

# NSS - Still Going Strong on VLF

By ROBERT J. GLEASON



NAA—ARLINGTON, VIRGINIA (1917)

Although not as old as NAA, NSS is still in operation on VLF. In fact, it is the oldest continuously operating very low frequency station in the entire world!

NSS is located on the small peninsula known as Greenbury Point on the northeastern shore of the Severn River, directly across from the United States Naval Academy at Annapolis, Maryland.

The ground on which it is located was part of the estate known as "Hammond's Inheritance of 1737" and the 500 acres were purchased by the U.S. Navy in 1910 for a dairy farm for the Academy. Price, \$49,500! From 1911 to 1917, part of this site was also used for the first Naval Air Station.

It was not until World War I that NSS came into being. Early in that war it was recognized that additional dependable radio communication to Europe was essential so new stations were planned for the U.S. and France. The site selected for the east coast high power VLF transmitter was Greenbury Point. Under wartime pressure, six 600-foot self-supporting towers were fabricated and erected and the ground system consisting of 35 miles of copper wire was installed. The huge flat top aerial was hauled up between the towers with a center down-lead. Transmitter, power plant and quarters buildings were completed, a dock was built for coal delivery to the power plant, etc. -- all in less than 18 months. The station was commissioned August 6, 1918.

Two transmitters had been installed to insure continuous operation. They were 350 kilowatt Fessenden arc transmitters designed and built for the Bureau of Engineering, Navy Department, by the Federal Telegraph Company.

The receiving facilities and control point were located in the Navy Annex building near the Potomac River in Washington, D.C., about 30 miles away.

The two arc transmitters continued in service until 1931 when one of them was removed and replaced by a General Electric Company Type TBJ 500 kilowatt tube transmitter. Later, LF transmitters were added, also many high power HF transmitters, with additional buildings and antennas scattered over the site and the adjacent area which had become the Naval Academy's golf course. But the vital VLF operation never stopped and many operators will remember well the time ticks, weather bulletins, hurricane warnings and press sent from NSS.

In 1969, extensive modification and improvement of the VLF antenna system was begun. A new 1200-foot guyed center tower was erected and surrounded with nine 600-foot towers (three of which are identical to those erected in 1917). The modified "Goliath" antenna consists of the 1200 tower and the "top hat" assembly supported by the 600-foot towers, covering about 200 acres. A single ceramic insulator supports the entire system which weighs "about as much as a destroyer." The output from the transmitter coupling coils is fed to the center tower at the 300, 600 and 900-foot levels and these "lead-ins" are a part of the complete antenna system.

To power the new VLF antenna a 1000 kilowatt AN/FRT87 transmitter was installed in the original transmitter building. This huge transmitter purchased from the Continental Electronics Manufacturing Company occupies the entire building, which is 75 feet wide and 145 feet long, with the output fed directly into the coupling coils in the adjoining "helix house" which is 75 feet square and 65 feet high. These huge variometers (there are two of them in series) take up most of the space in this large building, as each is 35 feet high. They are wound with 4.4 inch diameter Litz wire and carry about 1300 Amperes. (Yes, four and four tenths inch Litz wire!)

The AN/FRT87 transmitter uses four 250,000 watt tubes in push pull in the final amplifier. Additional tubes are alongside each pair as "hot spares" which can be very quickly switched in if needed. These tubes are manufactured by Eimac and presently cost \$11,000 each. The 17,500 volt D.C. plate supply is provided by solid state rectifiers. The tubes are kept at proper operating temperature by circulating and cooling 700 gallons of distilled water per minute.

Although HF was phased out at Annapolis a few years ago, the VLF and LF operation has continued uninterrupted. In addition to the VLF, three powerful transmitters continue on LF. For LF, an 850-foot vertical radiator and two "flat top" antennas between three 300-foot towers are used. A fourth 300-foot tower is used for microwave systems connecting the facility with various locations.

Two auxiliary power plants each with 200 kilowatt alternators insure constant power supply. The auxiliary plant's big diesel engines are manufactured by General Motors and are the same as used on their railroad locomotives.

