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Install and Maintenance

Plan the Execution and Execute the Plan!

Ideas for things to discuss

- **What are the gotchas?**
  - The things that are easy to miss, but can cause big issues (like blower belts)
- **What are the "must haves"?**
  - Things that no transmitter site should be without (a first aid kit?)
- **What's the obvious stuff?**
  - Sometimes, it's the most overlooked (like generator testing)
- **Other thoughts?**
  - How to improve the state of the average site?
  - How do we sell it to management?

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Installation considerations

- Points to Consider:
  - Accessibility (can the delivery truck get there?)
  - Moving (will it fit and do we have the manpower?)
  - Plumbing (where does the coax enter and will it interfere with air handling?)
  - Grounding (too much can be as bad as not enough)
  - Things to remember (the “gotchas”)

Accessibility

- Remember details like:
  - Can a truck get in the driveway without sinking?
  - Is a lift gate required and are there steps/railings in the way?
  - Stairs – if using a stair crawler, vertical clearance needs to be considered
  - Transmitter dimensions (crated and uncrated)
  - Doorways
  - Other equipment in the way

Moving

- Will mechanical assistance be required?
  - Due to either accessiblity or site conditions
  - Due to limited manpower
- Are clearances sufficient?
  - Would it fit if uncrated?
  - Are there stairs to consider?
  - Remember that crated size is much bigger than published dimensions

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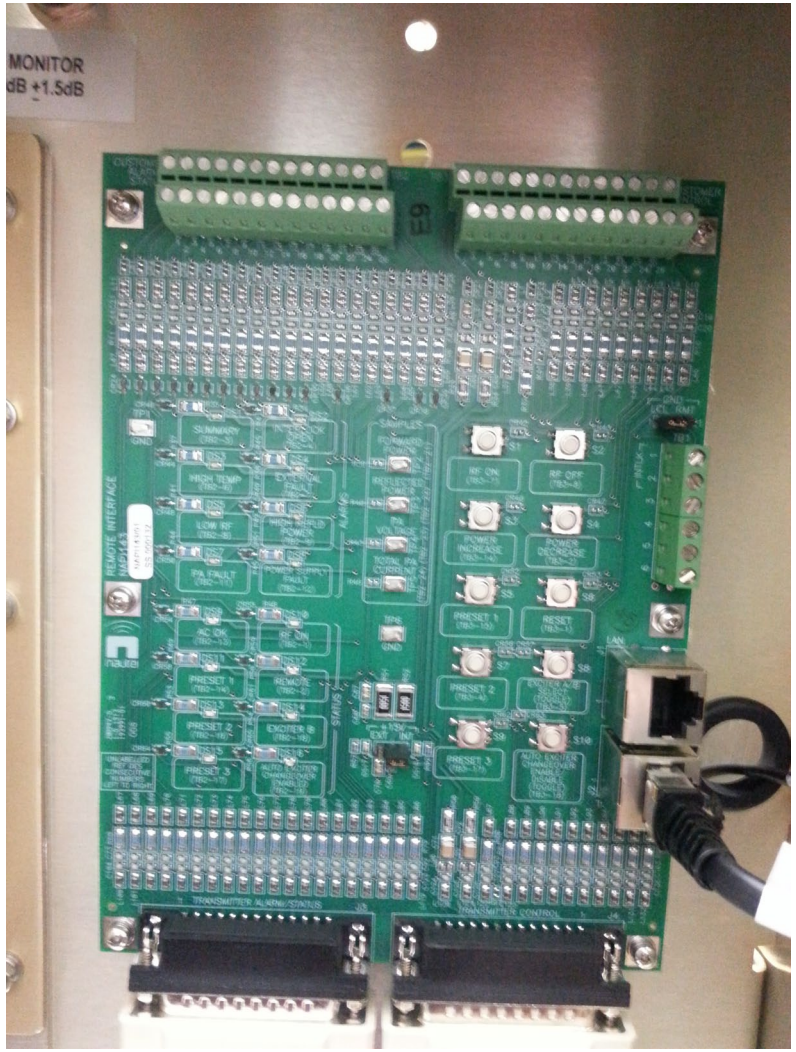
Keep Your Cool

- 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
- This site was plagued with PA and power supply failures; rerouting the airflow has solved that problem.

Clean equipment is happy equipment

Poor airflow, or insufficient cooling, can be expensive!!!

