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Architectural/Historical Assessment of the Airway Beacon Lighthouse, Oak Ridge Reservation

December 4, 2007

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Architectural/Historical Assessment of the Airway Beacon Lighthouse

Introduction

A structure was recently discovered on the Department of Energy Oak Ridge Reservation in a wooded area in the vicinity of the Oak Ridge National Laboratory (ORNL). Information was gathered, and it was determined that the structure is Building 0969, an old, abandoned airway beacon lighthouse that was used between 1920 to the mid-1930s for nighttime navigation (see appendix). The site is on an existing power line right-of-way buffer area that traverses the reservation and is now well cleared of trees and vegetation (Fig. 1).

Fig. 1. Building 0969 on the Oak Ridge Reservation.

Description

The lighthouse is a metal frame structure, approximately 14 ft long by 10 ft wide by 10 ft tall. It is clad in sheet metal inside and out and has a metal gable roof. Wooden boards measuring 1 × 4 in. are nailed at the four corners of the structure and around the window facings. The wood floor is supported by a concrete footing. There are three six-over-six wood sash windows that are protected by window hoods (Fig. 2). The entry door is missing.

On the east side of the structure are the concrete piers that once supported the 500 gal fuel tank for the generator (Fig. 3). Adjacent to them are four depressions in the ground surface that identify the location of the concrete piers that once supported the four corners of the 51 ft tall beacon tower. The concrete piers for the support of the diesel fuel generator are inside the structure (Fig. 4). The generator, fuel tank, and tower were removed from the site prior to the discovery of the lighthouse.

Fig. 2. The windows are protected by hoods.

Fig. 3.The concrete piers that supported the diesel fuel tank.

Fig. 4.The wood floor and the piers that supported the power generator.

Condition

The windows are protected by window hoods and are in good condition. The entrance door had been vandalized and is missing. The structure is in relatively good condition, considering its age (late 1920–1930) and abandonment (Figs. 5, 6, and 7). The wood floor is sound. The metal siding is intact. Evidence remains of a two-foot wide black painted band around the mid-height of the building. The metal roof and two roof vents are intact and do not appear to leak, although they are rusted.

Fig. 5. The roof, vents, and siding are rusted but not leaky.

Fig. 6. Interior view: ceiling and walls.

Fig. 7. Interior view: windows, walls, and floor.

History

The visual navigational system based on airway beacon lighthouses was replaced by newer radio technology developed during WWII (see the appendix). Therefore, it is presumed that much of the airway beacon lighthouse network was disassembled and that the equipment was salvaged or sold. The survival of the structure at ORNL is unique in that the land on which it is located became federal property at about the time of the system change and thus did not face the same threat of demolition. Because of its relatively remote location, it survived without attention.

An abundance of information about the early airmail airway beacon routes is available on the Internet (see the appendix). Widespread interest may have originated with sightings of partially intact facilities across the United States, particularly the arrow-shaped concrete pads (see the appendix, Fig. A1.).

Assessment of Eligibility

The airway beacon lighthouse on the DOE Oak Ridge Reservation is significant because of its associations with the U. S. Transcontinental Air Mail Route program of the early 1920s. Although the facility does not retain its equipment, the remaining structure and concrete piers are sufficient to convey its unique history in early nighttime navigation in East Tennessee. It is believed that this structure is the only one of its kind located on the Oak Ridge Reservation. It is the opinion of the historic architect that the facility and associated structures meet Criterion Exception A for their association with the Transcontinental Air Mail Route program as set forth in 36 CFR 60.4, and are therefore eligible for inclusion in the *National Register of Historic Places*.

References

Schamel, John. 2007. *The Development of Night Navigation in the U.S.*, 10/08/2007. http://www.atchistory.org/History/nightnav.htm.

“Criteria for Evaluation.” 36 CFR 60.4. July 1, 2007.

Appendix. Historical Background for the Airway Beacon Lighthouses

The following text was excerpted from an article by John Schamel to provide a brief historical background of the Airway Beacon Lighthouse network (excerpted with permission from http://www.atchistory.org/History/nightnav.htm).

The Development of Night Navigation in the U.S.

Last updated 10/08/07
By John Schamel

A 1923 experiment conducted by the Army Air Corps in Ohio showed that pilots could navigate at night using rotating light beacons. With this example, Henderson [Paul Henderson, who became the Second Assistant Postmaster General in 1922] was able to press his requests for the development of a similar system for the Air Mail routes. Congress, in 1923, approved funding for the lighting of the Transcontinental Air Mail Route. Work started immediately. . . .

What resulted was the first ground based civilian navigation system in the world. Beacons were positioned every ten miles along the airway. At the top of a 51-foot steel tower was a 1 million candlepower-rotating beacon. Pilots could see the clear flash of light from a distance of 40 miles. . . . The beacons were also built to aid daytime navigation. Each tower was built on an arrow shaped concrete slab that was painted yellow. The arrow pointed to the next higher numbered beacon. An equipment/generator shed next to the tower had the beacon number and other information painted on the roof.

