NPS Form 10-900
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United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
received APR 9 1986
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Trans-Canyon Telephone Line, Grand Canyon National Park

and/or common Emergency Telephone Line, Grand Canyon National Park

2. Location

street & number N/A not for publication

city, town X vicinity of Grand Canyon

state Arizona code 04 county Coconino code 005

3. Classification

Category	Ownership	Status	Present Use	
___ district	___ public	N/A ___ occupied	___ agriculture	___ museum
___ building(s)	X private	___ unoccupied	___ commercial	___ park
X structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	___ yes: restricted	___ government	___ scientific
	___ being considered	X yes: unrestricted	___ industrial	___ transportation
	N/A	___ no	___ military	X other: communication

4. Owner of Property

name Mountain Bell

street & number 3033 N. Third Street

city, town Phoenix N/A vicinity of state Arizona

5. Location of Legal Description

courthouse, registry of deeds, etc. Mountain Bell

street & number 3033 N. Third Street

city, town Phoenix state Arizona

6. Representation in Existing Surveys

title N/A has this property been determined eligible? ___ yes X no

date ___ federal ___ state ___ county ___ local

depository for survey records

city, town state

7. Description

Condition		Check one	Check one
x excellent	___ deteriorated	___ unaltered	x original site
___ good	___ ruins	x altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

SUMMARY

The trans-canyon telephone line is located entirely within the Grand Canyon in northern Arizona. It is approximately eighteen miles long and roughly parallels the Bright Angel and North Kaibab Trails from the South Rim to Roaring Springs, with a spur line running two miles up the South Kaibab Trail to the Tipoff (see accompanying map). The line consists of a series of 592 metal poles strung with copper-weld wire. The poles, installed in 1935 and modified in 1938-1939, are unchanged from their original appearance. Although two small sections of the line have been removed in recent years, the line overall possesses a high degree of integrity.

Location

The telephone line crosses one of the seven natural wonders of the world: the Grand Canyon. It runs from rim to river, descending nearly a mile from pine forest to desert. Over most of the way, the terrain is rough and rocky, with many steep cliffs; the landscape is generally desert-like, with sparse forest vegetation toward the rims.

From the south, line begins in the vicinity of the Bright Angel Lodge. It descends one thousand feet down steep cliffs alongside the cross-canyon water line to Mile-and-a-Half Resthouse on the Bright Angel Trail, where an emergency telephone is located. The line drops another thousand feet in elevation on the east side of the trail to Three-Mile Resthouse, which also has an emergency telephone. After descending the Redwall escarpment, the line continues north to Indian Gardens. The ranger station there has a telephone extension. Below Indian Gardens, the line runs alongside the original Bright Angel Trail down Salt Creek Canyon to Pipe Creek. The line then rejoins the present trail and terminates at the River Rest House on the Colorado River, which has an emergency telephone.

The other section of the line begins at the emergency telephone located at the Tipoff, above the Inner Gorge on the South Kaibab Trail. It drops about twelve hundred feet to the east side of the Kaibab Suspension Bridge, where it crosses the Colorado River, and runs along the North Kaibab Trail to Phantom Ranch. Here it serves both the National Park Service and Fred Harvey facilities. The line continues north alongside the trail to Cottonwood Camp, where the ranger station has an extension. It continues north for another two-and-a-half miles to Roaring Springs, the source of water for both rims, where it terminates.

Description

The telephone poles are made from standard two-inch galvanized pipe manufactured by the Jones and Laughlin Company. The pipe is in four- and eight-foot sections, which could be screwed together depending on desired pole height. The poles are fitted with cross-arms to

hold the circuit lines. Installation of a second circuit in 1938-39 required modification of the cross-arms. On the southern section of the line, another cross-arm was added to the tops of the poles, which raised their height from between twelve and eighteen inches. On the northern section, a plate was placed across the original cross-arms to hold the circuits, which did not raise their height at all. The two mile section to the Tipoff did not receive modifications. The poles vary in overall height from about two to twelve feet, depending on the nature of the rugged terrain, but most are about eight to ten feet high. The telephone line itself is an open-wire copper-weld line with porcelain and glass insulators.

Integrity

The line stands today essentially as it did when installed in 1935. The top cross-arms on many poles were added in 1938-1939, but since the materials used were identical to the original and because the new circuit represents an evolution of the telephone system, the modification enhances the line's historic significance. Most of the original telephone wire remains in use today.

Two sections of the original line have been removed: about one and a half miles of line between the River Rest House and Phantom Ranch in 1982, and about three miles of line from Roaring Springs to the North Rim several years previously. The poles from the river section do duty today in the Bright Angel and Indian Gardens campgrounds. Hikers hang their backpacks on the cross-arms to deter rodents.

