1. NAME OF PROPERTY

Historic Name: Montgomery Bell Tunnel

Other Name/Site Number: Patterson Forge Tunnel

2. LOCATION

Street & Number: [redacted]

City/Town: White Bluff Vicinity: X Not for publication: X

State: Tennessee County: Cheatham Code: 021 Zip Code: N/A

3. CLASSIFICATION

Ownership of Property		Category of Property	
Private:	___	Building(s):	___
Public-local:	___	District:	___
Public-State:	X	Site:	___
Public-Federal:	___	Structure:	X
		Object:	___

Number of Resources within Property

Contributing	Noncontributing	
___	___	buildings
___	___	sites
1	___	structures
___	___	objects
1	0	Total

Number of Contributing Resources Previously Listed in the National Register: 1

Name of related multiple property listing:
Iron Industry on the Western Highland Rim, 1790s-1920s
(National Register Nomination)

4. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this ____ nomination ____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ____ meets ____ does not meet the National Register Criteria.

_____ _____
Signature of Certifying Official Date

_____
State or Federal Agency and Bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria.

_____ _____
Signature of Commenting or Other Official Date

_____
State or Federal Agency and Bureau

5. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:

____ Entered in the National Register
____ Determined eligible for the National Register
____ Determined not eligible for the National Register
____ Removed from the National Register
____ Other (explain):_____

_____ _____
Signature of Keeper Date of Action

6. FUNCTION OR USE

Historic: INDUSTRY Sub: waterworks

Current: RECREATION AND CULTURE Sub: outdoor recreation

7. DESCRIPTION

ARCHITECTURAL CLASSIFICATION:

MATERIALS:
Foundation: N/A
Walls: Limestone
Roof: Limestone
Other: N/A

Describe Present and Historic Physical Appearance.

[redacted] It is located in the town of White Bluff, in Cheatham County, Tennessee, about 20 miles west of Nashville.[1]

[redacted]n

[redacted].

The portals appear as oblong holes in the nearly vertical limestone walls of the ridge; no additional masonry was used as part of the rough cut excavation.[2] The entrance portal is approximately 12′ tall x 35′ wide [See Photographs #1 & #2], and the exit portal is approximately 9.5′ tall x 16′ wide. [See Photograph #3]

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[1] Until the creation of Cheatham County in 1856, the tunnel was located within Davidson County.

[2]Unrelated to the construction and operation of the tunnel are two stone abutments adjacent to the vertical wall of the limestone ridge on either side of the upstream (entrance) portal.

As constructed, the 290' long, unlined tunnel generally measured 8' tall and 15' wide. The top arch of the tunnel is semi-elliptical. In addition to the accumulation of silt within the tunnel, some deterioration of the original tunnel interior limestone walls has occurred over the years. A portion of the tunnel's side walls has suffered scouring from recent floods. Additionally, since some of the exposed stratifications of limestone within the tunnel were weaker than other sections, some large and small pieces of limestone have fallen from the top arch of the tunnel into the water below.

The nominated resource consists only of the 290' long tunnel, portal to portal. Excluded from this nomination, but located close to the tunnel portals, are a few resources which do not meet NHL criteria. The closest of these resources are the late 19th-century stone bridge abutments located left and right of the entrance (southeast) portal. These abutments are built against the limestone ridge through which the tunnel passes. [The second bridge to rest on these abutments was a Warren pony truss bridge built in 1910 by the Nashville Bridge Company.] The 1984 reinforced concrete road bridge which these abutments currently carry above the tunnel portal does not touch directly against the limestone ridge. A dam, and presumably a headgate, would have been located near the upstream portal to divert and control the flow of water into the tunnel. There are no standing remains of these features. On the downstream (northwest) side of the tunnel neither the flume, water wheel(s), dam, impoundment pond or tail race (all of which would have been associated with water-powered activity), remain in place and/or in their original configuration. [See Figure #1] Finally, the Patterson Forge, which operated near the downstream portal during the mid 19th century, no longer remains.[3]

[3]April 27, 1993, letter from Steve Rogers, Tennessee Historical Commission, to Robie Lange, NHL Files, National Park Service, Washington, D.C.

8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties: Nationally:___ Statewide:___ Locally:___

Applicable National Register Criteria:	A ___ B ___ C X D ___
Criteria Considerations (Exceptions):	A___ B___ C___ D___ E___ F___ G___
NHL Criteria:	I & IV
NHL Theme(s):	XII-H-4 BUSINESS-POWER AND LIGHTING-WATER XVIII-C TECHNOLOGY-ENERGY CONVERSION XVIII-H TECHNOLOGY-CONSTRUCTION
Areas of Significance:	COMMERCE ENGINEERING INDUSTRY
Period of Significance:	1818-1819
Significant Dates:	1819
Significant Person(s):	N/A
Cultural Affiliation:	N/A
Architect/Builder:	N/A

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.

