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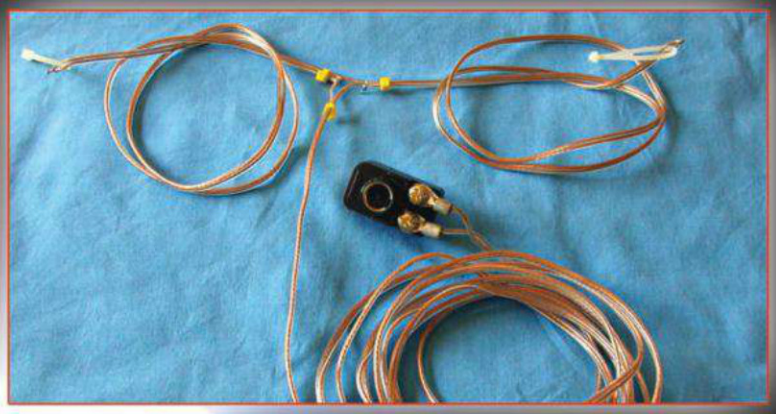

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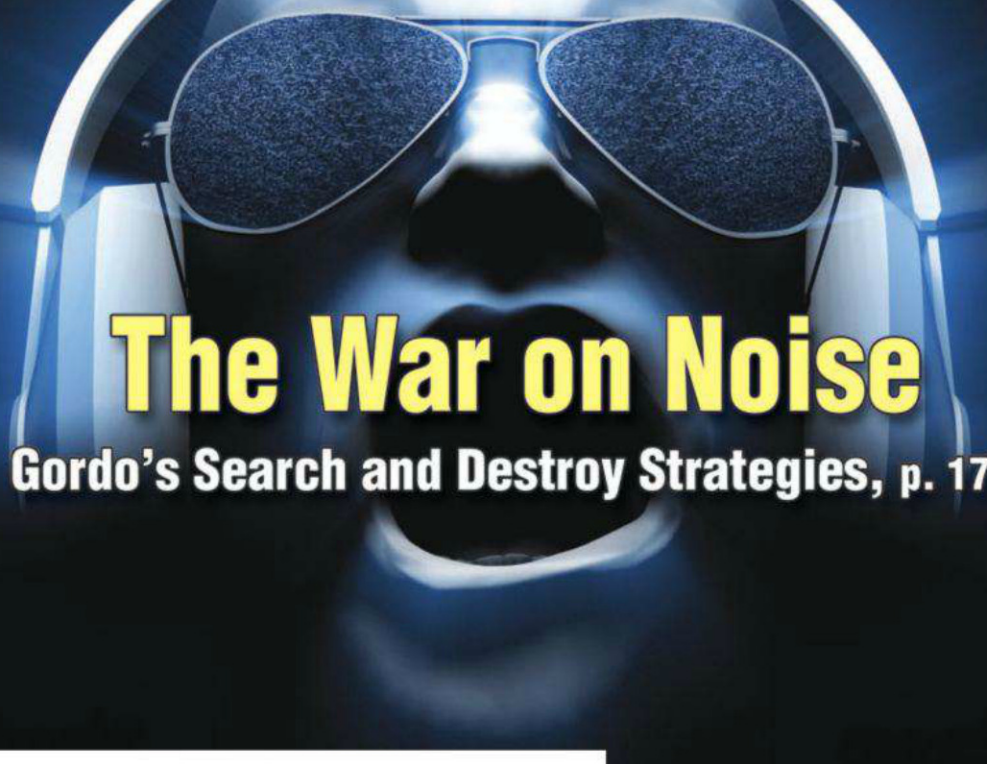

