

TO Gang

2/23/55

FROM IVAN ANDERSON

WCCO started September 18, 1924 with 500 Watts on a frequency 720KC.

On 6/30/27 we changed frequency to 740KC and had permission to use a power of 5KW days and 7 $\frac{1}{2}$  KW nites.

On 11/11/28 we changed our frequency to 810KC.

Information per Kermit.

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TO Kermit

2/19/55

FROM IVAN ANDERSON

Talked to Lyall Smith and he said that WLAG was on 300 Or 400 meters. That WCCO at one time had a frequency of 720KC and we lost it and had to move to 810 KC. He couldnt give any dates.

I.H.A.

## WLAG and WCCO History.

WLAG Transmitter was a Western Electric Company 500 Watter, Master Oscillator type of frequency control, which at a later date was changed to crystal control.

Broadcasting from former Station WLAG was resumed on September 17, 1924 and the use of the new call letters (WCCO) on October 1, 1924. At this time work was started on the installation of a new W.E.Co. 5 KW transmitter.

The new W.E.Co. 5 KW transmitter was placed in service on March 4, 1925 and the new studio's in the Nicollet Hotel was formally opened.

Temporary studio's was maintained in the St.Paul Athletic Club until June 8, 1925 when new studio's and offices in the St.Paul Union Depot where opened.

The old WLAG transmitter was given to the U of M for their use as well as an a ~~XXXXXXXXXXXXXXXXXXXX~~ auxiliary for WCCO.

WLAG Transmitter was a Western Electric Company. Type unknown, 500 Watter, Frequency Controlled by a master oscillator. This was removed at a later date and crystal control was installed.

- 9/17/24 Broadcasting from the former WLAG station was resumed.
- 10/1/24 The new station call letters first used.
- 10/24/24 The ground system for the new Western Electric Co Type D-77964 transmitter was composed of a center ground bus extending 250 feet to the West, and 110 feet to the East from a point in the center of the transmitter building. The ground bus running around the building on the North & South sides to join the West bus with the East bus. From the West bus another bus was connected and extended into our 410 foot well. To this East-West bus was connected every two feet a ground wire on both sides of the bus, to fill an area 300 by 370 feet.  
At each end of the East-West ground bus was a 200 foot triangle sided towers built as I recall it, by the Minneapolis Steel Machinery Company.  
Supported between the towers was the antenna, flat tops and cages were used.  
Also in connection with the ground system was installed a counterpoise approximately 10 feet above the ground and some where near the size of the West end ground system.
- 3/4/25 The transmitter was a Western Electric Company Type D-77964 Radio Broadcast Transmitter. 5 KW. Adjusted to the frequency of 810 KC. From Left to Right the transmitter had the following units:
- D-79007 A.C. Power Panel.
  - D-79008 D.C. Power Panel.
  - D-79180 Modulator Panel.
  - D-79024 Rectifier Panel.
  - D-79009 Amplifier Panel.
  - D-77970 Tuning Unit Panel.
  - 2- 1600 volt motor generators.
  - 2- 24 volt motor generators
  - 2- 7 volt bias motor generators
  - 2 Water Pumps.
  - 1 Cooling Radiator.
  - 1 Antenna Grounding Switch.
- 11/6/28 Our General Radio Company, Type 275, No. 71 Piezo Oscillator received from The Bureau of Standards after being calibrated. This was out frequency monitor.
- 5/29 The frequency of the Western Electric Company Type D-77964 was converted from the master oscillator to that of crystal control. This new equipment was installed in the D-79008 D.C. Power Panel Unit.
- 6/32 Western Electric Company Type 1A Frequency Monitor placed in service.
- 10/9/32 Automatic Recovery Circuit installed in the Western Electric Company D-95306 transmitter. This circuit will recover the first two overloads and remain out on the third.

