

# Allegheny Oil Powers

## Documenting Endangered Cultural Resources in Allegheny National Forest

When Col. Edwin Drake drilled 69 1/2 feet through rock and sand to tap oil trapped below Oil Creek, Pennsylvania in 1859, it signaled the birth of the modern oil industry. Oil and petroleum would soon become so useful a product that transportation, technology, and society would never be the same again. But what are the monuments to the beginnings of this industry, and are any of the thousands of pieces of equipment used for the drilling, pumping, barreling, and piping of oil documented or preserved for future generations? While the Commonwealth of Pennsylvania has created an outdoor museum with several operable artifacts at the Drake Well Museum, few examples are preserved *in situ*. Some oil barons' houses and oil-related commercial districts have gained National Register status, yet few technological sites have received federal designation.<sup>1</sup> Until recently, the Historic American Engineering Record (HAER) had documented only a handful of oil sites.<sup>2</sup> Finally, in 1997, HAER received authorization to document six historic oil pumping sites within the boundaries of the Allegheny National Forest (ANF), and entered into a tripartite agreement with Allegheny National Forest

*The HAER team approaching the Lockwood powerhouse. Photo by the author.*

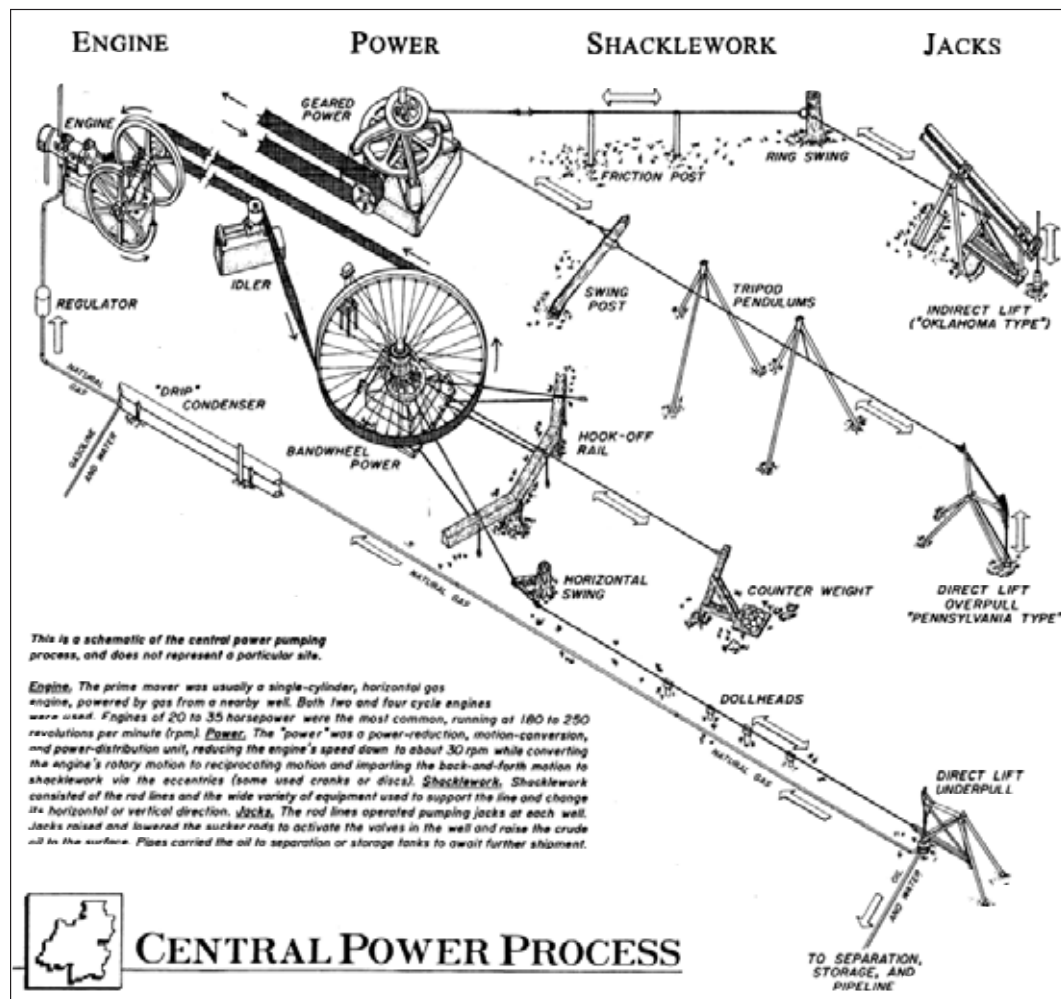


and West Virginia University's Institute for the History of Technology and Industrial Archaeology (IHTIA).