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VOLUME 31, NUMBER 12

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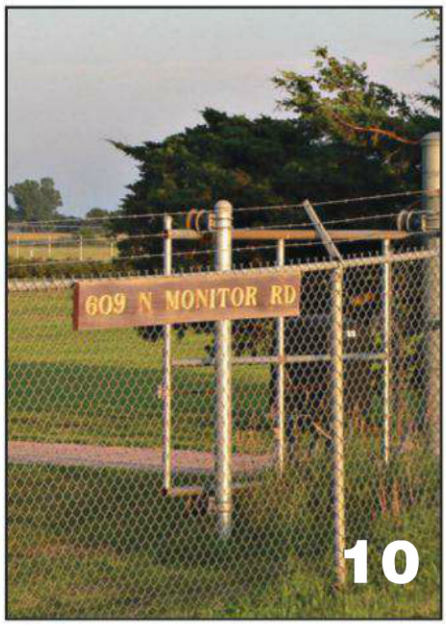

FEATURES

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ON THE COVER

RF Noise can invade your listening post from a whole army of devices. From printers and toasters to fax machines and TVs, they create enough interference to ruin your monitoring fun. This month, Gordon West, WPC6NOA, declares war on noise and gives you his strategies for hunting it down and stamping it out. See page 17. ALSO: Propagation expert Tomas Hood, WPC7USA, reminds us that this is the time of year for Sporadic-E, which is a gateway to FM broadcast band DXing. See his column on page 56. Then turn to page 63 for plans to build a simple FM antenna to do some DXing of your own. *Plane Sense's* Bill Hoefer, KPC4KGC, suggests some smartphone apps that will make your aviation monitoring all the more interesting! *(Photography courtesy of Shutterstock and KPC6PC)*

COLUMNS

DEPARTMENTS

FCC Monitoring Station, Grand Island, Nebraska: In the Rearview, Across the Decades

By Randal R. Schulze, KDØHKD

"Although there is no longer a human presence, it's good to know that after long and distinguished service, the Grand Island monitoring station is still alive and well"

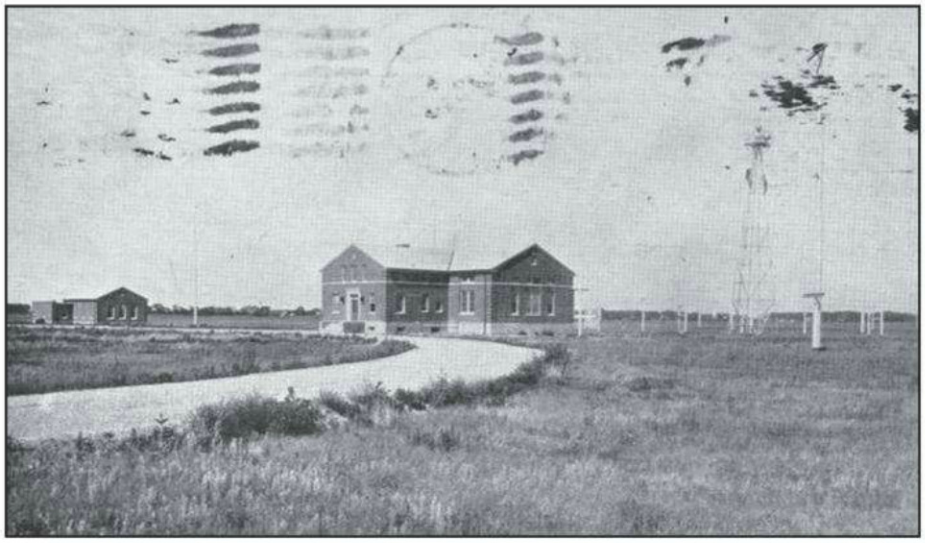

Photo A. This card, postmarked in 1936, was from the Auburn Greeting Card Company, featuring a very early picture of the FCC Monitoring Station near Grand Island, Nebraska. Note the aircraft beacon located to the right. *(Courtesy of KDØHKD)*