- 6/32 Approximately 200 feet to the north of the 200 foot towers, two 300 foot Blaw-Knox , four leg insulated from ground, towers were installed. These towers were 600 feet apart. Midway between these towers was erected a coupling house which had a ground bus around it which was connected to the coupling unit inside. Connected to the ground bus were 62 No.10 hard drawn copper wires extending away from it for a length of 200 feet. A total of 12,000 feet of wire.
- 2/1/33 The Western Electric Company D-77964 transmitter sold to Dr. Young for \$3000.00.
- 1933 General Radio Company Type 244 Wavemeter purchased.  
Amertrem Company Type PA 83 Amplifier purchased.  
Jensen Company Type D 86AD Speaker purchased.  
Leeds Northrup Company Type 5300-# Resistance purchased.
- 10/34 It appeared that the ground system installed in 1932 was not sufficient and more wire was needed. An additional ground wire in between the present ground wires was installed. Both wires extended to cover an area 500 feet by 750 feet. The new ground wire was attached to the old ground wire 138 feet from the coupling house. This made a new total of 36,000 feet of ground wire.
- 1935 RCA 65A Amplifier purchased.  
General Radio Company Type 733A. 400 cycle audio oscillator purchased.  
General Radio Company Type 731A. Modulation Meter purchased.  
RCA Type 68B Beat Frequency Audio Oscillator purchased.  
RCA Type 5014 Fixed Frequency Radio Receiver. 30 to 45 MC. purchased.  
Used to monitor W9XHW transmitter on 31.6 MC.
- 10/37 Photoelectric Control of WCCO tower lights installed.
- 11/37 Reverse Feedback installed in the Western Electric Company Type D-95306 transmitter to improve it's characteristics.
- 4/38 A voltage regulator installed in the power supply to the Western Electric Company 110 A Gain Reduction Amplifier.
- 5/17/38 Recording of WCCO's signal by the FCC Grand Island, Neb. Monitoring Station was begun
- 1939 Audio Development Company Type B327 Isolation Amplifier purchased.
- 4/39 CBS Volume Indicator Type 9A placed in service.
- 4/39 Field Intensity measurements of WCCO's signal taken at 1 mile radius.
- 9/39 Temporary Antenna made up and tested. stored for future use.
- 11/39 WCCO authorized to determine the operating power by the direct measurement of antenna input. FCC release #44558.
- 12/39 General Radio Company Type 732-AC Distortion Meter purchased.  
General Radio Company Type 732-PI Range Extension Filter purchased.  
RCA Type 82B Monitor Amplifier purchased.
- 1940 Buffalo Drill Press Type No.15 purchased.

- 4/40 Transmission Line Protective Circuit installed in The Western Electric Company Type D-95306 transmitter.
- 1/16/41 Victor J. Andrews Type 818 remote antenna ammeter installed to enable us to check antenna current at all times, while the thermocouple meter is shorted out. It being used to check the remote meter and the necessary FCC readings required.
- 6/23/41 Western Electric Company Type 1A frequency monitor converted to a 1C type.
- 7/28/41 Grid Short Indicators installed in The D-95306 W.E. Transmitter.
- 9/24/41 A voltage regulator installed in the Western Electric Company D-95306 transmitter A Unit to maintain constant supply voltage to the rectifiers supplying the low power stages.
- 7/3/42 Hartenstein, Zane Co. N.Y. inspected and tightened our vertical 640 foot tower. This part finished 7/5/42. Back again 9/3/42 to remove rust and paint these spots.
- 7/23/42 Hammerlund Super-Pro Type 2008 Receiver sent us by CBS to monitor WCRC and WCRX, CBS owned short wave stations. This was done in case they were needed for program.
- 10/16/42 WCCO received orders to remain on the air 24 hours per day because of their appointment as a Key Station by the 7th Service Command Area.
- 11/25/42 Transmitter power reduced. Antenna current from 26.0 to 23.15 amperes.
- 10/26/43 Inspection of the tower lights and recording same on FCC log.
- 11/28/44 Discontinued 24 hour operation.
- 10/1/45 Transmitter power increased. Antenna current returned to 26 amperes. By the use of discarded tubes during reduced power operation, a saving of 122,846 hours of tube life was agained.
- 12/26/45 DuMont Cathode Ray Oscillograph Type 224A purchased.
- 7/12/46 South Bend 9"x 48" lathe and attendant equipment purchased.
- 8/8/46 An emergency generator from KMOX of sufficient size to supply 93 KW or 5KW output of the W.E. D-95306 transmitter was installed in case a strike of Northern States Power Company employées.
- 10/7/46 Emergency Power Unit returned to KMOX.
- 10/12/47 Solar Capacity Exas-meter purchased.
- 3/12/49 FCC granted us permission to read our antenna power direct. Antenna meter moved from the ground side of the antenna coil to that of ~~the~~ a point above the coil.
- \*\*\* 6/15/45 General Electric Tube Checker Type TC3P purchased.
- 2/8/50 Ferris Signal Generator Type 22A purchased.  
General Radio Company Type 916A R. F. Bridge purchased.
- 3/16/50 RCA Voltchayst Vacuum Tube Voltmeter Type WV75A purchased.

