

# The 805A Report by Larry Hanlon

We have a unit!!! exclaimed Dave McClain at about 5PM on February 29, 1992. Dan Ogle, Dave, and I had spent the day in various contorted positions installing traction motor brushes and repairing a ground fault inside the #3 traction motor, and I had just opened the throttle and run the 805, pushing the 512, back and forth on 2 rail outside of the enginehouse. The 3 of us broke into assorted whoops of joy as all those long weekends finally paid off. Dave then took her out around the balloon for some initial testing, and I brought her back. Initial reaction: looks like one strong unit!

The only other person around was Hap Manitt, which struck me as especially appropriate given his long association with the Zephyr. He had a grin from ear to ear, even though the 805 isn't a steamer! In the rapidly fading light, Dan cut away from the 512 and spotted the 805 next to the 921 for a quick photo session. We then installed the other number board and shot a couple of runbys on video--it was too dark by then for film. How appropriate that the Silver Lady chose Sadie Hawkins Day to rejoin the ranks of operational locomotives.....

## Recent Results

On Dec. 26 and 27, Dave, John Ryczkowski and I had planned a motor car trip down in Southern CA. Given the impending storm and our bet that the 3751 trip would be scrubbed, we instead came to Portola to work on the 805. Obviously we bet wrong on the 4-8-4; it's a good thing we weren't gambling in Reno!

We first pulled the end housing of the left side engine blower, since it had developed an ominous noise when we last ran the engine. We found no oil inside, which quickly led to the discovery that the oil feed line from the block had been removed and the hole plugged with a bolt and rag. This was totally mysterious, as both feed lines were in place 2 years ago after I installed and tested the prelube pump. We removed the needed part from the "C" engine outside of the shop and installed it. (Late on the 27th, Ski found the missing feed line in the rear of the locomotive. Strange.)

On the 27th, using the piping diagrams in an F3 manual, we began tracing the piping for the air system, in particular the control air. Among a number of amazing discoveries, we found that 1) the control air regulator had been removed and bypassed, and 2) the air compressor unloader had been disabled. While Ski and Dave worked out a plan to restore the proper plumbing, I removed the voltage regulator from 708 and installed it in the electrical cabinet. We ran the engine for about an hour to test our repairs. Mixed results: the auxiliary generator still wasn't putting out any voltage and

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the blower was still making noise, although not as bad; a test of the air compressor unloader showed it was functional. We then shut everything down while I began tracing wires and took a number of resistance measurements in order to diagnose the generator problem. On the way home, I realized that the only consistent explanation for the readings I'd seen was that the wires to the voltage regulator were mislabeled.

A few days later, Dan finished rewiring the BC relay. He also began checking out the auxiliary generator circuits, taking resistance measurements, and came to the same conclusion. When we later compared notes we also shared a few observations on southern shortline maintenance.....

On January 18, 1992, I brought Bob Bucklew, a railfan friend from back east, to Portola, and found Dan hard at work on the electrical system. We took some additional measurements to check our hypothesis about the mislabeled wires, which proved to be correct. After switching the offending wires, we put Bob to work shooting video and started her up. This time, the batteries were charging at a 170 amp rate, the NVR relay pulled in (indicating the alternator was working), the traction motor blowers were running, and the radiator fans would run when their contactors were manually closed. Success!!! Dan checked the DC voltage and found it to be right on the money at 74V, with very little change between no load and full load. Hank Stiles checked out the brake cylinders, all of which were tight except for a massive leak from #1 cylinder right under the engineer. Power, brakes --- let's see if she'll move! No luck. We checked a number of likely trouble spots in the electrical system; ground relay, power contactors and interlocks, but to no avail. The charging rate for the batteries behaved well, having dropped to about 50 amps. The blower bearings were no longer making noise, and, for the first time, there were no visible water leaks at all. Since an hour of running had pretty well filled the shop with smoke, we decided to call it a day and let the exhaust fans catch up on their work. Hank disassembled the #1 brake cylinder and replaced the defective seal. Maybe we should bring Bob to Portola more often.

