



ON THE SYSTEM

The Official Publication of the UNION PACIFIC RAILROAD HISTORICAL SOCIETY

January/February, 1981
Volume 2, Number 1/2

SNOW PLOWS, PAST AND PRESENT



UNION PACIFIC RAILROAD HISTORICAL SOCIETY

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NEEDED FOR FUTURE ISSUES

We are in need of good black and white and color prints or slides covering the subject areas shown below for future use in articles or books.

- F units, roster and action
- Switch engines, any and all
- General action, diesel, 1950-1970
- Steam engines, action or roster
- 3985 and 8444, action

1 COVER PHOTO

In the Spring of each year, the Union Pacific Railroad sends one of its most modern snow plows up to the Yellowstone Branch to clear the accumulation of winter snow from the tracks. Seen here is 900081 doing just that in the spring of 1975. Photo Courtesy Union Pacific Railroad.

EDITORIAL

OUR SECOND YEAR

With the start of our second year of publishing a newsletter we have made some changes we hope you will enjoy. We have added four more pages per month and combined everything into a bi-monthly publication making each issue a full 32 pages of current and historical material. This was done so we could include longer articles without having to split them as often between issues. We will still continue to do this on certain types of articles though. We also went to the bi-monthly concept to save money on postage. Since going to First Class postage our costs for postage went up nearly eight times what we were paying and it may go even higher if the Post Office has its way.

You may wonder what the economics are in going to First Class postage if it has increased our overall costs. We went to First Class postage at the encouragement of many of our members, but not totally. First Class postage gives us the ability to mail any number of pieces at any given time from anywhere. This is a tremendous help when mailing back issues and issues to new members. First Class postage also gets the issues to our members within days from mailing rather than the weeks we encountered using the Fourth Class Rate. Overall we feel the extra cost is worth every penny we pay in convenience for us and more importantly, the convenience it gives our members.

After looking over the last year's issues we decided to change the look of the issue a bit. We dropped the lines we used for borders and used that space to enlarge the photographs. The photographs are, for the most part, larger than last year. This was done to help increase the amount of detail presented in each photograph.

In terms of new items, we added a Book Review column, a suggestion from one of our members. This may not be in each issue, but as new books come out on the Union Pacific we will feature them and help keep you abreast of new publications. We have several books to review over the next several issues and we know of a couple more yet to come that we will review as soon as we have our copies.

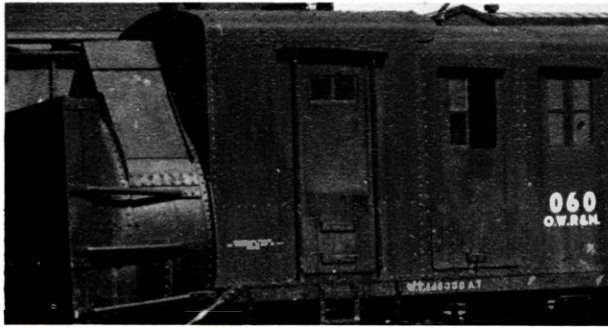
We added a general column, Did You Know The purpose of this column will be to provide facts that you probably didn't know or items you might not have been aware of. We have a lot of small bits and pieces that are interesting in themselves but are not enough, by themselves, to write an article around. We will use this new column to present these to you.

Since the Pacific Fruit Express Company was partially owned and operated by the Union Pacific Railroad we are including it here in the form of articles about the operation of the company and the equipment operated and owned by P.F.E. These articles will appear in each issue for a while. Then when the time is available we will put out a book on the equipment. We're not sure when it will be ready but we are planning on sometime in 1982, late in the year. We have several other books we will be doing before then so it all depends on the progress of those.

Overall I feel the changes we have made in the issues will appeal to the membership and compliment our philosophy of providing the best Historical Society possible. We have had our problems in the past with late issues and the back-breaking bankruptcy of our previous printer. We have survived and will continue to strive for the best. We appreciate the support we have received from you, the membership, and we will continue to provide you with information you find useful and informative. If you have any suggestions for articles you would like to see please feel free to write me. If you have some information you would like to share or have photos you would like us to use please feel free to send them to us. We will return all material back to you. With your help we can become even more important to you and the other members. You might also be interested to know over 5% of our members live outside of the United States. Interest in the Union Pacific Railroad is really international and with your support and help we can stay important to so many people.

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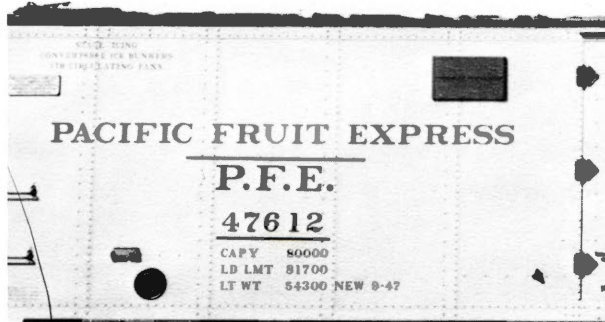
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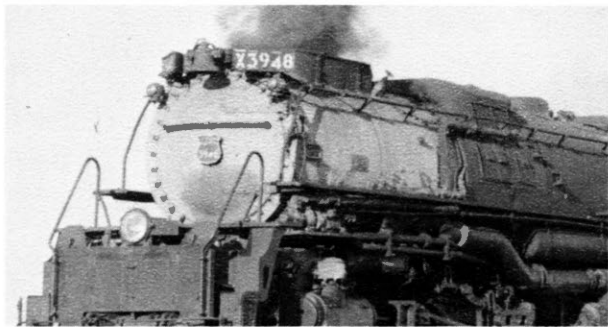
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NEWS BRIEFS

- In December, 1980 Precision National Corp. bought DD-35's, 73B and 78. P.N.C. bought DD-35's, 81B and 90B along with GP-7, 127 and GP-9's, 164, 173, 191 and 223 in January.
- SD-7's and SD-24's previously being held for conversion to slug sets were released for sale in December, 1980. The units to be sold are: SD-7's, 450-453, 455 and 458, SD-24's, 409, 411B, 414, 428, 430B, 445 and 448. SD-24's 445 and 448 are ex-demos.
- L.G. Everist, Inc. bought GP-9's, 148 and 262 also in December, 1980.
- The SW-10 program for 1981 is under way with the selection of SW-9's, 1851, 1852, 1844 and 1860 as the next four units to be converted. An attempt was made to convert an SW-7 using the same procedures and parts being used on the SW-9's in December. The test didn't work so it was scrapped; but as the SW-9's run out an attempt may be made later to make an SW-7 to SW-10 conversion. (See article on SW-10's in next month's issue).
- Power is still being stored, serviceable, in Council Bluffs, Kansas City, North Platte, Cheyenne, Green River, Salt Lake City, Los Angeles, Hinkle and Las Vegas. At the beginning of January over 270 units were stored serviceable another 36 were awaiting repairs and some 14 units were awaiting retirement notice.
- U-28-C, 2804, is still in Omaha. As we reported in November, 1980 the unit was being converted to a training center for teaching mechanical types the workings of the GE units. The Union Pacific has yet not found a permanent home for their training center so it continues to stay in Omaha. This training program may be extended to include an EMD unit in the future.
- GP-9, 232, was leased to Fairfax Grain in Fairfax, KS in February.
- SD-24, 419, was scrapped in the Omaha shops in January.
- SD-40, 3119, was retired at Salt Lake City after it was involved in an accident at Kelso, CA in November, 1980.

SNOW PLOWS, PAST AND PRESENT, Part 1



2 Little is known of this photo but it is probably O.S.L. Rotary Snow Plow 02011. The only markings on the Rotary are the letters "NE" next to the first door, possibly part of the word "LINE". The Rotary Snow Plow was built in 1913. Photo courtesy Union Pacific Railroad.

SNOW PLOWS - 1885 Roster

Number	Division	Class	Location	Number	Division	Class	Location
1	K.C.	Iron	Leavenworth	41	U.P.	Wood	Evanston
10	D. & S.P.	Iron	Como	42	U.P.	Wood	Evanston
11	D. & S.P.	Iron	Como	43	U.P.	Iron	Evanston
12	D. & S.P.	Iron	Como	44	U.P.	Iron	Evanston
13	D. & S.P.	Wood	Como	45	K.P.	Iron	Armstrong
14	D. & S.P.	Wood	Como	46	K.P.	Iron	Armstrong
20	U. & N.	Iron	Eagle Rock	47	K.P.	Iron	Armstrong
21	U. & N.	Iron	Eagle Rock	48	K.P.	Iron	Armstrong
22	U. & N.	Iron	Butte	49	K.P.	Iron	Armstrong
23	U. & N.	Iron	Logan	50	K.P.	Iron	Wamego
24	U. & N.	Iron	Spring Hill	51	K.P.	Wood	Brookeville
30	U.P.	Wood	Omaha	52	K.P.	Wood	Ellis
31	U.P.	Wood	Grand Island	53	K.P.	Wood	Wallace
32	U.P.	Wood	North Platte	54	K.P.	Wood	Wallace
33	U.P.	Iron	North Platte	55	K.P.	Wood	Wallace
34	U.P.	Iron	North Platte	56	K.P.	Wood	Hugo
35	U.P.	Iron	Cheyenne	57	K.P.	Wood	Denver
36	U.P.	Iron	Cheyenne	58	C.C.	Wood	Denver
37	U.P.	Iron	Laramie	71	O.S.L.	Wood	Shoshone
38	U.P.	Iron	Laramie	72	O.S.L.	Wood	Shoshone
39	U.P.	Iron	Rawlings	73	O.S.L.	Wood	Shoshone
40	U.P.	Iron	Rawlings				

K.P. - Kansas Pacific
 C.C. - Colorado Central
 O.S.L. - Oregon Short Line

K.C. - Kansas Central
 D. & S.P. - Denver & South Park
 U. & N. - Utah & Northern
 U.P. - Union Pacific

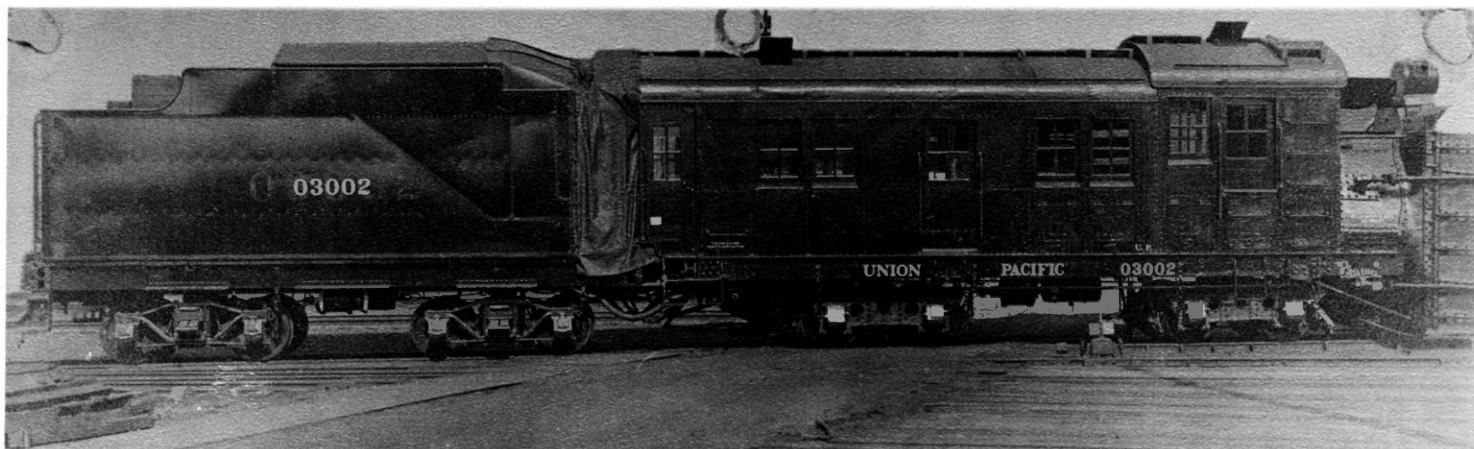
SNOW PLOWS - 1926 to 1949

Road	Number	Type	Built	Length	Weight	Remarks
LA&SL	010520	Wedge		41'-10"	39,650	Wood/S.U. Retired by 1950.
LA&SL	010521	Wedge		41'-10"	39,650	Wood/S.U. Retired by 1945.
LA&SL	010522	Wedge	11/48	41'-10"	92,500	Steel. Renumbered 040 , 8/49. All LA&SL Wedge Plows were rebuilt from Flat Cars. 010522 was rebuilt from 52104. 010520 renumbered from 00451 and 010521 renumbered from 00452 in 1924.
OWRN	045	Wedge	11/50	41'-10"	95,000	S.U. Rebuilt from Flat Car 50123.
OWRN	059	Rotary	11/87	30'-4"	116,500	Wood/S.U. Cooke Loco. Works.
OWRN	060	Rotary	11/88	29'-11"	164,300	Steel. Cooke Loco. Works.
OWRN	061	Rotary	1/13	32'-10"	200,000	Steel. American Loco. Works.
OWRN	062	Rotary	7/17	33'-2"	190,700	Steel. American Loco Works. All OWR&N Rotary Plows were built new for OWR&N. All retained original numbers. 062 converted to oil 6/48.
StJGI	0330	Wedge		32'-10"	94,200	Wood. Retired by 1950.
StJGI	0331	Wedge		39'-9"	92,200	Wood. Retired by 1950.
LNP&N	098	Rotary	1917			Steel.
LNP&N	099	Rotary	1917			Steel.
LNP&N	0100	Water				Steel. Water Car with 099 . LNP&N equipment acquired in 12/51.