Mountain Bell installed a microwave transmitter at Phantom Ranch in 1982. Telephone calls are relayed via the telephone line to the microwave, which transmits the calls to the South Rim switching station. Telephone stations at the three Resthouses along the Bright Angel Trail provide emergency connections along the line directly to the Park Service dispatcher on the South Rim. Many an injured or disabled hiker has been rescued as a result of these emergency lines. Although the telephone line no longer runs from rim to rim, it is still an essential trans-canyon communication system and a reminder of the days when man first asserted himself, via technology, in the timeless canyon.

Because the line survives largely intact, and its appearance, use and setting remain unchanged from the period of historical significance, it possesses integrity of location, design, setting, materials, workmanship, and feeling. It is worthy of National Register listing.

8. Significance

Period	Areas of Significance—Check and justify below			
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture
___ 1600–1699	___ architecture	___ education	___ military	___ social/ humanitarian
___ 1700–1799	___ art	X engineering	___ music	___ theater
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ transportation
X 1900–	X communications	___ industry	X politics/government	___ other (specify)
		___ invention		

Specific dates 1935/1938-39 **Builder/Architect** Civilian Conservation Corps/National Park Service

Statement of Significance (in one paragraph)

SUMMARY

The trans-canyon telephone line in Grand Canyon National Park was constructed by Civilian Conservation Corps forces in 1935 to facilitate communication between the North and South Rims and from the inner canyon section of the Park. It is significant under criterion A for its association with the National Park Service and Civilian Conservation Corps and because of its importance as a communication link in a remote place. It is also significant under criterion C because the metal telephone poles represent a distinctive method of construction and the open-wire copper-weld line represents a vanishing type of telephone technology. The primary areas of significance for the line are politics/government, engineering, and communications, on a local level.

Politics/ Government

Congress established Grand Canyon National Park on February 26, 1919. The National Park Service (NPS), created only three years earlier, took control of the park from the Forest Service, which had managed it as a National Monument since 1908. When the Park Service arrived at Grand Canyon, it found a dearth of facilities, staff, and funding. Yet visitation was growing at a rapid rate, and despite the limited staffing and funds, Park management had to quickly rise to the challenges of administering and protecting the vast natural beauty of Grand Canyon.

The Park had the unique distinction of being split by the impressive gorge which separated the administrative center of the South Rim from the more remote North Rim. Although the two areas were only ten air miles apart, travel between the rims in 1919 was an arduous task. One had to hike or ride a mule over a primitive twenty-five mile long trail system (the precursor to today's well-maintained trails) and cross the Colorado River on a rusty old cable tramway. The alternative involved travelling hundreds of miles over dirt roads by automobile, and crossing the Colorado River on a manually operated ferry. The Park administration needed a rapid and reliable communication system between the rims. Moreover, plans for inner canyon development would soon bring staff and tourists to Indian Gardens, Phantom Ranch, and the North Rim, increasing that need.

Because of funding limitations, facilities were first developed on the South Rim. However, by 1921, the Park Service started to improve the inner canyon trail system in the main trail corridor which

9. Major Bibliographical References

See Continuation sheet.

10. Geographical Data

Acreage of nominated property N/A: Eighteen linear miles

Quadrangle name Bright Angel, Arizona **Quadrangle scale** ~~1:62,500 (15')~~

UTM References

	Zone	Easting	Northing		Zone	Easting	Northing
A	12	397350	3990700	B	12	401200	3995250
C	12	400000	3995250	D	12	402000	3994450
E	12	402250	3995650	F	12	401400	3995600
G	12	407350	4000350	H	12	407100	4005300

Verbal boundary description and justification

The nomination boundary is limited to the poles and wire which constitute the structure. The line begins at the South Rim, terminates at the Colorado River, begins again at the Tipoff and terminates at Roaring Springs. See Item 7.

List all states and counties for properties overlapping state or county boundaries

state	N/A	**code**	**county**	**code**
state		**code**	**county**	**code**

11. Form Prepared By

name/title Ms. Teri A. Cleeland, consultant

organization for Mountain Bell **date** March 1, 1986

street & number PO Box 802 **telephone** (602) 635-2270

city or town Williams **state** Arizona

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state X local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature Donna J. Schober

title State Historic Preservation Officer **date** April 1, 1986

For NPS use only

I hereby certify that this property is included in the National Register

Linda McCleland **date** May 13, 1986

Keeper of the National Register

Attest: **date**

Chief of Registration

GPO 911-399

followed the Bright Angel fault to the North Rim. The Fred Harvey Company began to build a tourist resort, later known as Phantom Ranch, at the mouth of Bright Angel Creek. In 1922, the United States Geological Survey (USGS) established a river gauging station and residence for their hydrographer there. The park needed to station a ranger in the inner canyon to oversee the various activities. All of these functions required a reliable communication system.