Cable Entry



- Prior to installation confirm:
  - Location of remote interface
  - AC entry point
  - Routing of audio/monitor/IP cabling

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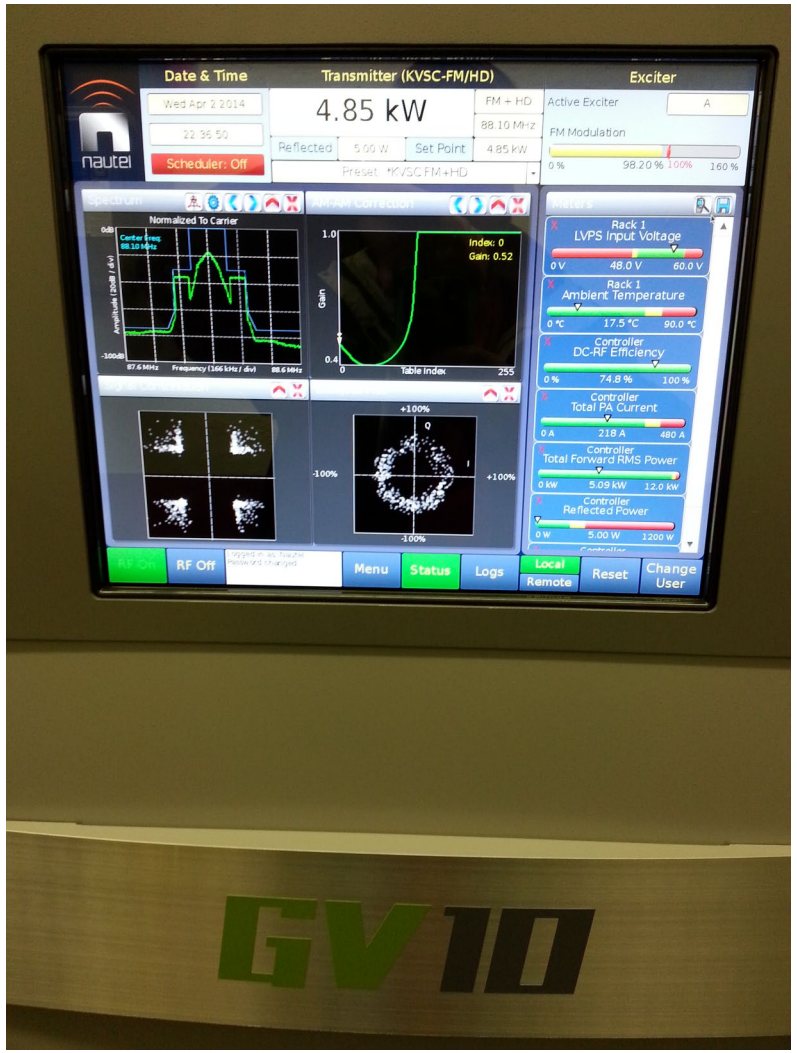
Gotchas

- Some systems may have power modules secured for shipping.
- Ensure any packing materials are removed.
- If there are cover plates installed for shipping, these need to be removed.

Wrapping It Up



- More and more, some programming may be required
  - Configure RDS
  - Set up SCAs
  - Program audio loss alarm and actions
  - Set up email alerts

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Trim Around the Edges

- Especially at AM sites, weeds and brush can create challenges
  - Brush and trees can degrade, or even destroy, ground radials
  - In some areas, high grass can also hide other hazards (snakes, for example)
- Keeping the area around towers free of weeds can also prevent other problems
  - In some cases, we've seen kudzu or ivy growing up an AM tower, resulting in VSWR trips every time it rained
- In addition to safety and reliability of signal, there is a security issue, as tall grass and growth can help to mask the presence of intruders