A four-county, 500,000-acre federal reserve, Allegheny National Forest is located in the heart of oil country, just up the Allegheny River from Oil Creek, the site of Drake's Well. The Oil Creek field was the first of several fields in western Pennsylvania to be drilled for oil, part of an oil seam that stretched from New York to Tennessee known as the Appalachian Field. The particular grade of oil in this region became known as Pennsylvania Grade crude oil, a high-grade, higher-gravity oil, which became a valuable lubricant for automobiles, airplanes, and other industries. The region boomed from 1860 to 1900, an era when Pennsylvania led the nation in oil production. While other fields rose to maturity elsewhere in the country, the northwest Pennsylvania region sustained a relatively small but profitable share of production into the 20th century. Oil wells had originally been pumped by a single oil rig per well, each of which required a "prime mover," usually a steam engine, to power the machinery, or "string of tools," to drill and pump through rock to recover the oil. A "central power" utilized only one prime mover, and distributed power to pump 8 to 15 different wells at a time. Previously abandoned wells were made economically viable again with the development of central powers, a regionally-significant operation that dominated secondary oil recovery technology from the 1880s to the 1940s; some managed to stay in production well into the 1960s and 1970s. The remains of these central power complexes remain scattered throughout the landscape in northwestern Pennsylvania, and it was these artifacts which became the central resource in the HAER documentation project.<sup>3</sup>

The HAER project focused on six representative central power complexes dating from ca. 1890 to 1940. The sites were treated with level-one HAER documentation: measured drawings

The central power pumping process operated in a variety of ways in the northwest Pennsylvania oil fields, as shown by this schematic. Drawing by Eric S. Elmer, 1997.



