



CONTENTS

FOREWORD	4
By Jim Wrinn	
1 Birth of a Legend	8
When Union Pacific's 4-8-8-4s ruled the West	
2 Big Boy Impressions	36
Engine crews loved the 4-8-8-4s	
3 Without Equal	60
UP needed a bigger locomotive; Alco provided the Big Boy	
4 Compound Articulated; Simple Articulated	66
How developments in articulated locomotives led to the Big Boy	
5 Which Was the Biggest?	88
Comparing Big Boy to America's other heavyweight contenders	
6 Super-Power	100
How modern steam technology evolved from Berkshire to Big Boy	
7 Yes, They Could Handle It	118
How UP acquired No. 4014 from a California park, towed it 1,300 miles, and rebuilt it	
8 On the Road Again	152
No. 4014 stretches its legs for the first time in 60 years	
9 Where the Boys Are	196
Along with No. 4014, seven other Big Boys have been preserved	
10 Big Boy Gallery	212
A look at 4-8-8-4s in action and at rest	

Urban legends of the Wasatch

The Big Boys were denizens of some of the most remote places in America, but they still generated their share of urban legends.

One such story involves Adolph Hitler, whose spies are said to have told him of huge locomotives, capable of handling heavy trains through the Rocky Mountains at high speed. It's undeniably intriguing to think that history's greatest villain might have obsessed over this symbol of American industrial might, but it doesn't seem to be true.

Steve Lee, former head of Union Pacific's steam program, heard stories about German prisoners of war passing through Cheyenne, allegedly awed and dispirited at the sight of doubleheaded 4000s charging forth to do battle with Sherman Hill. One of the captives was heard to mutter that, "any nation that could build something like that cannot be defeat-

ed," according to the story. But as Lee points out, the 4000s didn't operate out of Cheyenne during World War II; they ran on the Wasatch grade between Ogden, Utah, and Green River, Wyo. Nor could this be a case of mistaken geography: The Big Boys didn't run as doubleheaders between Ogden and Green River, owing to the tunnels.

Additional circumstantial evidence comes from the wartime files of the FBI. Eight Nazi saboteurs were sent to wreak havoc on America's war-making capability in 1942 (see *Classic Trains*, Winter 2001). The agents were captured before they could carry out their mission, but we know from their confessions that their rail objectives included Horseshoe Curve; Penn Station in Newark, N.J.; Hell Gate Bridge; unspecified targets on the Chesapeake & Ohio; and Great Northern's Cascade Tunnel. The sabotage operation was person-



ally conceived by Hitler, which suggests that the targets would have included Union Pacific if the Führer had been interested in the Big Boys.

Another persistent legend holds that No. 4005 was sold to Argentina. In one book, the locomotive is even said to have been “partially dismantled” in preparation for the move. The 4005 did earn distinction as the guinea pig for various modifications (up to now, it remains the only Big Boy converted to burn oil, for example), but there was never anything to the Argentina rumor. The 4005 has spent its retirement years at Denver’s Forney Museum of Transportation, one of eight Big Boys donated to various parks and museums. The other 17 were destroyed — but intentionally so, not as the result of sabotage. — *Peter A. Hansen, author and editor of the Railway & Locomotive Historical Society’s publication, Railroad History.*



Inset above: No. 4014 rolls under semaphores at Echo, Utah, with a merchandise train. Below: No. 4014 traverses the Harriman Cutoff, also known as Track 3, the preferred westbound line across Sherman Hill after 1953. Above, Union Pacific; below, James L. Ehernberger



3 Without Equal

by Steve Lee

Union Pacific needed a bigger locomotive;
Alco provided the Big Boy

T TO CALL A UNION PACIFIC 4-8-8-4 a “big locomotive” would be akin to calling the Mona Lisa a “nice painting.” Built in two lots in 1941 and 1944, the 25 Big Boys were the acme of steam locomotive development for the American Locomotive Company, and were so successful they still made money for UP more than a decade after its managers had chosen to dieselize.

The Big Boy was the result of a design effort which had already produced two successful series of 4-8-4 Northerns and 4-6-6-4 Challengers. For the new 4-8-8-4s, the Alco-UP engineering and design team didn’t need to break too much new ground — they only had to refine and enlarge what they’d developed and proven in service.

