VOICE OF AMERICA

DELANO RELAY STATION

DELANO, CALIFORNIA

The Voice of America broadcasts news and information to a worldwide audience on both medium frequency (standard broadcast) and high frequency (international shortwave) bands. All programming originates from VOA's Washington, D.C. studios, however, VOA has correspondents and "stringers" in almost all major countries. To many people, VOA is the only source for reliable information about the United States and its policies. Delano is proud to be playing a role in broadcasting the "Voice" to the world.

Location

The Delano Relay Station is located approximately 2½ miles west of Delano, California. Delano is Kern County's second largest city and has a population of just over 23,000. It's in the southern San Joaquin Valley approximately 35 miles north of Bakersfield and 75 miles south of Fresno, along California Highway 99. Los Angeles is 140 miles to the south, and San Francisco 260 miles northwest.

The Delano Relay Station is on 800 acres of rich agricultural land in the heart of California's central valley farm lands. Cotton fields, vineyards and almond orchards surround the station. Agriculture is still the area's mainstay, although light industry is beginning to locate nearby.

The Delano VOA site is one of the valley's few remaining uncultivated areas. It even offers living space for a few varieties of small mammals and reptiles on the "endangered species" list.

History

In June 1942, the Office of War Information (OWI) was established. The OWI determined that west coast shortwave radio stations would be necessary to assist the Pacific War effort. These radio stations would provide information and much needed entertainment for the troops spreading out across the Pacific.

After considerable research and testing, Delano was selected as one of two west coast sites. The other was at Dixon, California, about 250 miles to the north.

Eventually, two identical sites were constructed at Delano and Dixon, California. Operation of the two facilities was initially contracted to the major radio networks. NBC operated Dixon and CBS ran Delano. Some area radio buffs say they can still detect the network's "personalities" in the operation of the two sites. Dixon was placed in caretaker status in late 1989 at the end of the Fiscal Year.

Construction at Delano began in February, 1944. In November of that same year two 50,000 watt RCA transmitters went on the air. A 200,000 watt Federal transmitter was added 1945.

All three of these early transmitters used amplitude modulation. The two RCA transmitters employed a *common* high-level modulator and two independent RF sections. A single RCA 50,000 watt RF section and modulator section made up the driver for the "big" Federal transmitter. A push-pull class B grounded grid linear amplifier was used for the 200 kW PA.

At the end of World War II, the OWI was abolished and the Voice of America created. VOA was assigned the task of continuing to broadcast news and information from Delano to overseas populations in the Far East as well as to VOA facilities in Hawaii, Okinawa and the Philippines.

During those early days VOA maintained its independence as a separate group, that was monitored and *occasionally* controlled by the Department of State. It was during this period that VOA became the "official" international broadcasting "Voice" of the United States Government. A 1953 reorganization placed the VOA under the *United States Information Agency*.

In 1963, the contract with CBS for operation and maintenance of the station was terminated and full control of the facility became the direct responsibility of the government. Since that time, the staff and management of the station have all been federal employees.

Presently, the Delano Relay Station broadcasts primarily to Latin America. Back-up feeds to the Philippines and on occasion the Bangkok Relay station make up the rest of the schedule.

Programs all originate in Washington D.C. and are then beamed, via a digital Ku-Band satellite circuit from the roof of the Health and Human Services building in downtown, Washington, D.C. to Delano's downlink. Here, the satellite signals are decoded, amplified and routed to the proper transmitters and antennas by our technicians. An automated switching console in the control room is used to see the proper program automatically gets to its scheduled transmitter.

Programming

Over 500 program-hours are transmitted weekly from Delano. Worldwide the VOA broadcasts programs in 44 languages, however, only 18 of these are regularly broadcast from Delano—and that includes English and Spanish language broadcasts relayed for the BBC. Currently, languages programmed out of Delano include broadcasts in English, Chinese, Cantonese, Bangladesh, Indonesian, Korean, Bengali, Vietnamese, Russian, Amharic, Hindi, Khmer, Thai, Swahili, Portuguese, Burmese and Lao. By special agreement, we also carry programming for the BBC (British Broadcasting Company) and on occasion the United Nations.

Description

The station complex consists of a main transmitter and administrative building, and several smaller structures for equipment shelters, mechanical shop, storage and well pumps. The nearly nine miles of transmission lines and sixteen antenna systems take up most of the remaining 800 acres.