3 'Clearing the line' with O.S.L. Rotary Snow Plow **02011**. The line is the Yellowstone Branch in Idaho and the plow is working hard to keep the snow moving as the steam engine behind pushes hard to keep the plow moving. Photo courtesy Union Pacific Railroad.

Road	Number	Type	Built	Length	Weight	Remarks
OSL	02009	Wedge				Retired by 1920.
OSL	02010	Rotary	7/96	36'-0"	137,300	Wood/S.U. Renumbered 050 , 10/49.
OSL	02011	Rotary	1/13	38'-3"	181,000	Wood/S.U. Renumbered 051 , 9/49.
OSL	02012	Rotary	10/14	39'-7"	252,100	Steel. Renumbered 052 , 9/49.
OSL	02013	Rotary	3/16	39'-3"	213,100	Steel. Renumbered 053 , 9/49.
OSL	02014	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02015	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02016	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02017	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02018	Wedge	11/23	40'-10"	31,700	S.U. Renumbered 030 , 9/49.
OSL	02019	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02050	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02051	Wedge	/23	40'-10"		S.U. Retired by 1945.
OSL	02052	Wedge	/23	40'-10"		S.U. Retired by 1945.
Wedge Plow 02018 rebuilt from Flat Car 59853. All other Wedge Plows built from Flat Cars, 58100-58164, 59800-59898.						
U.P.	03000	Rotary	1/88	40'	173,800	Steel. Cooke Loco. Works.
U.P.	03001	Rotary	1/88	40'	173,800	Steel. Cooke Loco. Works.
U.P.	03002	Rotary	1/88	40'	173,800	Steel. Cooke Loco. Works.
U.P.	03003	Rotary	1/13	40'	173,800	Steel. America Loco. Works.
U.P.	03004	Rotary		40'	173,800	Steel. Retired by 1949.
U.P.	03005	Rotary	12/22	40'	173,800	Steel. American Loco. Works.
Rotary Plows 03000-03005 renumbered to 070-074 , 8/49 - 10/49 except 03004 .						
U.P.	03010	Wedge	11/46		99,300	Wood/S.U. Rebuilt from Flat Car 56200. Renumbered 09 in 9/49.
U.P.	03011	Wedge		31'-8"	91,500	Wood.
U.P.	03012	Wedge		31'-8"	91,500	Wood.
U.P.	03013	Wedge		31'-8"	91,500	Wood.
U.P.	03014	Wedge		31'-8"	91,500	Wood.
U.P.	03015	Wedge		31'-8"	91,500	Wood.
U.P.	03016	Wedge		31'-8"	91,500	Wood.
U.P.	03017	Wedge		31'-8"	91,500	Wood.
U.P.	03018	Wedge		31'-8"	91,500	Wood.
U.P.	03019	Wedge		31'-8"	91,500	Wood.
U.P.	03020	Wedge		31'-8"	91,500	Wood.
U.P.	03021	Wedge		31'-8"	91,500	Wood.
U.P.	03022	Wedge		31'-8"	91,500	Wood.
U.P.	03023	Wedge		31'-8"	91,500	Wood.
U.P.	03024	Wedge		31'-8"	91,500	Wood.
U.P.	03025	Wedge	9/18	31'-8"	91,500	Wood.



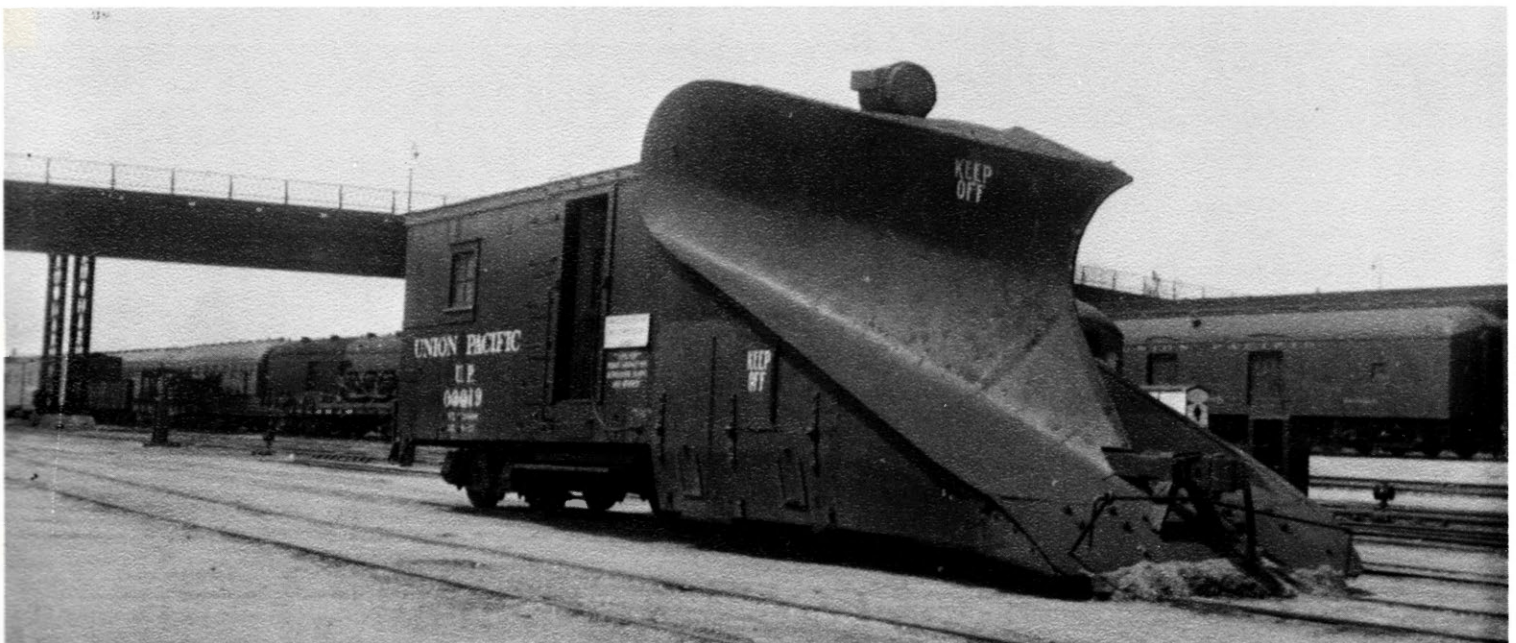
4 Union Pacific **03002** is a Cooke Locomotive Works graduate from January, 1888. This Rotary Snow Plow was one of three built for the Union Pacific Railroad during this period and were some of the first all steel Rotaries built. Photo courtesy Union Pacific Railroad.



5 Of the 21 Wedge Snow Plows built by the Union Pacific Railroad from old box cars during 1915-1920 almost all were identical. Here plow **03017** sits on a siding at Encampment, WY on August 17, 1946, just a couple years before it was retired. Photo from R. L. Schmeling Collection.

Road	Number	Type	Built	Length	Weight	Remarks
U.P.	03026	Wedge		31'-8"	91,500	Wood.
U.P.	03027	Wedge		31'-8"	91,500	Wood.
U.P.	03028	Wedge		31'-8"	91,500	Wood.
U.P.	03029	Wedge		31'-8"	91,500	Wood.
U.P.	03030	Wedge		31'-8"	91,500	Wood.
U.P.	03031	Wedge		31'-8"	91,500	Wood.

Wedge Plows **03011 - 03031** were rebuilt from wood Box Cars. **03024** and **03027** were Double Track, others Single Track. 15 of these Wedge Plows were left by 1945. **03011** and **03025** were only 2 left in 1949. **03011** was not renumbered but still carried on 1951 roster. **03025** was renumbered to **010**, 9/49.



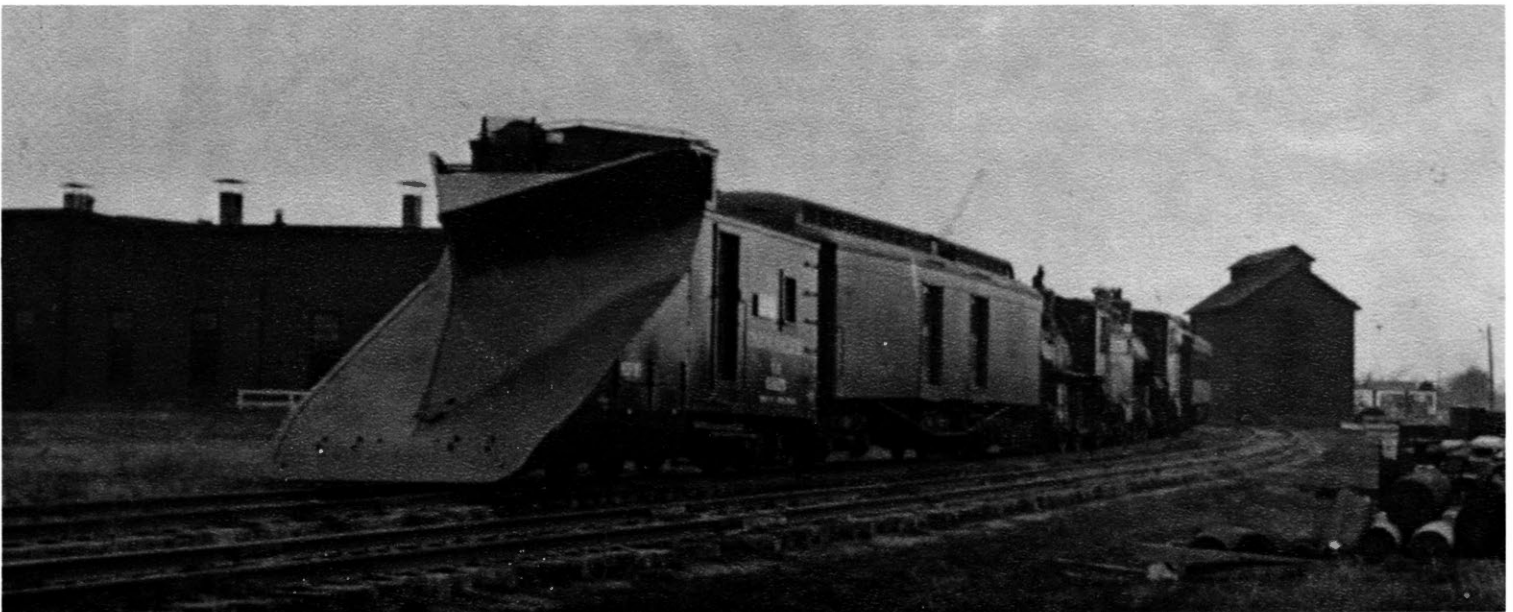
6 Wedge Plow **03019** was found in Cheyenne, WY on April 24, 1938 resting between winters. The plow was among 21 built by the Union Pacific Railroad during the period 1915-1920. Photo from R. L. Schmeling Collection.