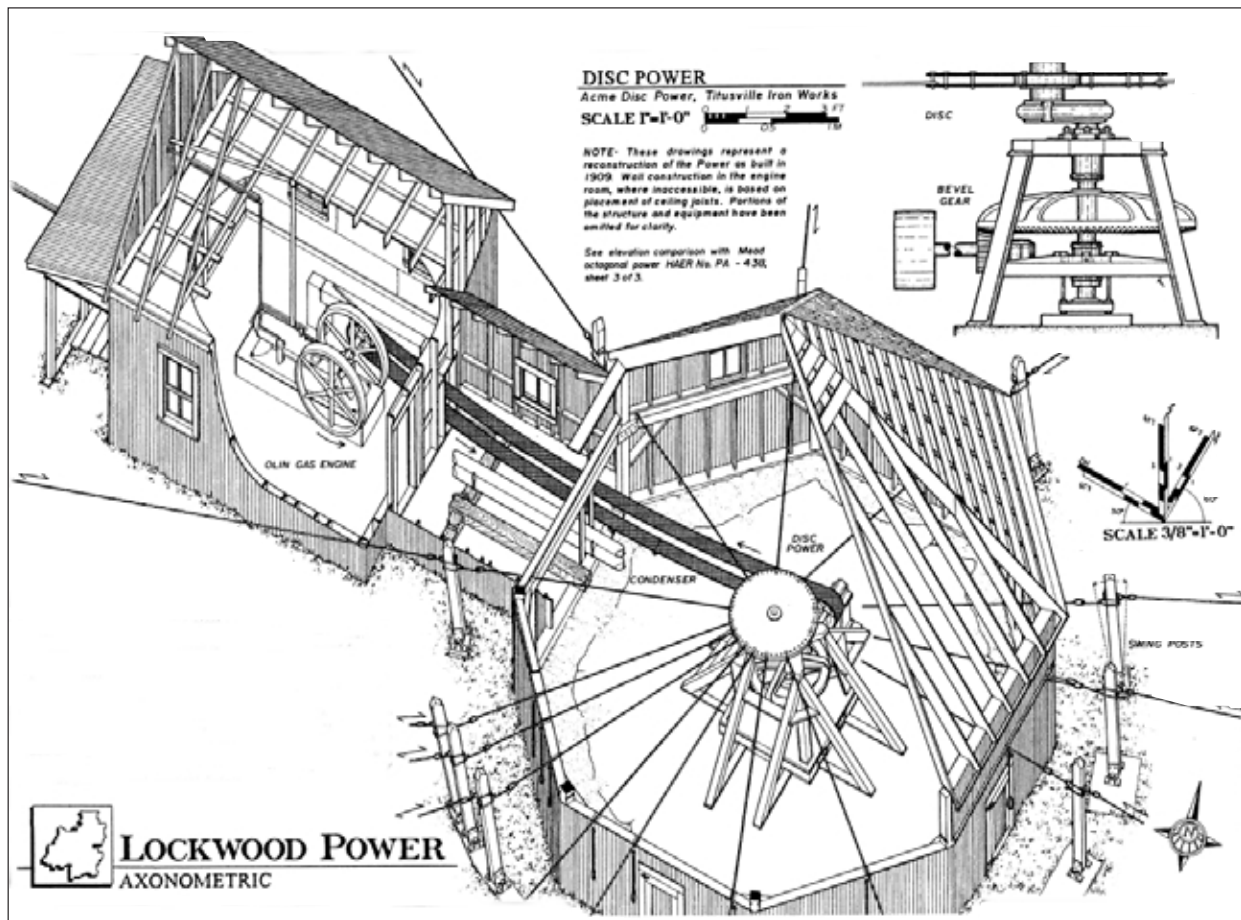
of all machinery and structures, large-format photographs, and historical reports, all placed within a larger historical context that located extant artifacts in the development of the history of petroleum production, especially in its roots in northwestern Pennsylvania. These sites were deemed to be of the highest structural integrity following the results of a 1995-96 cultural resource survey of thousands of artifacts—rusting jacks, rod lines, tanks, engines, and powerhouses scattered throughout the forest—led by ANF Heritage Resource Program Leader Rick Kandare, and historian Phil Ross.<sup>4</sup> The survey canvassed the entire four-county forest, looking for five structural features:

- powerhouse structure—enclosed and protected the machinery from the elements
- prime mover—gas or hybrid (converted steam) engine
- power—a power-reduction/motion-conversion/power distribution unit

- shacklework—a system of rod lines and supports radiating out over the landscape
- pumping jacks—connected by rod lines, located over each well

Of these, only about 20 sites had the full five features, and six of these were chosen as representative examples, each showing differences in structure or technology.

The central power complexes operated on the same general principles. A prime mover (gas engine) supplied power to a central power (either geared or bandwheel) which slowed down the engine speed while converting the engine's rotary power to reciprocating power, as eccentric gears produced a back and forth motion on 8 to 15 rod lines radiating out from the power. These rod lines were a component of the shacklework extending up to a mile out from the central power, where they connected to pumping jacks located 1,500 to 2,000 feet above pre-drilled pools of oil. The jacks activated valves in the



*An axonometric view of the Lockwood Power (built in 1909), near Warren, Pennsylvania, showing the spatial relationship of machinery to structure inside a typical octagonal power. Drawing by Eric S. Elmer, 1997.*

underground wells and raised the oil to the surface where it was stored in tanks.