- 4/11/50 The Seago Construction Company, Dallas, Tex. completed it's inspection and painting of our 640 foot tower.
- 5/8/50 RCA Frequency Deviation Monitor Type WF49A purchased  
RCA Amplitude Modulation Monitor Type WM43A purchased  
Hewlett Packard Distortion Analyzer Type 330B purchased  
Hewlett Packard Audio Oscillator Type 201B purchased.
- 6/30/50 RCA Transmission Measuring Set Type BI-11A purchased/
- 12/1/51 60 degree corner reflector for 153.35 MC mobile unit reception.
- 8/16/52 Purchased by Midwest Radio & Television, Inc.
- 1/15/53 New B Unit added to the Western Electric Company 407-A transmitter. This unit permits the changing of the Bias and H. V. Rectifier tubes without entering the transmitter enclosure to do so.
- 7/16/53 640 foot tower lighting wiring completely replaced.
- 8/7/54 *3 unit turntable just used today.*

To Larry Haeg (2)  
 From Kermit Sueker  
 Station WCCO

## OFFICE COMMUNICATION

February 10, 1954

T R A N S M I T T E R

1931. When the Columbia Broadcasting System took possession of WCCO, the transmitter was a WE-5A, 5-KW, housed in a 2920 square foot concrete and tile building (basement and 1st floor) situated on U.S. Highway 10 2½ miles ESE of Anoka. This transmitter fed a center connected cage antenna supported by two 200-foot self-supporting three-leg towers and a ground system. Property area was 6.6 acres.  
*W.E.C. FREQUENCY STANDARD PLACED IN USE.*
- 2/1/32*  
*Sp/31 1932.*  
*60 KW ONLY*  
1932. Two Blau Knox 300-foot four-leg self-supporting towers supporting a half-wavelength T antenna and a new ground system replaced the 1931 array.
- Aug. 22,*  
*6:38 AM*  
*W. H.*  
1932. 9.4 acres of land were added and on it the present transmitter building, 5852 square feet of brick and concrete was constructed. In it was installed a WE-D95306 50-KW Radio Telephone Transmitter feeding a 500-foot two-wire RF transmission line to a new coupling house.
- 6/37. Placed in service a WE-110A gain limiting amplifier.
- 10/39. Completed construction of a 640-foot constant cross section <sup>six</sup> three-guy vertical radiator (manufactured by Leigh Structural Steel Co.) and a 180-wire ¼-wavelength radial ground system. Nine more acres of property added.
- 3/29/41.* Changed operating frequency 810 to 830 KC.
- 10/42. Necessary phone, teletypewriter, etc., were installed for 7th Area Service Command key station operation. 24-hour operation. Continued until 11/44.  
*CBS 1A Amplifier Installed*
- 2/25/47*  
7/46. WBBM type composite audio peak shifter installed.
- 5/50. 7.5-KW emergency generator for tower and building lighting installed.
- 9/50. A new 50-KW WE-407A-1 Radio Telephone transmitter, new 6-wire transmission line and method of antenna coupling was placed in service. The old transmitter was partially moved within the building and retired to ~~standby~~ *Aux.* duty. Necessary building changes in transformer room, bias and filament generators made.  
*\* Modulation Monitor, etc.*
- Placed in operation a new General Radio frequency monitor, Hewlett Packard audio oscillator and distortion meter.
- 4/51. As a safety measure, transmitter property was completely enclosed with cyclone seven-foot fence.
- 5/51. Construction begun on Conelrad equipment utilizing part of the auxiliary 50-KW WE-D95306 transmitter. Conelrad frequency 640 KC - 5-KW power. Time to convert to Conelrad frequency, including preheating transmitter filaments - 30 seconds; without preheat - 5 seconds.
- 6/51. Emergency antenna, 1/2-wavelength dipole off-center feed, supported on 50-foot poles, constructed.