7 Wedge Plow **03032** was built in October, 1926 as a double track plow but was later converted to single track. The tender behind the plow is not assigned to the plow. This photo was taken in Ogden, UT on September 1, 1947. Photo from R. L. Schmeling Collection.

Road	Number	Type	Built	Length	Weight	Remarks
U.P.	03032	Wedge	10/26	30'-0"	95,000	Wood, Double Track.
U.P.	03033	Wedge	10/26	40'-0"	92,500	Wood/S.U. Single Track. Retired 8/53.
U.P.	03034	Wedge	10/27	31'-8"	91,400	Wood, Single Track. Retired 9/53.

03032 Retired by 1949. **03033** Rebuilt from Box Car 95274. Renumbered to **011** in 9/49. 03034 renumbered to **012** in 9/49.



8 A snow clearance train lead by **03029** was found by a Union Pacific Railroad photographer in Kearney, NE on April 15, 1931 waiting for a good snow fall. Note the compound 4-4-0 and 2-6-0 used for pushers. Photo courtesy Union Pacific Railroad.

SNOW PLOWS - 1949 to 1953



9 O.W.R. & N. Rotary Snow Plow **060** sits idle at the end of a shop track in the La Grande, OR yard waiting for another snow fall to come to the Blue Mountains of Oregon. Photo courtesy Union Pacific Railroad.

Road	Number	Type	Built	Length	Weight	Remarks
U.P.	01	Wedge	7/49		230,000	Steel. Rebuilt from Tender 12-C-203.
U.P.	02	Wedge	9/49		230,000	Steel. Rebuilt from Tender 12-C-213.
U.P.	03	Wedge	9/49		230,000	Steel. Rebuilt from Tender 12-C-218.
U.P.	04	Wedge	9/49		230,000	Steel. Rebuilt from Tender 12-C-219.
U.P.	05	Wedge	7/49		231,010	Steel. Rebuilt from Tender 13-C-114.
U.P.	06	Wedge	8/49		231,010	Steel. Rebuilt from Tender 12-C-150.
U.P.	07	Wedge	8/49		231,010	Steel. Rebuilt from Tender 12-C-147.
U.P.	08	Wedge	8/49		231,010	Steel. Rebuilt from Tender 12-C-149.
U.P.	09	Wedge	11/46		99,300	Wood/S.U. Renumbered from 03010 .
U.P.	010	Wedge	9/18	31'-8"	91,500	Wood. Renumbered from 03025 .
U.P.	011	Wedge	10/26	40'-0"	92,500	Wood/S.U. Renumbered from 03033 .
U.P.	012	Wedge	10/27	31'-8"	91,400	Wood. Renumbered from 03034 .
U.P.	013	Wedge	12/53			Steel. Rebuilt from Tender 12-C-155.
U.P.	014	Wedge	12/53			Steel. Rebuilt from Tender 12-C-136.
U.P.	015	Wedge	12/53			Steel. Rebuilt from Tender 12-C-115.
All Wedge Plows 01-015 are Single Track. 01-04 are without Flanger Equipment or Cabs. 05-08 are with Flanger Equipment and Cabs.						
U.P.	020	Wedge	9/49		231,000	Steel. Rebuilt from Tender 12-C-108.
U.P.	021	Wedge	9/49		231,000	Steel. Rebuilt from Tender 13-C-120.
U.P.	022	Wedge	9/49		231,000	Steel. Rebuilt from Tender 13-C-119.
U.P.	023	Wedge	9/49		231,000	Steel. Rebuilt from Tender 12-C-140.
All Wedge Plows 020-023 are without Flanger Equipment or Cabs. All are Double Track.						
OSL	030	Wedge	11/23	40'-10"	31,700	S.U. Renumbered from 02018
LASL	040	Wedge	11/48	41'-10"	92,500	Steel. Renumbered from 010522 .
OWRN	045	Wedge	11/50	41'-10"	95,000	S.U.
OSL	050	Rotary	7/96	36'-0"	137,300	Wood/S.U. Renumbered from 02010 .
OSL	051	Rotary	1/13	38'-3"	181,000	Wood/S.U. Renumbered from 02011 .

Road	Number	Type	Built	Length	Weight	Remarks
OSL	052	Rotary	10/14	39'-7"	252,100	Steel. Renumbered from 02012 .
OSL	053	Rotary	3/16	39'-3"	213,100	Steel. Renumbered from 02013 .
OWRN	059	Rotary	11/87	30'-4"	116,500	Wood/S.U.
OWRN	060	Rotary	11/88	29'11"	164,300	Steel.
OWRN	061	Rotary	1/13	32'-2"	200,000	Steel.
OWRN	062	Rotary	7/17	33'-2"	190,700	Steel.
U.P.	070	Rotary	1/88	40'	173,800	Steel. Renumbered from 03000 .
U.P.	071	Rotary	1/88	40'	173,800	Steel. Renumbered from 03001 .
U.P.	072	Rotary	1/88	40'	173,800	Steel. Renumbered from 03002 .
U.P.	073	Rotary	1/13	40'	173,800	Steel. Renumbered from 03003 .
U.P.	074	Rotary	12/22	40'	173,800	Steel. Renumbered from 03005 .
U.P.	075	Rotary	1/50	49'-11"	300,400	Steel. Lima-Hamilton Corp.
U.P.	076	Rotary	1/50	49'-11"	300,400	Steel. Lima-Hamilton Corp.
U.P.	077	Loader	10/49		53,000	Steel. Barber Green Corp.
U.P.	078	Melter	10/49	53'-6"	77,000	Steel. Built Flat Car.
U.P.	098	Rotary	1917			Steel. From LNP&N, 12/51.
U.P.	099	Rotary	1917			Steel. From LNP&N, 12/51.

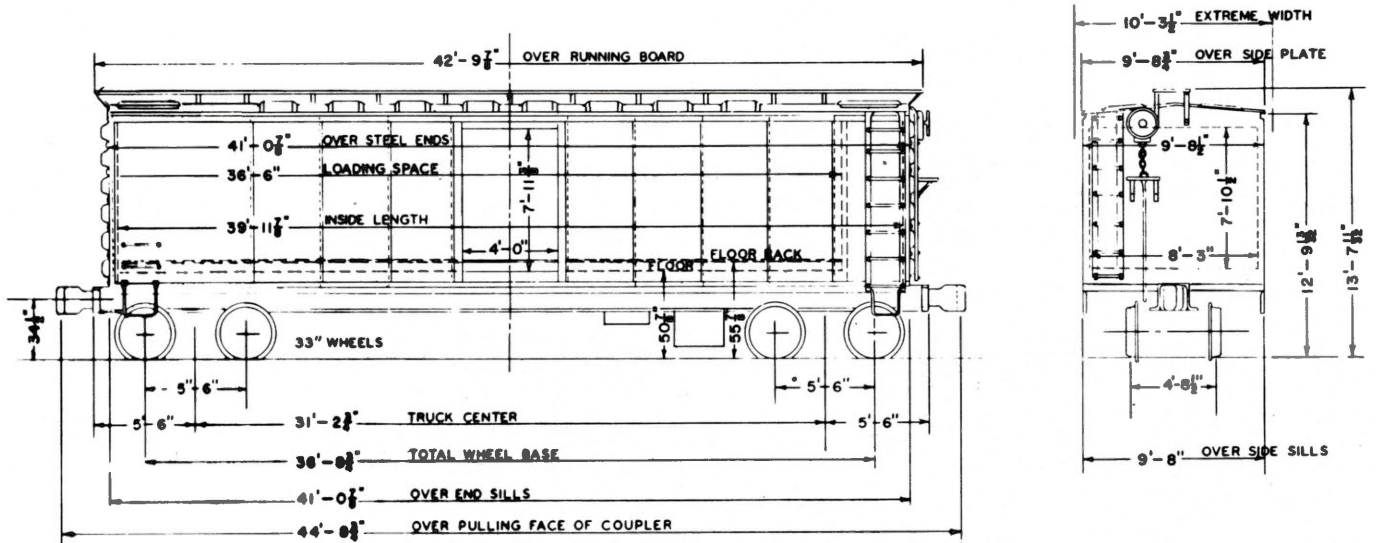


10 A close-up of Rotary Snow Plow **075**, built by Lima-Hamilton in January, 1950, shows some of the details of this Lima production. The event was the opening of the Yellowstone Branch in the spring of 1952. This is one of the tests given each new rotary and the reason so many people are present.



11 As Rotary Snow Plow **075** backs up to show the 'cut' made by the plow one of the Union Pacific photographers takes the opportunity to put it down on film. Photo courtesy Union Pacific Railroad.

REFRIGERATOR CAR 80,000 LBS. CAPACITY



LIGHT WEIGHT OF CAR	22,400	REFERENCE DRAWINGS	
CUBIC LOADING CAPACITY	2348	GENERAL ARR'G'T.	4R-5350
AVAILABLE LOADING HEIGHT	7'-9 1/4"	STEEL SHEATHING	128-2229
CAPACITY OF ICE TANK	7400	UNDERFRAME	444-C-9805
		AIR BRAKE ARR'G'T.	444-C-9805
LOAD LIMIT	23,600	INSULATION-WALLS	276-C-9810
CAPACITY	20,000	INSULATION-FLOOR	4R-5350
UNDERFRAME	ALL WELDED TYPE	LETTERING	ER-4900
TRUCKS	A. S. F. A-3 RIDE CONTROL	ALLOCATION OF SPECIALTIES	283-C-9862
WHEELS	33" STEEL, 33" CAST STEEL		
AXLES-JOURNALS	5" X 9"		
COUPLER	TYPE E RIGID SHANK		
DRAFT GEAR	FRICTION		
AIR BRAKES	AB		
HAND BRAKES	AJAX, EQUIPCO, MINER, SUPERIOR UNIVERSAL		
SIDE DOOR	4'-0" 2 PIECE SWINGING		
INSULATION-FLOOR	4" RIGID FOAMED PLASTIC		
INSULATION-WALLS	4" 50% HAIR, 50% JUTE FIBER		
INSULATION-ROOF	4" GLASS WOOL, HAIR		
ICE TEMPCO	PRECO-PETTER NA2 20002-20062		
ICE TEMPCO	PRECO-LISTER NA3 20063-20162		
ICE TEMPCO	PRECO-PETTER NA2 20163-20801		
ICE TEMPCO	PRECO-LISTER NA3 20802-20701		
ICE TEMPCO	EQUIPCO-LISTER PDE 2 20702-21001		

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AM. CAR & FDY.		
GEN. AMERICAN		
PULLMAN STD.		
PACIFIC CAR		

CAR NUMBERS	
20002 - 21001	
CAR CLASS	DIAGRAM
R-40-23	R-9

Diagram courtesy Pacific Fruit Express.