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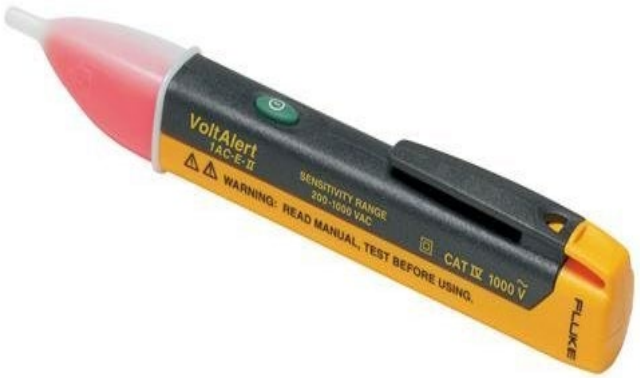
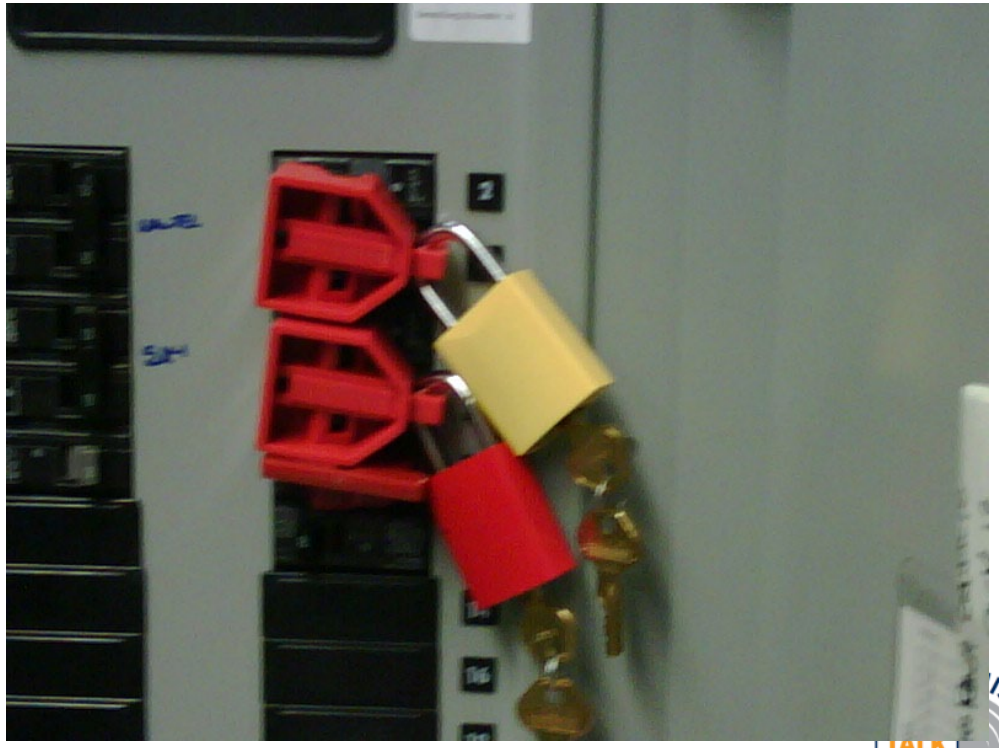
Be Safe





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Safety is Key

- Arc Flash
  - Can happen on any circuit handling over 125kVA
    - 50kW AM on 240VAC
    - Any AM transmitter 100kW or higher
    - 40kW FM on 240VAC

Troubleshooting/Maintenance

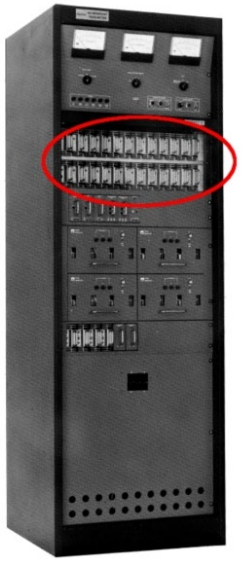
- All legacy equipment (anything over 15 yrs old):
  - Check power supply wiring for cracked insulation
  - Check circuit breakers for mechanical integrity and operating temperature.

Troubleshooting/Maintenance

- Fan life is specified at zero backpressure and 40 deg. C
  - Life nominally doubles for every 10 deg. C that ambient is decreased
  - Lifespan decreases if fan is stressed (negative pressure)

Troubleshooting/Maintenance

– If a transmitter has a cover panel, LEAVE IT IN PLACE!



- Safety
- Airflow
- Circulating currents

Unless there is a note specifying it's to be removed!

NV20/NV15 INSTALLATION MANUAL — UNPACKING AND POSITIONING

8. Remove the grey, plastic power supply shipping panel in the lower, front compartment of the transmitter cabinet (covers the module power supplies). The panel is secured using M4 hardware.

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Safety Considerations

•Locking out a breaker while working on equipment ensures nobody else will be turning it on… while you're still in the rig.

•Transmitter interlocks are a safety feature, not an inconvenience to be bypassed and left bypassed.

•Measure before touching! Some systems have multiple AC mains connections (such as separate feeds for exciters).

•De-energize everything – breakers off, then ground stick.