The essential telephone line arrived at the bottom of the Grand Canyon in mid-January 1922. A crew hired by NPS for the project installed the single wire line on trees and rocks along the trail. The Northern Arizona Leader announced that "the first telephone line across the Grand Canyon . . . has been working perfectly from Grand Canyon to Roosevelt Chalet [Phantom Ranch], 11 1/2 miles. There are stations at Indian Gardens and Pipe Creek."[1] They completed the line up Bright Angel Canyon to the North Rim on July 27, 1922. The Park Superintendent's report for the year 1923 mentions the new line: "The telephone system has been maintained in satisfactory condition. Its extension to the North Rim last season has proved of inestimable value."[2]

Communication boon that the telephone line was, users still experienced problems with it. In 1925, the USGS, who relayed daily river level observations by telephone to the Weather Bureau, reported having considerable difficulty making calls on account of "the telephone line being out of commission, or unusual use of the line by other parties."[3] The single wire line could only support one conversation at a time, and increasing use soon taxed it. Unfortunately, there was little the park could do about the situation without funding to improve the line. Ironically, the Great Depression would bring the needed funds to Grand Canyon.

When Franklin D. Roosevelt took office in the midst of the Depression, he instituted a plan which would have an enormous effect on National Parks and other government lands. The "Emergency Conservation Work [ECW] Act" of March 1933 authorized the Department of Labor to recruit young men as Civilian Conservation Corps (CCC) enrollees, organized and transported by the War Department and put to work by the Departments of Agriculture and Interior. The National Park Service gained recruits to perform a variety of projects. At Grand Canyon, they did road and trail work, constructed buildings and bridges, cleared brush and planted trees--and completely rebuilt the trans-canyon telephone line.

Although the park had plans for the reconstruction in late December 1933, the project did not begin until November 1934. In that month, enrollees surveyed the proposed line and cleared a right-of-way as far as the Colorado River, roughly along the old Bright Angel

Trail. The ruggedness of the canyon is demonstrated by the fact that the task required nearly four-hundred man-days of labor. In December 1934, workers began to set poles, operating out of a side camp at Indian Gardens. By March 1935, they had installed the line to a point just past Phantom Ranch. With the line from rim to river ninety percent complete, over fourteen-hundred man-days had been expended. A spur line ran past the Kaibab Suspension Bridge and up the South Kaibab Trail for about two miles to an emergency telephone at the Tipoff.

In March, CCC workers from the Phantom Ranch camp began the thirteen mile long telephone line section up Bright Angel Canyon to the North Rim. They set up a side camp at Cottonwood Campground, seven miles from Phantom Ranch. By July, 1935, crews were working down from the North Rim and up from the bottom of the canyon. They finally completed the new trans-canyon line in September, 1935.

To protect the beauty of natural landscapes, the Park Service had a policy of keeping all construction as inobtrusive as possible, and each park had a landscape architect who supervised CCC projects. At Grand Canyon, landscape architect Harry Langley gave regular reports on the CCC work, and made suggestions for placing poles in inconspicuous places. For this reason, and because of engineering requirements, the line is located off the main trail whenever possible. In the first mile or so, it runs almost vertically down the steep canyon alongside the waterline which brings water from Indian Gardens. Below Indian Gardens, they built the line along the old Bright Angel Trail, which had been moved west and reconstructed five years earlier. The line had to run along the trail in places, to service telephone stations established at development areas like the Trailside Shelters, Indian Gardens, Phantom Ranch, Cottonwood Campground, and Roaring Springs. The line also had to be accessible for maintenance purposes. Architect Langley recommended that the poles be painted complimentary to the surrounding rock formations. An excerpt from one report: "Trans Canyon telephone is nearing completion. A few poles remain to be set and some pole painting must still be done. This work is satisfactory as to landscape features."[4] The CCC finished painting the poles in November, 1935.

The Park Service owned and maintained the new twenty-five mile long line, which was connected to a central switching station owned and operated by the Mountain States Telephone and Telegraph Company, who built their exchange on the South Rim in the summer of 1929. Prior to that, telephone systems were owned and operated by individual concerns like the Park Service, Fred Harvey, and the Santa Fe Railway. The symbiotic relationship between Mountain States and the Park Service lasted until 1957, when Mountain States bought all of the Park Service lines. That company, which is now known as Mountain Bell,

continues to own and maintain all of the telephone lines at Grand Canyon. The inner canyon line is the only one in the state of Arizona which is still maintained from mule back.

