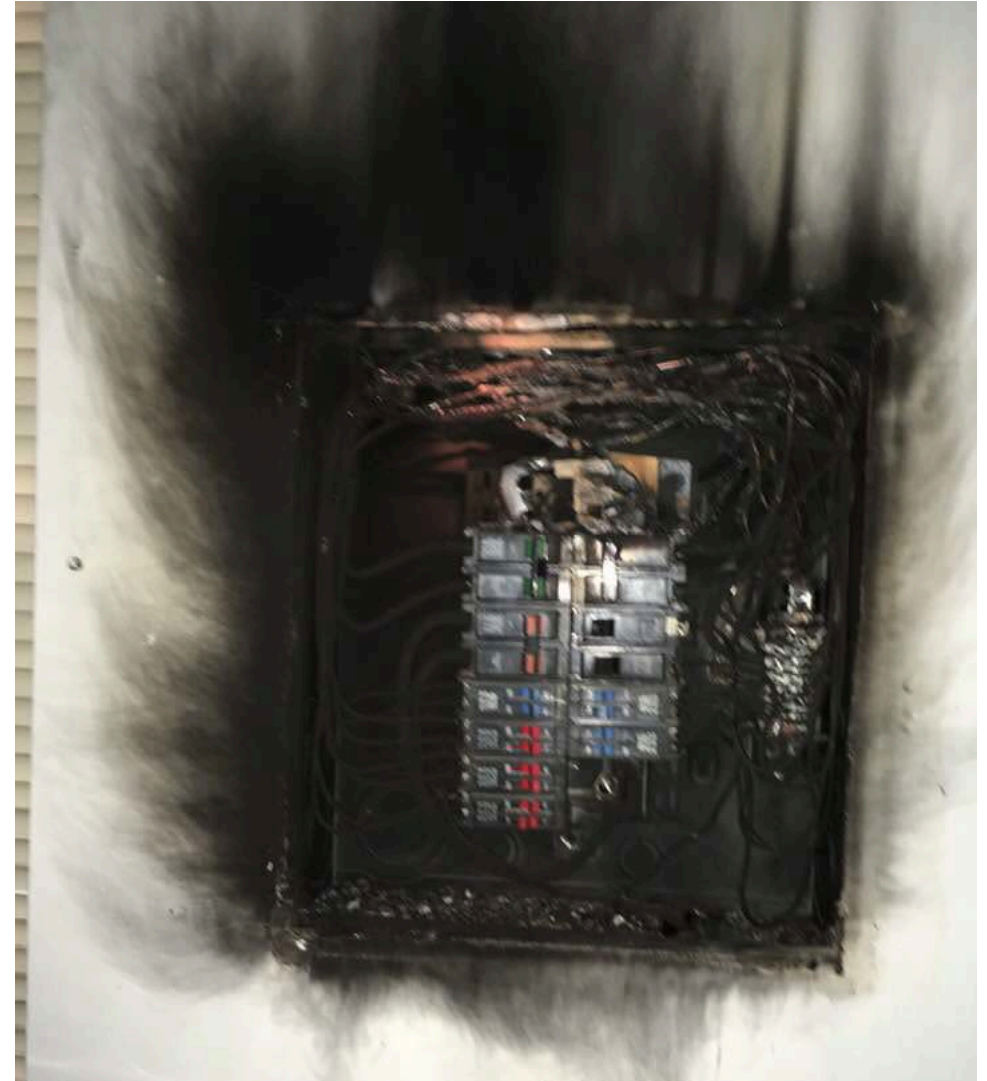
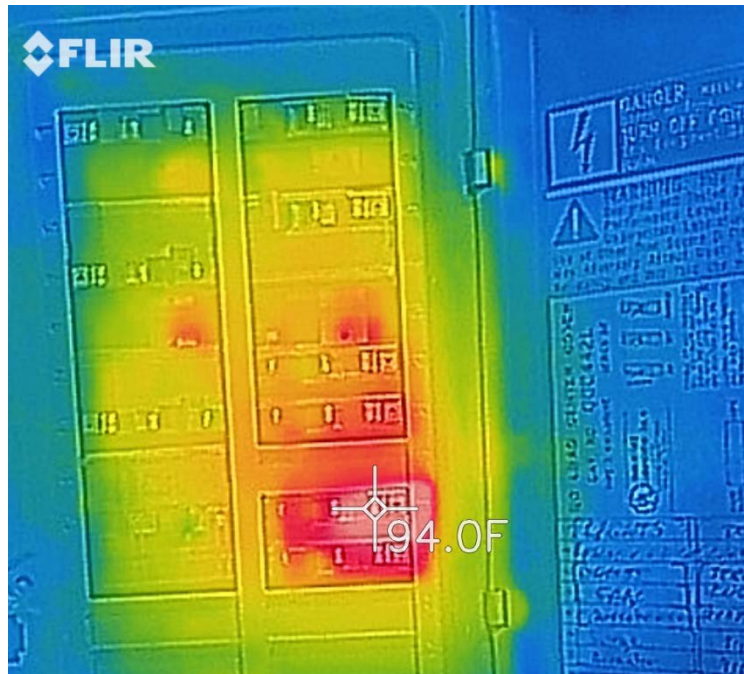
Photo credits: Rod Thannum, Northwestern Media



