



Hello, thanks very much for inviting Broadcast Signal Lab to come out to WCHC. Here is a rundown of our observations, repairs done to this point, and suggestions for future actions.

OBSERVATIONS

There are eight main issues for WCHC to deal with:

1: Transmitter needs repair or replacement

- ?? The QEI 675 P.A. (power amplifier) has failed and needs repair.
 - o Currently the station is on the air using the exciter only, which can only deliver ~10 watts vs. ~100 watts of the P.A. This is causing reduced total signal coverage but at least keeps the station on the air.
- ?? Given the age of this unit (believed to be 18 years old) repair may prove less cost-effective than a total replacement, as there is a strong likelihood of additional failures in the near future. Most transmitters are designed to last approximately 20 years, so this QEI is approaching the end of its useful lifetime.
- ?? Also, an old Robert A. Smith transmitter was found in the WCHC transmitter rack. This most likely dates back to the days when WCHC was a 10 watt "Class D" FM license (pre 1987). This transmitter should be permanently retired as it cannot produce the needed wattage for WCHC to be legal.

FCC 47C.F.R. Section 73.1560(b) Operating power and mode tolerance.

2: FCC license renewal

- ?? The renewal process for WCHC's license to broadcast begins on September 24th, 2005. When the FCC mails renewal notices. Pre-filing on-air notices must begin on October 1st, and the (electronically-filed) renewal application is due on December 1st, 2005.
- ?? *Legal assistance from the College of the Holy Cross is required. Assistance from a law office that specializes in FCC/communications law is strongly encouraged.*

3: EAS, Emergency Alert System:

- ?? There is EAS equipment present but it is not installed.
- ?? The WCHC staff is not trained in EAS usage and procedures.

FCC 47C.F.R. Section 11.35: EAS Equipment Requirements & Section 11 in general.

4: Transmitter Control & Metering:

- ?? There is a means of turning the transmitter on and off in the studios, but there is no established method or procedure for transmitter control during unattended operation by the station.
- ?? There are no means in place to verify compliance with FCC requirements for signal modulation.
- ?? There are no means in place to verify compliance with FCC requirements for output power of the station.

FCC 47C.F.R. Section 73.1350 Transmission system operation.

FCC 47C.F.R. Section 73.1400 Transmission system monitoring and control.

5: Station Log:

- ?? There is no FCC-compliant Station Log.

FCC 47C.F.R. Section 73.1820 Station Log

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6: Main Studio Rule:

- ?? There is no means in place to ensure a "meaningful management and staff presence" is maintained at the main studio of WCHC during regular business hours.

FCC 47C.F.R. Section 73.1125 Station main studio location
Jones Eastern of the Outer Banks, Inc., 6 FCC Rcd 3615 (1991), clarified, 7 FCC Rcd 6800 (1992), aff'd 10 FCC Rcd 3759 (1995).

7: Programming Control during Unattended Operation:

- ?? There is no means of ensuring the Legal ID is announced as close to the top of the hour as possible.

FCC 47C.F.R. Section 73.1201 Station Identification

8: Chief Operator:

- ?? A specific person must be designated the "Chief Operator" of the station, and must perform the FCC-mandated duties of the CO each week. We did not see the required letter designating the CO posted in the main studio of the station.

FCC 47C.F.R. Section 73.1870(c) Chief Operators

9: Public File:

- ?? FCC-mandated Public Information File is missing.
- ?? Procedures not in place for compliance with FCC rules regarding public access to the Public File.

FCC 47C.F.R. Section 73.7527 Local public inspection file of noncommercial educational stations

10: RF warning signage:

- ?? There are no ANSI-compliant warning signs or (known) documented control procedures for ensuring RF safety around the broadcast antenna.

ANSI Standard Z535.1 -1998 Safety Color Code
ANSI Standard Z535.2 -1998 Environmental and Facility Safety Signs
ANSI / IEEE Standard C95.2 -1999 IEEE Standard for Radio-Frequency Energy and Current-Flow Symbols

These ten issues require WCHC's immediate attention. However, there are several other issues that either I noticed could use attention, or that WCHC management mentioned that they wished to have addressed. These include:

- ?? Comrex DH-20 telephone hybrid & Hotline POTS codec.
- ?? Mic jacks in Studio C.
- ?? Mic booms in Studio B.
- ?? CD players overall could stand to be replaced with pro broadcast models.
- ?? Remote control/mute panels for Mics 2, 3 & 4 in Studio B.

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REPAIRS DONE TO THIS POINT

On September 2nd, 2005, Broadcast Signal Lab visited WCHC to investigate a report of extremely weak signal from the transmitter, and to review our report from a previous site visit in 2003.

First, BSL performed an inspection of the transmitter rack in the mechanical room on the top floor of the Hogan Campus Center (rm.602 – Mechanical Equip. Rm. No. 3). It was determined that the power amplifier was showing typical symptoms of power supply failure. Since the priority was to provide a means for WCHC to “get back on the air” in time for the first week of class, the power amplifier was removed from the transmitter chain and the exciter put on the air directly.