Park Superintendent Miner Tillotson wrote about the nearly completed new line on July 31, 1935: "There seems to be little question locally but what [sic] the telephone service between the North and South Rims, when the new circuits are entirely complete, will be far superior to any lines that extend out of the North Rim. . . . [and] the quality of transmission between the North and South Rims will be greatly improved."[5]

Unfortunately, the new system became overloaded almost as soon as it was in place. The single circuit line could normally support about ten telephones, but by 1937 this one had twenty-two telephones connected to it. They belonged to the NPS, the CCC, The USGS, the Fred Harvey and Utah Parks concession companies, and private individuals, all who competed for use of the line. A five-minute per call limit had to be placed on the telephones, and government agencies used radios whenever possible. The line needed another circuit, and on November 1, 1938, a small group of CCC enrollees accompanied by the park electrician and a lineman once again descended the canyon to install one.

With the addition of a second circuit, three conversations could take place simultaneously over the line, because interaction between two balanced metallic circuits results in a third, or "phantom" circuit. This third circuit between the North and South Rim headquarters did not go through the Mountain States switchboard, and thereby allowed Park Service conversations to remain confidential.

The new circuit required slight modification of the poles installed in 1935. New cross-arms had to be added to the tops of many poles, raising them an additional eighteen to twenty-four inches in height. Other poles, primarily on the North Kaibab Trail section, simply had plates added to the original cross-arm. The insulator pins used in the 1935 line were an unusual size, so the 1938 crew replaced them with standard-size pins, for easier and less expensive maintenance.

The new circuit was completed by the summer of 1939, and the telephone line remains in service largely unchanged from that time.

The association of the telephone line with the National Park Service is significant because it represents their early efforts to administer the vast Grand Canyon National Park and to provide facilities for resource protection and tourism. Its association with the CCC is significant because of the enormous impact the Depression-era job relief program had on the nation as a whole and on National Park

facilities specifically. The project was ideally suited to the program's objectives, which were to employ young men, improve government facilities, and revitalize the economy. The building of the telephone line required stamina and ingenuity, which the young enrollees provided in boundless amounts.

Engineering

The telephone line is significant because of its unique design, fashioned specifically for the rugged canyon, and because it is one of the relatively few remaining open-wire copper-weld lines remaining in use in the nation today.

The original 1922 line construction must have been viewed as a temporary measure, since limited funding necessitated its installation on trees and rocks. In 1935, ECW funds and CCC labor ensured that the line could be permanently installed. The park needed to use poles which were suited to the rugged canyon, keeping in mind that men or mules would haul in all supplies. The poles had to be permanent, inconspicuous, and easy to transport. Since the rocky terrain required drilling for poles, a small diameter was also desirable. Standard wooden poles were too large, unwieldy, and subject to rot, eventually necessitating replacement. The park decided that two-inch galvanized iron pipe would be an ideal material for pole construction. It fulfilled all the requirements, and was inexpensive as well. CCC workers custom fitted the poles with the cross-arms which held the circuit.

This type of pole is unique, although at least one other example of metal pole construction in the west is known. That is a telephone/telegraph line in Nine-Mile Canyon near Price, Utah, which was built in the late 1880s. The metal poles there, different than the inner canyon ones, became necessary because Indians constantly cut down the wooden poles.

The most common varieties of telephone lines are open-wire and cable. Both types, suited for different purposes, have been in use since the late 1880s. The more expensive cable line is practical for urban areas because a single cable can carry hundreds of calls simultaneously. Inexpensive open-wire lines are better suited to rural areas, because they serve vast expanses of lightly populated land, and such lines can handle lighter call volumes.

When first developed, all telephone lines were open-wire iron lines similar to telegraph lines. These could be unreliable and subject to static from electrical interference. Copper lines had less resistance, resulting in less static, and were thus superior for long-distance transmission. Copper telephone wire had been developed as

early as 1880, but it was so thick that it was economically unfeasible to use. By the turn of the century, a physicist developed a method for using thin ("hard-drawn") copper wire in telephone lines, and as refined through the years, it became superior to the less expensive iron wire. However, galvanized iron wire was still popular when the Park Service constructed the 1922 trans-canyon telephone line. That iron line proved to be unreliable, so the CCC replaced it in 1935 with hard-drawn copper wire, referred to as copper-weld wire because it had welded sleeves. These sleeves splice together two lengths of line. For the time, copper-weld wire was the state of the art for open lines, and it remained in wide use until the 1950s. Copper wires are still used in open wire lines, but today the sleeves are crimped together, a more expedient method. Much of the original copper line with welded sleeves remains in use today along the trans-canyon line.

