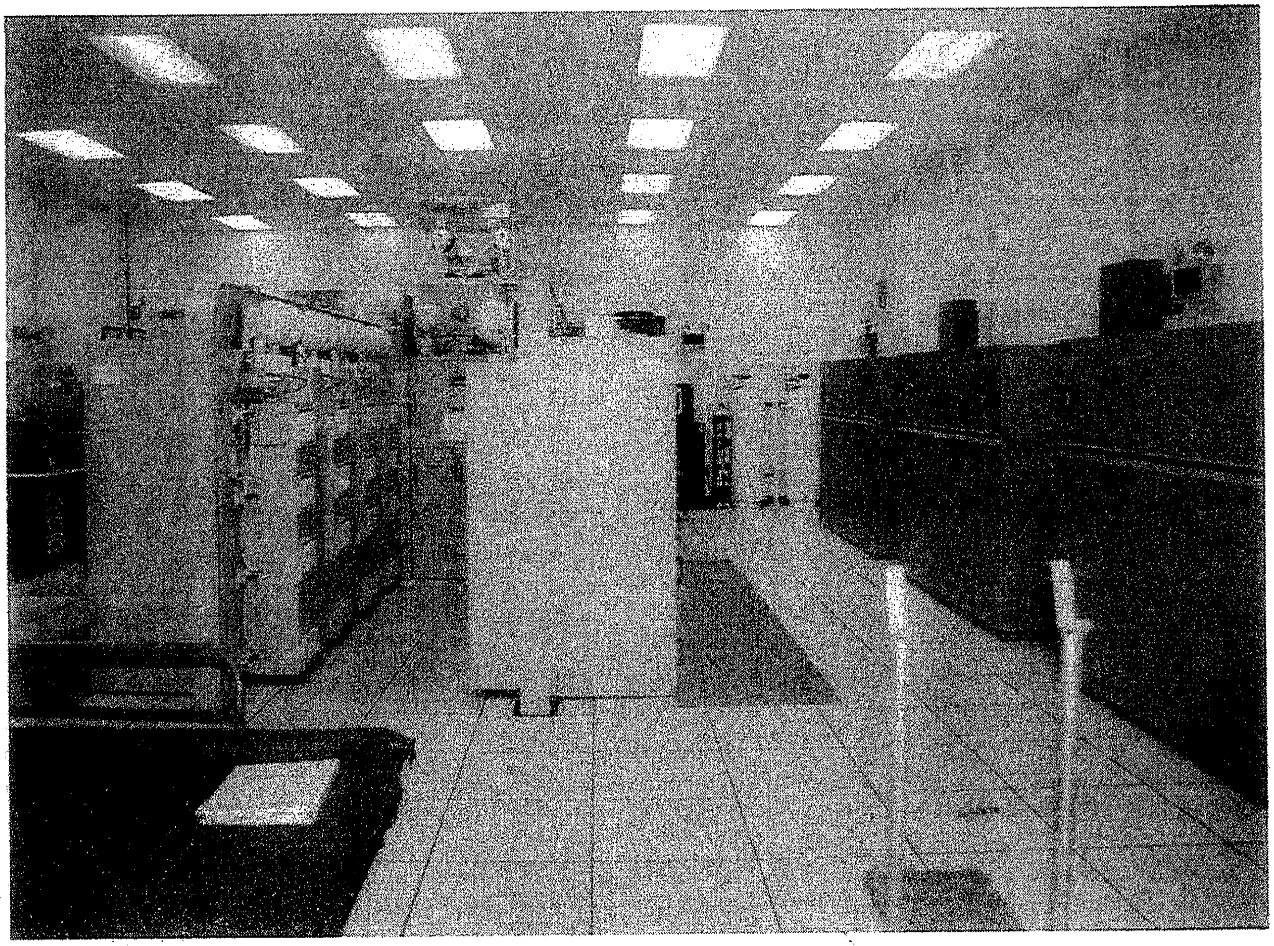
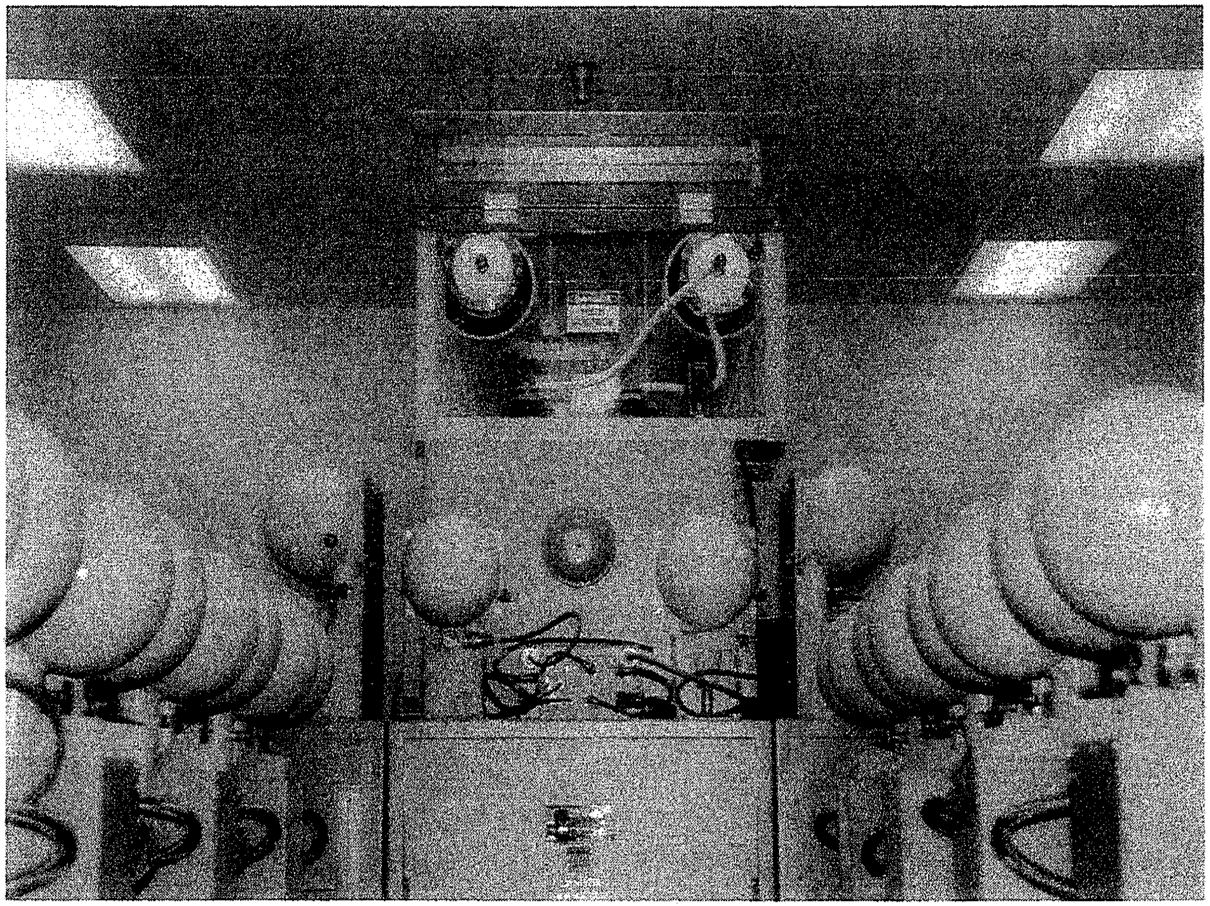