The exciter-only setup will suffice for a temporary solution, but the output wattage of just the exciter is approximately one-tenth of what is required to achieve the licensed ERP (effective radiated power) of 100 watts. In addition, if the exciter-only solution is in place for more than 30 days, a special temporary authority (STA) from the FCC will need to be sought on or about day 25.

The remainder of the equipment was photographed and cataloged, as was the antenna itself (just outside & above the transmitter rack).

The defective power amplifier, as well as an outdated and unused Robert A. Smith exciter, (from the pre 1987 days when WCHC was a Class D 10 watt station) were removed from the transmitter rack and taken to storage in the WCHC studios.

After the transmitter removal, members of WCHC and BSL walked through the WCHC studios and reviewed various issues and options related to the transmitter and other studio / operational issues. A new computer software program (Winamp Radio Scheduler) was suggested to address the problem raised in point # 7 (Legal ID's at the top of the hour).

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SUGGESTIONS FOR FUTURE ACTION

1: Overall the transmitter plant

The existing transmitter plant appears to be all equipment that dates back approximately 20 years and all of it is likely to be prone to failure in the coming years. We recommend that all of it be replaced as soon as possible to ensure trouble-free operation in the coming years.

Below is a rough list of equipment and projected costs:

Primary projects

- ?? New transmitter (\$5000-\$8000 see note about tower below)
 - o As mentioned in previous BSL messages, WCHC needs to send notification to the FCC after 10 days of operating below 90% of licensed ERP/wattage, and if it will be 30 days before returning to nominal ERP, an application for Special Temporary Authority (STA) must be filed with the FCC at or about day 25.
 - o Usually it takes at least a few weeks to purchase and receive a new transmitter from any manufacturer's factory, so requesting a 3 to 6 month STA would be recommended.
- ?? New audio processor / stereo generator (\$3500)
- ?? Uninterruptible Power Supply (UPS) with Automatic Voltage Regulation (\$1700-\$2000)
 - o This provides consistent & clean power, and provides extra protection against power surges.
- ?? Transmitter Remote control (\$1500-\$2000)
 - o Includes web-based remote control interface, silence sensor, wiring, misc. parts
- ?? RDS encoder (\$500)
 - o Allows RDS-equipped radios (most car radios) to display "WCHC" on the radio when tuned to WCHC's signal.
- ?? Labor, training, documentation and misc. wiring (\$1500-\$2500)
- ?? EAS wiring, parts, labor & documentation (\$500-\$800)
 - o EAS must be wired into the air chain so that, in case of a national emergency, the President of the United States can seize control of every radio and TV station in the country.
- ?? FCC license renewal consulting (\$800-\$1600)
 - o BSL cannot directly provide legal advice, however we can provide technical advice to assist a designated legal authority – namely the legal office of the College of the Holy Cross and/or (we strongly suggest) a communications law firm.
- ?? RF warning signs for the door into the mechanical room and the door out onto the roof (\$50-\$75)
- ?? Holy Cross will also need to provide internet access via an Ethernet connection (as well as regular telephone access) to jack HG601 in rm.602 in Hogan. This will permit remote control access to the transmitter. BSL is not familiar with the internal cost policies of Holy Cross but there may or may not be some costs associated with this installation to WCHC's budget.

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Secondary projects

BSL also recommends WCHC consider the following additional projects / purchases:

- ?? **A:** A physical RF switch, that's remote-controllable, to allow the new transmitter and existing exciter to share the same antenna. This will allow for minimal downtime and smooth transitions to a backup system should the main system ever fail or need scheduled maintenance.
- ?? **B:** Alternatively, WCHC should consider constructing a new tower on the roof of Hogan that could serve two purposes:
 - o Increasing the height of the antenna, thus improving coverage and reducing radiation exposure on the roof / upper floors.
 - o Allowing for two or three antenna bays (instead of just one) which can reduce the size/cost of the transmitter needed, improve signal coverage slightly, and reduce downward radiation.
- ?? Wiring the Comrex DH-22 phone hybrid and Comrex Hotline POTS codec into the POTS (Plain Old Telephone Service) infrastructure and to the mix board. The hybrid would allow for the station to put callers on the air. The Hotline allows for a remote broadcast to send high-quality audio over a regular telephone line...very useful for live events and sports broadcasts. These units are already in place in the studio – they just need to be connected and the staff trained on their use.
- ?? Replacing the existing consumer/DJ-style CD players with professional CD players with balanced outputs (to reduce noise problems) and designed to handle the rigors of radio station usage. BSL recommends the Marantz PMD325 or Tascam CD01UPRO.
- ?? Installing a radio receiver, wired to the mix board, so DJ's in the air studio can monitor a real-world air signal (i.e. "hear what they're actually broadcasting")

SUGGESTIONS FOR FUTURE BUDGETARY PLANNING

Broadcast Signal Lab recommends that WCHC setting up a regular budgetary items for regular equipment repair/replacement and to have BSL's consultation and engineering service available.

- ?? \$1500/yr to cover all phone and e-mail correspondence for regular questions, ideas, consultation and related.
- ?? \$1000/yr allotment for site visits, including travel time. If site visits are not required, no billing will occur.
- ?? \$2000/yr allotment for emergency equipment replacement & labor.

Sincerely,

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