

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

FOR NPS USE ONLY
RECEIVED SEP 18 1979
DATE ENTERED NOV 21 1979

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
El Paso and Southwestern Railway Water Supply System
AND/OR COMMON
Bonito Pipeline

LOCATION

STREET & NUMBER *S of Nogal*
CITY, TOWN _____ NOT FOR PUBLICATION
CONGRESSIONAL DISTRICT 2
 VICINITY OF Nogal
STATE CODE COUNTY CODE
New Mexico 035 Lincoln 027

CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
<input type="checkbox"/> DISTRICT	<input type="checkbox"/> PUBLIC	<input type="checkbox"/> OCCUPIED	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> MUSEUM
<input type="checkbox"/> BUILDING(S)	<input checked="" type="checkbox"/> PRIVATE	<input checked="" type="checkbox"/> UNOCCUPIED	<input type="checkbox"/> COMMERCIAL	<input type="checkbox"/> PARK
<input type="checkbox"/> STRUCTURE	<input type="checkbox"/> BOTH	<input type="checkbox"/> WORK IN PROGRESS	<input type="checkbox"/> EDUCATIONAL	<input type="checkbox"/> PRIVATE RESIDENCE
<input type="checkbox"/> SITE	PUBLIC ACQUISITION	ACCESSIBLE	<input type="checkbox"/> ENTERTAINMENT	<input type="checkbox"/> RELIGIOUS
<input type="checkbox"/> OBJECT	<input type="checkbox"/> IN PROCESS	<input type="checkbox"/> YES: RESTRICTED	<input type="checkbox"/> GOVERNMENT	<input type="checkbox"/> SCIENTIFIC
	<input type="checkbox"/> BEING CONSIDERED	<input checked="" type="checkbox"/> YES: UNRESTRICTED	<input type="checkbox"/> INDUSTRIAL	<input type="checkbox"/> TRANSPORTATION
		<input type="checkbox"/> NO	<input type="checkbox"/> MILITARY	<input type="checkbox"/> OTHER:

OWNER OF PROPERTY

NAME
City of Alamogordo ATTN: Mayor Frank Carr, Jr.
STREET & NUMBER
P.O. Box 776
CITY, TOWN STATE
Alamogordo VICINITY OF New Mexico

LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC. Lincoln County Courthouse
STREET & NUMBER
CITY, TOWN STATE
Carrizozo New Mexico

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
New Mexico State Register of Cultural Properties
DATE
December 9, 1977
____FEDERAL STATE ____COUNTY ____LOCAL
DEPOSITORY FOR SURVEY RECORDS Historic Preservation Section, New Mexico State Planning Office
CITY, TOWN STATE
Santa Fe New Mexico

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
<input type="checkbox"/> EXCELLENT	<input checked="" type="checkbox"/> DETERIORATED	<input checked="" type="checkbox"/> UNALTERED	<input checked="" type="checkbox"/> ORIGINAL SITE
<input type="checkbox"/> GOOD	<input type="checkbox"/> RUINS	<input type="checkbox"/> ALTERED	<input type="checkbox"/> MOVED DATE _____
<input type="checkbox"/> FAIR	<input type="checkbox"/> UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The original pipeline for the El Paso and Southwestern Railway Water Supply System extended from the south fork of Bonito Creek fifty-three miles to Coyote, New Mexico. Between 1910 and 1914 the line was extended another fifty-four miles to Pastura, covering a three-county area. Most of the pipeline has disappeared, however, and the most noteworthy portions of the line may be found nine miles south of Nogal on State Highway 37. The pipeline is a wood-stave line joined with steel bell-and-spigot joints. The joining was effected prior to placing the pipe in the ditch. In a bell-and-spigot joint, the spigot slipped into the bell and was then packed with oakum (a packing made of braided hemp). Next, lead was heated to a charring temperature; this was used to "chaulk" (cork) the joint for tight sealing. Following the joining operation, the pipe was lowered into the ditch by a block and tackle suspended from a tripod. Then the ditch was covered with dirt by teams hitched to scrapers.

The line was laid through a cut, a tunnel ranging from ten to thirty-five feet deep, from the outlet in Nogal Lake to level ground. Though installed in the lake at a depth of forty feet, the pipe leaked constantly. Seepage in the lake, effected by the honey-combed texture of the soil, wasted millions of gallons of water. An effort was made to stop the leaking by grouting (plastering). The drilling of 120 wells, four inches in diameter, around the edge of the lake eliminated some of the seepage. When leaks in the line developed, wooden plugs were put in place. Leaks were generally created by air entering the line. As long as the pipe remained full of water leaks were a rare occurrence.