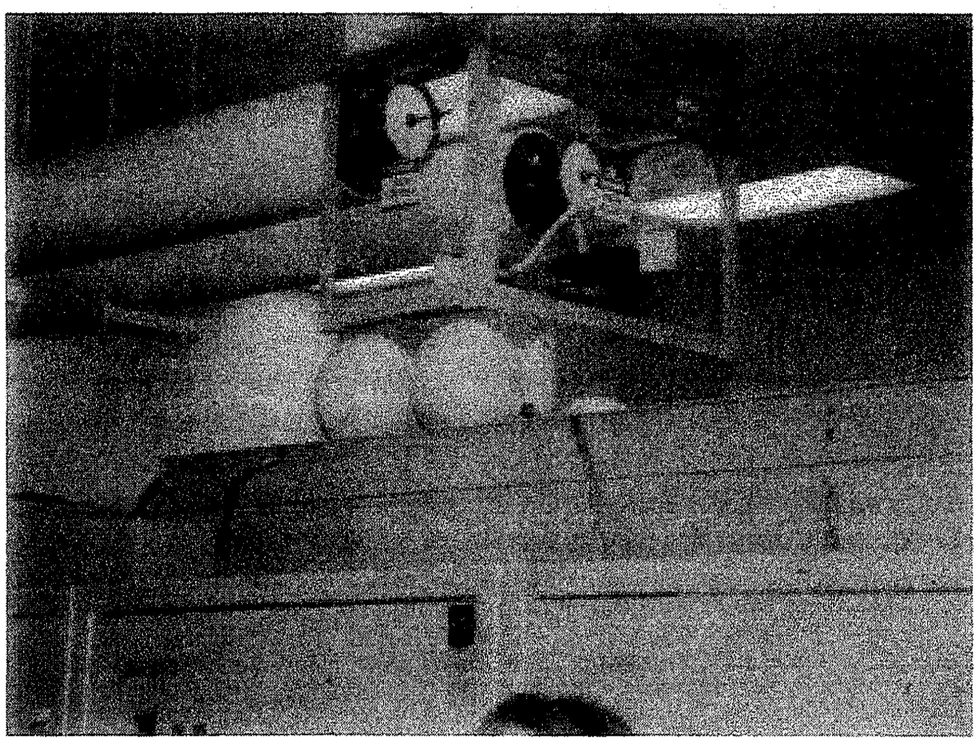
View of the transmitter room. There are two identical transmitters in the room. The one on the left is the primary and normally on the air. The right one is used as a standby in case the primary fails. The cabinets near the wall on the right side of the room are air conditioning units that use exterior heat exchangers.

The white tanks on the right at the rear wall and the small white ball shaped objects attached to the transmitters are part of the fire suppression system. If a fire is detected, an alarm will sound and then after a short delay, the room and all the equipment racks are flooded with a fire suppressing gas. A human cannot survive in the room without special breathing apparatus once the suppressant dumps. The alarm gives the people in the room time to get out before the gas dumps.

