



# AM/FM Transmitter Site Checklist

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The following inspection guidelines were developed to help familiarize new engineering employees with transmitter inspections. The list can also be used to inform management with the encompassing level of responsibility a Chief Engineer owns over the transmitter site. This list is a good starting point for site inspections, but should be customized to your own site. The checklist has been divided into monthly, quarterly, and yearly duties.

**CAUTION:** Before conducting any equipment maintenance, it is important that all equipment is powered down (turned off). Disable the remote control, so the air staff doesn't inadvertently turn the transmitter on. Make sure your staff know you are at the transmitter site. Throw all associated breakers and disconnects to OFF, and use a shorting stick to discharge all components. Never work on RF equipment when you are tired, or during active thunderstorms. Always work with a buddy – RF systems can kill.

## MONTHLY INSPECTION

As you drive to the transmitter site, write down a list of clear driving directions – include full street names, turns, and mileage. This document should be posted at the studio control point, in the event the engineer is unable to drive to the site. Also list the "official" 911 address, so that emergency crews can be easily dispatched, should an emergency occur.

As you drive to the AM transmitter site, keep your eyes open for new construction – especially new towers or cellular monopoles. New construction can seriously affect AM directional patterns, and early detection is the best policy. This is not an issue for FM sites, unless the new tower or antennas are being erected within the FM antenna aperture.

**EXTERIOR** – Check all gates and fences for security. Note the results of this inspection on the maintenance log or contracting workorder. Open and close

all locks with keys, making sure they operate freely. Make sure no locks are missing, or that gates are open. Spray WD-30 into the lock, working lock (opening and closing) and tilting it so lubricant coats internal parts. Look for holes cut in fencing, chains or hinges missing, torn, ripped, or missing razor/barbed wire – any signs of attempted intrusion.

Before entering the transmitter building, make a visual inspection of the exterior – walk all the way around it. Check for missing or broken windows, water damage, holes in walls, missing or broken flood lights, graffiti, or other indications of vandalism. Notify police of any problems discovered, asking for a copy of the police report – should an insurance claim be necessary. Also make a notation in the maintenance log or contracting workorder.

Make sure there are Danger High Voltage signs on the tower fences, and that each tower has a sign affixed to it listing the FCC issued Tower Identification Registration Number. This is required by the FCC.

As you inspect the exterior, are transmitter air intakes or air conditioning condenser units clear of weeds and vegetation? Mow around the building, or use Roundup™ to prevent weeds from growing up the building. Another alternative is to lay a 4-foot perimeter of landscape fabric up to the building, and cover the fabric with clean, crushed stone.

Inspect the roof for missing shingles or tiles, signs of leaks, or broken flashing.

Check satellite dishes for bird's/bee nests in the feedhorn, for loose hardware, loose anchoring bolts, anchor wires, or loose mounts. Look for any sign of vandalism to the dish – tilting it or attempts to move it. A good idea is to mark the dish pole and the anchor pole with a Sharpie™ marker so any side-to-side rotational movement is obvious. Should the dish be moved by vandals, these marks will make resetting it easier – simply move the dish back till the two lines line up, one over the other.

While inspecting the satellite, check for missing sections of the dish material, for out-of-round shape (caused by snow or ice buildup which bends and deforms the dish). Deformed dishes will either have weak or nonexistent signals, since the satellite beam is no longer focused into the LNB because of the deformity. Remember this when it snows or ices.

Keep the dish clear by sweeping it with a broom. Don't bang on the dish, as this may deform it. Gently sweep snow and ice out. Waxing a dish with car wax helps the snow and ice not to stick. When a dish is treated this way, a broom will quickly swish out the snow and ice. This might be a service a contract engineer can offer other stations with dishes.

This service can be developed into a contract maintenance service – you will mark the dish settings, inspect for loose or missing hardware, spray the feedhorn for bees/birds, and wax the dish for easier snow removal. Most station owners know it's cheaper to prevent the problem, than lose listeners and revenue when the dish is out.