The design team started with a performance-based requirement for a locomotive that could pull 3,600 tons up the 1.14 percent ruling grade between Ogden, Utah, and Evanston, Wyo., without a helper — and worked up the design to meet those needs. The locomotive they produced exceeded expectations, as evidenced by successive increases in the Big Boy’s tonnage ratings once experience revealed their capabilities. Ultimately, the Big Boys were rated at 4,450 tons on this district, 23.6 percent more than planned.

The Big Boys were big locomotives, so large that before the first one was delivered, UP had to invest money to remodel facilities at engine terminals where the Big Boys would be fueled, watered, and maintained. Turntables 135 feet long were installed at Ogden and Green River and Laramie, Wyo. Cheyenne, Wyo., got a 126-foot table. Several roundhouse stalls at each terminal were lengthened so the new locomotives would fit inside. Locations outside their usual territory, such as Denver and North Platte, Neb., were not equipped

with the long turntables, and the railroad had to turn them on wyees, and use only roundhouse stalls aligned straight across the turntable from inbound tracks. At those locations, most 4-8-8-4 inspections and repairs had to be done outdoors. Water standpipes not already raised to clear the tall tenders on the 4-8-4s had to be raised so they could swing over the tops of the 4-8-8-4s’ tenders.

Union Pacific’s right-of-way also required investment to accommodate the Big Boys. The distance between adjacent tracks had to be increased on sharp curves so the smokebox overhang to the outside of curves would not result in sideswipes. Cuts on curves had to be widened for the same reason, as did curved tunnels such as between Devil’s Slide and Morgan, Utah. Certain bridges and culverts had to be strengthened. Some trackage in terminals and yards had to be realigned. Even with all that, employee timetables carried long lists of speed restrictions specific to the Big Boys and they were kept from some tracks owing to their size and weight.

An Alco success story

Conventional wisdom holds that of the three steam locomotive builders, Alco, Baldwin, and Lima, the latter was the innovator, and Alco and Baldwin followed its lead. The same wisdom holds that Baldwin was the champion at building big locomotives in volume.

Where Alco differs from its competitors was its ability to build big locomotives in large quantities at a competitive price, and innovate. Of the three builders, Alco was the biggest proponent of three-cylinder power, and developed the ultra-high-pressure Delaware &



Union Pacific Extra 4015 West is in the yard at Laramie, Wyo., on Sept. 18, 1956. Laramie was a crew-change point in this era, and boasted a 27-stall roundhouse as well as a giant icing facility for refrigerator cars. *James L. Ehernberger*



With the cab removed and the backhead exposed, work progresses on No. 4014's boiler in March 2017. Compare this image to the photos on page 149 showing the cab being installed in this area. *Four photos, Jim Wrinn*



Looking down the barrel of the long boiler from the smokebox end, and with both front and rear tube sheets removed, boilermaker Jimmy Thompson uses a cutting torch to remove a staybolt.



We're far from Cheyenne, Wyo., in the heart of Pennsylvania Amish Country, in Strasburg, Pa., where the famed Strasburg Rail Road shop was working on No. 4014 wheel centers and axles in May 2017.

“Soon, the drivers with new tires and crank pins will return from rebuilding at the Strasburg Rail Road. Workers will load the tubes and flues into the boiler. Reassembly will begin with thousands of parts ready to breathe new life into this old friend.”

In June 2018, we visited once more. My report that time focused on the work that had been accomplished in three months and the work that was ahead: “With six of the eight wheel sets back from renovation and application of new tires, boiler work at the company's steam shop in Cheyenne, Wyo., has continued at a rapid pace. Rigid staybolts, flexible stays, rigid crown bolts. Rivets. Appliance studs. The gritty, tedious work continues on the 300-psi pressure vessel. In late June, the nine-member steam crew was installing the last rigid staybolts in the firebox. The rear truck that supports the firebox and cab was ready, and attention turned to the cab, which is getting significant amounts of new metal. Ahead is rewheeling of the locomotive, installation of tubes and flues, and a hydrostatic test of the boiler to ensure its integrity.”

Soon the crew was boring the cylinders and replacing the bottom of the cab where rust had taken its toll. By December 2018, No. 4014's restoration was moving forward at a rapid clip. The engine was moved outside to be reunited with its rebuilt front and rear engines.



In a scene unimaginable only a few years prior, No. 4014's boiler and front engine share space inside the Cheyenne backshop. New lubrication lines (light colored strands) have already been run on the engine.