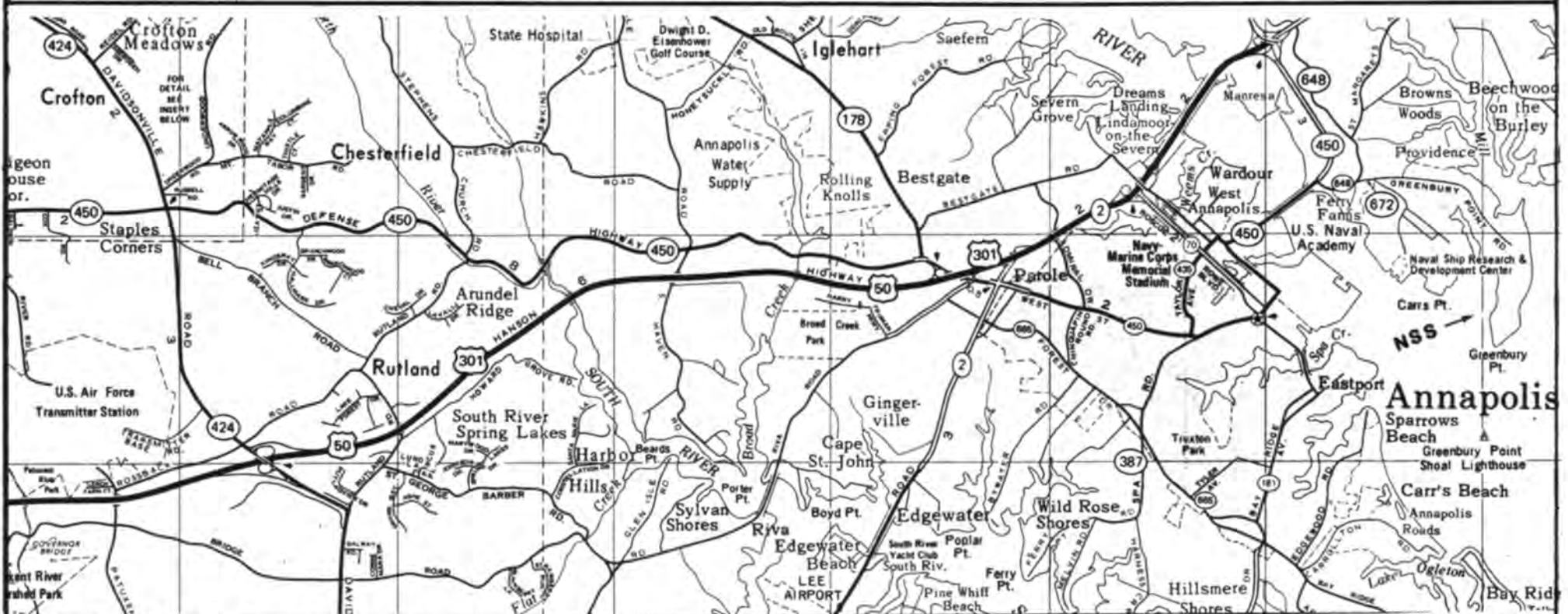
Today the mission of the NSS Navy Radio Transmitting Facility is to provide fast, reliable and secure communication for our submarine units in the Atlantic and the Mediterranean.

Specially designed sophisticated multiplex transmission equipment is used and all traffic is computer encrypted. Although NSS is going stronger than ever, with a terribly vital mission in this nuclear powered world, sad to say, the call letters NSS are now never transmitted.

The Naval Radio Transmitting Facility is presently staffed by about 70 military and civilian personnel under command of Lt. Commander Samuel G. Curry.