PFE, Class R-40-23 Roster

Number Series	Cars	Built	Builder	Weight	Class	Insulation		
						Walls	Roof	Floor
5001-6000	1000	1947	Mt. Vernon	54300	R-40-23	4"	4"	4.5"
6001-6500	500	1947	Amer. Car	54300	R-40-23	4"	4"	4.5"
6501-7000	500	1947	Gen. Amer.	54300	R-40-23	4"	4"	4.5"
7001-7500	500	1947	Pullman	54300	R-40-23	4"	4"	4.5"
7501-8000	500	1947	P.C. & F	54300	R-40-23	4"	4"	4.5"
46703-47202	500	1947	Amer. Car	54300	R-40-23	4"	4"	4.5"
47203-47702	500	1947	Gen. Amer.	54300	R-40-23	4"	4"	4.5"
47703-48202	500	1947	Pullman	54300	R-40-23	4"	4"	4.5"
48203-48702	500	1947	P.C. & F.	54300	R-40-23	4"	4"	4.5"

REBUILT R-40-23 by P.F.E. in 1961 at Los Angeles

20002-21001	1000	1961	P.F.E. Co.	52400	R-40-23	4"	4.5"	4.5"
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13 PFE Reefer, Class R-40-23, 20043, was photographed at Los Angeles right after it had been rebuilt from one of the 1947 built ice bunker reefers. Note the new motorized fan located behind the left truck. These cars only had one ice bunker at the 'B' end of the car. Photo courtesy Pacific Fruit Express.

In 1947 ice bunker refrigerator cars were the state-of-the-art in moving perishable commodities across the country. With the advent of mechanical refrigeration units coming in 1953 the use of ice was becoming less and less. So much so, that Pacific Freight Express was closing several of its ice plants by the early 1960's. These changes prompted some experimenting by P.F.E. with their vast fleet of ice bunker reefers.

In 1961 Pacific Fruit Express took 1000 cars from the 5000 cars in the R-40-23 class and removed the 'A' end ice bunker. P.F.E. then installed an underframe diesel generator and fuel tank that would drive fans located in the 'B' end ice bunker to circulate the cool air around the entire car. What this change did was increase the cubic feet for loading commodities and reduce the amount of ice needed to half that before. Included in this change was a thermostat which regulated the use of the fans in order to keep the car at a constant temperature.

The original design of the R-40-23 class cars as built in 1947 was changed very little. The doors and body were not changed except to add more insulation in the floors. The original axle driven PRECO circulating fans were removed (see round black area above left truck of 47612). The painting and lettering followed current practice of reefer orange sides, aluminum roof and black ends with all black lettering.

Reprinted below is an article written by Pacific Fruit Express which appeared in their employee newsletter of December, 1960. The article details the new "Ice Tempco" cars.

PFE'S NEW "ICE-TEMPCO" CONSTANTLY OPERATING AIR-CIRCULATING FAN SYSTEM

On December 13th PFE announced plans for equipping 500 ice bunker cars with units for constant operation of air-circulating fans while under load to produce controlled temperatures. Installation will be made at PFE's car shops in Los Angeles in conjunction with general repairs to cars. Following this order, an additional 500 cars will be equipped with this device, all of which will be completed and in service by August 1961.

The modified cars (to be known as "Ice-Tempco" cars) are Class R-40-23 40-ft. ice bunker cars with four inches of insulation. One ice bunker will be removed from each car and the remaining bunker enlarged to hold in excess of 7,000 lbs. of ice. Increased cubical loading capacity of these cars will be about 10%.

With the constantly operating fans and with thermostats for controlled temperatures, many commodities can be loaded higher in the car with adequate air circulation and refrigeration.

Tests run by PFE over the past year and a half with this type of car have proved very successful in transporting all types of fresh perishable commodities. Providing as it does a controlled temperature, the car is especially attractive for vacuum-cooled products, tomatoes, deciduous and citrus tree fruits, and other fresh commodities where controlled temperatures are desirable.

The device to be used consists of a 5 h.p. diesel engine

installed under the car, and an alternator or generator which in turn operates the fans within the car. The thermostat controls the operation of these fans and dampers or louvers open and close as needed to control the circulation of air throughout the car.

Specifically, four fans will be used in the bunker end of the car, one fan serving as a "circulating fan" and the other three fans serving as "cooling fans." The "circulating fan" operates continuously and pulls air from the lading area up through a special bunker by-pass duct located in the bunker bulkhead. The "cooling fans" operate at a fixed speed until the temperature of the air in contact with the thermostat, located in the bunker by-pass duct, has been lowered to the thermostat setting. At this time the "cooling fans" are stopped by the thermostat controls and the solenoid or motor operated dampers in front of the "cooling fans" automatically move to the closed position. (Closing of the dampers prevents the flow of air down through the bunkers due to the pull of the "circulating fan" and natural convection). Later, when the lading air temperature rises to the sensing point of the thermostat, the controls open the dampers and start the "cooling fans" again.

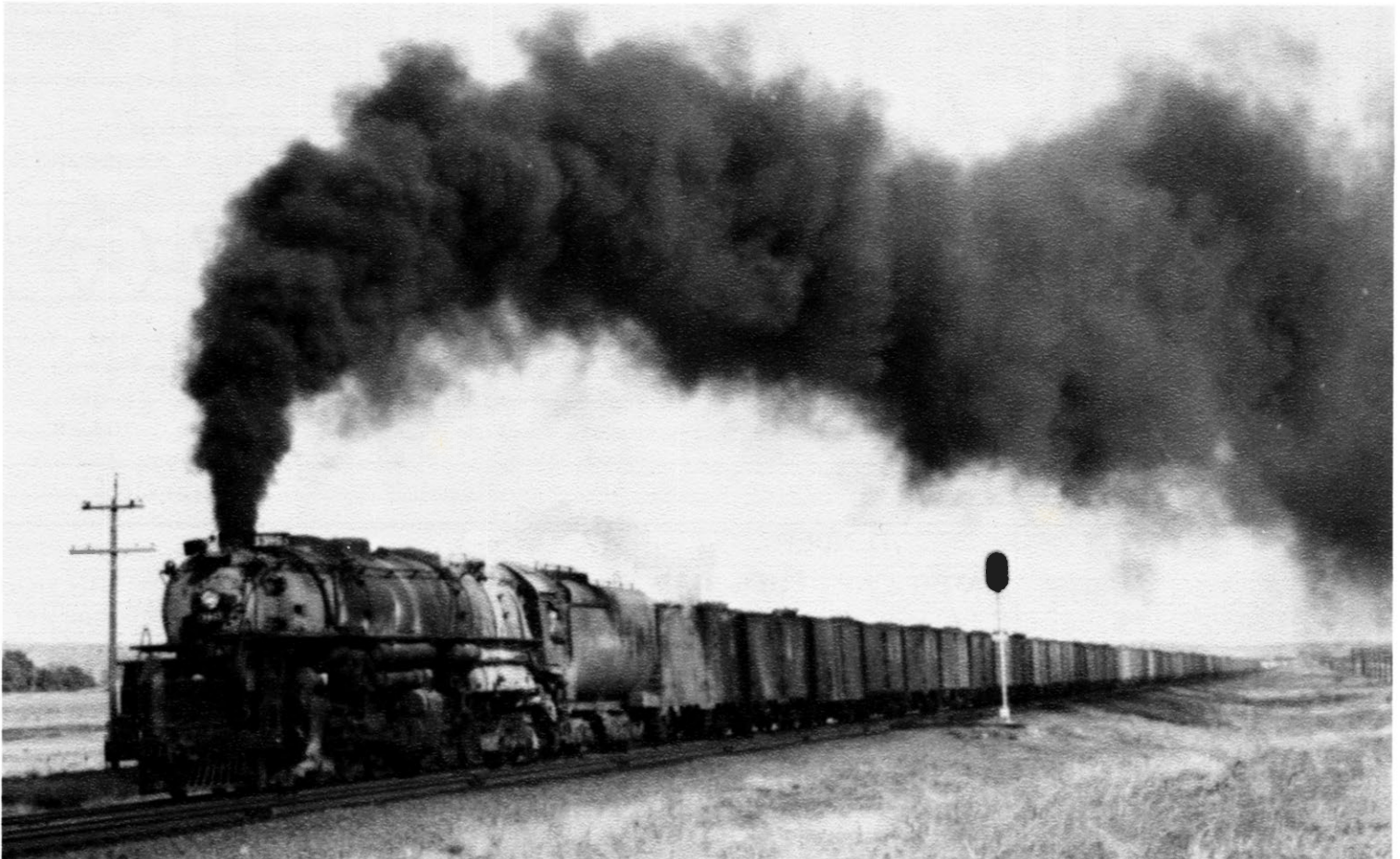
The thermostat control range is from 30 to 70° F. with control settings provided in five degree increments. A "Heater Service" switch is provided in the thermostat control box, which when thrown to the "Heater Service" position, will reverse the action of the thermostat. When

the commodity temperature falls below the desired set point, the fans which then become "heater fans" will start and dampers open, by thermostat action, and bring the commodity up to desired set point. Actual heat is generated by an alcohol heater installed in ice bunker with pilot lit and thermostat on heater set at same relative degree as thermostat setting on "Ice-Tempco" unit. This sequence is opposite that of cooling in that the thermostat starts the fans with descending temperatures in "Heater Service" and starts the fans in ascending temperature in "Cooling Service."

The diesel engine and alternator are attached to a steel base which is shock mounted in a steel box-type structure below the car. The diesel engine fuel tank is of sufficient capacity to run the unit continuously for at least 15 days at full load.

Besides the 1000 Class R-40-23 cars, 20002-21001, there was only one other car to receive this treatment, 25001. This car was also converted from an R-40-23 class reefer. The only difference between the 25001 and the others was that it was equipped with meat rails in the ceiling for transporting frozen meat. No other cars received this treatment and the 1001 cars that did were referred to as 'Ice-Tempco' cars. Shown below is an expanded explanation of these cars written in P.F.E. in December, 1960.

Article and diagram courtesy Pacific Fruit Express Co.



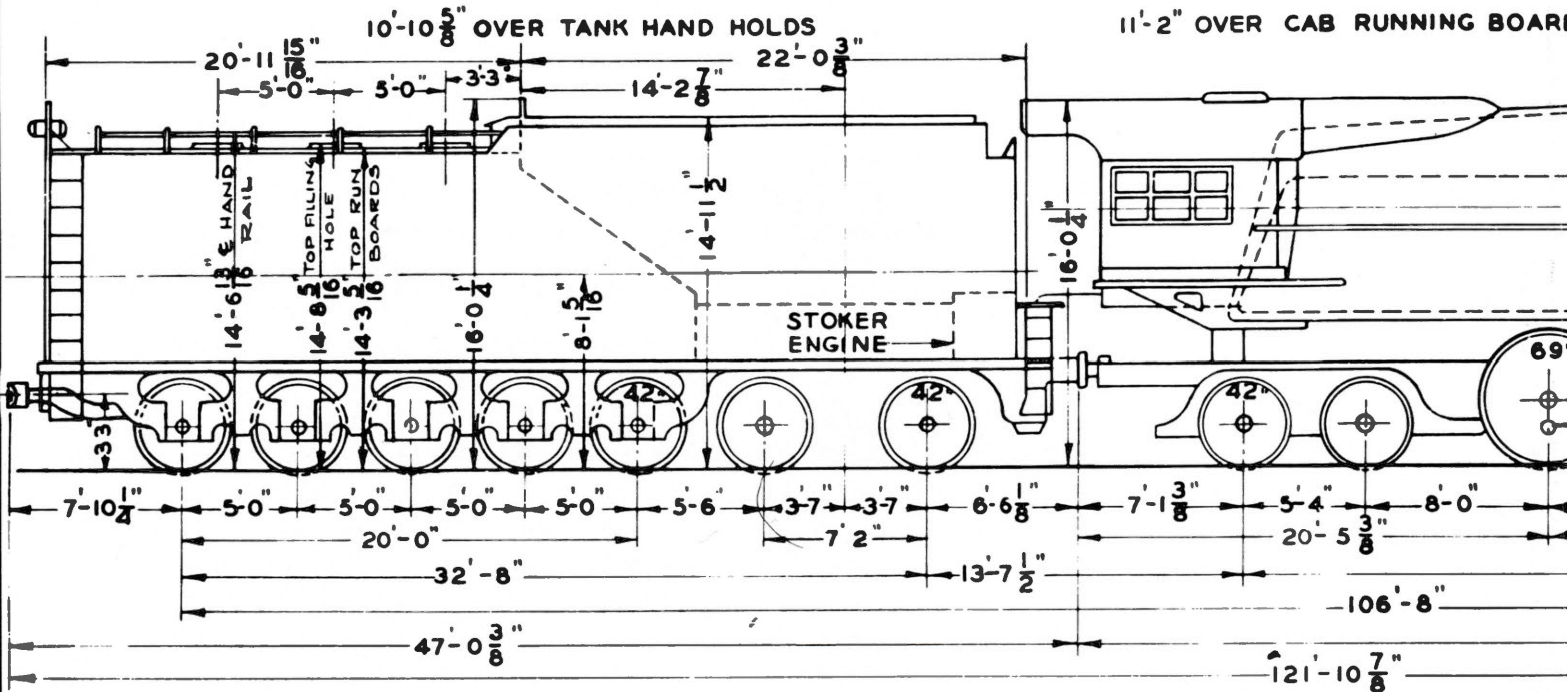
14 "Little Challenger", 3803, is headed westbound just west of North Platte, NE with a train of empty PFE reefers on a sunny October 25, 1958. As late in the season as it is they probably won't be loaded again this year. Photo by Wm. S. Kuba.