While each site had similar features, each had differences in the machinery, structure, or type of power, reflecting the fast pace of change in technology during this 50-year period. The Geer-Tiona Power (HAER No. PA-441) is the oldest surviving structure (c.1890), and features a 12-foot handmade wooden bandwheel operating up to 8 rod lines, built on an angled foundation that lay parallel to the sloped hillside. Golden Oil Power (HAER No. PA-440) features a structure sheathed with lap-wood siding and a corrugated roof comprised of three sheds linked together dating from 1920. The ca. 1900 Lilly gas engine is a hybrid, having been converted from a steam engine by the addition of a new cylinder. It drove a bevel-gear Bessemer Co. power, with two overslung crank and gear eccentrics working 8 rod lines. Lockwood Power (HAER No-437) was constructed in 1909 by the South Penn Oil Co., operating until 1960. It features an Olin engine and an Acme disc power, which actuated 8 rod

lines. Mead Power (HAER No. PA-438), also built by South Penn in the same period, operated 11 wells and used a Franklin valveless engine to run its Titusville geared double-eccentric power. Both Lockwood and Mead powerhouses feature a unique octagonal form over the central power unit. According to the project's historian, Michael Caplinger, this highly aesthetic form was relatively easy to construct, provided spacious access around the circumference of the power, and was sheathed in corrugated tin siding. The eight-sided triangular roof panels formed a rigid, sectional cone, which proved a superior rigid form to withstand high winds and heavy snows in the region's harsh climate. Mallory Lot 6 (HAER No. PA-436) dates to 1939 and is housed in a long rectangular shed. The largest survivor, its Cooper-Bessemer gas engine ran an 18-foot steel bandwheel power with underslung eccentrics. This site has been preserved by ANF and is open to the public. By far the most accessible of the six sites, Mallory has been renamed "The Old Powerhouse" and its



equipment has been repainted and labeled with interpretive signs.

The field team included Eric Elmer, HAER (U. Cal-San Luis Obispo); Paul Boxley, Scott Daley, Kevin McClung, IHTIA architects; Arturs Lapins, ICOMOS architect from Latvia; John Nicely, IHTIA photographer, and Michael Caplinger, IHTIA historian. This author served as project leader with Phil Ross providing onsite expertise. The drawings were designed to show the relationship between the machinery and the structure, and included comparative plans, sections, elevations, and details, as well as cutaway axonometrics. Photographs documented each site in its current condition, from exterior and site views to machinery details. Select historic photos were also included. Historian Michael Caplinger wrote an overall contextual history of the oil industry in Pennsylvania, as well as historical reports on each site.

Oil leases continue to operate on Allegheny National Forest and other sites in the vicinity. Today, these wells are pumped by electrically-operated pump jacks which are much more economical and less maintenance-intensive than central powers. However, it not hard to find a vestige from the central power-era nearby, a reminder of the significance of an era and the importance of

documenting a vanishing element of our nation's oil heritage.

### Notes

- 1 Coolspring Power Museum and Bradford Oil Museum in western Pennsylvania also house historic oil equipment. However, all these artifacts have been moved from their original site. The Drake Well is a national historic landmark.
- 2 U.S. Department of the Interior, *Historic American Engineering Record* (HAER), No. WV-9, "West Oil Company: Endless Wire Pumping Station," Prints and Photographs Division, Library of Congress, Washington, DC.
- 3 For further information, see Michael Caplinger, U.S. Department of the Interior, *Historic American Engineering Record* (HAER), No. PA-436, "Allegheny Oil Heritage Project: A Contextual Overview of Crude Oil Production in Pennsylvania," 1997, Prints and Photographs Division, Library of Congress, Washington, DC.
- 4 The results of this survey were used as primary documentation for Ross' book, *Allegheny Oil: The Historic Petroleum Industry on the Allegheny National Forest* (Warren, Pennsylvania: United States Department of Agriculture, Allegheny National Forest) 1996.

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*The bandwheel of Mallory Lot 6 Power, near Klondike, Pennsylvania, has been preserved as "The Old Powerhouse" by Allegheny National Forest and is open to the public. Drawing by Arturs Lapins, 1997.*

