



DEMONSTRATION REPORT

for the

National Weather Radio (NWR) Nautel Transmitter Installations

August 2010

**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service/Office of Operational Systems
Field Systems Operations Center/Test and Evaluation Branch**

Table of Contents

	<u>Page</u>
1.0 Introduction	1
2.0 Purpose	1
3.0 Demonstration Activities.....	1
3.1 Installation at Rocky Mount, NC	1
3.2 Installation at Salem, OR.....	3
4.0 Conclusions/Lessons Learned.....	5

List of Tables

	<u>Page</u>
Table 1 Nautel NG300/NG1000 Transmitter Locations	1

Figures

	<u>Page</u>
Figure 1 - Drop Indicator Activated	2
Figure 2 - Power Supply Pushed In.....	2
Figure 3 - Power Supply Missing Pin	2

1.0 Introduction

This test report contains the results from the demonstration of the field installations and evaluation of the new National Oceanic Atmospheric Administration (NOAA) All-Hazards Weather Radio (NWR) Nautel NG300/NG1000 transmitters. This demonstration report will describe the purpose, demonstration activities, and conclusions/lessons learned.

The demonstration confirmed the transmitter installation and checkout, and operational performance and monitor for successful operation. The Office of Operational Systems, Test & Evaluation Branch (OPS24) was responsible for conducting and reporting of the demonstration.

The transmitter installations started at the WFO Raleigh, NC (RAH) transmitter at Rocky Mount, on the week of August 2, 2010 and at the WFO Portland, OR (PQR) transmitter at Salem, OR on the week of August 16, 2010 (see **Table 1 Transmitter Locations**).

Table 1 Nautel NG300/NG1000 Transmitter Locations

WFO	Transmitter Locations	Type	Install Dates
WFO Raleigh, NC (RAH)	Rocky Mount, NC	NG1000	Aug 3, 2010* Aug 18, 2010
WFO Portland, OR (PQR)	Salem, OR	NG300	Aug 17-18, 2010

*initial shipment was damaged

At Rocky Mount, the initial transmitter shipment was damaged as per drop indicators and the replacement shipment was subsequently shipped by Nautel and re-installation was performed by the WFO Raleigh staff on August 18, 2010.

2.0 Purpose

The purpose of the demonstration was to evaluate the on-site installations, evaluation, and monitoring of the Nautel NG300/NG1000 transmitters in an operational environment. The demonstration test sites were pre-selected by Disseminations Services Branch (OPS17) per solicitations from all the regional focal points.

3.0 Demonstration Activities

3.1 Installation at Rocky Mount, NC

On Tuesday, August 3, 2010, the site staff at WFO Raleigh began their installation of the Nautel 1000W transmitter. There were able to unpack and initially assemble the Nautel 1000W transmitter at the transmitter site at Rocky Mount, NC. After initial installation was finished and power-on procedures were initiated, several problems were encountered:

- a. When power was switched from secondary (TXB) to primary (TXA), there were switching problems which did not allow the switch.

- b. The TXA displayed 0W on the front panel and 0W on output. TXB displayed 380W on the front panel and on output.
- c. Upon further inspection, the staff discovered that the main unit packing crate indicated a 25G drop and that impact has occurred. The staff then proceeded to open both the TXA and TXB units and discovered that the power supplies have been pushed back from the front to the back. One of the units (TXA) even had one of its power supply pins sheared off and missing. The following pictures in Figure 1 through Figure 3 display drop indicator and some of the damaged parts of the transmitter.



Figure 1 - Drop Indicator Activated



Figure 2 - Power Supply Pushed In



Figure 3 - Power Supply Missing Pin

The test team then proceeded to call a meeting with Nautel and Ron Vaillant (OPS17) to discuss the failures and the group agreed that current problems could be attributed to the damaged units during shipping. Kirk Zwicker from Nautel agreed to ship a new transmitter to the Rocky Mount site to ensure that the site receives a brand new transmitter and to mitigate any other problems in addition to the damaged power supplies.

At the Nautel status meeting held August 12, 2010, Brian Campbell responded that the re-installation was successfully performed by the WFO Raleigh staff on Wednesday August 11, 2010. The new transmitter was successfully aligned, configured, and currently on-air broadcasting messages with no reported failures. At this point, the monitoring period for the WFO Raleigh NC office started.

At the status meeting, when prompted by OPS24 if additional transmitter evaluations using the Console Replacement System (CRS) should be performed on the new transmitter, Brian Campbell responded that additional evaluations are not necessary. Subsequently, Brian proceeded to provide electrical power requirements and recommended miscellaneous parts not included in shipment to Bill Flieder and Ray Duvall in preparation for the Nautel 300W transmitter installation at Salem, OR. When queried, Bill confirmed that the crates did not indicate dropped status. They also acknowledged that the transmitter site is ready for all power requirements (concurrent power capability for current SRS and for the new Nautel during checkout), including having the requisite power cords which are not included in the shipment.

Brian Campbell informed Bill and Ray the instructions on how to download the latest revisions to the Nautel 300W Transmitter Installation and Checkout (INCO, Mod Note 88) and to the Nautel 300W Alignment (Maintenance Note 69). Brian explained that Mode Note 88 should include all the requisite procedures for installation and alignment for the new transmitter, including new extensive pictorial step by step procedures and incorporation of Nautel installation procedures from other manuals.