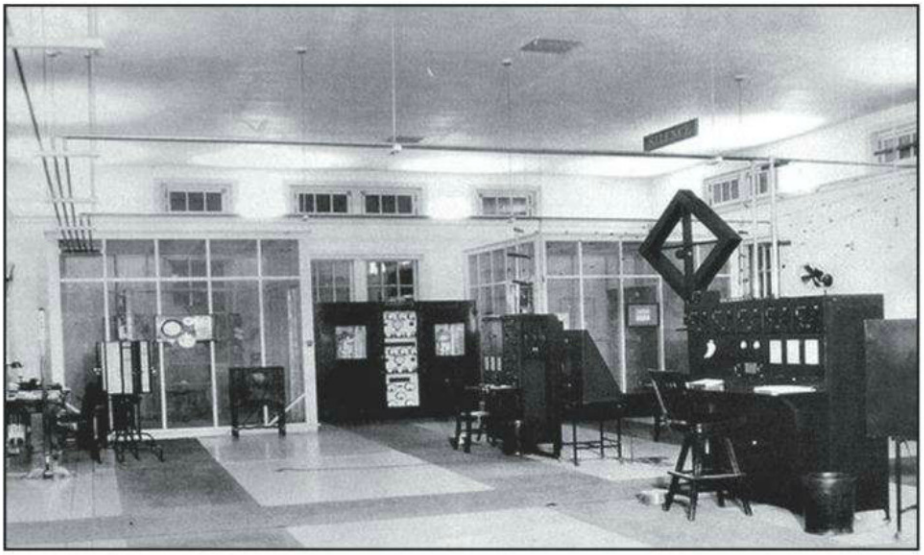

Photo B. Here's a view inside the Monitoring Room on the north side of the building as it appeared in 1932. This is the same room KDØHKD saw on his tour of the facility in the early 1980s. Equipment included primary and secondary standards and an all-wave receiver. *(U.S. Government photograph, courtesy of KDØHKD)*

Like many radio amateurs, I've had the "bug" for electronic communications, and have been involved in communications professionally one way or the other most of my adult life. I first became aware of the FCC Monitoring Station at Grand Island, Nebraska when I was 16 years old, during the Citizen's Band radio craze of the mid-1970s.

I grew up in Kearney, Nebraska, a scant 45 miles west of Grand Island, and worked part-time at the local RadioShack® where we sold a lot of CB radios and met with many of the *good buddies* from the area on a daily basis. *"Ya'll better keep your ears low, Driver, or Uncle Charlie will come out here from G.I. and shut her down! 10-4?"*

I never actually saw or had firsthand knowledge of a representative of the FCC coming to town to deal with a CB issue, but the rumors would hit the air if anyone saw a plain white van with more than one antenna on it driving through town!

I enrolled in college a few years later, and majored in Radio and Television Broadcasting. I also worked at one of the local AM/FM radio stations. At that time, if the station did not have an onsite, licensed engineer, disk-jockeys at radio stations were required to test for, and hold a valid Third Class Radio-Telephone Operators License issued by the FCC.