One last thing as you check the satellite dish – check the coax from the feedhorn. It should not be bent, chipped, or split. If the coax goes into a pipe, seal the entry with dum-dum or expanding foam and steel wool. Is the RF connection to the LNB sealed with waterproof tape? Are black wireties used to secure all the cables? (White wireties will break when they are exposed to ultraviolet radiation. Do not use them outdoors for any application).

Make a notation of utility pole numbers, and the location of water meters/main shut-off valves. Combine this utility information with the station account numbers and emergency utility phone numbers. Keep a copy of this information at the transmitter site, as well as at the station control point.

If a generator is used, inspect it. Look for leaks, check the coolant level, oil level, run a test and note the meter readings on the engine. Do the test under load, so it switches over and provides the power for the half hour or so that it's testing. Testing under load is more likely to point out any failure modes.

Check the fuel level, and open up the engine housing to inspect for loose wires, leaky hoses, worn/glazed fan belts, etc. Talk to your generator service company, and find out how much fuel is used per hour. Determine how much fuel is in the tank, and calculate how many hours of operation a full tank will provide.

Check the battery terminals for corrosion. While the generator is running its test, you can go inside the transmitter building a conduct a routine inspection.

INTERIOR – Once inside, before touching or adjusting any equipment, check the readings and log all test meters for your critical equipment – this includes the transmitter, STL receivers, ISDN program delivery equipment, and audio processing. The object is to create a base-line of indications when equipment is operating normally.

If you are showing up at the site because of an equipment failure, use your eyes, ears, sense of touch, and smell to inspect. Do you detect a burning smell? Do you hear relays chattering or a blower motor bearing whining? As you touch the rigid transmission line, is it hot – warm is OK, but if the line is

hot to the touch, this can indicate an internal failure. In a transmitter with pilot lights or LED's to indicate operation, keep a note as to which are illuminated during normal operation. This will help you determine, at a glance, if something is wrong.

With a senior engineer's help, develop a flowchart block diagram for each transmitter site. This will help diagnose failures, as you determine where the signal is flowing and where it is not.

Check to see that there is a working flashlight – preferably a battery-charged type that plugs into an AC outlet. Keep a fresh set of batteries at the site, if a traditional flashlight is used.

For FM operations, check the reflected power meter on the exciter. This indication should be a minimum – less than 1 Watt. If not, the input to the transmitter needs to be retuned, or the coaxial cable replaced. Also check the reflected power on the transmitter, which indicates antenna matching problems. This reflected power reading should also be low. Depending on the transmitter output power, this value could be from 20 to 50, to as much as a hundred watts on a 20kW transmitter. Note that the forward power is correct –at the FCC Licensed value.

A calculation of the indirect power for FM ( $E_p \times I_p \times \text{effy} = \text{Indirect Power}$ ) should be performed. The efficiency factor (effy) can be found from the transmitter test data sheets or in the transmitter manual, and should be posted if you determine power in this method. Compare this value of TPO (Transmitter Power Output) with the licensed value. FCC limits for power are 5% above licensed value, 10% below. Note any discrepancy in the maintenance log or on the contracting workorder.

For AM applications, check the base current (non-directional) or common point current (directional) meter and use the direct power formula to determine the operating power ( $I_{ant} \times I_{ant} \times \text{Resistance} = \text{Direct Power}$ ). The "R" resistance is measured using an impedance bridge. For a non-directional station, the resistance is measured at the tower base. In an AM directional, the resistance value is measured at the common point. These values are also listed on the station license.

For AM stations, the same 5% above, 10% below power applies, but be careful. This is 5% above power, not 5% above the antenna current indication. Here's what I mean – if the station measures 10A into 50 ohms, the direct power is  $10 \times 10 \times 50 = 5,000$  Watts. (The direct power formula is Power equals Current squared, times Resistance). 5% above licensed power is 5,250W. If you do the math, you will see that this is not 5% of the licensed 10 amps.

To find out what the current maxima and minima are, you must calculate backward. 5,250W is the licensed power plus 5%. Divide this by 50 (the resistance) and take the square root of that number to get the current. The square root of 105 is 10.25A.