T R A N S M I T T E R  
(Cont'd)

- 8/51. Conelrad equipment in operation.
- 9/53. Built and put into operation an electronic keyer for Conelrad operation.
- 4/53. Automatic changing of high-voltage rectifiers installed. *See*

TRANSMITTER FACILITIES AS OF 2/10/54

Regular transmitter 50-KW WE-407-A1 830 KC; Auxiliary Transmitter 50-KW WE-D95306 830 KC, or 5-KW 640 KC (Conelrad frequency). Time to change transmitters - with preheated filaments - (instantaneous); without preheat - (30 seconds).

640-foot, constant cross-section, 3-guy tower, radial ground system, 6-wire transmission line and coupling system.

Two equalized lines from studios - necessary keys, pads and coils to feed peak shifter, and gain control amplifier which feed the transmitter.

On 25 acres, completely fenced, of land situated on U.S. Highway 10  $2\frac{1}{2}$  miles ESE of Anoka, Minnesota.

Emergency power plant for tower and building lights.

Emergency antenna,  $\frac{1}{2}$ -wavelength dipole 50-foot high poles. Time to convert to emergency antenna (including erection and connection to transmitter) maximum one (1) hour.

(P) \* More Like 2 Hr.

S T U D I O S

- 8/31. When Columbia Broadcasting System took possession of WCCO, studios were located on the top floor of the Nicollet Hotel, Nicollet at Washington Avenues in Minneapolis. There were four studios -- two small announce, one transcription and one of sufficient size to accommodate an orchestra. This larger one had its own control room and housed a Wurlitzer three-console pipe organ. A Master Control room housing switching of studios, network and remote broadcasts completed the facilities. Equipment was in the main of Western Electric manufacture.
- 4/39. Moved to 625-2nd Ave. So., second, third and fourth floors of what was known as the Elks Building. 15,000-feet of operating space on the second floor consisting of two studios with their own control rooms and of a size to accommodate an orchestra, one studio (orchestra size) controlled from M.C.; two announce and a news studio controlled from Master Control; Master Control for switching to studios, remotes and network. Master Control consists of the necessary equipment for five outgoing channels (three of which are in permanent service), transcription cutting and playback. All of the second floor operating units are suspended windowless and air conditioned. RCA equipment predominates. The 4th floor auditorium studio, 5400 square feet, including stage, seats 440, and has its own control room. WE equipped.



S T U D I O S  
(Cont'd)

- 8/48. A mobile unit, Chevrolet Station Wagon mounting a 50-watt Link 153-megacycle transmitter, audio mixer, storage batteries and generator was placed in operation.
- 9/52. Tape and disc recording facilities were augmented. A portion of Studio 3 was utilized to divorce a part of the heavy tape operations from Master Control. Three Ampex console recorders, RCA console (rebuilt) and an auxiliary announce studio constructed.

SUMMARY OF FACILITIES  
- STUDIOS -

Two studios with their own control rooms, 42x24 and 20x36.

One studio operated from Master Control, 28x16, partially used by three fixed tape recorders and console.

Three announce and a news studio.

Master Control -- switching for all operations, five channels out; control of announce and news studios; two Presto disc recorders; five Ampex Ampex tape recorders; remote line pack; three disc playback machines (3-speed); Mobile Unit receiver and antenna control; test equipment; audio oscillators, gain set, distortion and noise meters.

Five portable tape recorders (15 & 7½ inches per second speeds).

Mobile Unit, 153-MC, 50-watt, Link battery-operated, Leece Neville generator. Antenna and receiver atop the Minneapolis Athletic Club.

Another receiving antenna at Anoka transmitter site.

Plymouth Station Wagon Remote equipment (RCAOP 5, 6's and 7's). Telephones.

Mostly RCA Senior microphones, also WE cardoids and Altec.

Ten Studio Technicians, two supervisors. Six Transmitter Technicians and Resident Engineer.

K.L.S.

✓ KIS rwm

cc: Mr. I. H. Anderson, Resident Engineer