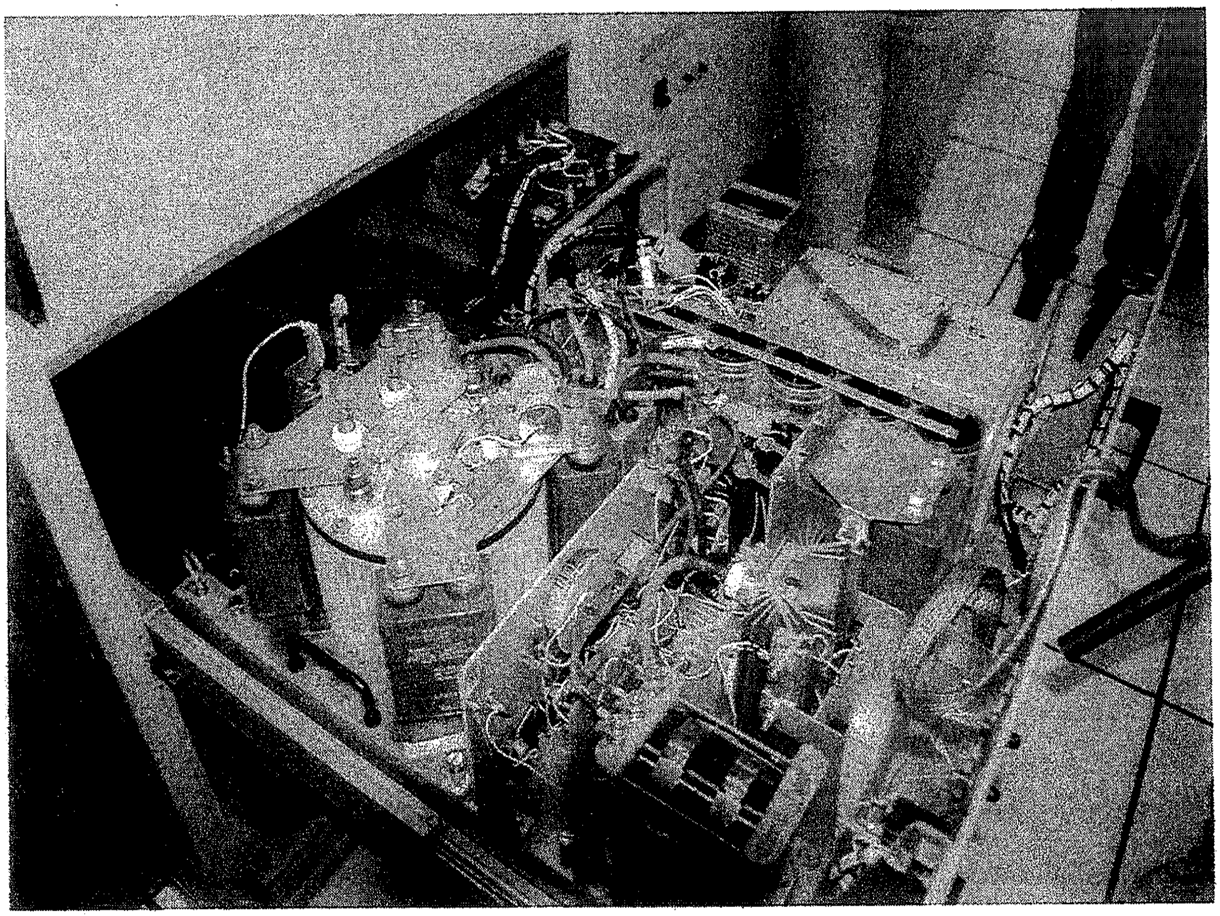
Notice the area between the two transmitters. It contains two identical coax transmission lines connecting to the antenna and the switching gear to select either the primary or standby coax.



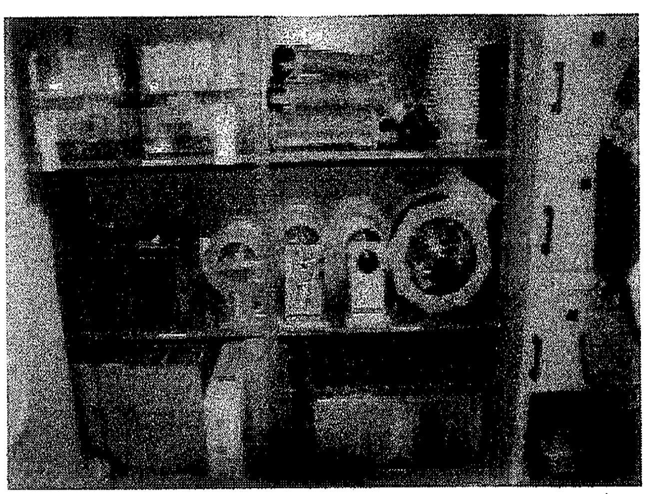
Close up picture of the fire suppression tanks and the coax feed lines.