15

Challenger 3949 (CSA-5) was the last 4-6-6-4 built for the Union Pacific Railroad. It was built in October, 1944 just two months before the

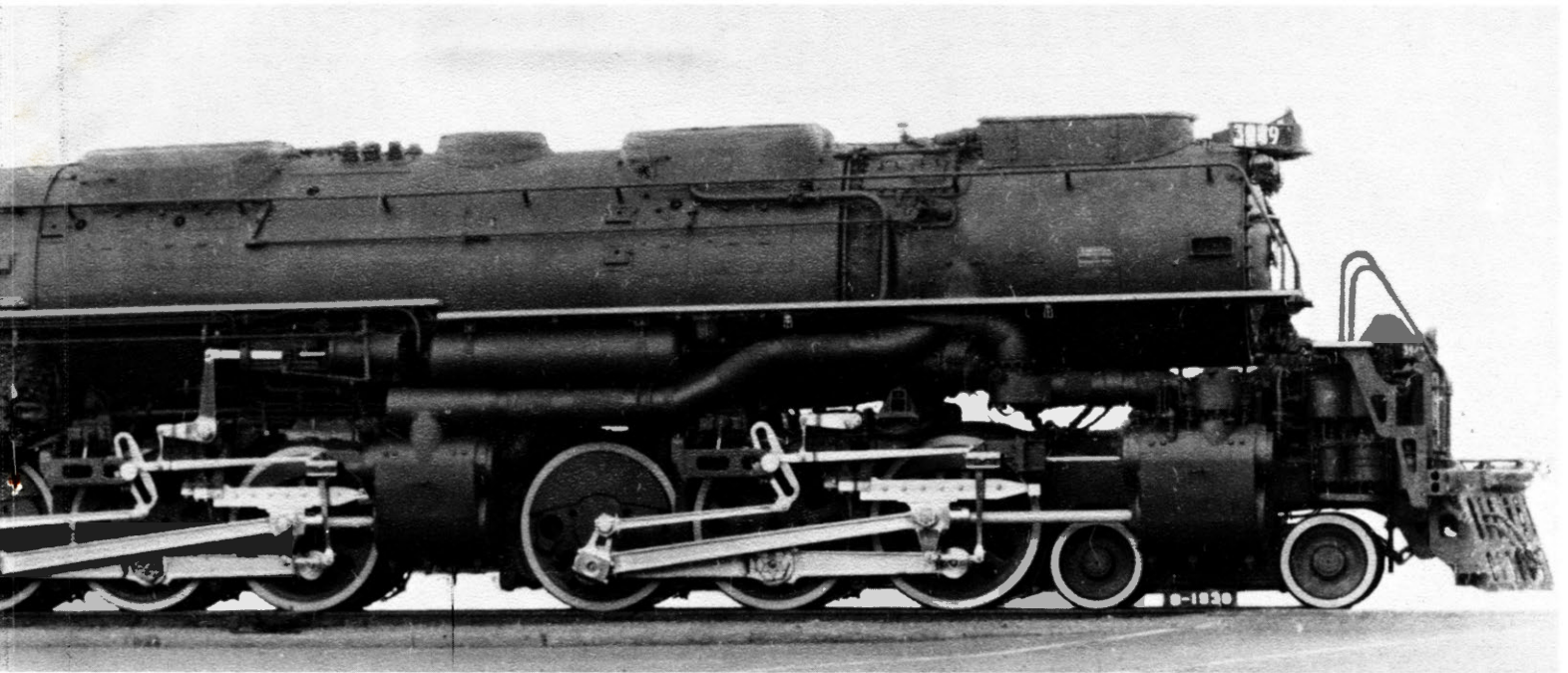
25000 GALLON CYL.



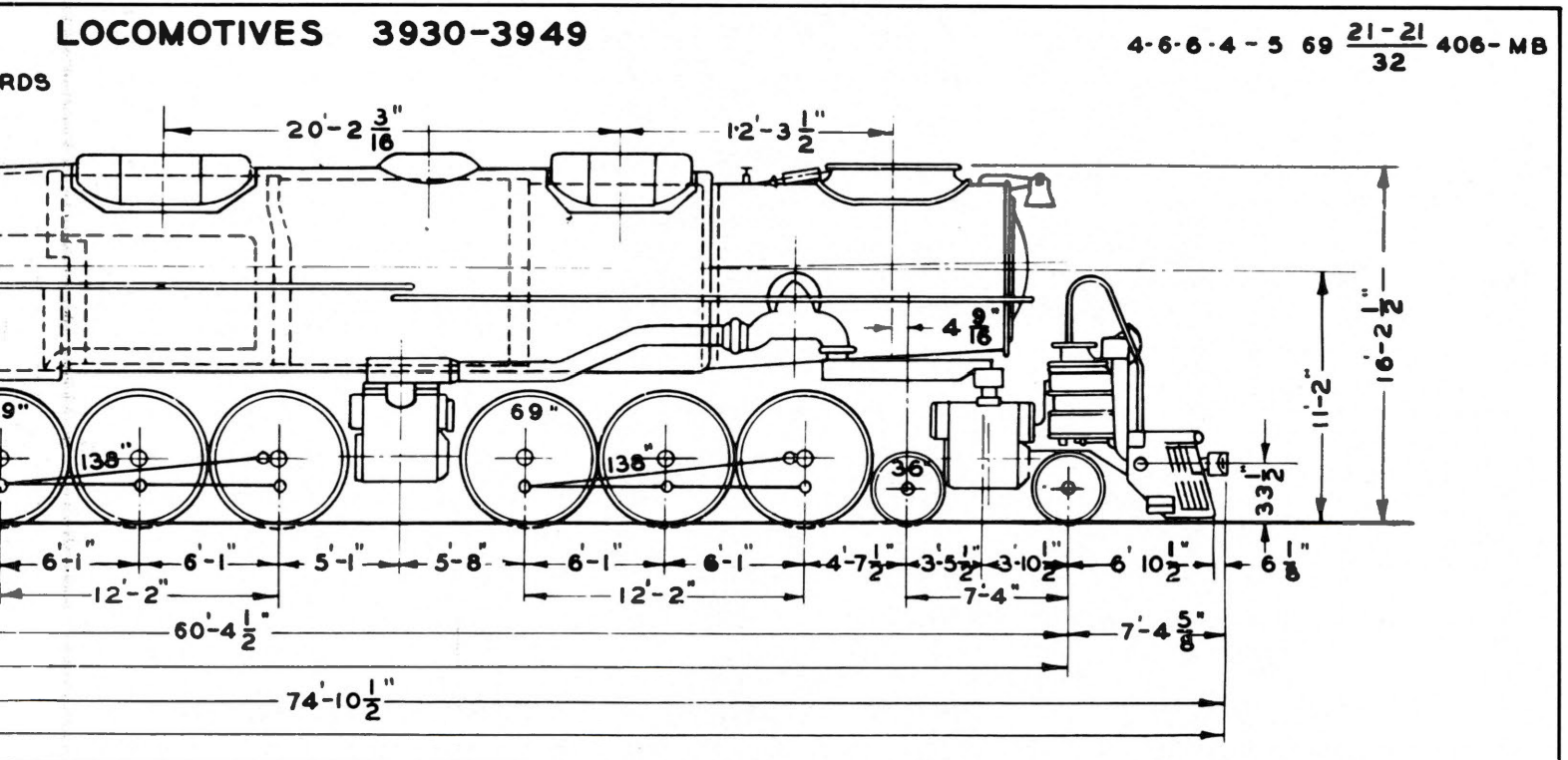
TENDER

WATER CAP.		FUEL CAP.	
GALLONS		COAL	
25,000		LEVEL FULL 56,000 LBS.	
WT. OF TENDER		TOTAL WT.	
LIGHT	LOADED	ENG. & TEND. LOADED	
172,300	436,500	1,071,000	
TENDER FRAME	TRUCK	BUILT	
WATER BOTTOM	GENERAL STEEL	A. L. CO. 1944	
TIMKEN ROLLER BEARINGS			

UNION PACIFIC RAILROAD CO.
RESEARCH AND
MECHANICAL STANDARDS



The last steam locomotive would be built for the Union Pacific Railroad, 844 (FEP-3) in December, 1944. Photo courtesy Union Pacific Railroad.



ENGINE												
BOILER		FIREBOX		TUBES			EVAPORATING SURFACE - SQ. FT.					
INSIDE DIA	PRESSURE	LENGTH	WIDTH	NUMBER	DIA.	LENGTH	TUBES	FLUES	FIREBOX	CIRCULATORS	TOTAL	
94 $\frac{11}{16}$ "	280 LBS.	187 $\frac{1}{32}$ "	108 $\frac{3}{16}$ "	176	69	24" 5 1/2"	2,062	1,976	510	94	4,642	
SUPERHEATER SURFACE SQUARE FT.		GRATE AREA SQUARE FT.		CYLINDERS		WHEEL BASE		WEIGHT IN WORKING ORDER - LBS.				TOTAL LT. WT. ENGINE
1,741	132	21"	32"	35'-1"	60'-4 1/2"	101,700	406,200	126,600	634,500	582,700		
DRIVING WHEEL DIA.	MAXIMUM TRACTIVE EFFORT	FACTOR OF ADHESION	AIR PUMP	VALVE GEAR	F. W. HTR	STOKER	SUPERHTR	ROLLER BEARINGS			BUILT	
69"	97,350	4.17	2'-8 1/2" CC	WALSCH-AERTS	ELESCO EXHAUST STEAM	STANDARD	TYPE	ENG. TR.	DRIVERS	TR. TRUCK	RODS	A. L. CO.
						M.B.	A	S.K.F.	TIMKEN	S.K.F.	-	1944