If you inadvertently take 5% of the licensed current (10 Amps), you get an upper limit of 10.5A – this is 0.25A higher than the FCC authorizes. Making this mistake will cause you to be cited for OVERPOWER operation. The same problem occurs when you mis-calculate for the lower power (10% low) value using the current instead of the power.

You should have a copy of the station license at the transmitter site. Include a listing of all the pertinent licensed parameters so checking these numbers can be done easily. Check all the numbers periodically to insure proper operation.

On an AM directional license, do not use the “theoretical” values for this purpose. These values were used by the consultant to design the directional array. Use the ACTUAL values for base current, phase, and loop ratios, as these are the actual measured values when the proof was conducted.

A current copy of the tower registration information should be at the site.

For AM's, a current copy of the antenna or common point resistance sweep, plot, and measurement.

As you look over the license, if any of the items differ from your inspection, find out why.

Check the transmitter for any illuminated overload lights. Identify them on the maintenance log or contracting workorder, reset the overload, and see that the overload doesn't return. Check all overload lights and make sure none are burned out. Usually there is a “lamp test” switch for this purpose.

Take a composite set of all transmitter readings, including the filament hours, date and time, and your name/initials. Do the same for critical equipment like processors or STL equipment. The purpose is to spot any trends. Check the readings against previous logs or the transmitter manual specifications, and note any discrepancies. Remember that changing meter readings can be the first indication of pending problems.

There should be a sheet of paper in your maintenance log that identifies the tubes used in each transmitter, the type of tubes, when they were installed, and the filament hours (which indicates length of service). Also note what

spares are on hand and their condition. Identify spare tube boxes with the type of tube, whether it's new, used, and if used, when it was removed from service and its condition – "Weak output but OK for spare".

If you write the date and hours a tube was removed on the tube itself, do not write on the ceramic or glass. Write only on the metal, and not where any contact surface exists (such as the plate cap or screen ring). The serial number of high power RF tubes is found on the underside, etched into the metal.

Always note the serial number of the tube BEFORE you install it – once it's in the socket, you can't see it.

In an emergency, this information will be helpful. If a tube fails after only a few week's or month's time, you can get it replaced, but only after completing a detailed "failure report".

This log sheet can also be used to keep track of filament voltage, if filament voltage is monitored and reduced to extend tube life. Have the manufacturer's part number of the tube listed, too, along with their phone number so replacements can be easily ordered.

It is important to be familiar with the transmitter manufacturer's emergency service support number. Keep this number posted at the site, and also in your PDA.

If your transmitter permits you viewing the tubes (such as older AM tube rigs) they should glow, but not too brightly – cherry red is an indication of too much current and should be investigated.

If you remove a tube from its socket, pull straight up – don't twist or rotate it – this will damage the contact fingers. Note, however, that some tubes must be turned a quarter of a turn before removing – study the spare tube before removing, so contacts aren't stressed.

Check the transmitter air filters. If they are dirty, replace them. Write on the edge of the filter the date they were changed. This will give you an idea of how often you will need to buy filters. With a damp – not wet – clean rag or towel, wipe the front of the transmitter to remove dust and dirt – especially from meter faces. Don't use alcohol for this. If you replace the filter, before installing the new one, wipe the filter tray with this damp cloth. This will remove dust and dirt that settled in the filter compartment. Make sure the filter is installed with the airflow arrow pointing in the right direction. Usually, air flows INTO the filter and into transmitter. Exhaust air usually exits the top of the transmitter through a screened opening.

Use the damp rag to carefully wipe the top of the transmitter, cleaning off any dust or dirt. Use care that dirt doesn't fall into the open top of the transmitter.

While checking filters, be sure to replace any incoming air filters or air conditioning filters. If your site is air conditioned, have them serviced at least once a year – remember, these systems run 24/7 and their failure can cause catastrophic problems.

Make sure condensate drains are clear, blow air through them to remove algae buildup. Never run the air conditioners without filters. If the site is cooled with outside air (no air conditioning) tape the edges of the incoming air filters, so there is no space between the edges. This will further block unfiltered air. Note the dates these filters were installed, too.