Regular scheduled night service on the Transcontinental Air Mail Route started on July 1, 1924. Now operating around the clock. . . . By the fall of 1924, the lighted segment extended from Rock Springs, WY to Cleveland, OH. By the summer of 1925, it extended all the way to New York.

An English aviation journalist, visiting the U.S. in 1924, wrote, “The U.S. Post Office runs what is far and away the most efficiently organized and efficiently managed Civil Aviation undertaking in the World.”

On July 1, 1927, the U.S. Post Office ended its Air Mail operation. The Transcontinental Air Mail Route, and other air mail routes, were turned over to the fledgling Airways Division in the Commerce Department’s Bureau of Lighthouses. The Airways Division continued with the development of lighted airways. An improved version of the beacon was fielded in 1931. . . .

By 1933, the Federal Airway System operated by the Airways Division comprised 18,000 miles of lighted airways containing 1,550 rotating beacons and 236 intermediate landing fields. Air Mail pilots routinely navigated the skies during the night, following the “signposts” of the rotating beacons.

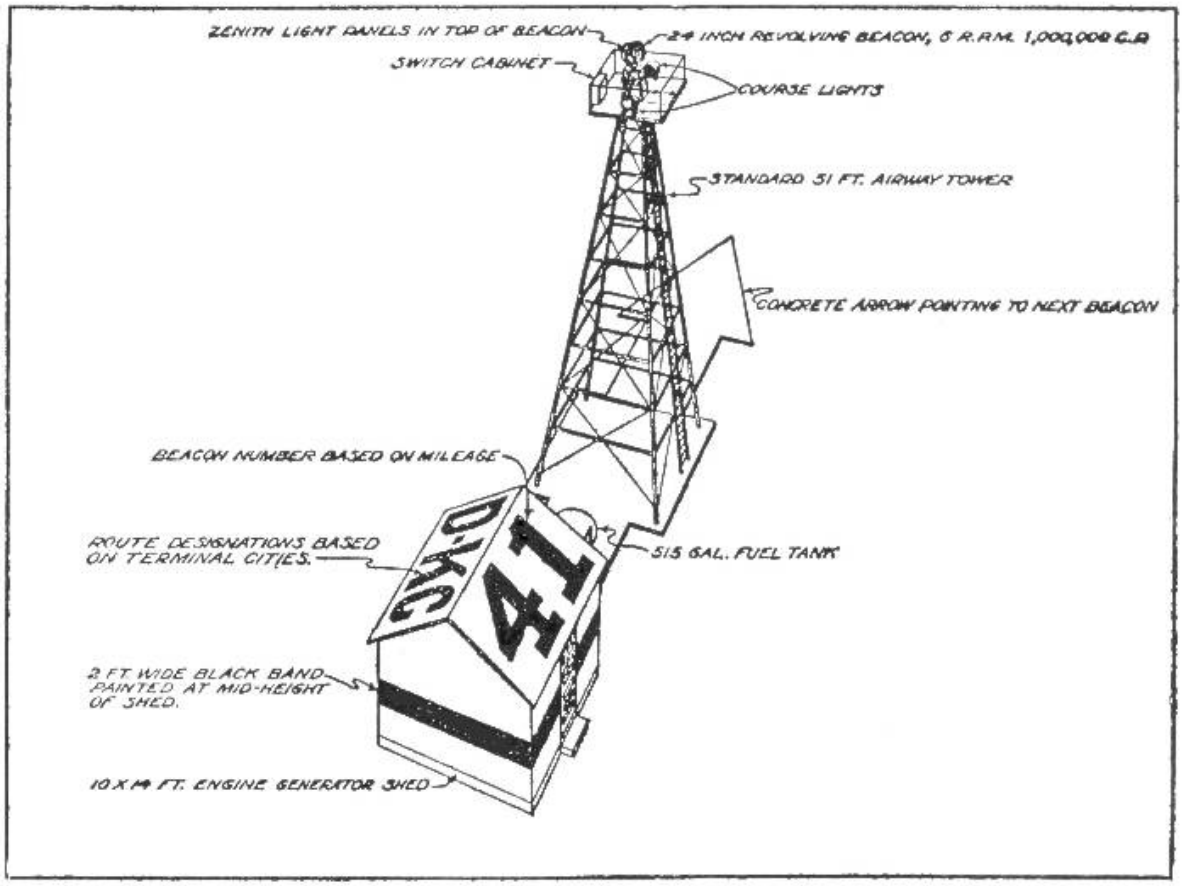

Fig. A.1. Standard Airway Beacon installation (1931).
(Adapted with permission from http://www.atchistory.org/History/nightnav.htm).