LOCOMOTIVES DESIGNED FOR 20 DEGREES MAXIMUM CURVATURE

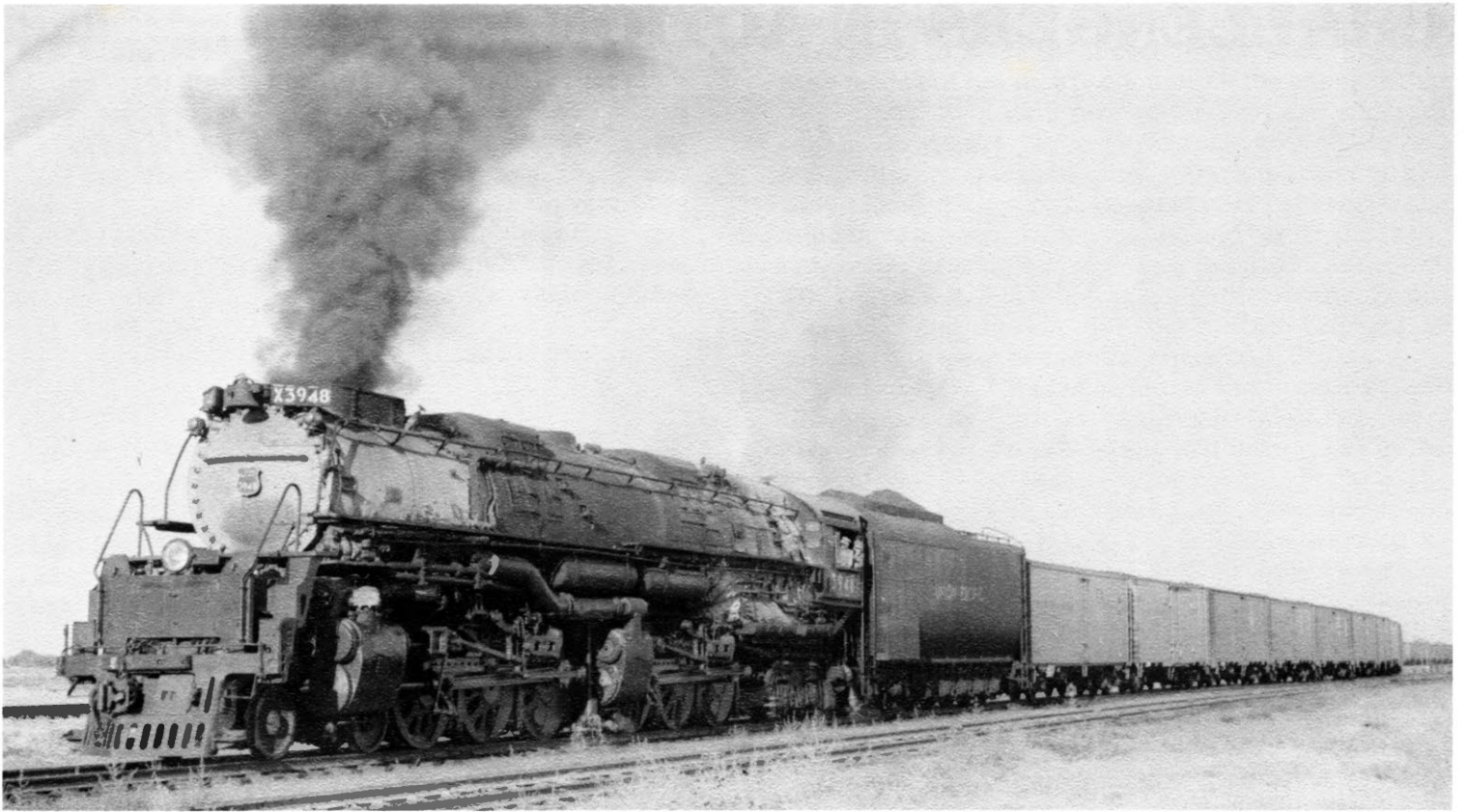
3930 - 3949 CLASS CSA 69 - $\frac{21-21}{32}$ - 406



16 4-6-6-4 Challenger 3707 (CSA-5), ex 3944, is westbound just west of North Platte, NE with several transformers and a rider caboose in tow in October, 1958. Photo by Wm. S. Kuba.

Original Number	Class	Built	Builder Number	Tractive		Converted			
				Effort	Weight	to Oil	Renumb.	Date	Retired
3930	CSA-5	8/44	72792	97,350	406,200	10/52	3700	10/52	1/61
3931	CSA-5	9/44	72793	97,350	406,200	10/52	3701	11/52	1/61
3932	CSA-5	9/44	72794	97,350	406,200	10/52	3702	11/52	3/61
3933	CSA-5	9/44	72795	97,350	406,200	—	—	—	6/59
3934	CSA-5	9/44	72796	97,350	406,200	10/52	3703	10/52	3/61
3935	CSA-5	9/44	72797	97,350	406,200	—	—	—	6/59
3936	CSA-5	9/44	72798	97,350	406,200	—	—	—	6/59
3937	CSA-5	9/44	72799	97,350	406,200	11/52	3704	11/52	12/58
3938	CSA-5	9/44	72800	97,350	406,200	11/52	3705	11/52	10/59
3939	CSA-5	9/44	72801	97,350	406,200	—	—	—	6/59
3940	CSA-5	10/44	72802	97,350	406,200	—	—	—	7/59
3941	CSA-5	10/44	72803	97,350	406,200	—	—	—	9/59
3942	CSA-5	10/44	72804	97,350	406,200	—	—	—	12/59
3943	CSA-5	10/44	72805	97,350	406,200	10/52	3706	11/52	3/61
3944	CSA-5	10/44	72806	97,350	406,200	10/52	3707	10/52	6/61
3945	CSA-5	10/44	72807	97,350	406,200	—	—	—	10/59
3946	CSA-5	10/44	72808	97,350	406,200	—	—	—	7/60
3947	CSA-5	10/44	72809	97,350	406,200	—	—	—	12/59
3948	CSA-5	11/44	72810	97,350	406,200	—	—	—	12/59
3949	CSA-5	11/44	72811	97,350	406,200	—	—	—	10/59

Builder: AMERICAN LOCOMOTIVE CO., Scenectady, NY
As built, they were coal burning and some were later converted to oil burning locomotives



17 Challenger, 4-6-6-4, 3948, is departing the North Platte, NE yards with an empty, westbound Fruit Block on August 25, 1954. 5 years later, 3948, would be retired, still burning coal. Photo by R. L. Schmeling.



18 The hostler helper is preparing to refresh the oil in the tender of 3707 prior to its being reassigned to a westbound freight. Another Challenger is coupled to the front of 3707 and helped bring in an eastbound freight from Cheyenne, WY just hours before. Photo by R. L. Schmeling.

CHALLENGERS IN ACTION



19 Two 'Little Challengers', 3804 (CSA-1) and 3838 (CSA-2), are seen here double heading a fruit block just east of North Platte, NE on December 1, 1956. Both of these steam locomotives lasted into the summer of 1959. Photo from R. L. Schmeling Collection.

CSA-1

The first "Challengers" on the Union Pacific Railroad were an outgrowth of need. The need for faster freight schedules, more horsepower, more versatility in handling both freight and passenger trains and the need to upgrade an aging fleet of malleys.

Union Pacific did not just want to buy an existing design as they felt that no single design was capable of filling all of their needs, not even the new 4-12-2's. So during the mid 1930's the Union Pacific spent a lot of time studying various locomotive designs being used plus various equipment used on those steam engines along with doing their own testing on their own locomotives in order to design the super-powered steam locomotives they wanted and needed. With the advent of the simple articulate replacing compounds it was decided this was the basic design to take and make a steam locomotive from - and articulated it would be.

Union Pacific was not alone in this endeavor. The American Locomotive Company, ALCO, the major steam locomotive builder for the U.P. since the turn of the century, was also very interested in the new effort

at U.P. to come up with a super-powered steam locomotive. ALCO was also very interested in building this new design once it was developed. With the help of ALCO in addition to the work the U.P. had already done a design was arrived at by late 1934. By late 1935 the locomotive design was finished and ready to be built.

The design was by far and enlarge an ALCO design with a few suggestions coming from Union Pacific. Remember, this was a new design, from the ground up and U.P. had little experience with such an undertaking. ALCO was relied upon to provide the expertise and U.P. provided the ideas and need. Because of the effort the U.P. put into the first several orders of Challengers the U.P. became better at designing steam locomotives and thus as later Challengers were built the U.P. had more and more to do with their design.

In August, 1936 the first 4-6-6-4 Challengers were rolling over the Union Pacific Railroad. The first order of 15 steam locomotives, 3900-3914, were built to operate between Ogden and Green River and between Laramie and Cheyenne over the grades located there. During their first months of operation they were seen in other areas as testing of the new design was under

way. Union Pacific was favorably impressed with the new design, called class CSA (Challenger - Simple Articulated). It was decided rather quickly that more were needed and a second order was placed for 19 more.

As an interesting note of the original order and design there were actually 27 steam locomotives built. The first 15 going to Union Pacific and the last 12 going to the Northern Pacific which wanted a fast freight type to operate along side their 2-8-8-4 "Yellowstones".

CSA-2

Because of the increased traffic of the post-depression era the first 15 Challengers were not able to cover all of the trains the Union Pacific had wanted them to cover. So, in early 1937 an order was placed for 19 more 4-6-6-4's. These steam locomotives were to be numbered 3915-3933 and classed as CSA-2's.

A problem developed with this second order though. There just was not enough time to incorporate the

changes Union Pacific wanted to make in the steam locomotive to make them even better. Some changes were made but not nearly enough. Of the changes that were made such as a new rod design and different exhaust ports the Union Pacific was happy, but two changes were not made that were important to the Union Pacific. These two changes were roller bearings and larger tenders. Union Pacific had been testing the new roller bearing concept on 4-6-2, 2906 and 4-8-2, 7002. The U.P. felt this was a significant change but there was just no time to make it since the next 19 Challengers were desperately needed.

Later in 1937 it was determined that running these Challengers in front of passenger trains was very economical but no provisions had been made in the second order for that type of assignment. So the second order was increased by 6 more steam locomotives, 3934-3939. These last 6 were to be assigned to the South Central District out of Los Angeles for over Cajon Pass and to the Northwest District out of Huntington for use over the Blue Mountains. The problem was that both of these two



20 Challenger 3828 (CSA-2) is pulling hard as she passes the Omaha Union Station, westbound, in June 1955. X-3828 West will go to Columbus and wait there for the morning westbound passenger train seen loading behind. Photo by Wm. S. Kuba.



21

Challenger 3831 (CSA-2) is seen in Cheyenne, WY prior to its retirement in June 1957. The locomotive is being stored here as most were prior to their eventual retirement and scrapping. Photo courtesy Union Pacific Railroad.

districts had been converted to oil usage and were not able to handle coal fired steam locomotives any more. The month after the steam locomotives were delivered the last 5 were converted to burn oil and were assigned to those districts. The sixth locomotive, 3934, was not converted until later in 1938.

Overall the first and second series, 3900-3914 and 3915-3939, known as 'Little Challengers' in their later years, were doing the job they were needed for. They were moving freight faster, passenger trains without helpers and second sections and running more efficiently than previous articulates of compound design. Remember the only articulates U.P. had previous to the 4-6-6-4's were compounds so these first 2 series were really the beginning of super-power on the Union Pacific Railroad, a beginning started in 1936 and ending in 1969 with the DD-40X's. Over 30 years of some of the most powerful, efficient power ever designed and rostered on any single railroad.

The operations of these first two CSA classes were, for the most part, over the Wyoming and Nebraska Divisions. This was due to the fact that these two divisions handled nearly all of the traffic rolling over the railroad so they were assigned there first. The basic assignments were to the grades out of both Ogden and Cheyenne to make the operations in these

areas as efficient as possible.

Initially the concept was to run the Challengers on passenger trains from time to time but due to the increased traffic in freight, passenger assignments were rare. This situation created the extra 6 CSA-2's added to the original order so as to provide Challengers for passenger assignments on both the South Central and Northwest Districts. So in September, 1937, 3936 and 3937 were converted to burn oil and were sent to Huntington, OR and 3935, 3938 and 3939 were converted to oil and sent to Los Angeles. These two assignments of the Challengers were primarily for the operation of passenger trains over the grades in those areas. They did take some freight assignments but their primary duty was to pull passenger trains. If these steam locomotives had not been converted to burn oil they probably would have found their way back to join the other CSA's on the Eastern District.

Between the 1937 model CSA-2 and the 1942 model CSA-3 Union Pacific went through a series of significant changes. The Streamliners grew up and became famous, the FEF class 800's were being reshopped in order to make them super-powered and the Big Boy, 4-8-8-4, was born. After all this was done a new Challenger evolved, the CSA-3, 3950-3969. This was the design the Union Pacific Railroad would run forever.

CSA-3

With the designing of the first Big Boys in the early 1940's finished work could now procede on redesigning the Challengers. Redesign was the word for it.