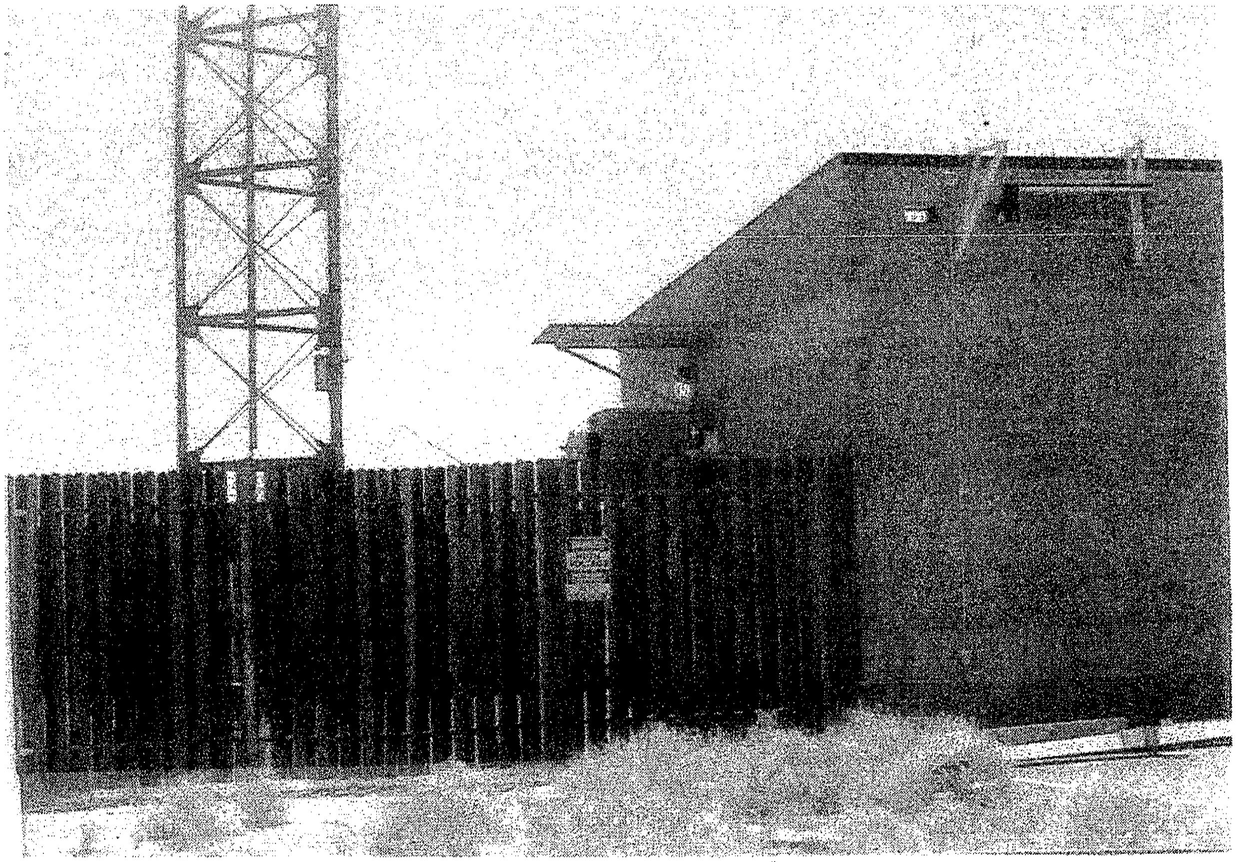
Close up view of the coax feed lines.



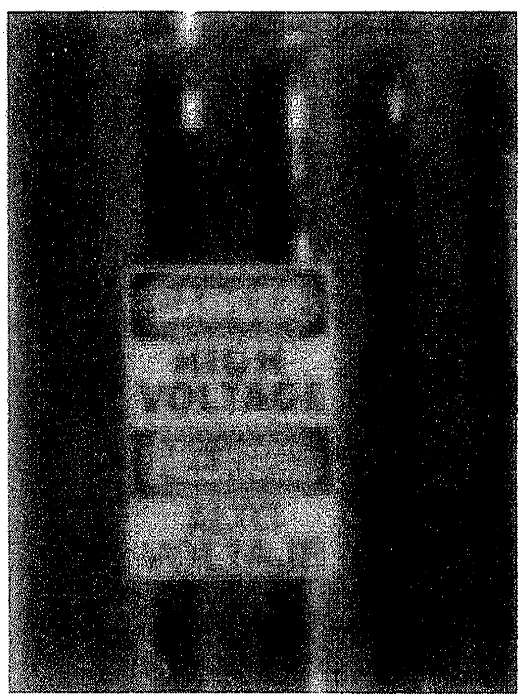
One of the transmit modules. Each transmitter contains 16 of these modules. Each module produces a portion (1/16th) of the output waveform and the outputs are coherently combined to produce the transmitted signal. Each module outputs a signal with a peak power of 500 kW. The cylindrical object in the rear of the drawer is the actual power amplifier. The rest of the components are for the power supply and monitoring. Most components in the module operate at a voltage of 10,000 volts.