In preparation for our license test, we were taught about just what the FCC

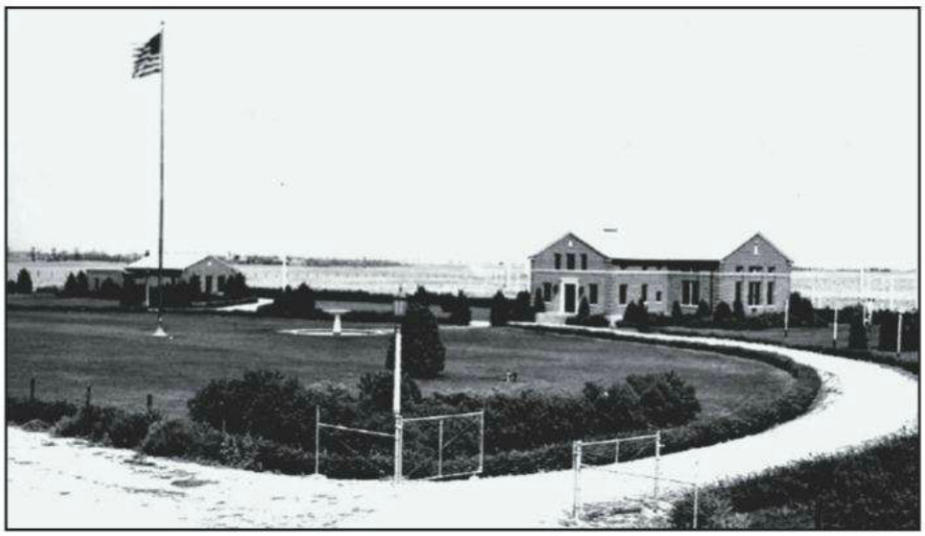

Photo C. This photograph was attached to the 1972 application to add the Grand Island FCC Monitoring Station to the National Register of Historic Places. The actual date of this picture is unknown. However, the similarity of this photograph to the postcard accompanying the sidebar headlined "A Brief History of the FCC Monitoring Station Program, and Grand Island Site" is striking. This may be from around the era of World War II. *(U.S. Government photograph, courtesy of KDØHKD)*

could and *would* do if our radio stations were found to be in violation of regulations or laws, and that if we were the operator — disk jockey — on duty at the time of the violation, our personal license, as well as the station license could be in jeopardy. *(**NOTE:** No license means no job! – KDØHKD)*

To back up what was being taught, we were shown examples of letters to stations from the FCC, which would typically contain a paragraph that said something like, *"At such and such time, on a specified date, Engineers for the Federal Communications Commission Monitoring Station at Grand Island, Nebraska monitored the following violation, etc., etc . . ."*

An Impromptu Tour of the Station

Some years later, I had started a career in law enforcement and public safety and worked at the Hall County Emergency Communications Center, known as GIEC in Grand Island. After I'd lived and worked in Grand Island for a while, I thought I'd drive out and take a look at the FCC Monitoring Station west of town I'd heard so much about over the years. It was sometime in 1980 or '81.

When I arrived at 609 North Monitor Road — *gee, I wonder why the road got that street name?* — I observed this not-too-large, red brick building that resembled a mid-20th century schoolhouse. Outside were what appeared to be an airport beacon light and an antenna farm, with wires strung out across the property around the building. I parked in the horseshoe-shaped driveway in front and entered, expecting to find a receptionist or someone at a front desk, but instead found a fairly plain lobby with a glass display case containing a model of a car from the 1920s and some old radio parts.

After a while, a casually dressed individual — *I wish I remembered his name* — stepped into the lobby, and not expecting a visitor. I didn't have an appointment, but he kindly greeted me, and asked if he could help me. I introduced myself, told him a bit about my background, and explained that I was curious, and wondered if I could arrange for a tour.

He was very happy to comply, adding that there was really not much to see. He told me about the items in the display case. The model car was the type of vehi-

Photo D. This is a view of the FCC Monitoring Station near Grand Island, Nebraska as it appears today. With the exception of the shaggy grass growing on the gravel drive, it appears much as it did in the 1980s. *(Courtesy of Creative Commons CC0 1.0 Universal Public Domain Dedication)*