The CSA-3 Challengers were the efforts of a, now experienced, design staff at Union Pacific. With the data of several years of operation of the CSA-1's and 2's plus the added experience of designing the 4-8-8-4's and 4-8-4's the Union Pacific design staff had what they needed to redesign the Challengers to compliment the new Big Boys.

The CSA-3's were to be used to move freight across Wyoming, from Green River east. This would be the same tonnage the Big Boys would bring up to Green River from Ogden. This meant the earlier CSA-1's and 2's could be converted to oil burning and moved to the South Central and Northwest Districts to replace older power there and improve overall operations. So in 1942 and 1943 those older CSA-1's and 2's were converted to oil and sent west and south.

The new CSA-3's, 3950-3969, were built in the summer of 1942. They were built, almost entirely rebuilt, using the expertise the Union Pacific had

gained plus the same expertise ALCO had provided in the past to do a job almost equal to the new Big Boys. These new Challengers were not referred to a 'little' any more.

Some of the new design changes were larger tenders and higher boiler pressures in order to sustain higher speeds along the Wyoming countryside yet still maintain high tonnage ratings. Other changes were incorporated such as the application of almost every available modern appliance to assist crews and increase the efficiency of those fast machines. Double stacks were used instead of a single stack, the smokebox door was enlarged to cover the entire front of the steam locomotive and roller bearings were put where ever possible. Overall almost every detail on the new Challengers was changed except for the wheel arrangement. Common parts were used whenever practical between the 4000's, 800's and the new 3950's to simplify maintenance and replacement.

The CSA-3's were actually the last major steam locomotive developed by the Union Pacific Railroad. No new major designs were made after them as World War II came along and the steam locomotives received during it were nothing more than re-orders of designs already made.



22 In their later years many of the active Challengers would be brought out during the summers to help move freight. Seen here is 3956 (CSA-3) eastbound across Nebraska with an empty fruit block. Photo courtesy of Union Pacific Railroad.



23 Challenger 3712 (CSA-4), ex 3979, is headed west across Nebraska in the late 1950's with another freight for North Platte. 3712 kept its smoke lifters right up to the very end. Photo from Wm. S. Kuba Collection.

CSA-4

The success of the CSA-3's plus the war traffic increases brought the need for more Challengers. In late 1942 the Union Pacific placed an order for 25 more Challengers. By this time the War Production Board was in control of all steam and diesel locomotive building. The W.P.B. approved the order and scheduled ALCO to build the locomotives later in the next year. In order to get the locomotives as soon as possible it was decided to forgo making any major changes in the design of the Challenger since this would have taken more time and the W.P.B. might not have approved of the changes and time element necessary in order to build the locomotives. The CSA-4's, 3975-3999, were, in almost every detail, duplicates of the CSA-3's. Those 25 steam locomotives were delivered in the late summer of 1943.

At this time the War Production Board also felt the

Denver and Rio Grande would need 6 steam locomotives of this design in order to handle projected increases in tonnage over their road. Since the Union Pacific was having such good success with that design an extra 6 Challengers were produced for the D. & R. G. W. The Rio Grande used the locomotives until the end of the war but after put them in storage until the Clinchfield Railroad bought them. The reason the Rio Grande didn't want to continue running them was the fact that they would have to maintain spare parts for only 6 steam locomotives of rather complex design and establish a maintenance staff to keep them running. So after the war was over the Rio Grande told the W.P.B. to find a buyer for them. Although the Union Pacific had Challengers running all over Wyoming the U.P. felt dieselization was just around the corner and the need for 6 more Challengers just wasn't there so they made no move to buy them from the Rio Grande.



24 Preparing to leave Cheyenne, WY, westbound, with another load of empty reefers is 3989 (CSA-4) in July, 1953. 3989 sister to 3985 was one of the last Challengers to be retired in July, 1962 nine years after the above photo was taken by Wm. S. Kuba.

CSA-5

The final order of Challengers came to the Union Pacific Railroad in the Fall of 1944. That December would find the last FEF class 4-8-4, 844, coming to the U.P. and the last new steam locomotive bought by the Union Pacific. Later some used steam was purchased but the only thing new from December, 1944 on would be diesel locomotives and gas turbines.

Twenty more Challengers, class CSA-5, 3940-3949, were ordered through the War Production Board early in 1943. It wasn't until early in 1944 that the approval came for the locomotives and the scheduled completion for ALCO was later that year. These Challengers were again very similar to the CSA-3's. Only small changes were made in the design of this last and final order of Challengers.

With this last order one problem did develop. What numbers would this new order have? In order to keep the Challengers together numerically it was necessary to renumber something. The Big Boys started with the 4000's but renumber them was really out of the question. The only other alternative was to

number the CSA-5's from 3949 down to 3930 thus making the newer, larger Challengers in a group from 3930 to 3999. This meant the earlier CSA-1's and 2's had to be renumbered in order to make room. When the W.P.B. approved of the last order for Challengers the entire fleet of CSA-1's and 2's were renumbered to 3800-3839. This renumbering also served to separate them since they were all oil burning anyway and operating primarily on the South Central and Northwest Districts. This renumbering set the stage for other renumbering as the CSA-3's, 4's and 5's were converted to oil in their later years.

Over the remaining years of operations of the Challengers many tests and improvements were made on them in order to improve their efficiency. One of the most visible changes was the addition of 'elephant ears'. In early 1945 these smoke deflectors were being used on the 4-8-4's in passenger and freight service in order to lift the smoke up and keep it out of the cab. The project was successful enough to have them installed on the Challengers used in passenger service on the Northwest and South Central Districts by 1946. The smoke deflectors were also tried on 3943



25 Speeding, westbound, through Laramie, WY in July, 1953 is 3949 (CSA-5), the last Challenger built for the Union Pacific Railroad in November, 1944. Photo by Wm. S. Kuba.



26 Another view of 3949 was taken by the Union Pacific Railroad while X3949 West was climbing the grade of mainline no. 3 near Harriman, WY west of Cheyenne. 3949 lasted until October, 1959 before being retired, almost 15 years of service.

and 3967 in freight service but was not deemed successful although 3967 kept them until retirement.

During 1944 passenger service was increasing on the South Central District and more Challengers were needed in order to cover for the Pacific's and Mountain's needed for troop train movements. In November, 1944, 3975-3979 were converted to burn oil and sent to Los Angeles. Again, two years later, 3980-3984 were converted to burn oil and sent to the Northwest District along with the 3975-3979 in order to move the increasing passenger traffic in the northwest. In later years the oil burners were seen all over the west as shifts in traffic demanded more power in one area or another. The Challengers were some of the most versatile steam locomotives and were shifted from one area to another in order to keep freight and passenger traffic moving.

The only other conversions of coal to oil happened in 1952 when a coal strike curtailed the use of some coal so eight more Challengers were converted to burn oil and sent to the Northwest District. During this 1952 conversion the other oil burning locomotives on the Northwest, 3975-3984, were renumbered 3708-3717 and the other eight conversions of 1952 were numbered 3700-3707. The only other conversion from coal to oil was in 1949 when 10 of the CSA-1's and 2's were converted from oil to coal and back to oil all within a period of 6 months. This might have been done to supplement power needs on the Wyoming division for a short period but little is known of why this conversion back and forth ever happened.

With the conversion of the 3980-3984 to oil and passenger service in November and December, 1946

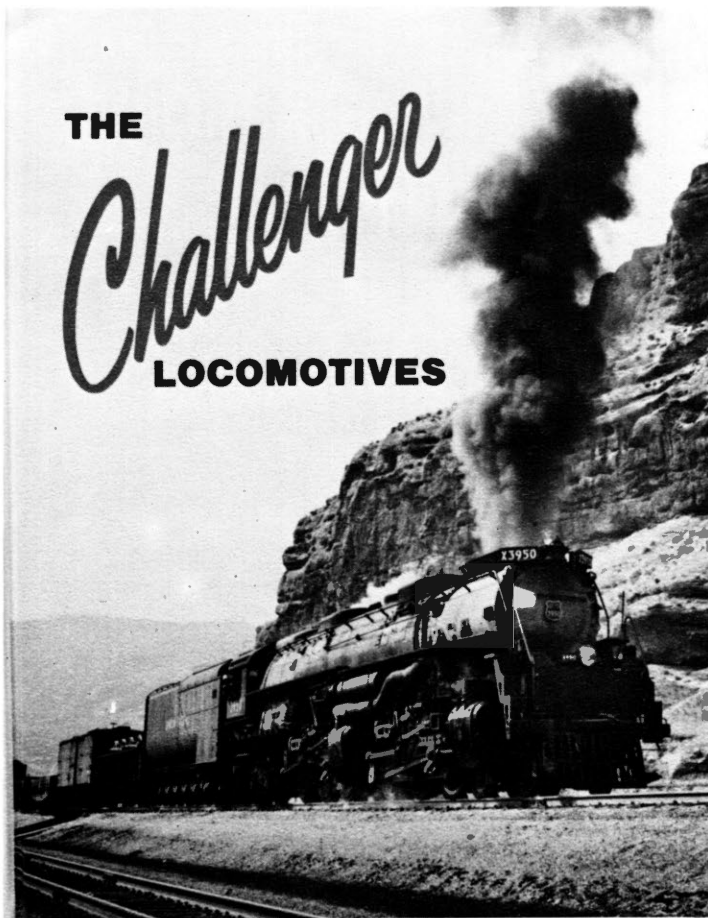
the Omaha staff felt the new two-tone gray scheme might fit well on the Challengers involved in passenger service. Albina was instructed to paint one of the Challengers in two-tone gray. (See November, 1980, photo #181). The scheme was accepted and the other Challengers assigned to passenger service out of Albina were repainted in early 1947.

Originally each of the Challenger classes were built to run between Cheyenne and Ogden and later Cheyenne and Green River. As newer classes came along the older classes were bumped to the west and the south but rarely to the east of Cheyenne as the flat lands of Nebraska and Kansas were dominated by 4-12-2's, 2-10-2's and 4-8-4's. Not until the end did North Platte see many of the Challengers.

The main shops for the Challengers were located in Cheyenne. The shops in Green River were for the Big Boys and the shops in Pocatello were mainly for the older compounds with some work being done on the oil fired Challengers. So, for the most part, the Challengers life was centered around Cheyenne. As each of them came to the end of the line Cheyenne was the place they went for scrapping. It is only fitting that the 3985 be rebuilt in Cheyenne as so many of them died there.

Overall the Challengers were the super-power and a lot more the Union Pacific wanted from their beginnings in the mid 1930's to their end in the late 1950's and early 1960's. The locomotives were well accepted by the crews and were missed when they were finally displaced. One can only hope that the rebuilding of 3985 will once again bring just a little of that back to life.

BOOK REVIEWS



Title: *The Challenger Locomotive*

Author: Not sighted

Subject: Union Pacific Railroad's 4-6-6-4's

Publisher: Kratville Publications

2566 Farnam St.

Omaha, NE 68131

Price: \$28.50

General: 144 pages, hard cover, black and white cover, 8½ x11, black and white interior, photographs and some diagrams.

The Challenger Locomotives was published in 1980. The book seems to be a collection of information and photos compiled over many years.

The book is sectioned off by each class and appears to be well laid out, sometimes lacking in other Kratville books. The book addresses both modifications of the original designs and experiments that the Challengers took part in. It also addresses the operations of each class which sheds some light on the thinking of Union Pacific officials during the Challenger era.

Overall the book is an excellent publication. The photographs are produced well, by virtue of the fact it is not a reprint.

The price of the book is rather high for its 144 pages with no color. The book also has no index but due to its organization this is really not necessary but would be nice to have. The book is a good buy if you want to know about the Challengers and I would recommend its purchase.