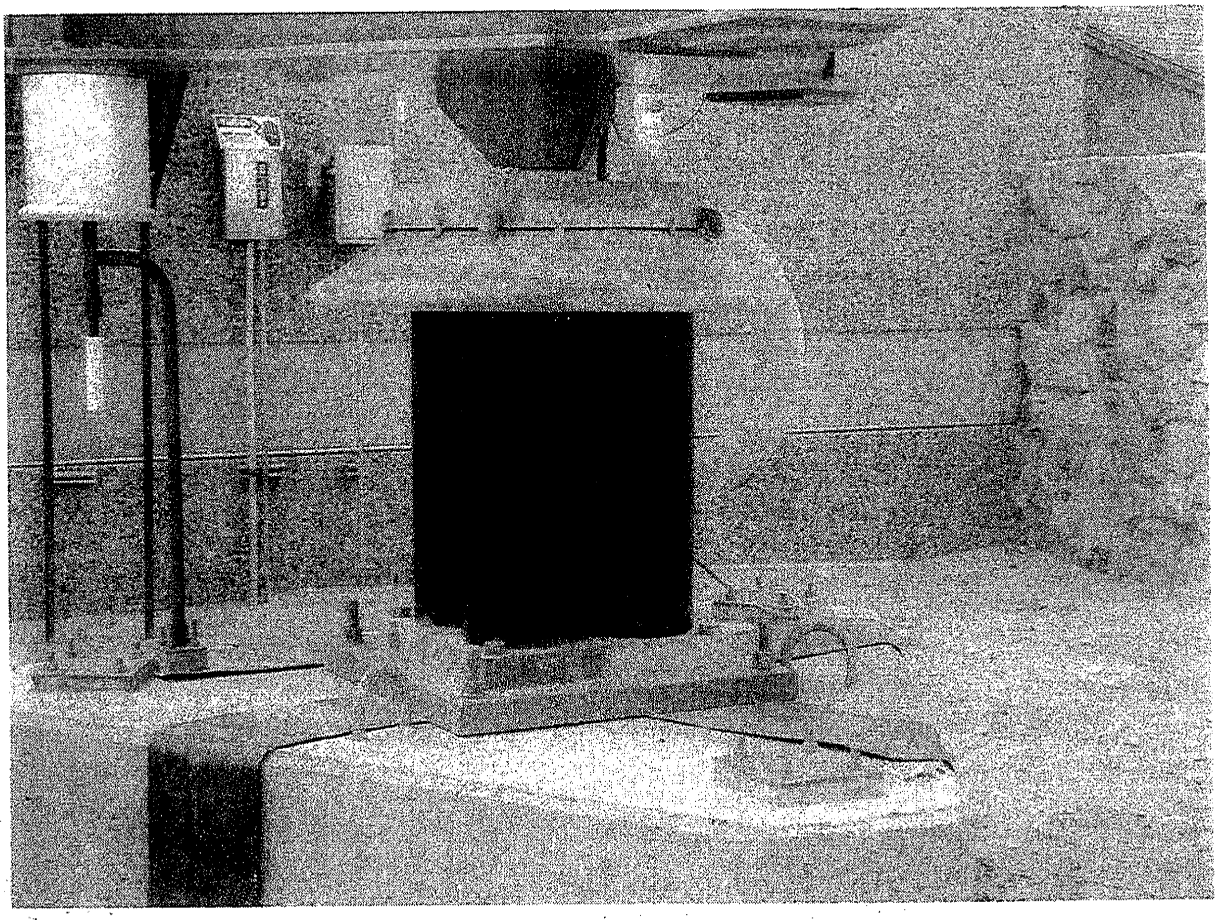


Some of the spare parts maintained at the site. The bottom of the rack contains high voltage capacitors. The center shelf contains variable high voltage inductors and the top shelf contains high voltage variable capacitors and fixed inductors. These are the kind of components that cannot be easily replaced; they are not the type of item your local radio store would be able to supply.



Picture of the wooden protective fence around the antenna. Note the warning signs.