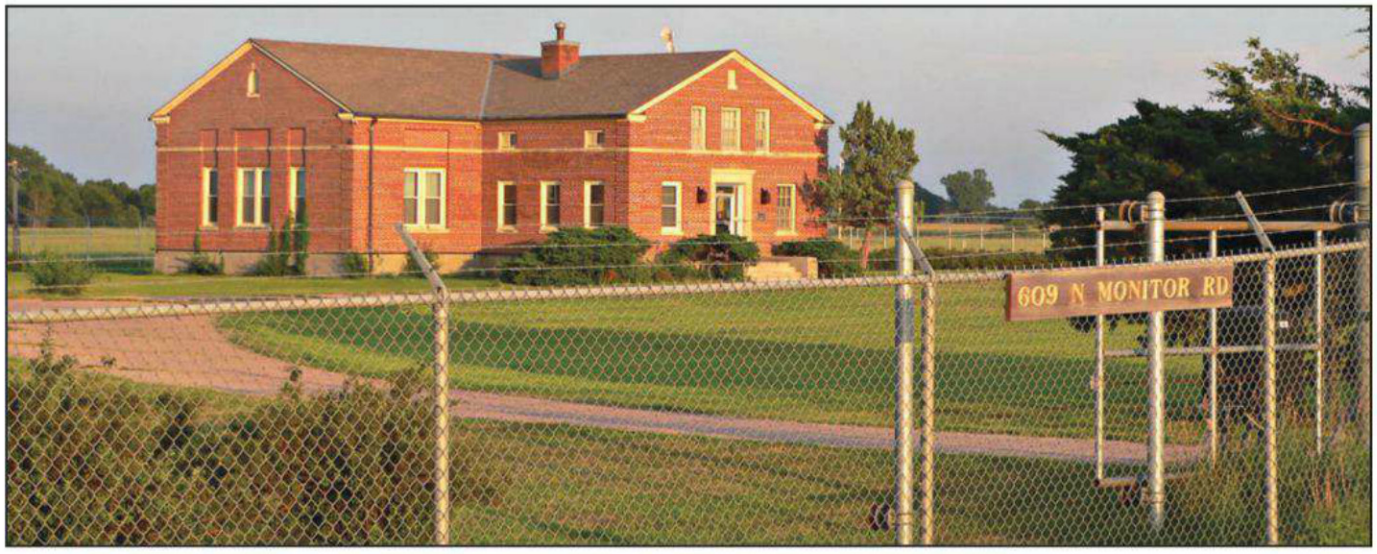

Photo E. Here's a view of the station from the northwest, showing the classic street address plaque. To the communications aficionado, the name of the road is a dead giveaway to the building's use. *(Courtesy of Creative Commons CC0 1.0 Universal Public Domain Dedication)*

cle used by the Department of Commerce before the days of the FCC to monitor radio traffic, and that a similar car was used to select Grand Island as the FCC's first and flagship monitoring station[1].

He explained that in those days, the government was monitoring not only to regulate the airways, but also to investigate possible issues of espionage[2]. Wow! *Spy stuff!*

The other end of the building contained offices, "really nothing to see there," but the actual Monitoring Room was in the north half of the building. I was escorted to a very large, well-lit room, with a big L-shaped rack containing various types of equipment. At the right end of the console were two Model 28 teletype machines. One was hard-wired via dedicated telephone lines while the other worked via radio. But both carried basically the same traffic simultaneously.

On the right side of the room behind the teletypes were large shelves filled with all sorts of books and documents. My tour guide selected one binder and looked up a page and said, "Here you are, Randy. It has your Third Class ticket and your CB license listed here!" I did not have my amateur radio license then . . . but that's another story for another time.

Two engineers were working on calibrating some equipment

Photo F. From the southwest, the Grand Island Monitoring Station presents a view that no longer has the site's historic aircraft beacon light. *(Courtesy of Creative Commons CC0 1.0 Universal Public Domain Dedication)*

with an oscilloscope, while in the background we could hear the notorious "Russian Wood Pecker" chattering away from one of the speakers. "Yeah . . . the Russians claim they're doing atmospheric research, but who knows. It's real annoying!"

On the far left end of the console was something I was told I'd be interested in. Built in, was a standard AM/FM radio, like you'd find in the dashboard of any car of the day, and a programmable radio scanner.

My tour guide explained that if the engineers weren't too busy, they would listen to music, or more specifically, listen for ID violations on the broadcast or public service bands. Sure enough, the FM station where I had worked was already tuned in, and the scanner was programmed to listen to my Emergency Center at GIEC. Our center was normally considered *a good dog,* and that as far as he recalled, we had no violations.

Learning About the Site's Antenna 'Farm'

I asked about the antenna farm. Many of the antennas scattered over the adjacent land were no longer in use, my guide said. There was one particular antenna array that was fairly new and cutting edge at the time — remember, this was 1980 or '81 — and was used for most of their activity.