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AC Service...

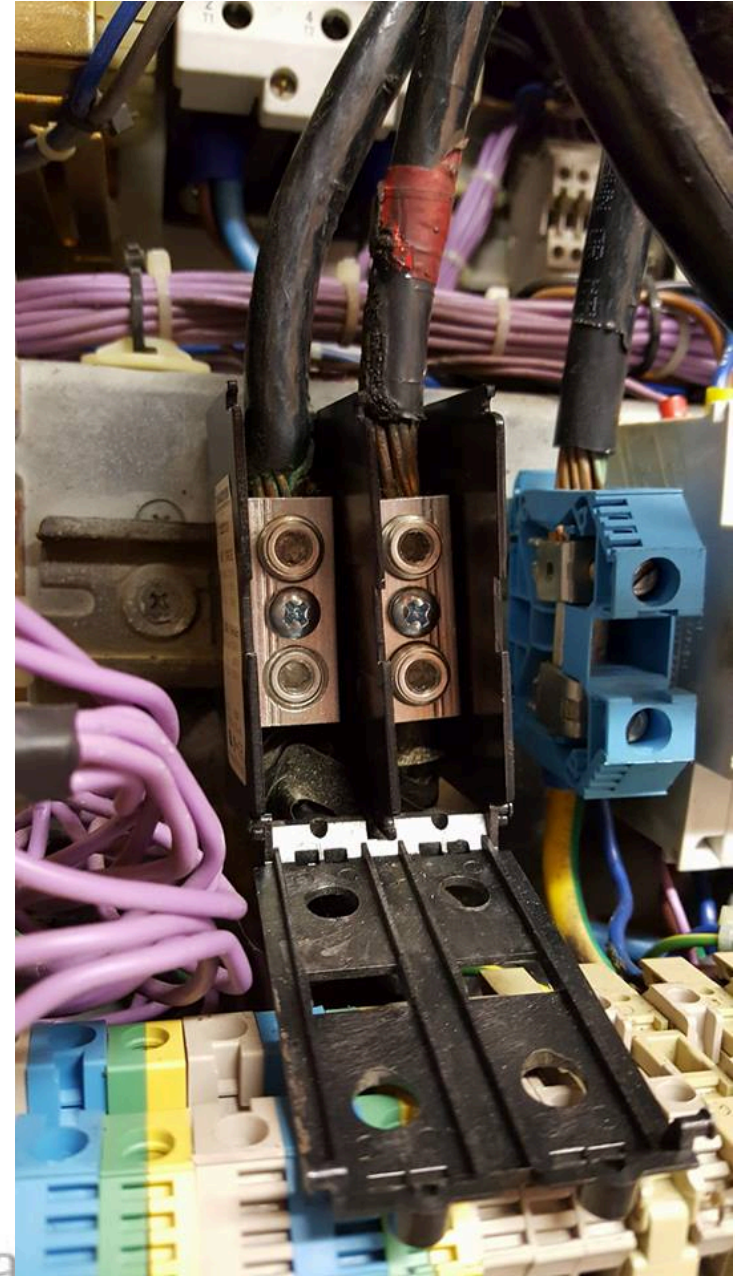
- Take time to review overall facility electrical layout!
- Do a thermal sweep
- Calculate branch loads
- Avoid surprises!