Between 1910 and 1914 the E.P. & S.W. Pipeline was extended from Coyote to Pastura. This line, similar to the older pipe, was constructed of redwood slats. Unlike the earlier line, however, the later extension was wound with a quarter-inch round wire in one continuous string. This created a stronger band than the flat steel wrapping previously employed. This wire, wrapped tightly around pressure points in the line, proved superior to the earlier construction practices.

The newer pipe did not corrode as easily as the former material, and it remained smooth inside. The later line was first rolled in asphalt, then sawdust. The collars for the pipe were covered on the outside with asphalt. Finally, the sections of pipe were driven together after they were placed in the ditch.

To finish the line, pumps were installed at Coyote and Luna to lift the water a distance of twenty-one miles. These pump stations were equipped with twin twelve-inch pipes which pumped more than three hundred pounds per square inch, or approximately one million gallons a day. The line descended from an altitude of 7,200 feet at Nogal Lake to 3,500 at Coyote. It then ascended to 6,700 feet at Corona. Gravity managed the water flow between the Corona Reservoir and Pastura.

Today, though sizeable portions of the line can be observed along Highway 37 between Bonito Lake and Nogal, the old wood-stave pipe is in a state of deterioration. The best preserved portions of the older line may be found nine to nine-and-a-half miles south of Nogal.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
<input type="checkbox"/> PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE
<input type="checkbox"/> 1500-1599	<input checked="" type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> ART	<input checked="" type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input checked="" type="checkbox"/> TRANSPORTATION
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> COMMUNICATIONS	<input type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)
		<input type="checkbox"/> INVENTION		

SPECIFIC DATES 1908 - 1914

BUILDER/ARCHITECT Charles H. Henning
Construction Engineer

STATEMENT OF SIGNIFICANCE

At the time it was constructed, the Bonito Pipeline was the longest railroad water pipeline in New Mexico. The line was laid by the El Paso and Southwestern Railway in 1908. Two years later it was extended to Pastura.

Nogal Lake, located three miles southeast of the village of Nogal, was the logical location for storing water for the pipeline. Originally, the land adjacent to Nogal Lake was public domain. In 1905, J.H. Skinner, a Baptist Minister, leased the school section at Nogal Lake; at that time a natural body of water containing from one to eight feet of water the year round. Skinner sold the lake to the El Paso and Southwestern Railway, contingent upon the railroad's promise to provide water for Skinner's stock and domestic supply.

After obtaining the site, the railroad made preparations to store the lake with 412,000,000 gallons of water. In an attempt to lessen seepage, nearly six hundred head of cattle were driven continuously around the lake bed to trample the earth. One local resident, Monroe Howard, received twenty-five cents a day per head for furnishing one hundred animals on this operation.

The railroad, facing serious problems in obtaining large quantities of water, secured permission in 1907 from the New Mexico territorial government to divert five second feet of water from the Bonito River into the proposed pipeline. Naturally, this prompted protests from area farmers, particularly since the diversion carried the water from one watershed to another -- from a tributary of the Pecos system to the Northern end of the Tularosa Basin. Despite this opposition, the territorial engineer approved the permit in the summer of 1907.

Under the somewhat loose arrangement concluded between the territorial authorities and the railroad, the latter was allowed to allocate a portion of the water for "domestic use." Initially, railroad authorities applied a strict interpretation to this clause, permitting only their employees to use the water. However, this policy proved harmful to public relations. Furthermore, minor sabotage for the purpose of obtaining water from a fifty-three mile line proved difficult to prevent.

The railroad, therefore, made arrangements with Carrizozo and other small communities along the line to supply a limited amount of water for domestic use. Though refusing to function as a public utility, the railroad placated the local inhabitants.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Baker, T. Lindsay. "Some Unusual Water Pipelines of the Southwest." Cast Iron Pipe News, XLII, No. 2 (Spring-Summer, 1975), 12. (Available at Library, Texas Tech University)