It was connected to RF direction-finding equipment that when used in conjunction with the other monitoring stations, was extremely sensitive and accurate. I mentioned the tower that appeared to be an airport light beacon, and asked what that was for. Turns out, it was no longer in use, but back when the site was established in 1929, not only was radio in its infancy, so was aviation.

Navigation at the time was by the visual identification of landmarks, and in predominantly rural areas, such as Central Nebraska, there were not a lot of lights that might be observed from the air at night.

Lights, similar to what we might recognize today as airport beacons, were set up along air routes on any available government land. Nighttime navigation was done visually from beacon to beacon.[3]

A Brief History of the FCC Monitoring Station Program, and Grand Island Site

By Randal R. Schulze, KDØHKD

Let me tell you about the history of the FCC Monitoring Station program and the Grand Island, Nebraska station, in particular. Here's a snapshot I gleaned from a display in the lobby of the Federal Communications Commission:

"Under the Radio Acts of 1910 and 1912, the Department of Commerce received the authority to monitor and inspect shipboard radio equipment, license radio operators for that equipment, and prevent interference between stations.

"Prior to 1930, there were few radio services. The primary users of the available frequencies were ships, coastal stations, point-to-point telegraph, AM broadcasting, and radio amateurs with the radio amateurs far outnumbering the other radio operations. The budding AM broadcasting segment of radio operations began to grow phenomenally after the start of KDKA in a basement in Pittsburgh, Pennsylvania in 1921. Licensed and unlicensed broadcast stations were in service, causing a need for a frequency monitoring facility.

"The Radio Division in the Department of Commerce in Chicago used Packard radio-test cars and other equipment to determine the best location for a Central Frequency Monitoring Station. After an extensive search, the flat prairie region of central Nebraska, specifically, an area six miles west of Grand Island, Nebraska, was selected because of its superb reception conditions, central geographic location, and freedom from nearby transmitting stations. The original

Photo A. A genuine Curteich "C.Y. Art-Colortone" postcard shows the artist's view of the Monitoring Station near Grand Island, Nebraska. It was postmarked in 1945. The poles in the background held up wire antennas. *(Courtesy of KDØHKD)*

I was invited to come back during the graveyard shift — that's when most of the interesting monitoring cases are worked, and he provided me with a phone number to call to let the night engineer know when I was coming.

Monitoring Excitement on the Night Shift

A few weeks after my initial tour, I was about to come off the evening shift at the Emergency Communications Center at 11 p.m., and telephoned the FCC Monitoring Station to see if this might be a good night to come out and observe. The duty engineer replied that he was expecting my call, and added this would be a perfect night to come, as he would be involved in an interesting investigation.

I arrived at the station around midnight, and was cordially invited inside. The engineer — *again, I wish I could recall names, but this was a long time ago* — explained to me that the FCC had received many complaints from amateur radio operators about an unidentified person who frequently came on the 40-meter band who sounded like he was intoxicated and was preaching, swearing, and generally jamming and interfering with other conscientious radio operators.

This *ne'er do well* was on the air on this night and up to his regular routine! Along with Grand Island, several other monitoring stations would be involved. I was told they only needed two stations to make a successful location identification, but more would make a more valid conclusion.[4] Grand Island would be the station coordinating the investigation.[5]

Once at the radio console, the engineer used a piece of equipment which, to my untrained eye at the time, appeared as an oscilloscope that would display a lobe on the screen pointing by compass degrees to the source of the signal.

When the subject started transmitting, the engineer would tune his equipment with his left hand, while typing on the teletype to other participating monitoring stations with his right hand. *"On, On, On, On, On,"* during the transmission.

tract of land for the monitoring station was comprised of 50 acres, which was purchased in April 1929 for the sum of $1 from the estate of Fred Matthiesen, Jr.