Open wire lines are still used in highly isolated rural areas where few telephones are needed, but high maintenance and installation costs have virtually precluded the new construction of such lines today. (Since deregulation of the telephone industry, most of the historic cross-subsidies in the nation's telephone system have been eliminated, so that today users of a new open-wire line would have to pay all of the construction costs of such a line, a prohibitive amount). It has been estimated that less than one percent of the total circuit miles existing in the country today are open wire lines. At Grand Canyon, the line between the Grand Canyon Village and Desert View is open wire, but it is unreliable, and the extremely high maintenance costs associated with the line may mean that it will be replaced with microwave or cable at the earliest possible time. Open wire telephone lines will become more and more uncommon as new technology is introduced.

Communications

The line is also significant because it opened up a large and remote area to reliable telephone communications. It is difficult to imagine the isolated situation of the North Rim in the early years of this century. Virtually cut off from the rest of Arizona by the depths of the Grand Canyon, it was also isolated from far away population centers in Utah by the dirt roads which were sometimes impassable during the muddy rainy season, and blocked by snow in the winter. For administration of the new National Park, a reliable and rapid communication system was essential. The trans-canyon telephone line linked the entire North Rim area with the outside world, via the long-distance switchboard on the South Rim. Even by 1935, when the present line was installed, it provided much clearer connections than the line extending north from the North Rim.

The trans-canyon telephone line was not the first line installed in the canyon. As early as 1903, a line set on wooden poles ran from the South Rim to Indian Gardens. Ralph Cameron probably installed it, for he controlled the Bright Angel Trail and Indian Gardens with mining claims and a toll road franchise. It is not known when that line was removed, but the 1922 line certainly superseded it. Another line ran from the South Rim to the camp at Hermit Basin by 1916. Santa Fe Railway operated this tourist camp located on the Tonto Platform several miles west of Indian Gardens. In 1922, the Park Service proposed running a spur line off of the trans-canyon line west to Hermit Camp. The line was likely removed along with the rest of the Hermit Camp facilities in about 1930.

The trans-canyon telephone line is historically significant because it is the oldest extant line in the Grand Canyon, and it unified the North and South Rims of the Park. The unique pole design and survival of a rapidly disappearing telephone technology give it added significance.

Endnotes

1. Northern Arizona Leader (Flagstaff), February 14, 1922.

2. "Superintendent's Annual Report" for the year 1923, on file at the NPS Study Collection, Grand Canyon.

3. Letter dated August 31, 1925, from W.E. Dickenson, USGS District Engineer to Porter Preston, Superintendent of the Bureau of Reclamation, In "Miscellaneous USGS Correspondence 1/21-7/54" file, NPS Study Collection, Grand Canyon.

4. "Landscape Architects Report" for August 1935, In Accession #1195, NPS Study Collection, Grand Canyon.

5. Letter dated July 31, 1935, from Miner R. Tillotson, Superintendent of Grand Canyon National Park to R. D. McVay, Arizona Manager of Mountain States Telephone and Telegraph Company, In "Mountain States Telephone and Telegraph Correspondence 1928-1954", file D5027, NPS Study Collection, Grand Canyon.

Bibliography

Books

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Boettinger, H.M. The Telephone Book. Croton-On-Hudson, New York: Riverwood Publishers, 1977.

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Files at the NPS Study Collection, Grand Canyon

"CCC Narrative Reports," December 1933-November 1935. In Accession #1195.

"Landscape Architects Reports," December 1933-November 1935. In Accession #1195.

"ECW-CCC Telephone, Radio, and Telegraph Lines," Accession #1195, Catalog #660.04.

"Miscellaneous USGS Correspondence, January 1921-July 1954" file.

"Mountain States Telephone and Telegraph Correspondence 1928-1954" file D5027.

"Superintendents Annual Report" for the years 1922, 1923, 1933, 1934, and 1935, filed by year.

Newspapers

Northern Arizona Leader (Flagstaff) August 8, 1903.

The Coconino Sun (Flagstaff) February 14, 1922.

Personal Communication

Telephone interview with Herb Hackenberry, Mountain Bell Headquarters, Denver, January 17, 1986.

Interview with Marvin Hanchett, inner canyon lineman, Mountain Bell, Flagstaff, January 17, 1986.