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Hardware

- Compression connections must be checked periodically



Keep Your Cool



This is an example of poorly considered airflow

- The gray rack is the transmitter.
- The silver pipe is the incoming air – directed away from the transmitter
- The hole below is the exhaust fan – pulling air AWAY from the transmitter air intake (the rear of the transmitter, or left side of the photo)
- This site was plagued with PA and power supply failures.
- Rerouting the airflow has solved that problem.

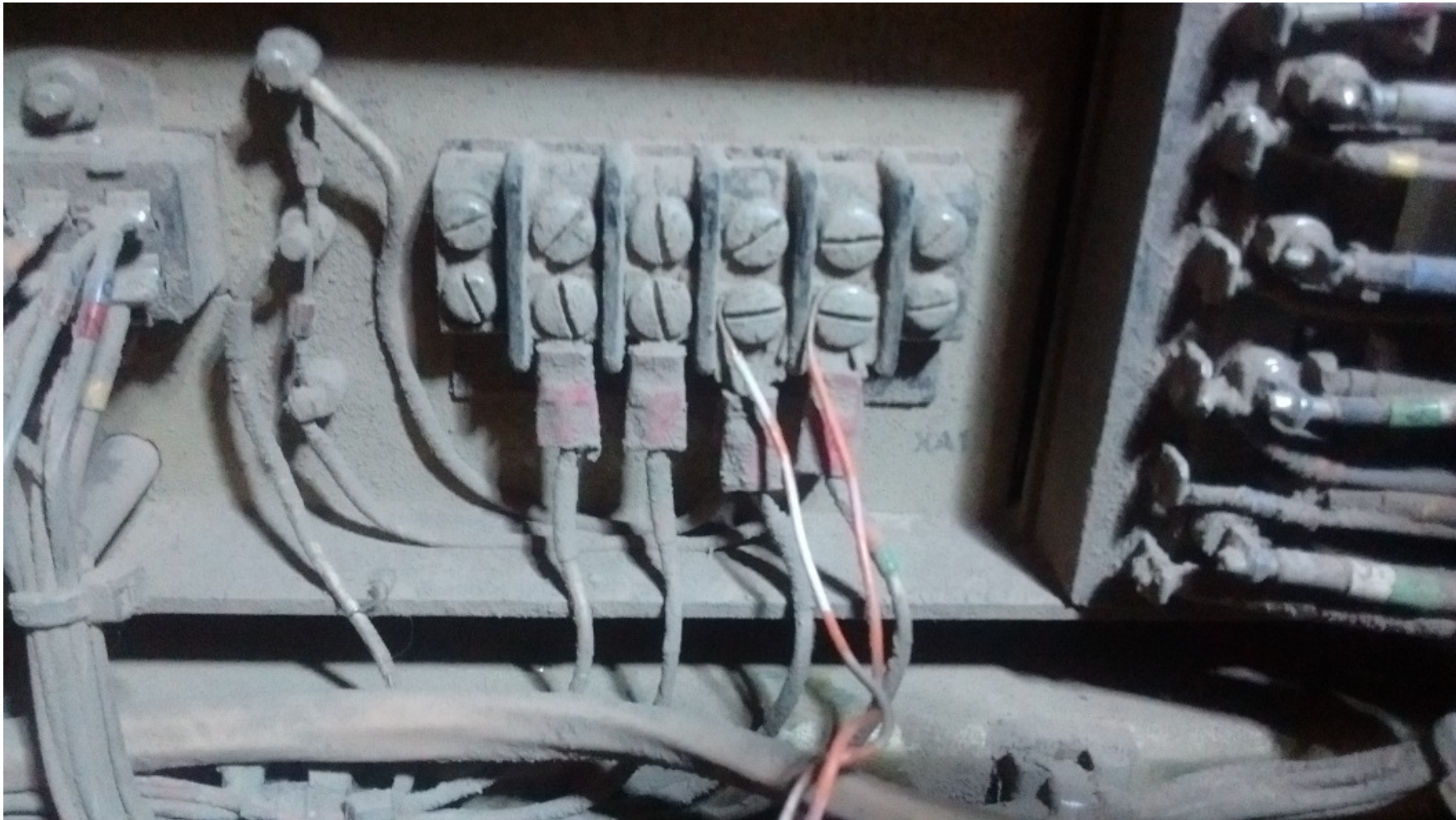
Maintenance

Not replacing
fan filters –
cost \$0.00

Except....



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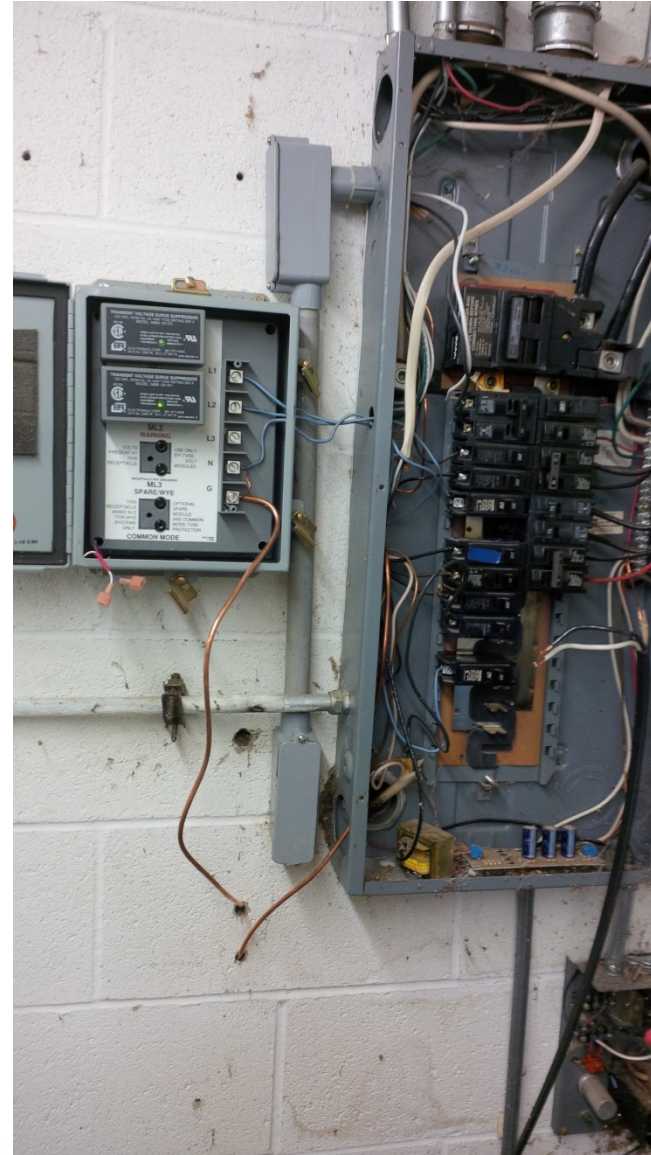


Maintenance

I'm the only one who's ever here...

- what if you're sick?
- or away?