Use only high efficiency air filters – the woven, pleated kind. They cost more, but are more efficient and will keep everything cleaner. Buy filters in quantity and save money!

Check the transmitter manual. Newer transmitters use a 9VDC solid state battery for keeping memory alive should the power fail. Replace this battery annually, and check it regularly. Using a Sharpie® marker, write on the battery when it was last changed.

It's important that backup equipment is regularly tested. If you have an Auxiliary Transmitter, test it into the dummy load. If you have a water cooled load, make sure the water is turned on before the test. Take a composite set of readings for this transmitter too. Let the transmitter run for about a half hour – to insure it is reliable. Do not take other equipment readings while the auxiliary is running – at some stations, having both transmitters on the air can affect other equipment readings. It's also important to note that the emergency generator may not be capable of powering both transmitters. Never leave the site with a transmitter running into the dummy load. Since the dummy load converts RF into heat, leaving the site unattended could cause a fire.

Check your monitoring equipment. For AM this includes the base current meter indications, or if directional, the common point current. If a built-in Common Point Impedance Bridge is available, measure and record the common point impedance. Check the modulation monitor, if available. For AM, occasional negative 100% peaks, but never +125% peaks on the positive. For FM, occasional 100% peaks, but the modulation may be higher if you are running an SCA. For FM, also check the pilot level – it should be between 8 and 10%. Also check the AM noise for the FM transmitter – it should be

around -50dB, but if it's higher – like -35 or -40dB, find out why. A lower AM noise figure of -60dB is great.

For AM directionals, check the antenna monitor. Calibrate the zero set and 180 degree calibrate pot before reading the towers. Note the settings of the reference tower trip pot. If this value changes substantially, you may have a sampling or parameter shift problem. Measure the phase and ratios for all towers, and check that they are within limits. Calculate the percent deviations for each tower ratio. If these parameters are not within limits, notify your consulting engineer.

Never adjust the phasor without engineering help. Measure the base currents for each tower (in a directional) and like the antenna monitor, calculate ratios and percent deviations.

Do this for both DAY and NIGHT parameters – if licensed for both. Phase should be within  $\pm 3$  degrees, and ratios must be within 5% of the licensed values. Note any discrepancy and correct.

For FM stations, check the pressurization gauge to monitor line pressure. Typical pressure is 3psi. Check and note the volume of the nitrogen tank. New tanks have a volume of about 2200psi. As the line leaks, this volume will be reduced. You'll want to change the tank before it empties. If there is no pressure on the line, moisture can be absorbed into the line, causing reflected power and eventually, a flashover. Again, note the date new tanks are installed, so you don't run out of gas. Order a new tank when the gas volume gets about 500psi. Put the completely purged empty tank outside and call for pickup.

NEVER put a pressurized tank of nitrogen outside. Even with a couple hundred pounds of volume, the pressure of the gas can kill someone (or cause an air embolus) if they open the valve. Always cap unused tanks, and chain all tanks securely to the wall (This is an OSHA requirement). If tanks aren't chained to the wall, install a chain to avoid an OSHA fine. The regulator can break off tanks that fall, turning the tank into a missile. Turn off the line valve when installing a new tank so the line pressure won't drop.

If a dehydrator is used, make sure it does not run all the time. Even once or twice an hour is too much. Typical operation is once every hour or two. More active operation could indicate a leak. Some dehydrators have a sight glass with dessicant crystals inside. Check to see they are not moisture laden (pink). Normal condition is blue.

Check all pilot lamp light bulbs and replace burned out bulbs. This is especially true for indicator lights on transmitters. While on the subject of bulbs, check that interior and exterior lighting fixtures have working bulbs, and also your trouble lamps.

For FM stations that use rigid copper line inside the building, run your hand along the line feeling for heat. Start at the output of the transmitter, and feel all the way to where the line exits the building. Warm is OK, but hot spots could signal a pending failure. Elbows will be warmer than straight sections of line.