By tunneling through a 290' deep limestone ridge, Montgomery Bell created the first known water diversion tunnel in the United States.[1] In fact, this is the oldest known full-size tunnel of any kind in the United States. The tunnel served as a man-made water flume with an approximate 16' fall of water, which its owner planned to utilize as the central element of a water-powered industrial site. No other water diversion tunnel is known to have been constructed this early in the Industrial Revolution. Built sometime between 1818 and 1819, this tunnel was completed either before or at the same time as the 450'

[1]The Montgomery Bell Tunnel is the earliest known water diversion tunnel of substantial size. Although there is no known record of any earlier small diameter tunnels, the possibility exists that one could have been excavated elsewhere.

Auburn Tunnel on Pennsylvania's Schuylkill Navigation Canal which came into service in 1821. The Montgomery Bell Tunnel has been frequently overlooked in historical chronologies of tunneling, with the Auburn Tunnel often identified as the first substantial size tunnel in the United States.[2] Even though the construction of the first water diversion tunnel did not introduce any innovative design or construction techniques, the Montgomery Bell Tunnel is nationally significant for two reasons. First, it is the oldest, if not the first, full-size tunnel known to have been constructed in the United States. Second, it represents the first application of existing rock tunneling technology to the field of water power.

History

The man who would become one of Tennessee's most prominent iron masters hailed from a part of the country where furnaces and forges were familiar elements of the industrializing landscape. Montgomery Bell was born in 1769 in Fallowfield Township, in southeastern Pennsylvania. His first employment was as an apprentice tanner and curer of leather. Dabbling in other trades after his three-year apprenticeship, Bell attained some financial success after relocating to Lexington, Kentucky, at the age of 20. There he first established a hattery and later purchased land, houses, mills, and iron furnaces. His interest and success in the iron industry led him to relocate to middle Tennessee while in his early thirties, where he expanded his holdings. During the War of 1812, Bell's Cumberland Furnace produced cannon balls which were used in the Battle of New Orleans.[3]

In 1818, Bell purchased a parcel of property which became known [redacted] tunnel through the tall limestone ridge which separated the two close sections of the river. The tunnel's shortcut resulted in an approximate 16' fall of water from the entrance to the exit

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[2]Construction of the Auburn Tunnel began in 1818. Even if the Auburn Tunnel had been completed earlier than the Bell Tunnel, its 1856 conversion to an open-cut canal makes the Tennessee structure the oldest surviving tunnel in the United States. The next oldest tunnel is another Pennsylvania canal tunnel, the Union Canal Tunnel near Lebanon, built between 1824-1828. As the oldest remaining canal tunnel in the United States, the Union Canal Tunnel is being studied as part of this NHL theme study on historic tunnels.

[3]Ed Huddleston, "Horse Trading Sets Stage for Coming to Nashville," The Nashville Banner, May 11, 1955, p.3; Robert E. Dalton, "Montgomery Bell and the Narrows of Harpeth," Tennessee Historical Quarterly (Spring 1976): 3-6.

portal, producing the earliest known water diversion tunnel in the United States. This great tunnel did not rely on the introduction of any new technology to make the ambitious project less difficult, but rather on the desire of entrepreneurs such as Bell, to harness the energy of falling water to power industrial activity.

Although no documentation on the method of tunnel excavation survives, Bell's tunnel was almost certainly constructed using the long established method known as hand drilling, which utilized hand-held hammers, chisels, and black powder. Bell relied upon one of the oldest methods to accomplish this arduous work--slave labor. Bell's ownership of 83 slaves at the time of the tunnel's construction made him the largest slave-holder in the county.[4]

The primary means of rock tunneling at the time was accomplished by "drilling," or, more correctly, hammering holes into the face of the tunnel. Black powder explosive was then placed into these holes and ignited, causing the rock to fracture or break away from the tunnel heading. The most gruelling component of this work was the hammering. One worker would hold a hardened metal rod, or "drill," with a sharpened edge against the rock while one or two other workers hammered the other end of the drill. The drill holder would pivot the drill after each blow so the edge of the drill would make contact with a different portion of the hole. The number of blows required to drill the hole to the proper depth depended on the hardness of the rock, the sharpness of the drill, and the force of the hammering.[5] The hole would then be cleaned out and dried before the black powder was tamped into the hole, fused, and packed tight with clay. The drill tips would loose their sharpness after as little as one foot of progress. Newly resharpened drills were constantly being brought to the tunnel heading to replace the dull ones.[6] Some reports suggest that the 290' long tunnel was completed in as little as several months, while other accounts speculate that it took more than a year.[7]

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[4]Dalton, p. 8.