Safety ramifications – and more legal issues.



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Were You Raised in a Barn?



WYZE

2019-01-30 14:33:11

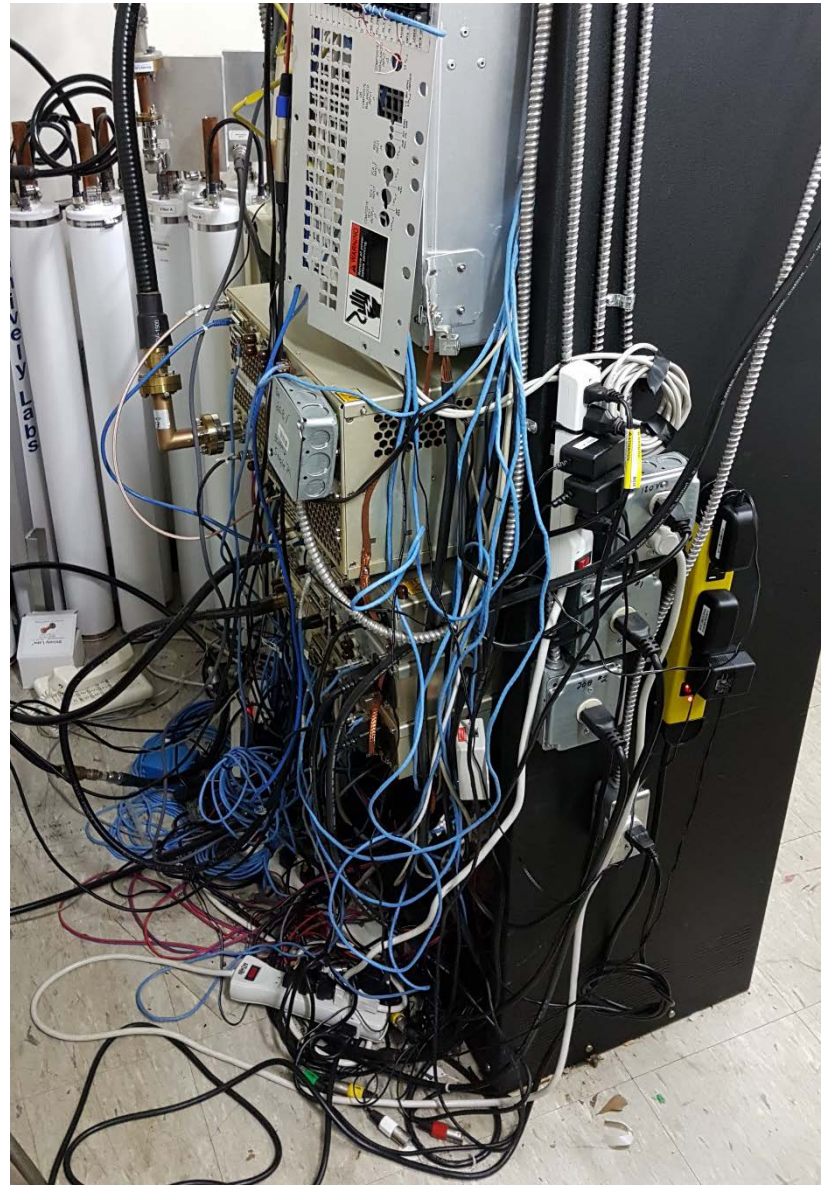
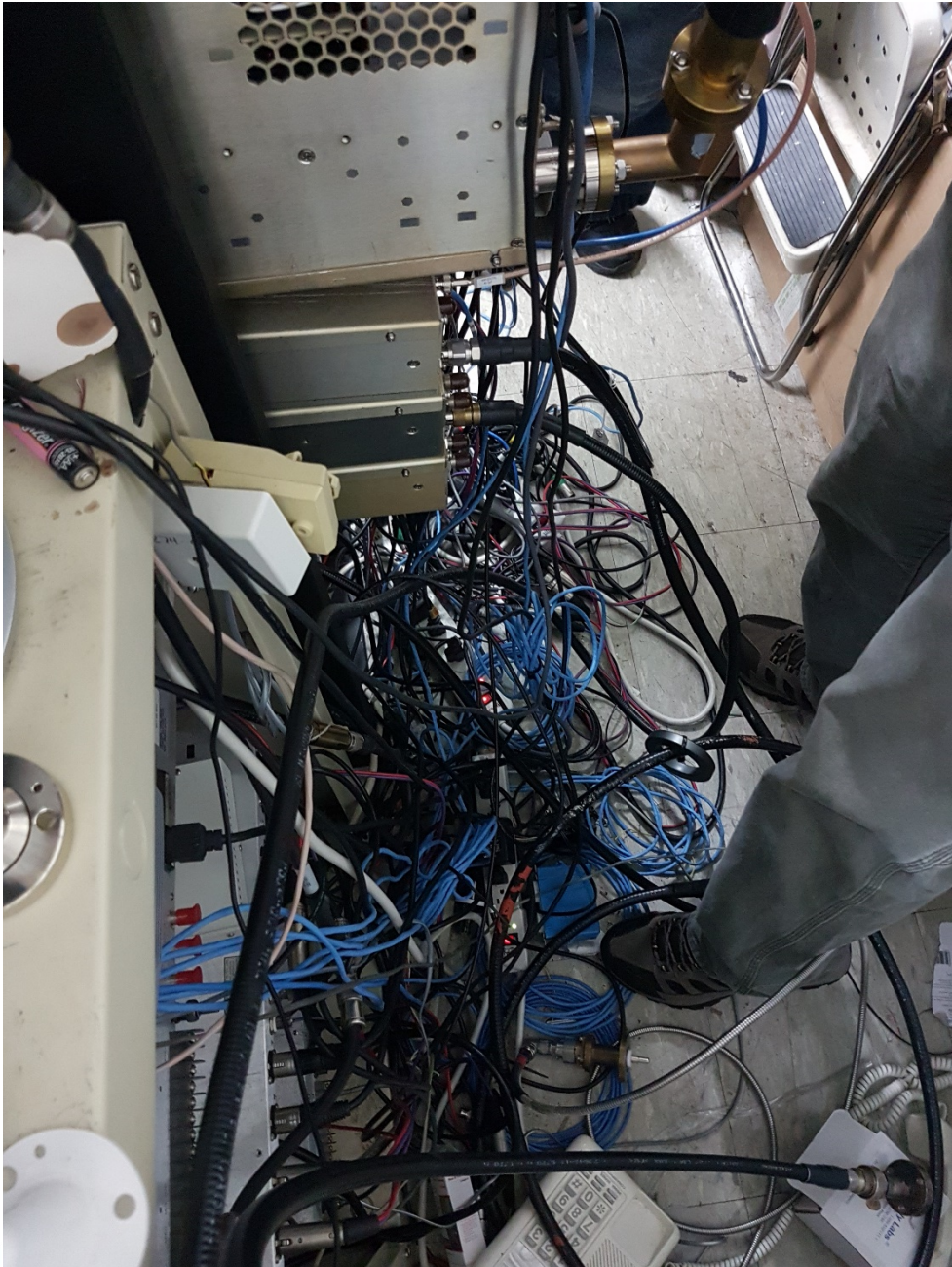


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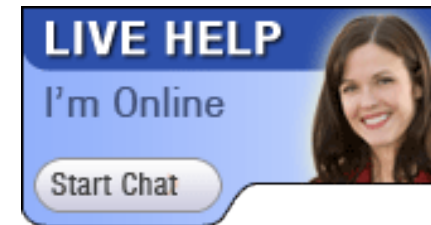
Maintenance



Sometimes it costs more to do things right, but there's less risk than doing things halfway.

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Thank you
for **50 years**
from all of us
at **Nautel**



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