The 47th Legislature of Nebraska passed a bill in 1931 that allowed school land to be purchased by the Department of Commerce for the development of a radio monitoring station."[1]

The FCC Monitoring Station at Grand Island was added to the National Register of Historic Places. In its 1972 application to the National Parks Service it was noted that this was the "first United States Radio Monitoring station and site. Construction completed in 1930 near the geographical center of the 48 contiguous states. Transferred to the FCC by passage of the Communications Act of 1934 as part of President Roosevelt's New Deal. At the time of the construction of this building there were nine radio district headquarters in various parts of the United States. At the present time (1972) there are 24 radio districts and 19 monitoring stations. In July 1911 there were two radio inspectors — one in New York and one in San Francisco — who were responsible for the inspection of ship radio installations. These original two inspectors have increased until, at the present time, (1972) there are approximately 420 employees of the Field Engineering Bureau who are concerned with the various aspects of monitoring.

Frequency coverage in 1927 extended from 10 to 30,000 kHz, in contrast to the frequency range today to more than 30,000,000 kHz. The latest figures in the Annual Report to Congress issued by the FCC shows that there are more than 7,948 broadcast stations (radio and TV), 1,745,709 stations (using 8,858,222 licensed transmitters) in the Safety and Special Radio Services, 2,523 CATV systems in addition to the telephone and telegraph facilities which are under the jurisdiction of the Commission. In the past 20 years it is estimated that transmitters in operation have increased more than 50 times."

Photo B. Hall County, Nebraska, is home to the Grand Island FCC Monitoring Station *(Courtesy of Wikipedia Commons)*

Elsewhere in the application, the specific site of the Monitoring Station is described:

"(The) FCC Monitoring Station consisting of 200 total acres in one parcel with one large two-story unpainted brick and asphalt-shingled building with detached garage of similar construction, with smaller auxiliary buildings nearby. The original monitoring room contained 2,000 square feet of floor space, and room for dormitories, kitchen, workshop, storage batteries, motor generator, and switchboards were provided. This building was constructed from plans and specifications prepared by the Navy Department, Bureau of Yards and Docks with the ground breaking in October 1929. The original site comprised 50 acres and was the first monitoring station constructed for the exclusive use of the predecessor, namely, the Federal Radio Commission which was authorized in an act approved February 23, 1927." [2]

FOOTNOTES:

1. For the story on the establishment of the FCC Monitoring Stations, visit <http://bit.ly/12YzxE3>.

2. National Register of Historic Places Inventory — Nomination Form 10-300, June 13, 1972, Nebraska State Historical Society <http://bit.ly/19hF6kv>.

The subject was indeed transmitting, and he did indeed sound intoxicated. I believe *"hammered"* is a better term! Although they obtained a fix very quickly on the subject, the monitoring stations continued scanning him for about another 15 minutes.

After triangulation between the stations had been completed, a latitude and longitude was calculated. The monitoring engineers determined the subject was about 10 miles off the coast of Wilmington, North Carolina, most likely on a boat.

I learned later the U.S. Coast Guard was dispatched and arrested the subject on suspicion of boating while intoxicated. As far as the FCC was concerned, that got the subject off the air and although documented for probable cause, no FCC related charges were made to my knowledge.

I asked the engineer what else he had to look forward to that night. He replied, mostly paperwork, but jokingly added if he found time, he'd turn on the scanner and write up some of my cops for *failure to ID* violations on the public service bands! I called it a night, and headed home after a very interesting and educational evening.