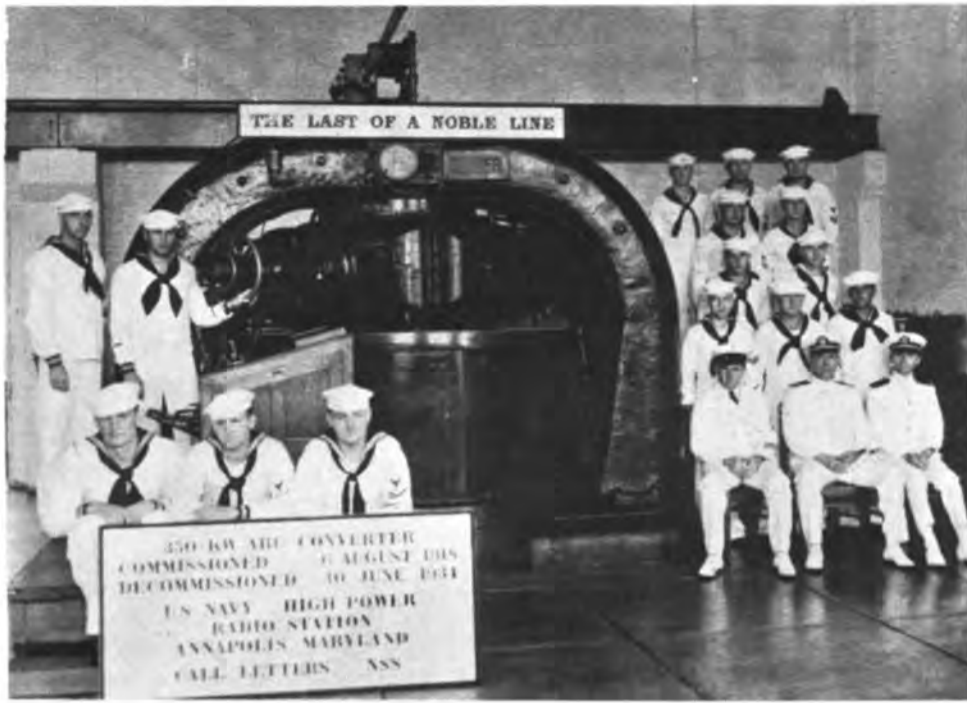
Danny G. Cartwright, Electronics Technician Senior Chief Petty Officer is the maintenance Chief in charge of the VLF installation and the man responsible for keeping it on the air. I am deeply indebted to him for digging into the historical files, procuring and taking photographs and "showing me the works."

As an old radioman and engineer, I am proud to see a great radio station continuing to serve our country efficiently and effectively.





# NSS . . . OLD CALL STILL MAKING HISTORY



### THE LAST OF A NOBLE LINE

The operators and staff of Station "NSS" as the 350 KW Arc Converter was decommissioned June 30 1934. We have been unable to identify those in the picture. Perhaps some of our members were among this group and can help us identify the 18 men pictured.