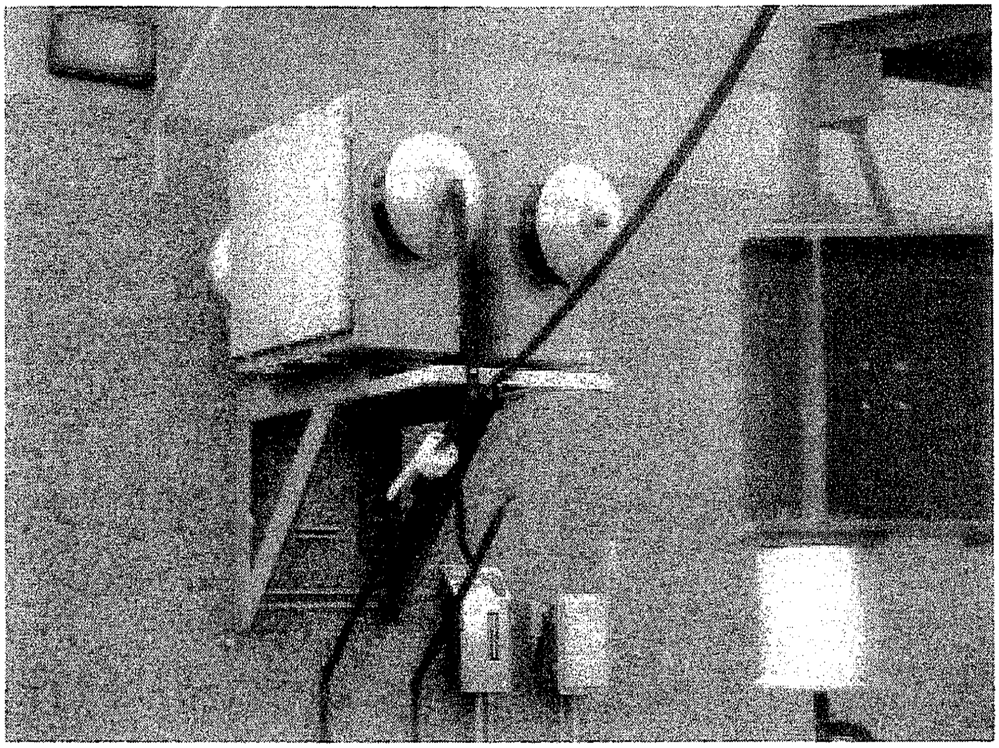


Base of the antenna. The antenna is actually a 750 foot tall triangular guided tower with a top hat. The tower is isolated from ground by the base insulator. This insulator consists of four thick glass tubes filled with oil. The white object on the left connected to the red metal tower is part of the instrumentation.

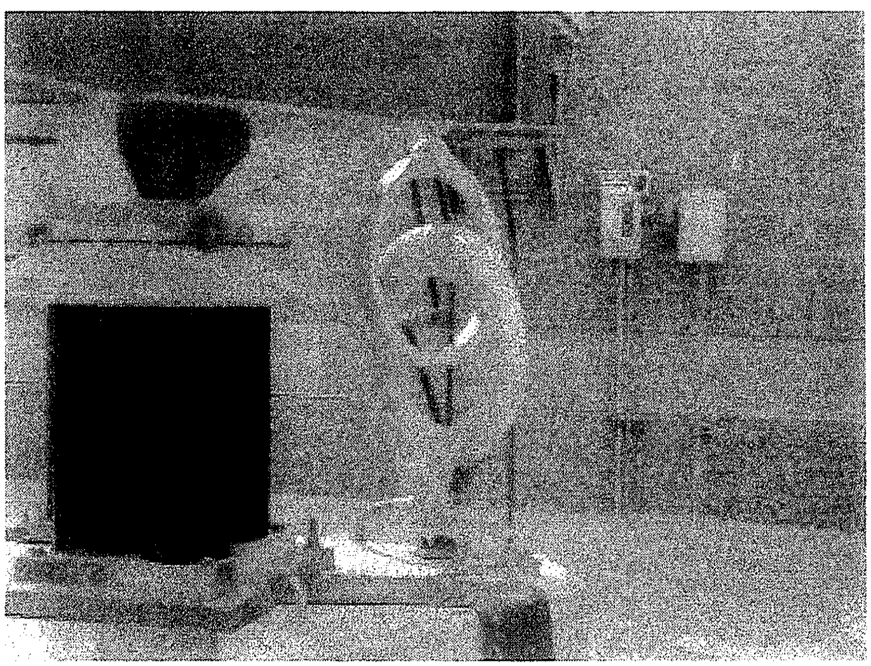
Notice the four copper ground straps running from the base plate into the ground. These actually connect to a circular ground radial system that extends for a mile around the site.

The tower is always "hot" and lethal to humans. The tower voltage peaks at about 30,000 volts during the transmission of a Loran pulse and decays to about 10,000 volts between the pulses. Normal visitors to the site are never allowed to get this close to the antenna. We were allowed to get to within 10 feet of it.

I noticed an interesting effect while near the antenna. I could actually "feel" the Loran pulses; I could easily sense the Loran pulse repetition rates.