Excessive heat inside the line indicates a breakdown – the line will eventually burn up. Unfortunately, with the black jacketed flexible line, by the time the line is hot enough that you can feel the heat through the jacket, the line is usually destroyed.

for both AM and FM, check and adjust the calibration of the remote control system. This means checking each channel, and adjusting its value so that it reads what the main meter indicates. There should be a sheet at each site identifying each remote control channel, what its raise/lower function is, what it reads, and what the normal reading is. For dial-up remote controls, include the pass code and dial in number.

If the remote value differs from the main meter value, the remote control must be adjusted so that both meters read the same. Note the date and time the meters were calibrated, and the meter indications.

Check the inside temperature of the building, and the operation of air conditioners. Note any abnormal heat.

Outside the building, examine all cable entry holes (where the lines exit the building and go to the tower). These passageways should be sealed closed. Sealed holes discourage insects, birds, snakes or rodents from entering the building. Seal holes with Fiberglas insulation, rubber boots, caulk, or foam insulation sealer. Scatter moth balls along the floor of the building, inside the bottom of equipment racks, and inside the phasor or coupling unit to discourage vermin.

Listen for unusual sounds. Arcing – sounds of buzzing or spitting. Squeals – indications of bad motor bearings or worn belts. Rapid cycling of the dehydrator can indicate a line leak.

Once a month, or as indicated on your AM license, monitor points should be measured. This is done for both DAY and NIGHT operation. Make these

measurements after reading the transmitter, base current, common point current, and antenna monitor readings. This will insure all transmitter parameters are normal before measuring the monitor points. The monitor point form should show the bearing of that point, a description of the point (from the license), a blank for the actual reading, and an indication of the FCC maximum reading for that bearing. It's also good to note the weather and temperature, as these values can be affected by seasonal variations.

Inspect the remote indication for your tower lights, to make sure the remote control is indicating proper lighting operation .

Make sure the station is operating at its proper power level and pattern. Also make sure the night pattern or PSA/PSSA low power operation is taking place at the correct time.

### **QUARTERLY INSPECTION**

Complete a tower inspection quarterly. Among things to check are a visual inspection of the tower lights – are all lit, and beacons flashing? Make sure both beacon bulbs are flashing (most beacon assemblies have two bulbs). View the flashing beacon from several angles around the property. If one side appears dimmer, a bulb may be out or the lens may be dirty.

On multiple tower arrays, make sure that all beacons that are licensed to be lit are actually working. If certain tower beacons are extinguished, make sure you have a copy of the FCC/FAA paperwork authorizing the “no lights” operation. The same holds true for strobes – check your control panel to insure all are firing, and that no failures are indicated.

The FAA has privatized their Notice to Airmen (NOTAM) services. This procedure has changed, and you will need to update your phone records. Many Flight Service Systems (FSS) have been shut down. In its place is a new national number for reporting tower light failures. Call toll free 877-487-6867. This number may route you to a FSS in another part of the country.

It's a good idea to check that your NOTAM has been properly recorded. This information is obtained at the following web site: [www.notams.jcs.mil/](http://www.notams.jcs.mil/). Enter the three letter abbreviation for the nearest airfield, preceded with the letter “K”. For BWI, you would enter KBWI. Click the button labeled “View NOTAMs” which will show all NOTAMs for that field. About half way down are the tower light NOTAMs. NOTAMs are usually promptly recorded, however, if 60 minutes passes and you don't see your failure recorded, call the FSS number again.

Visually inspect the paint on the tower(s) – is it peeling or faded? If so, make a notation and arrange for the tower to be painted. Visually inspect the grounds around the tower – is the field mowed, is there vegetation growth around the towers or guy anchor points? Check that there are no gopher or groundhog holes around the guy anchor points. Visually inspect the tower for plumb-ness (straight, not bent or with kinks in the steel structure). If the tower is bent, it will need a plumb and tension by a tower rigger.

Also inspect any fencing and gates around the tower and guy anchor points. All should be secure, with working locks. Note this inspection on your tower inspection form. Spray locks with WD-30 or Lock-Ease® to keep the mechanism from rusting. (This is a good monthly job, too).