10 GEOGRAPHICAL DATA

UTM NOT VERIFIED

ACREAGE OF NOMINATED PROPERTY 7.8 acres

UTM REFERENCES

A	<u>1,3</u>	<u>4,3,6,0,0,0</u>	<u>3,7,0,9,7,2,0</u>	B	<u>1,3</u>	<u>4,3,6,7,8,0</u>	<u>3,7,0,7,8,0,0</u>
	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
C	<u>1,3</u>	<u>4,3,7,2,2,0</u>	<u>3,7,0,6,3,6,0</u>	D	<u>1,3</u>	<u>4,3,7,6,0,0</u>	<u>3,7,0,4,1,6,0</u>
VERBAL BOUNDARY DESCRIPTION							
E	<u>1,3</u>	<u>4,3,7,6,0,0</u>	<u>3,7,0,3,6,2,0</u>	F	<u>1,3</u>	<u>4,3,7,4,9,0</u>	<u>3,7,0,3,3,4,0</u>
G	<u>1,3</u>	<u>4,3,7,4,4,0</u>	<u>3,7,0,3,2,2,0</u>	H	<u>1,3</u>	<u>4,3,7,2,2,0</u>	<u>3,7,0,2,5,5,0</u>

See Continuation Sheet.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

William L. Cumiford, Project Manager

ORGANIZATION

History of Engineering Program

DATE

February 7, 1978

STREET & NUMBER

Box 4089, Texas Tech University

TELEPHONE

(806) 742-3591

CITY OR TOWN

Lubbock

STATE

Texas

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL

STATE

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

Thomas W. Neal

TITLE

State Historic Preservation Officer

DATE

9-13-79

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

Carol D. Shel

DATE

11-21-79

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

KEEPER OF THE NATIONAL REGISTER

ATTEST: *Pell Brown*

DATE

1/19/79

KEEPER OF THE NATIONAL REGISTER

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CONTINUATION SHEET Significance ITEM NUMBER 8 PAGE 2

Mr. Charles H. Henning was hired as construction engineer and a Mr. Ueling was contracted as the foreman in charge of excavation. Ueling employed approximately 150 braceros who dug the ditch with picks and shovels. A powder gang was used to periodically blast out the dike.

The braceros, under contract from Mexico, lived in a large tent. The railroad supplied smaller tents for the few workers who brought their wives and children with them. Most of the workers took their meals at the camp mess tent and nearly all of the men traded at the Railroad Commissary. The laborers received a paltry sum of \$1.75 a day, from which they were expected to furnish working clothes, gloves and pay rent. Any complaints registered by a worker resulted in the man's discharge. A number of the men suffered illness from exposure, and some died for lack of medical attention.

At one time 110 wagons were used to haul pipe along the line. Ten 10-horse teams and thirty ore wagons were brought from Mogollon, a sizeable mining town located in the mountains in the western part of the territory. The heavy congestion on the narrow, unimproved mountain roads prompted confusion and numerous accidents.

The El Paso and Southwestern Railway Water Supply System stands as a remarkable engineering achievement, particularly in view of the fact that it was a massive wood-stave structure that functioned amazingly well until 1927, at which time the first metal pipe replacements were installed in the E.P & S.W. (Bonito) system.

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"Bonito Water Supply." Southern Pacific Bulletin, XIII, No. 11 (November, 1924), 8. (Available at El Paso Public Library, El Paso, Texas)

Bushnell, David. History of Water Use and Resources: Holloman Air Development Center. Holloman Air Force Base: Office of Information Services, 1957, pp. 43-49. (Available at Library, New Mexico State University)

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_____. "Pipe-Line Construction." Engineering News, LX, No. 9 (August 27, 1908), 225-29. (Available at Library, Texas Tech University)

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"Notes and Quotes." Engineering News, LX, No. 12 (September 17, 1908), 310-11. (Available at Library, Texas Tech University)

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"A 160-Mile Pipe-Line Water Distribution System on the El Paso and Southwestern Ry." Engineering News, LX, No. 9 (August 27, 1908), 223-29. (Available at Library, Texas Tech University)

"Water Distribution Systems for Railway Service." Engineering News, LX, No. 9 (August 27, 1908), 233. (Available at Library, Texas Tech University)

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CONTINUATION SHEET Geographical Data ITEM NUMBER 10 PAGE 2

VERBAL BOUNDARY DESCRIPTION

The property nominated consists of three separate linear units twenty feet in width centering on the lines extending between the eight above referenced UTM coordinates, and running generally on the west along NM State Road 37. The first unit extends from point A, just south of NM 37, on the Nogal Quad., in a south-easterly direction approximately 6800' to point B where it proceeds in a more southerly direction for about 5000' to point C, on the Angus Quad. The second unit extends from point D in a southerly direction for about 1800' to point E where it proceeds in a southwesterly direction for about 1000' to point F. The third unit extends from point G in a southwesterly direction for about 2300' to point H.