The Monitoring Station is Closed

I had contact with the FCC Monitoring Station one more time in 1984 while I served as Chief of Police for a small town in Northeast Nebraska. We had been suffering very strong radio interference to our in-car mobile repeaters in part of the business district of town. It was on the 155-MHz band, and made it impossible for my officers to communicate with anyone while in that area. At my request, engineers from the FCC at Grand Island came to town, located the offensive source in short order, and corrected the issue in less than one week from my original telephone call to them.[6]

On August 17, 1995, then FCC Chairman Reed Hundt announced the total restructuring of the FCC. This included the following:

"Monitoring Stations: We currently conduct national frequency monitoring operations in nine separate monitoring stations, and in four additional monitoring sites within FCC field offices. Fortunately, technological advances will permit us to replace these monitoring stations with a national automated monitoring network by the summer of 1996. Accordingly, I am proposing to the full Commission that we will close all nine monitoring stations and the monitoring functions within field offices at that time. The monitoring will be done electronically. No monitoring function will be impaired. We will retain one facility in Laurel/Columbia, Maryland, as our central station."[7]

Shortly after the new National Automated Monitoring Network was established in 1996, the FCC Monitoring Station at Grand Island, Nebraska was closed . . . *Or so it seemed.*

After considerable effort and the assistance of my U.S. Senator's office, I was able to learn that the old FCC Monitoring Station is still in use. In correspondence, the Federal Communications Commission replied:

"The Grand Island Monitoring Station is part of the FCC's High Frequency Direction Finding (HFDF) network. This network provides monitoring and interference resolution support for the Federal government, the public safety community, and other FCC licensees. The network is vital to FCC management of HF spectrum (below 30 MHz) within the U.S. and the enforcement of FCC spectrum rules. The network operation also provides special monitoring and technical assistance support during and after major emergencies." [8]

Although the human presence is no longer at the station, it's good to learn that after a long and distinguished career, the FCC Monitoring Station at Grand Island, Nebraska is still in service, and will continue to be in service well into the foreseeable future.

Photo G. Randal R. Schulze, KDØHKD, as he appeared about the time of his tour of the Grand Island FCC Monitoring Station in the early 1980s. *(Courtesy of KDØHKD)*

About the Writer

Randy Schulze, KDØHKD, grew up in Kearney, Nebraska, later attending the University of Nebraska at Kearney, then known as Kearney State College, and Dana College at Blair, Nebraska majoring in Radio Broadcasting.

Schulze served 16 years as a law enforcement officer with agencies in Nebraska and Missouri as 911 communications operator, police officer, and chief of police. Although involved in radio communications professionally throughout his adult life, Schulze did not get fully involved in amateur radio until the spring of 2009. Since then, along with two of his best friends, he is part of the Hams in Space Team, which provides presentations and videos on working amateur radio satellites <http://hamsinspace.com>.

Schulze resides at Kansas City, Missouri and works in Information Technology for CenturyLink in Overland Park, Kansas. He's an active member and President of the Raytown (Missouri) Amateur Radio Club, and is the National Coordinator for the CenturyLink Employees' Amateur Radio Club.

FOOTNOTES:

1. This display has been moved to FCC Headquarters. See <http://bit.ly/12YzxE3>.

2. Further reference to this activity can be found in a document titled, 1945 UNITED STATES GOVERNMENT MANUAL regarding FCC Activities during World War II <http://bit.ly/12J8nPZ>.

3. This was verified by a representative of the Federal Aviation Administration (FAA) at Kansas City, Missouri in August 2012.

4. I did not know this at the time, but reflecting on my experience in law enforcement investigations, it is likely the selection of three or more monitoring points, from disparate locations all over the country, not just ones close to the suspected location, is probably something suggested by the attorneys as a matter of evidence, to rule out any other signal sources, not as an engineering consideration.

5. Grand Island was considered the "lead monitoring station." A list of FCC Monitoring Stations can be found at <http://bit.ly/10vqGtW>, however this list has not been verified as accurate.

6. The "Offensive Source" turned out to be office equipment, similar to a telex machine. When disconnected from power, the interference stopped.

7. An FCC announcement dated of August 17, 1995 regarding the restructuring of the Federal Communications Commission, including the closure of the Monitoring Station at Grand Island, Nebraska <http://bit.ly/Zaa5Le>.

8. From a letter to the author from the Office of U.S. Senator, Claire McCaskill, (Missouri) March 12, 2013.