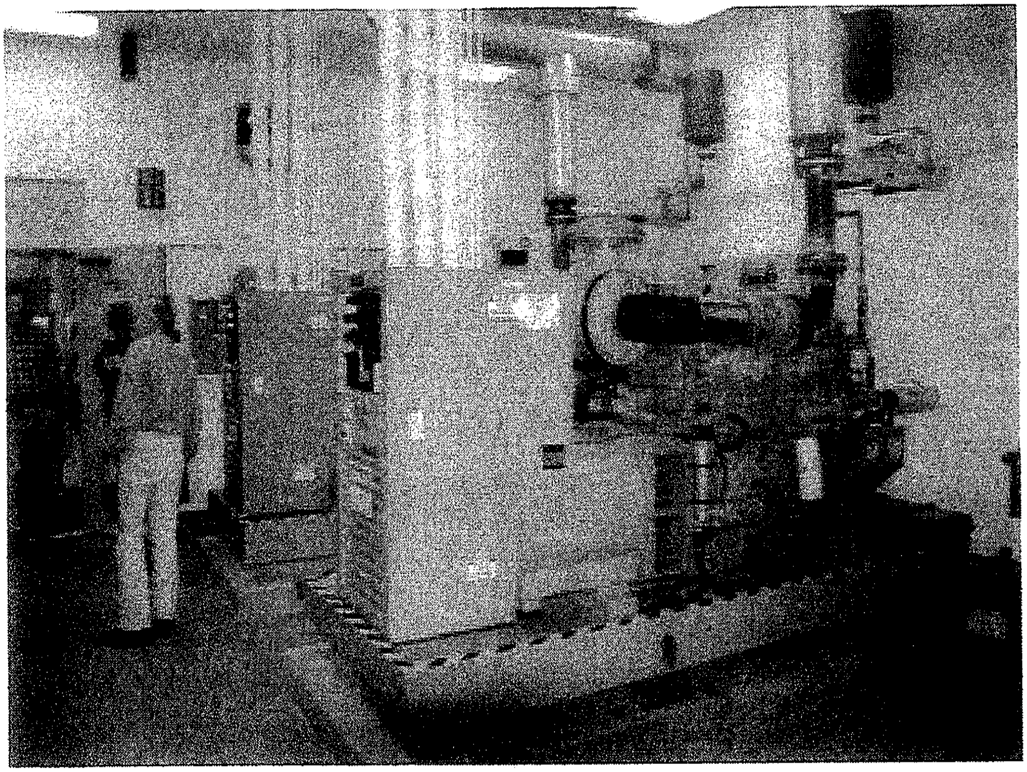


Picture of the coax feed line termination. Notice the spark gap lightning surge arrestor on the strap connecting the coax to the tower.



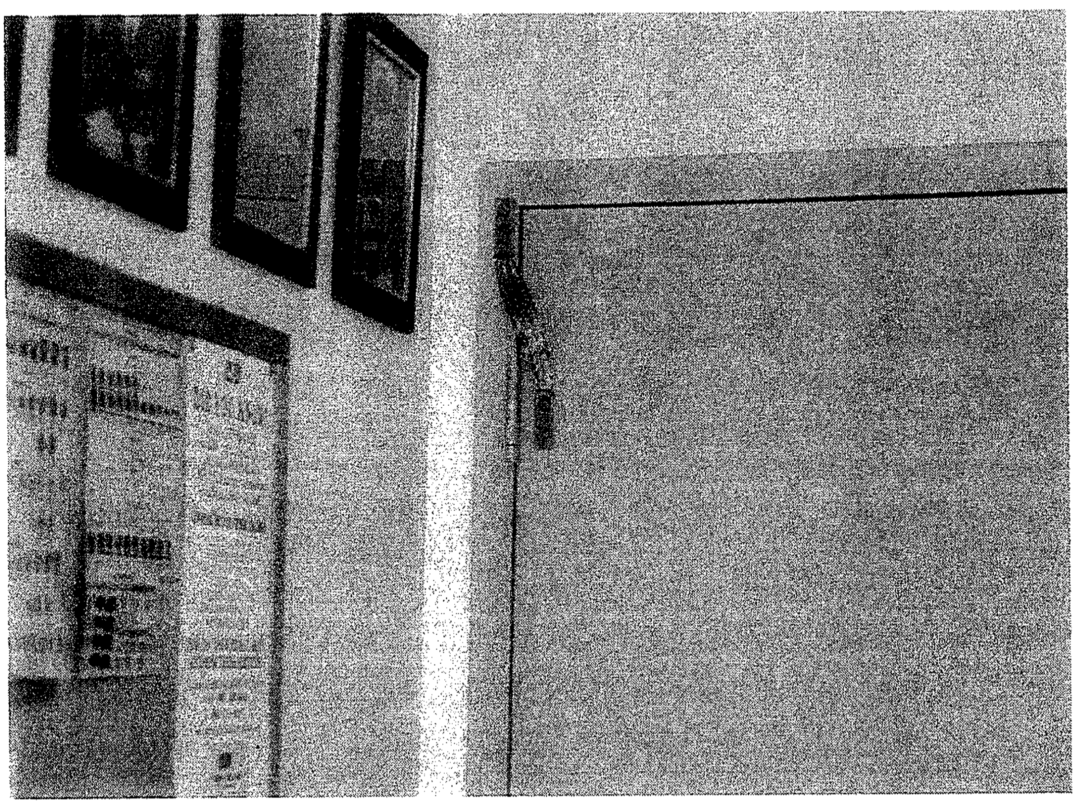
Picture of the special air core transformer used to couple AC power to the tower. The AC power is used to operate the tower obstruction lighting.

The tour guide related an interesting story concerning the tower lighting. They have to change light bulbs on a regular basis and this requires climbing the tower while it is "hot". To do this, they use a special fiberglass ladder to stand against the tower so they can start climbing several feet above the base insulator. The drill is to put the ladder in place, climb to the top of the ladder, take a deep breath and then grab the tower. The climber always gets a jolting shock at this time. As soon as the climber's body voltage equalizes with the tower voltage, he can continue climbing without getting any more shocks.