On the 19th, while Ski and I were finishing off the FT issue of the Headlight, Dan was doing insulation resistance measurements on the high voltage cables. He found them to be in good condition, but two things were amiss. First, a ground fault showed up in the #3 traction motor, and second, the motors had no brushes in them. No wonder she wouldn't move! CLICK---right!---the L&NW had pulled the brushes before shipping the locomotive to us as a safety precaution, and they were buried in the rear of the locomotive in a cardboard box. Dan also searched through 3 boxcars of

## We have a unit! Larry Hanlon's 805A Report Continued...

parts for the 3 load meters which had been brought back from WP units in Salt Lake before they were scrapped.

With these developments, Dave and I met Dan on Feb. 29, despite all of the recent and near-future travelling we'd been doing. It took most of the day to install the good used brushes plus a half-dozen new ones (12 per motor), and to repair the insulation inside #3 motor. We also replaced a bad brush holder with one from the #1 motor of 6946 --which turned out to be a D27!!! (F7s were delivered with D27 motors; Centennials with D87X. The #8 motor under 6946 is also a D27 -- evidently the UP stuck some old motors under there for show. Or maybe they were planning ahead and giving us some spare parts...). Dan also added extra insulation around the insulating boots on the #3 motor cable connections which had been sliced in half rather than receiving the proper installation, which is much more work. Shortline maintenance.....

After filling the cooling system, the wonderful silence of no water leaks was heard. Dave connected up the air compressor unloader plumbing while I installed the last of the brushes in #3 motor. We pulled her outside with the 512 and started her up. While the air was pumping up and the engine warming up, we worked on the B solenoid in the governor as well as the contacts on the control stand. Voltage measurements back at the governor showed the solenoid was getting power, so Dave pressed on the linkage to the pilot piston in the governor. Instant Run 6! Suddenly we had the whole throttle range working.....only to quit a bit later. Pressing the linkage again freed it up again, and from then on the governor has worked just fine. Guess the B solenoid just wanted a little extra persuasion.



I popped in the generator field switch and opened the throttle. Sound, but no movement. I knocked off the hand-brake while Dave released the brakes on the 512, and we tried again. This time, ever so slowly, the 805 began moving and we ran forward and back on 2 rail. It seems that the 805 is still set up for passenger service, as the load regulator initially loads ever so slowly --- silky smooth starts are no problem with this engine! Because of this, on the first attempt the 805 was unable to overcome the static friction of the brake shoes, even though, once moving, it had no trouble working against a full set of brakes on both the 512 and itself. (Switching on the WAG and the L&NW sure must have been fun with this unit!) After the video runbys described above, we began getting frequent low-oil alarms, and nursed the unit back to the shop. Knowing of the water in the lube oil, Dave suspected that the oil filters had swelled shut. But she ran well, sounded great, and the battery charging cur-

rent had dropped to a normal value of about 20 amps. Things were looking good!

On March 14, 1992, Dave, Dan, Ski, and I converged on Portola again. While Dan searched 2 more boxcars of diesel parts for the missing ammeters, Dave and I adjusted the injectors and valves. I liberated a flashcock from 6946 to replace a leaky one on #16 cylinder. Dave reconnected the control air regulator and associated plumbing while I disconnected the compressor control switch (CCS) and gauge in order to blow any debris out of the piping. I checked the torque on all of the cylinder head nuts and the rocker arm shaft mounting nuts. All was fine. After starting her up, it became evident that the pipe to the CCS was clear, and that the problem was a leaky pressure piston in the CCS itself. Hank presented us with a new switch, which I rewired while Dave modified the mounting bracket. After installing the new CCS, the air gauges on the electrical cabinet and on the dash panel in front of the engineer finally agreed - we had eliminated the leak.

The safety valve at the #2 main air reservoir was still popping off at 132 psi, while the CCS was (properly) set for 140 psi, so the compressor was still not unloading. We figured out how to adjust the safety valve, set it for 145 psi, and won. The air compressor was now cycling automatically, as intended, coming on at 132 psi and turning off at 140 psi. Another system back in service. And it became evident what the L&NW (or the WAG) had done. Faced with a bad CCS, they jury-rigged the plumbing so that the compressor would run continuously. To keep the air pressure under control, they had set the safety valve down to 132 psi. Shortline maintenance.....