Inspect the ceramic insulators at the guy anchor points – are there any cracks? They will need to be replaced, if so. There is usually a safety loop of steel cable that loops through the turnbuckles. This loop deters someone from turning the turnbuckles and causing the tower to fall. Is this safety loop cable present? Are all the pre-forms (the compression sleeves that hold the end of the guy wire together) in good shape? (No splitting or unraveling). Are the guy wires or preform wires or anchors that go into the ground rusted? If you note rust, have them evaluated by a qualified tower rigger.

The tower may have a base insulator, a ceramic form that the tower structure sits on – inspect it for cracks, dirt, or arc marks. Insulated towers are hot with RF – do not perform this inspection while the transmitter is feeding the tower. At the base of most AM towers, you will find a spark gap or two Johnny balls. Using a piece of crocus cloth, and with the transmitter off, polish these edges so there are no pits. The crocus cloth will also remove any carbon from lightning strikes. Do not adjust the space between the spark gap or Johnny balls – by yourself.

Setting the gap requires two people. Most gaps are set between  $\frac{1}{4}$  and  $\frac{1}{2}$  inch, but the gap must be wider for higher AM powers. The gap is adjusted with the highest modulation level (choose a dense, compressed song to keep the average modulation level high). Adjust the setting to the point where the RF signal starts to spark across the gap, then back it off slightly. The idea is for the gap to be wide enough that lightning will jump across the gap, but not so narrow that high modulation or spikes in modulation will cause an arc. If the gap is set to narrow, regular programming may cause arcs, possibly shutting the transmitter off, and definitely irritating listeners.

While at the base of the tower, check the ground strap and ground radial wires. Pull on the strap to insure it is securely fastened. Poor grounds, or lack of a ground system, will greatly reduce AM coverage. With the station off the

air, gently, but firmly check the connection from the tuning unit to the tower – it should be secure, not loose. With the station off the air, open the ATU (antenna tuning unit) and visually inspect the components. Clean out any cobwebs, bees nests, or mouse nesting material. Plug any small holes with silicon sealant.

Check to see that the light inside the ATU isn't burned out. Keep a spare bulb on the floor of the coupling unit. Capacitors and insulators holding coils should be cleaned. As you clean, check for any cracked insulators. Also look for cracks in the ceramic of the capacitors. Replace these. Vacuum capacitors have a copper inside that can be viewed through the glass envelope. The envelope should not be cloudy (the sign of a vacuum leak), nor should there be any burn or arc marks.

With the station off the air, and without removing the coil taps or the position of the taps on the coils, check to see that the clips are tight – wiggle them a little. If you move their position, you will de-tune the network, requiring hours to readjust.

You'll want the taps tight, so heat isn't generated, which could cause a fire or damage the coil. Using a nutwrench, firmly tighten the nuts connecting the copper tubing to the coils. Be careful in tightening connections to capacitors – carelessness can result in a crack or other damage. All hardware should be firmly tight, but not overtightened. Start with the bolts connecting the RF cable into the tuning unit, and then follow the copper tubing, tightening at every junction.

Visually inspect the coils for burned turns, or the little rotor in variable coils for burn marks. Again, don't turn the rotor, just visually inspect with a strong trouble light. Clean any bugs or cobwebs off the coil windings.

Check the tower lightning choke or static drain choke at the output of the coupling network. Again, use a strong light and a mirror to view behind the choke. Look for burned wires or arc marks.

While at the base of the tower, look on the ground for anything unusual – holes in the ground, bolts that may have fallen off the tower, nests in the tower structure, etc. Note anything unusual.

There should be no vegetation growing inside the tower fenced area, or the fenced area around the guy anchors. Growth retains moisture, and moisture will cause rust and eventual failure.

Walk around the site, if an AM – look for exposed ground radials. Radials must be covered. Broken radial wires will reduce the AM coverage.

In addition to cleaning out the ATU, open up the phasor and perform a similar component inspection and cleaning. Again, look for any heat damaged components.