Acquisition value of station is over 28 million dollars. Replacement costs are estimated at several times this figure. The station has an annual operating budget of slightly over 1.8 million dollars. About half of this total goes as salary to the 24 regular employees and supporting tradesmen, who then spread it throughout the local economy. Examples of other operating costs are; the high power transmitting tubes which cost as much as $68,000, and the station's electric power which can run as high as $2,200 per day.

The station has three 250,000 watt *Collins Radio Company* and four 250,000 watt *Brown Boveri Company* transmitters. These transmitters are used for regular AM (Amplitude Modulated) shortwave broadcasting. There are also two 50,000 watt Continental Electronics ISB (Independent Sideband)transmitters which are used for *point-to-point* program feeds, relaying VOA programs to our overseas stations. These transmitters are currently used to back-up satellite circuits feeding the Philippines.

There are sixteen *curtain* and five *rhombic* antennas plus a *phantom antenna* or "dummy load" Bearings for these antennas are approximately 300 and 125 degrees to cover primary reception areas in Southeast Asia and Central America. Each antenna is fed with a 300Ω open-wire transmission line. All transmitters may be connected to any antenna through a 10 by 22 remote controlled RF switchbay. The phantom antenna, used for equipment testing, is also accessible through the switchbay.

A direct two-way satellite link exists between the site and the Washington headquarters. Six program circuits and assorted data links connect through this system.

Modernization Programs

Over the years, several new transmitters have been added and older obsolete and inefficient ones replaced. Two 100,000 watt General Electric model 100C transmitters were installed in 1950-51. These transmitters operated until 1990 when they were decommissioned and sold for scrap.

In 1965 an extensive modernization program was started. The work completed in 1968 more than doubled the station's power output. Three new 250,000 watt automated shortwave broadcasting transmitters and two 50,000 watt Independent Sideband transmitters were added.

A new Master Control console was installed incorporating modern techniques for audio and RF systems control. Additional facilities for the testing and monitoring of equipment were included as part of this program. New administrative offices, rest rooms, a kitchen and foyer were included in a new wing added to the main transmitter building.

In 1975 modification and construction was started to improve the overseas reception, and thus program quality. Modifications were made to eight of the curtain antennas and new aluminum transmission lines feeding these "Asia" curtains installed. In 1977 a new *steerable* curtain antenna was placed in operation. This provided the station with effectively two additional high-gain antennas (6 and 9 MHz band operation) to the Pacific region including Micronesia.

The next facility upgrade was in 1985 when the original two RCA 50,000 watt and Federal 200,000 watt transmitters were removed, also for scrap value. These transmitters, which had been in service for forty years, were then replaced by four 250,000 watt Brown Boveri Company transmitters. Old timers Leon Brammer and Don Rinaldi, who had both been at the station from the start, were said to have shed a few tears over the loss of these transmitters. Don even came out of retirement to throw the "final off switch" on the last day.

In 1988 an experimental high-gain, multi-band curtain array antenna was installed. The antenna operates from 6 MHz to 26 MHz and has six separate input ports. It can be electrically "slued" in four degree increments up to 30 degrees from its boresight azimuth. Several vertical pattern modes are also available. Controlling this antenna takes six 8088 type microprocessor controllers and a DEC LSI-11 computer. The antenna is intended as a prototype for future design work as well as providing the station with much needed additional South American antennas. It is fully remote controlled, allowing patterns to be rapidly switched and the antenna "pointed" toward various reception areas from the control room with the "stroke of a key."

In its *maximum gain* configuration this antenna has a gain of 30 dB—a power increase in the beam direction of 1,000 times. In this mode the antenna consists of 72 phased folded-dipole elements arranged as a six high by twelve wide "Lazy H." Beam width in this mode is about eight degrees. The take-off angle can be set to as low as four degrees.

By co-phasing three transmitters into this antenna, the station has experimentally achieved an effective peak radiated power of 1.125 gigawatts! Of course, carrier power was only 750,000,000 watts.

Several other computer controlled and/or monitored projects are currently underway. The largest of these is a project intended to automate control of the RF switchbay. In early 1989, a computer controlled audio routing switcher system was added. This allows audio feed lines, from our satellite programs, to be switched automatically to various transmitters and monitors automatically, under computer control. This switcher also remotely starts reel-to-reel tape machines, cartridge tape machines, and compact disc players to provide sign-on and sign-off announcements, plus local emergency programming as required.

Future modernization, such as a satellite *Far East Gateway* facility to VOA's overseas stations is planned to insure the Delano Relay Station has the latest state-of-the-art equipment and operational techniques available to it.

July 21, 1991
Delano, California