We added 3/4 of a barrel of lube oil to bring the level up to its nominal value. Meanwhile, Dan had come back and buttoned up the electrical cabinets. With the valve covers all back in place on the engine and the electrical cabinets closed up, it's really starting to look like a locomotive instead of an explosion in a parts factory! Dan was unable to find the ammeters, which is annoying because it means that 3 perfectly good, authentic WP load meters, as well as the one taken from UP 6912, have disappeared from the boxcar in which they were stored. If anyone knows of their whereabouts, please tell someone at the museum. The 805 needs one.

While working on the air system, we had been running the unit mostly in Run 3, Run 6, and at idle. After more than an hour of this, we saw copious amounts of water vapor escaping from the lube oil through the valve covers -- another

# We have a unit! Larry Hanlon's 805A Report Conclusion...

good sign. Furthermore, the engine was very smooth and sounded great at all speeds; our little "tune-up" had worked. Once the air system was working, we worked her around the balloon, and again she performed well until we started getting low-oil pressure alarms. Next up is an oil change and new filters, and sending the injectors off to Sierra Diesel for cleaning.

In early April, Hank took the original 805 governor as well as 3 others to a shop in Oakland for rebuilding and recalibration. Over the April 11 weekend, Dan removed the broken ammeter from 805 as well as one of the ones from the 708 in an attempt to resurrect the broken meter. Hopefully it will work out.

April 16 was a busy day. I wired up the compressor control switch and took measurements to make a better pre-lube pump oil pickup tube than the one we currently have installed. I also took measurements of the various carbody and engine air filters in order to learn whether any readily available commercial filters would fit. We'll probably just use layers of filter material cut to fit as was done in the 921 and 707. In an attempt to get both headlight bulbs working, I found that the problem was not a bad bulb as we had assumed, but instead something amiss in the wiring. Meanwhile, Ski took two hose flange castings from the "C" engine outside the shop and cleaned them up with a wire wheel; these were needed to connect the crankcase breather to the engine air blowers. The third casting required will unfortu-

nately have to come from 708 for now.

In the course of switching out the various tracks at the museum in order to get things in order for operating season, Steve Habeck and Ed Warren assembled the consist shown in the cover photo. I drained water from the 805's crankcase and found perhaps 8 oz.; a very good indication that the various seals are in fact holding. We barely got the engine started because the batteries were so low, but once again it fired right up as soon as it was cranked over. After Steve and Ed spotted the ATSF caboose-cum-photo platform at Malfunction, I spotted the passenger consist following instructions from Ed and Ski, who collaborated on the photo composition. We left the headlight off because it looked awkward to have only one of the bulbs illuminated.

After the photo session I checked out the batteries and found it necessary to add several gallons of water to each one. We kept the engine in Run 2 for the next hour to boost the charging rate while I set about decoding the changes to the headlight wiring. After some study it became apparent what crazy things had been done either on the WAG or the L&NW. Shortline maintenance....

The battery charging current settled down to a normal value, and both headlight bulbs are now operational. By the time we shut her down and set her back in the shop it was rapidly getting dark, and Steve and Ed still had switching to finish off.



## Next Steps for 805 Work

The next work session is planned for May 9 and 10, 1992. Come help!

- Inspect traction motor bearing oil wick assemblies; replace damaged filler caps and weather seals, top off oil in reservoirs.
- Clean up engine room.
- Install new prelube pump pickup tube.
- Finish rewiring headlights.
- Install crankcase breather hoses.
- Pressure-wash radiators, engine room and underframe.
- Tighten crankcase-oil pan bolts.
- Clean out dirt, rust, etc. from interior of nose and spot prime.
- Replace porthole panel behind engineer.
- Complete sanding and polishing of stainless lower side panels.
- Repair, prep middle side panels for painting.
- Reinstall grabirons, handrails, and cab access ladders.
- Repair dent in pilot.
- Fabricate and install replacement stirrup steps on pilot.
- Obtain and install original cab windows.
- Install grabirons on rear of carbody for roof access.

See you next time.....