[5]The drill holder also periodically poured a small amount of water into the hole to reduce the heat being transmitted to the drill by the successive contacts with the rock.

[6]Graham West, Innovation and the Rise of the Tunnelling Industry (Cambridge: Cambridge University Press, 1988): 31.

[7]Frank Luther, "A Walk Back in Time," The Tennessee Conservationist, 39 (August 1973): 16, suggests that the tunnel was begun in 1815 and took three years; Dalton, pp. 7 & 13, suggests that the tunnel was begun in 1818 and completed later that year or early the next year.

By providing this source of water power, Bell had hoped to convince the federal government to purchase the tunnel and the surrounding land for a new armory site which Congress had authorized. Despite convincing General Andrew Jackson to write a letter of endorsement to Secretary of War John C. Calhoun, and convincing the state's General Assembly to make the property more appealing by granting large tracts of adjacent land for the proposed armory, the selection process dragged on throughout the 1820s. After the release of a critical evaluation of the Bell property as a possible armory site in an 1823 report to Congress, Bell became less confident that the federal government would select the Narrows of the Harpeth property.[8] Nevertheless, Bell had no intention of letting one of the most unique water power systems in the country go unused. Having found no buyers, he decided to use the site himself by adding another iron forge to his holdings.

At the time Bell built his forge, there were many iron furnaces scattered throughout middle Tennessee. These furnaces served to reduce the region's iron ore to a molten state to produce pig iron. To produce a higher quality wrought iron from this material, additional heating and pounding was conducted at a forge.

By the Spring of 1832, the water-powered Patterson Forge was in operation at the Narrows of the Harpeth.[9] The water falling through the tunnel powered water wheels which, in turn, raised a heavy hammer into position before it could pound the metal on an anvil. The water power probably also powered the bellows which blew air over the forge's fire.[10] Bell's wrought iron was then either hauled to Nashville and Franklin, or shipped down the Harpeth and Cumberland to Clarksville, from where it could be shipped to Natchez and New Orleans. There are no standing remains of Patterson Forge.

In 1823, Bell built a house on a ridge slightly northeast of the tunnel. This structure subsequently burned in the early 20th century.[11] After his death in 1855, Bell was buried near the

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[8]The final decision on a new federal armory site was not made until Rock Island, Illinois was finally selected in 1862. Dalton, 14-22.

[9]Claudette Stager, "Narrows of the Harpeth, Patterson Forge," 1988, National Register of Historic Places Registration Form, National Park Service, Washington, D.C.

[10]Dalton, 224; Ed Huddleston, "Legend Links Ironmaster's Name With Noted Bessemer Steel Process," The Nashville Banner, May 18, 1955, p.32.

[11]This house site is recorded as archeological site 40 CH 88, in the site files of the Tennessee Historical Commission's Division of Archeology.

then standing house.[12] The tunnel and forge were next owned and operated by Bell's nephew, James L. Bell. While under his ownership, it is believed to have gone out of operation during the Civil War. In 1882, the tunnel, forge, and surrounding acres were transferred from James Bell's widow to Justin Potter as part of a larger land sale. By the 1930s, the site had been leased by the Potter Foundation to the Middle Tennessee Council of Boy Scouts, and it was operated as a camp ground. The state of Tennessee acquired the property in 1978, [redacted].

The tunnel and the adjacent forge site were listed on the National Register of Historic Places on April 16, 1971. The American Society of Civil Engineers designated the tunnel as one of their civil engineering landmarks in 1981.

[12]Stager, p. 8-2.

9. MAJOR BIBLIOGRAPHICAL REFERENCES

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--------, "Mysterious 'Second Tunnel' at 'Narrows' Never Located." The Nashville Banner, 16 May 1955.

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Stager, Claudette. "Narrows of the Harpeth, Patterson Forge." National Register of Historic Places Registration Form. Washington: National Park Service, 1988.

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Previous documentation on file (NPS):

___ Preliminary Determination of Individual Listing (36 CFR 67) has been requested.
_X_ Previously Listed in the National Register.
___ Previously Determined Eligible by the National Register.
___ Designated a National Historic Landmark.
___ Recorded by Historic American Buildings Survey: #_____
___ Recorded by Historic American Engineering Record: #_____

Primary Location of Additional Data:

_X_ State Historic Preservation Office
_X_ Other State Agency (State Park & Division of Archaeology)
___ Federal Agency
___ Local Government
___ University
___ Other (Specify Repository):

10. GEOGRAPHICAL DATA

Acreage of Property: [redacted]

UTM References: Zone Northing Easting

[redacted]

Verbal Boundary Description:

[redacted]

Boundary Justification:

[redacted]

11. FORM PREPARED BY

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