3.2 Installation at Salem, OR

On Tuesday, August 17, the installation of the Nautel 300W transmitter began at Salem, OR. The installation was successfully performed by Ray DuVall and Joe Hannon (from the WFO Portland office) up to Step A.17 (Decommission and Shut off legacy transmitter) of the Nautel 300W INCO document.

On Wednesday, August 18, Ray and Joe successfully completed the Mod Note 88 INCO instructions for installing and aligning the Nautel 300W transmitter. The ROAMS was subsequently successfully programmed by Wendell Nakamine (OPS17) and validated by Tyree Wilde (WFO Portland WCM) via callback from WFO Portland. There were extraneous alarms that were noted during the callback, but according to Wendell Nakamine, these were old alarms from the replaced SRS transmitter.

At 11:50am PDT, the RWT was broadcasted successfully by the newly installed transmitter and the SAME and alert tones were confirmed on monitor by Ron DeWaters (OPS17) at the transmitter site using weather radio.

Upon direction from OPS24, Tyree Wilde proceeded to successfully perform the following transmitter evaluations using CRS:

- a. On CRS Logs, using Transmit option, the RWT SAME header data was verified and together with the Alert Tone, were successfully confirmed transmitted. The log was printed out for reference.
- b. On the CRS Transmitter Configure window, the primary to secondary power mode (and back) via CRS Transmitter Configure, using transfer tones, was confirmed at the transmitter site by Ron DeWaters.
- c. On the CRS Audio Control Panel (ACP), the CRS Backup Live capability was confirmed for the new installed transmitter (Transmitter 4) at the site by Ron DeWaters.

There were some minor recommended updates to the Mod Note 88 INCO instructions but overall, the installation went smoothly and the new transmitter was confirmed operational and functional by noon time Wednesday August 18, 2010.

On August 26, 2010, after the demonstration has ended, the WFO Portland staff reported that their Salem Nautel 300W Transmitter had a changeover failure alarm as it could not failover to TXA remotely. The condition has been reported to OPS17 and their resolution is currently pending.

4.0 Conclusions/Lessons Learned

On Wednesday August 25, 2010, OPS24 hosted the Nautel Installation Demonstration Wrap-Up meeting to confirm operational status of the two transmitter installations at Rocky Mount NC and at Salem, OR. The group in attendance included personnel from OPS12, OPS17, OPS24, NWSTC, WFO Portland, OR, and contractors.

The meeting started with the discussion of the current status at the two demonstration sites. WFO Raleigh SC has not reported any failures for the newly installed transmitter since their successful re-installation on August 11, 2010. WFO Portland has recently reported a changeover failure after the demonstration ended on August 26 (see Section 3.2).

During the wrap-up meeting, the group agreed that the demonstration has been a good learning experience and will look into all the lessons learned, including the need for better documentation from, and coordination with the transmitter manufacturer/supplier. The current documentation (Mod Note 88 INCO for the 300W transmitter and Mode Note 87 INCO for the 1000W transmitter) were primarily generated by Brian Campbell to mitigate our specific needs in NWS and would need to be further updated for the rest of the deployment of the Nautel transmitters at the other sites.

The lessons learned that were discussed included:

- a. Additional pictures and inclusion of the Nautel installation manual information into one INCO document made installation much easier at the Salem site. One drawback of the additional pictures and the installation descriptions was the increase in size of the INCO document. However, the demonstration group agreed that the additional pictures were very helpful and should be kept in the document as is. The inclusion of the Nautel installation instructions also eliminated confusing multiple documents reference during installation.
- b. Sites should check the dropped shipment indicators before accepting transmitter shipments and before actual installation. The dropped shipment was discovered at Rocky Mount, NC only after the crates have already been accepted and opened and installation has already proceeded.
- c. Offices should have their transmitter sites verified to have the requisite electrical power requirements outlined in the INCO, including creating required power cords prepared, before actual installation.

The group recommended to Jeffrey Earl (OPS12) the possibility of adding a pre-installation section in the INCO documents to contain the site setup electrical requirements and other pre-installation activities (e.g., power cord generation) to mitigate additional time required to finish the transmitter assembly and installation.

- d. Dry dummy loads for the 300W were found to be prone to failures as discovered at NWSTC and at Sumter, SC. Brian Campbell recommends that oil-filled dummy loads be used for all transmitters. Craig Hodan responded that, while this is not operationally critical, it would be beneficial to send these findings to Nautel and get their feedback and possible fix.

- e. The Nautel remote GUI software has failed during remote dialing by modem. Per Brian Campbell's findings, after dialing into the site and putting the ROAMS to sleep, connections will come up but would not update. There were reports of I/O error and external modems not disconnecting. When the software did display 'CONNECTED', not all Tabs would allow fields to be filled. The EVENTS tab indicated 'Loading...' but only a blank screen was displayed. In comparison, Brian Campbell did dial in to Crown and into Armstrong transmitters sites, using his current PC (Dell Optiplex Desktop) and external modem (US ROBOTICS 56K Fax Modem), and they all worked fine.

There were reported failures at Beaufort, SC and at Portland, OR. At the moment, Brian Campbell has contacted Nautel and he reported that Nautel is currently working to resolve the remote GUI software to work for all modems and PCs.

- f. Brian Campbell recommended that all current power alignment and calibration with the Nautel transmitters be retained in the INCO documents. Craig Hodan responded that the Nautel transmitter panel currently reports the power alignments within 1% accuracy while wattmeters are currently rated at around 10% accuracy. The group decided to keep the current alignment and calibration procedures for use by the sites if there are any accuracy concerns.