•Airflow interlocks protect equipment

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05/08/2020 14:03

Checklists

The Checklist Manifesto: How to Get Things Right

by Atul Gawande

4.04 · Rating details · 51,357 ratings · 4,480 reviews

The *New York Times* bestselling author of *Better* and *Complications* reveals the surprising power of the ordinary checklist

We live in a world of great and increasing complexity, where even the most expert professionals struggle to master the tasks they face. Longer training, ever more advanced technologies,neither seems to prevent grievous errors. But in a hopeful turn, accl

Want to Read

Rate this book

https://www.goodreads.com/book/show/6667514-the-checklist-manifesto

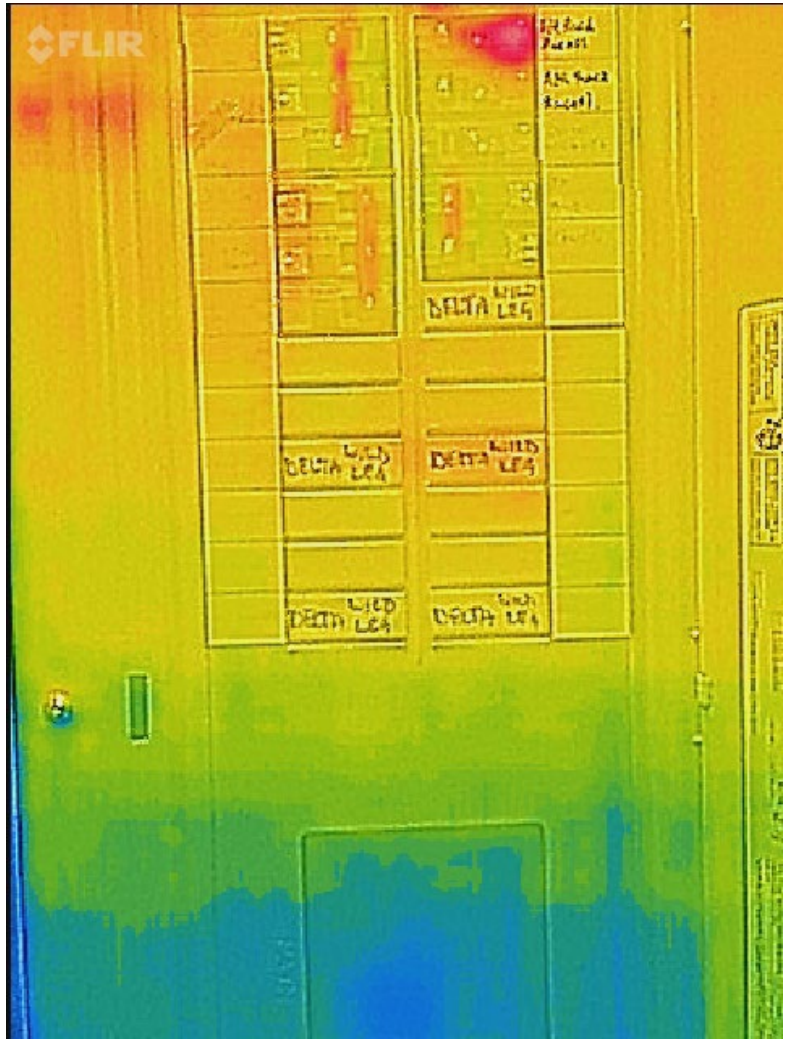
- ☐ Make a checklist of things to do
- ☐ Like checking the generator
- ☐ Changing air filters
  - ○ On both the transmitter
  - ○ And the air handling system
- ☐ Or testing the backup STL
- ☐ Tick off items as they're done to minimize surprises

Generator Maintenance

- Fluid levels and changes
- Belts and filters
- Check for leaks
- Fuel conditioning/treatment
- Battery check