RF contactors are used in many phasors and ATU's. These "RF Relays" mechanically switch the RF. Inspect the contact fingers for burns, damage, or bent fingers. Make sure the mechanical mechanism is free to move and does not bind as the contact arm swings from one end to the other. Watch the contactor actuate, while someone switches it from inside. Watch for binding, incomplete seating of the arm to the contacts, or sluggish solenoids. Replace with spare parts, as needed.

The transmitter should be cleaned internally once a quarter. Insure all AC has been turned off – realize that some older transmitters are wired with both a high voltage and low voltage circuit breaker or disconnect. Even the low voltage 120VAC can kill you. Use a volt pen "AC Sniffer" to insure all AC feeds are dead.

Discharge all internal parts with the shorting stick. Check that all connections are tight. Clean dirt and dust with alcohol and rags. Pour the alcohol on the rag and not on the components inside the transmitter. A vacuum cleaner hose can be used to coax dirt out of tight spaces. As you clean, use a trouble lamp to light the area. Do not adjust or bump tuned parts – especially in the FM PA cavity or the AM output cabinet.

Check all interlock switches, especially the air interlock above the tube or in the PA cabinet. The air interlock switch should move freely. Inspect the door interlocks to make sure they are functional and haven't been bypassed by a previous engineer.

Clean all ceramic insulators – they serve to isolate high voltage from the grounded chassis. When they get dirty, they can arc to ground. Use caution not to jar or misadjust critical settings like neutralization sliders on the tube socket or arc gaps inside the transmitter. Keep in mind that in some tube transmitters, a simple loop of wire can be part of a tuned circuit – don't bend or adjust when cleaning. Such action can detune the circuit.

Grease the transmitter blower motor as the manufacturer specifies. Most blower motors are not "sealed bearing" types, and will fail if not lubricated. Follow the manufacturer's specifications carefully, though. Over-greasing will

cause grease to be blown into the tube and final socket, ruining them – or causing a fire.

Inspect the wiring to the blower motor. Motor vibrations can cause the wire insulation to wear off.

As you clean the interior of the transmitter, look for frayed or burned wires, missing or loose hardware, or damaged components.

A box of clean rags – t-shirt material – make great cleaning aids. You can purchase bulk clean t-shirt material at uniform shops. Cleanliness will provide payback in terms of fewer failures. The inspections should catch little problems before they grow into bigger ones.

If the transmitter room floor is concrete, it should be painted with concrete floor paint, or tiled or carpeted. The point is to keep concrete dust from damaging transmitter components.

Mow the transmitter field quarterly, if needed. Especially in the Spring, just before the pollen starts – this will reduce pollen intake into the transmitter building.

In the Spring and Summer, spray the ATU building/cabinet, satellite LNB's and under the building eaves and around the door entry or vent openings with a good quality hornet spray. This will deter bees from nesting in these areas. In the Fall, place 3 to 6 mothballs in the ATU cabinet, and on the transmitter building floor to deter snakes. Set glue-type or standard mousetraps along wall edges to trap any mice that enter the building.

Perform an audio alignment check from the studio to the transmitter. For discrete analog operations, this is to determine that the LEFT/RIGHT balance is OK, and the mono signal indicates a minimum on the L-R modulation monitor. Also check that AM and FM noise are at tolerable levels.

For AM operations, make sure PSA and PSSA low power levels are properly set, so that the station isn't working with too much or too little power.

Make sure a complete set of the station's licenses are posted at the transmitter site.

### **ANNUAL INSPECTION**

Maintain a log book that has listed for every station the brand and model of each transmitter used, both main and backup. Once a year, contact the

manufacturers of this equipment and request any field modifications or updates for that particular model of transmitter.

If you cannot locate the original factory test data sheet for your transmitter, contact the transmitter manufacturer for this. This data sheet should be kept at the transmitter, along with a complete manual with schematics, to assist in diagnosing any problems. Before you need the manual, insure that complete manuals with schematics exist.

Use your digital camera to document all of the equipment in the racks at both the transmitter and studio locations. These pictures can be helpful in walking someone through a problem, as you can see the equipment in the rack from these pictures. Such files are invaluable to contract engineers, or the market or corporate engineer who has the responsibility for multiple sites.