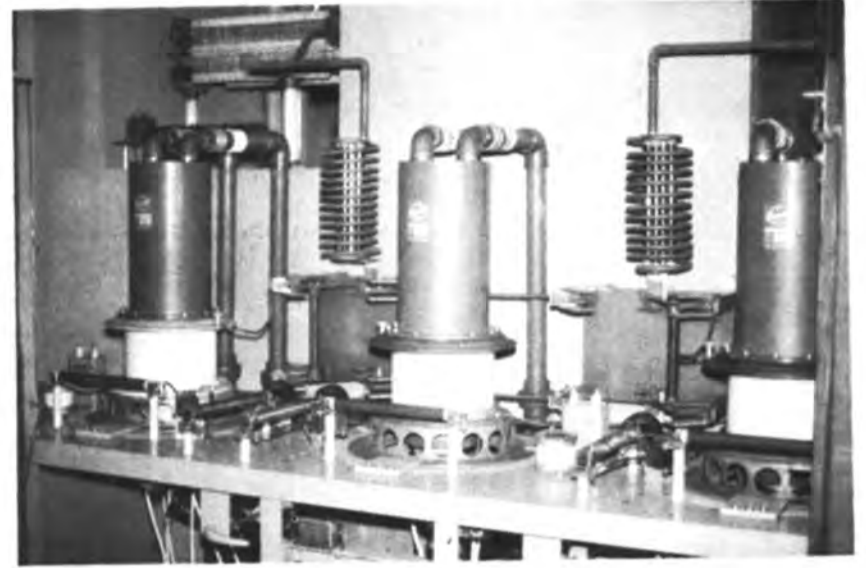
### 1938 - STAFF - NSS

High Power Radio Station - Annapolis, Maryland. Picture of Officers and men placing station in service at 1100 on Oct. 10 1938. Lieut H.A. Tellman, U.S.N. OIC. We are sure some of our members appear in the above picture. We will run a profile in a coming issue if we can obtain necessary identifications of those in picture. A "TBJ" transmitter was placed in service this date.



### 1930 - EARLY RECEIVING POSITIONS

1930 - EARLY RECEIVING POSITIONS - NSS Model RAB-1 Dual-position installed at RADIO CENTRAL, in Washington D.C. (Control). Radio Receiving Equipment was fabricated by RCA Victor Co., Inc. Receiver output, Channels, Jacks, etc. are located at right front of desk.



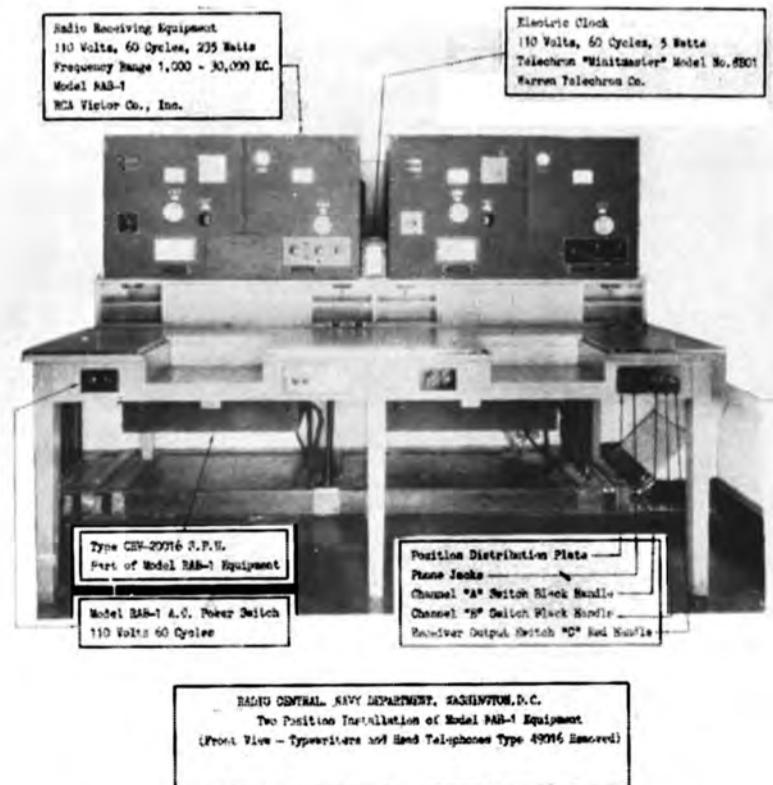
### TRANSMITTER - NSS

Front of PA-1 showing 3-PA Tubes. Two are used at one time with the third as a 'hot' spare. Power out of 1-PA is 500,000 watts - 250,000 watts per tube. There are two PA's used in push-pull to give a total of 1 million watts.



### TUNING SYSTEM.

No. 2 Antenna tuning Helicoil 35 Feet high. Also shows roof bushing feeding to antenna. This Helicoil is in series with No.1 Helicoil.



Thanks to the Naval Photographic Center, Naval District, Washington DC for pictures used and special mention to Cmdr. Curry, Lt. John Fisher and others who furnished pictures of NSS to Robert J. "Bob" Gleason for use in his article.

Drawing of NAA/NSS towers courtesy of Gardner Smith W9ALZ (Used on his QSL-Cards.)