Photo credit: www.cat.com

Check Connections



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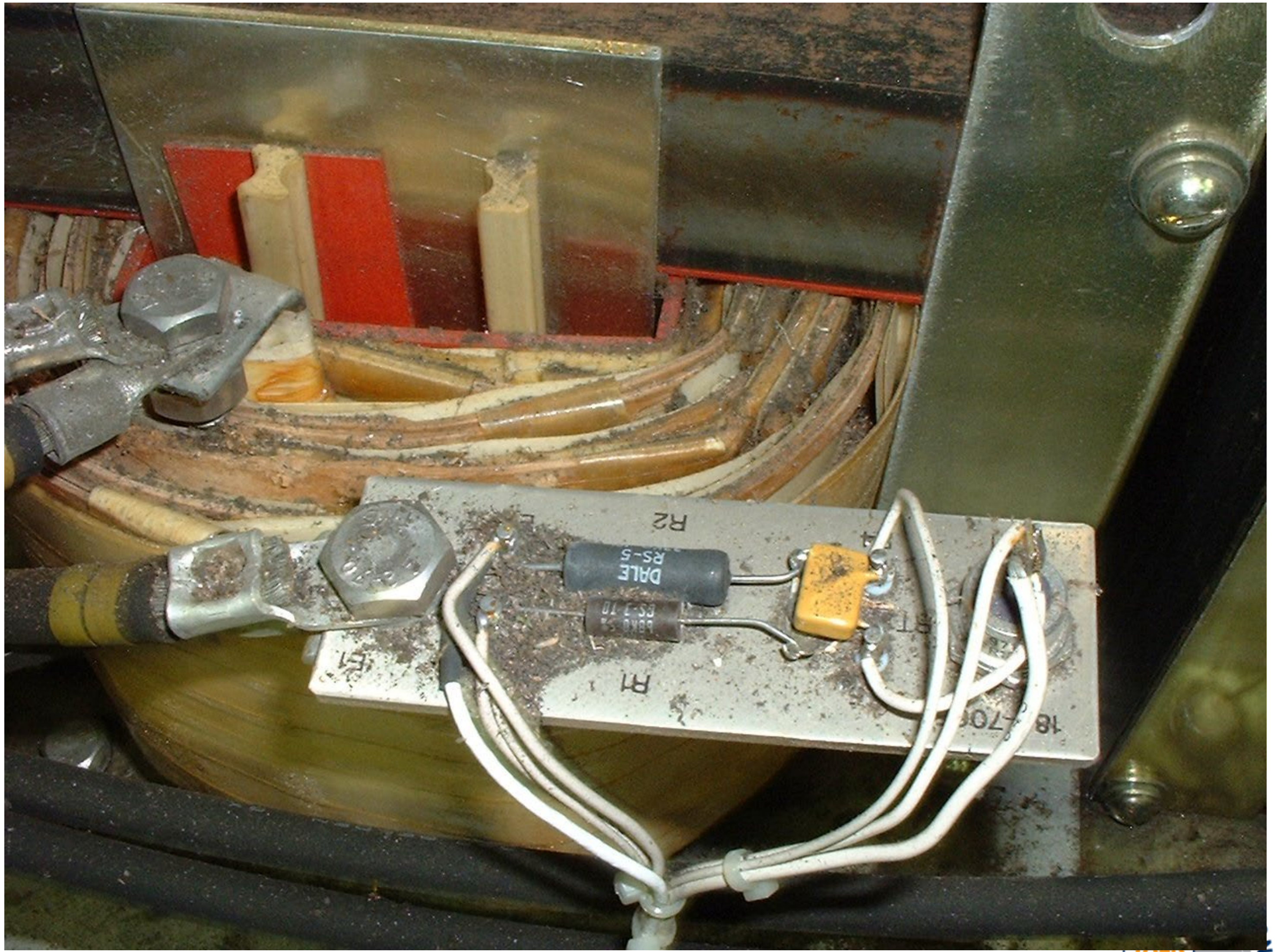
Cleaning

- Vacuum is preferable to compressed air
- Remove the dirt, don't relocate!



Bond Grounds

- Compression connections WILL get loose over time
- Will be worse with stranded cable
- Exothermic bonds are longer lasting

Emergency kits

- Water
- Food
- First Aid
- Sanitation
- Survival (blankets, lights)

- Allow for at least 72 hrs supply
- Per person, plus extra

Emergency Preparedness kit from edisastersystems.com

Summary

- Make a plan
  - Spreadsheet, checklist, whatever
- Determine the intervals
  - Filter changes, for example, are site specific
  - Generator testing and maintenance is not
- Execute the plan
  - Use the “oil change” analogy to sell the need for the investment, if required.

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Wrapping it all up…

- Keep it grounded
- Shield as needed
- Move that air
- Keep things clean
- Check hardware regularly
  - AC and HVDC connections
  - Grounds
  - RF connections (for AM)
- Temperature checks on breakers and line

Online Information

Webinars
https://www.nautel.com/resources/webinars/

Nautel Waves Newsletter
https://www.nautel.com/newsletters/

YouTube
http://www.youtube.com/user/NautelLtd

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THANK YOU!