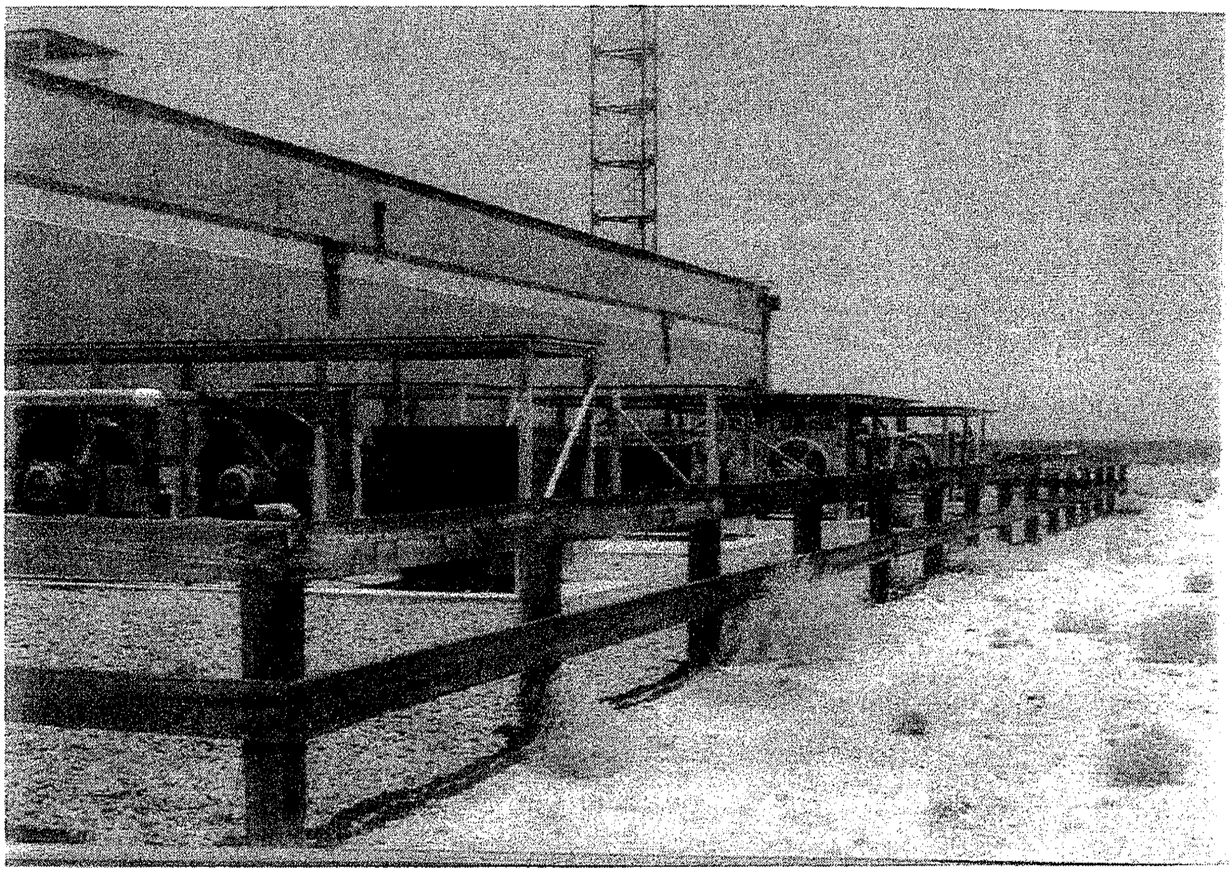


The site's standby generators.

The generators can power the site for several days should commercial power fail (which it frequently does in N.M.).



The entire building has a metal shield around it. Even the internal doors are bonded to the building frame as shown in the picture.



This picture shows the outside of the building and the heat exchangers for transmitter cooling. There are 12 units available. During the summer, they are sometimes stressed to keep the facility cool. Note the wood fence. Due to the strong RF fields around the site, all fences close to the building and antenna are made of wood. If metal fences were used, RF currents would be introduced causing potential safety hazards.

The Future of the Site.

I asked the USCG tour guide about the future of the Loran system. He said that Loran is being phased out and GPS will some day replace it. However, Loran still has many users, mostly military and private aviation. The Coast Guard conducted a survey in 2000 and found that enough people still use Loran to justify the continued operation of the system until at least 2008. The system is adequately funded to continue operation until then. The Loran site personnel believe that the US Loran chains will start being closed probably no later than 2010.

INSPIRE FIELD OBSERVERS

November/2002

New to the roster of observers is Andrew Collier, Team S-8.

(Unless noted otherwise, all longitudes are West and latitudes are North.)

Team #	Observer	Location	Longitude/Latitude
S-1	Kathryn Robinson. O'Connor High School	Helotes, TX	98° 47' / 29° 35'
S-2	Mark Mueller Brown Deer High School	Brown Deer, WI	87° 56' / 43° 10'
S-3	Elizabeth Quick John Marshall High School	San Antonio, TX	98° 72' / 29° 54'
S-4	Bill Pine Chaffey High School	Ontario, CA	117° 41' / 34° 14'
S-5	Jim Hoback John Jay High School	San Antonio, TX	
S-6	Loren Lund La Salle High School	Union Gap, WA	120° 30' / 46° 33'
S-7	Bill Combs Crawfordsville High School	Crawfordsville, IN	86.9075° / 40.0219°
S-8	Andrew Collier University of Natal	Durban South Africa	71°40'24" S / 02° 50' 03" W
I-1	Shawn Korgan	Gilcrest, CO	104° 67' / 40° 22'
I-2	Linden Lundback	Watrous, Sask,	105° 22' / 51° 41'
I-3	Robert Bennett	Las Cruces, NM	106° 44' / 32° 36'
I-4	Mitchell Lee	San Jose, CA	120° 40' / 39° 16'