Title: *The Mighty 800*

Author: Wm. W. Kratville

Subject: Union Pacific Railroad's 4-8-4's

Publisher: Kratville Publications

2566 Farnam St.

Omaha, NE 68131

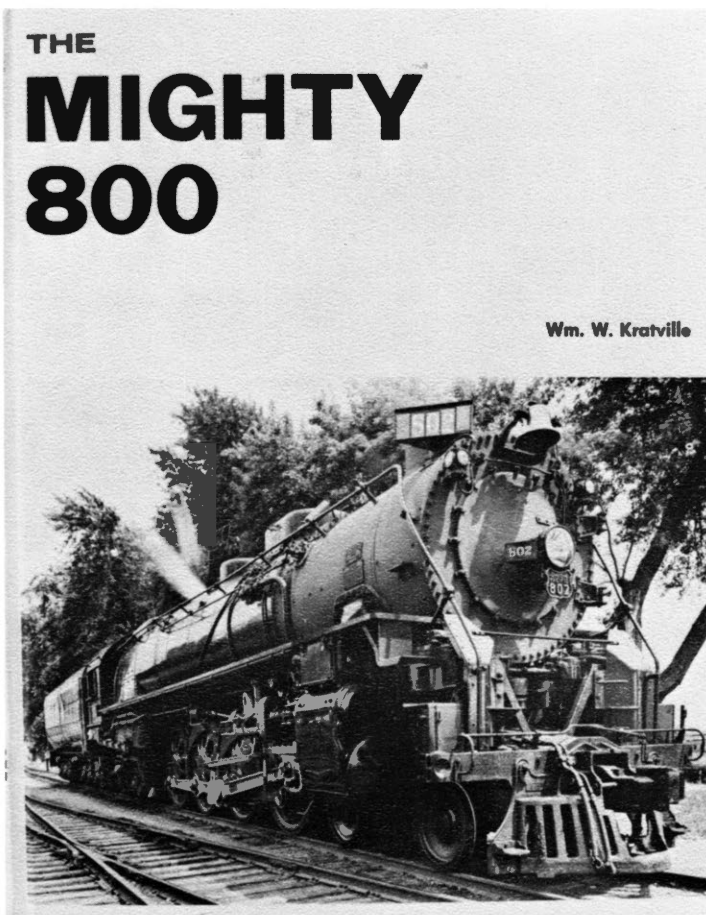
Price: \$20.00

General: 136 pages, hard cover, black and white cover, 8½ x11, black and white interior, photographs and some diagrams.

The Mighty 800 was originally published in 1967. The current book available is a reprint of that original work. The book is laid out by class, FEF-1 to FEF-3, then tests, modifications and action shots follow. The book is written well, with some minor errors. A lot of attention is given to details and explanations of working parts, a point some people might not desire.

Overall the book is overpriced for the size and quality of reproduction. Due to the fact that the book is a reprint, many of the photographs are not produced very well. The book has no index, a feature needed in this book. There is also no roster as such.

The book does contain several fold-out diagrams of the FEF's along with several good detail and action photographs. The writing is interesting and loaded with detail. The book is a fair buy if you want to know more about the history of the 800's. I would recommend the purchase of the book but only after you inspect the book.



DID YOU KNOW?

In response to several requests from our membership we are printing schedules and timetables that were once in effect and are now just history. The first schedule is shown in its entirety in this issue. As we print older timetables we may not be able to include everything due to the size of many of them. We will try to include what we feel is the more interesting parts and if there is enough interest generated we might make the entire timetable a reprint and offer it as a special "ON THE EXTRABOARD" publication.

Next month we will do a timetable from the last part of the last century covering an area no longer owned or operated by the Union Pacific Railroad. The interesting part about this is the fact that the railroad ran all the way into Texas. For those of you who haven't guessed it by now, it's the Colorado & Southern, or what was before the C&S.

This new series of articles will also cover other bits of information that might not have been as well known as the Gas Turbines or the 6900's. So keep an eye on these last pages for more information you might not have know about before.



27 The City of Los Angeles, above, is not included in the Schedule No. 9 on the following pages, although it did have a schedule to follow. The train is being lead by LA-4, 5 & 6, heading downgrade at Archer, WY at 40 mph on October 4, 1941. Photo from R. L. Schmeling Collection.

UNION PACIFIC RAILROAD COMPANY

Manifest and Perishable Train Schedules

SCHEDULE No. 9

Issued
May 22, 1947

FOR EMPLOYES ONLY

H. E. SHUMWAY,
General Superintendent Transportation
Omaha, Nebraska

WESTWARD

DLS (Live Stock)	DLS (Live Stock)	NLS (Live Stock)	155-369	K-O	Adv. K-O	NWD Frwdr	SP Frwdr	LA Frwdr	Advance Frwdr	MOS Chey Mdse	DP	MKC MOS	MLA-MCS Colo.	Adv. DP	KC	OS-LA CS-Colo.	STATIONS	
												7.10pTue			2.00aTue		Lv St. Louis	
		8.00pTue	155-7.00pTue	9.00pTue	1.00pTue							11.30aWed			11.30pTue		Lv Kansas City	
				217 6.35pTue													Lv St. Joseph	
		1.15aWed		1.45aWed 2.15aWed	6.45pTue 8.00pTue							4.30pWed 5.00pWed			4.30aWed 5.00aWed		Ar Marysville	
		6.15aWed										9.45pWed 10.30pWed			9.45aWed 10.30aWed		Ar Hastings	
		11.00aWed r No. Platte		5.20aWed 5.45aWed	12.40aWed 12.55aWed												Ar Lincoln	
		Cons. with NLS from Co. Bluffs			9.00aWed 5.00aWed												Ar Omaha	
				4.00aWed 6.00aWed	10.00aWed 6.30aWed												Ar Co. Bluffs	
				155 12.30pWed 369 8.55pWed													Ar Salina	
																	Ar Ellis CT Lv MT	
													11.00aTue			10.00pMon	Lv Chicago	
	12.30pTue	8.00pTue					6.00pWed	5.00pWed	5.00aWed	12.30pWed			1.00pWed			12.30aWed	Lv Co. Bluffs	
	6.30pTue 7.30pTue	3.00aWed					11.30pWed 12.30pWed	10.30pWed 11.00pWed	11.00aWed 12.30pWed	6.30pWed 7.30pWed			7.30pWed 8.30pWed			7.30aWed 8.30aWed	Ar Grand Island	
	1.00aWed 2.00aWed	12.05pWed					5.30aThu 6.30aThu	4.00aThu 4.00aThu	6.30pWed 7.30pWed	1.00aThu 2.00aThu		3.15aThu 3.45aThu	3.00aThu 4.15aThu		3.30pWed 4.00pWed	3.00pWed 4.00pWed	Ar North Platte CT Lv MT	
																	Ar Julesburg	
		Adv. D. F. 8.30pWed	369 12.60pThu									9.30aThu	6.00pThu Adv. Colo.	6.00pThu Adv. Colo.	8.30pWed	3.00aThu 3.00aThu	3.00aThu 3.00aThu	Ar Denver
	10.30aWed 5.15pWed	NLS 9.00pWed				10.00pThu	3.30pThu 5.00pThu	1.30pThu 2.30pThu	6.00aThu 7.30aThu	10.30aThu 2.30pThu		12.45pThu 2.30pThu	2.00pThu 5.15pThu		1.00aThu 3.00aThu	1.00aThu 3.00aThu	Ar Cheyenne	
	8.45pWed 9.45pWed	12.30aThu 4.00aThu				8.00pThu 12.30aFri	7.45pThu 8.30pThu	6.00pThu 6.30pThu	11.00aThu 12.01pThu	6.00pThu 7.00pThu	4.00pThu 5.00pThu	6.00pThu 7.00pThu	8.45pThu 9.45pThu	3.00aThu 4.00aThu	7.00aThu 8.00aThu	6.30aThu 8.00aThu	Ar Laramie	
	8.00aThu 9.30aThu	11.30aThu 12.30pThu				8.00aFri 8.45aFri	7.00aFri 9.00aFri	5.30aFri 7.00aFri	11.00pThu 1.00aFri	4.00aFri	2.30aFri CONS. WITH MLA-MCS- MOS	4.00aFri CONS. WITH MLA-MCS- MOS	8.00aFri 9.30aFri	11.30aThu 12.30pThu	6.30pThu CONS. WITH LA-CS-OS	6.00pThu 8.00pThu	Ar Green River	
9.30aFri	5.30pThu 6.00pThu	9.00pThu 10.00pThu		I. M. S.			5.00pFri	3.00pFri 3.30pFri	11.00aFri 12.01pFri			5.30pFri 6.00pFri	9.00pThu 10.00pThu		4.00aFri 4.30aFri	4.00aFri 4.30aFri	Ar Ogden MT	
10.45aFri 11.30aFri	7.30pThu CONS. WI TH DLS	11.45pThu		11.30pFri			5.00pFri 6.30pFri	6.00pFri 7.00pFri	1.30pFri CONS. WITH LA FRWDR			7.30pFri 9.30pFri	11.45pThu		6.00aFri 9.30aFri	6.00aFri 9.30aFri	Ar Salt Lake	
5.20pFri 6.45pFri				10.30aSat 11.30aSat				3.30aSat 4.15aSat				7.45aSat 8.45aSat			9.00pFri 10.00pFri	9.00pFri 10.00pFri	Ar Milford	
9.30pFri 9.00pFri				5.30pSat 6.00pSat				9.15aSat 9.30aSat				2.45pSat 3.00pSat			4.30aSat 5.00aSat	4.30aSat 5.00aSat	Ar Callente MT Lv PT	
12.30aSat 1.00aSat				11.00pSat 1.00aSun				2.30pSat 4.30pSat				8.00pSat 10.00pSat			11.00aSat 2.00pSat	11.00aSat 2.00pSat	Ar Las Vegas	
3.30pSun				11.00pSun				10.00aSun 2.00pSun									Ar Colton	
																	Ar East Yard Los Angeles	
							9.00pFri 7.00pSun						9.00pFri 7.00pSun			8.00aFri 7.00pSun	8.00aFri 7.00pSun	Ar Ogden PT Lv San Francisco
							8.45aFri			MOS 5.00aFri						03-8.00pThu	Ar Green River	
							9.55aFri 10.00aFri			6.30aFri 6.35aFri						9.30pThu 9.35pThu	Ar Grainger	
							6.00pFri 8.00pFri			3.00pFri 5.00pFri						6.00aFri 9.00aFri	Ar Pocatello	
							1.30aSat 2.00aSat			10.30pFri 11.15pFri						3.00pFri 3.45pFri	Ar Glens Ferry	
							5.15aSat 10.15aSat 5.45aSat			2.30aSat 6.00aSat 3.00aSat						7.00pFri 6.00aSat 7.45pFri	Ar Hampa Boise Hampa	
							9.00aSat 12.01pSat			6.00aSat 8.05aSat						11.30pFri 2.00aSat	Ar Huntington MT Lv PT	
		No. 151 Spokane 7.50pSat															Ar La Grande	
		9.00aSun 10.00aSun					2.30aSun 3.30aSun			10.30pSat 12.10aSun						5.00pSat 7.00pSat	Ar Bieth	
																	Ar Umatilla	
							3.30pSun 7.00pSun			2.45pSun 7.00pSun						10.00aSun 7.00pSun	Ar The Dalles	
							11.00pSun			11.00pSun						11.00pSun	Ar Albina Portland	
							298 10.30pSun			298 10.30pSun							Ar Argo Seattle	
																	Ar Spokane	

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EASTWARD

STATIONS	MS	UX	CBX	CH-EF-EV Fruit Blocks CF-KF	RK CUX CF-KF	OG-PHX	RO	Omaha Special	Adv. CK	CK	334-370- 154	158-198- 298			
St. Louis	kr			5.30pSat	5.30pSat										
Kansas City	kr			KF 1.00aSat	KF 1.00aSat				2.00aSat	4.00pSat	5.00aSun				
St. Joseph	kr									218-11.00pSat					
Marysville	lv kr			7.00pFri 6.30pFri	7.00pFri 6.30pFri					9.05aSat 6.30aSat					
Hastings	lv kr			2.00pFri 1.30pFri	2.00pFri 1.30pFri										
Lincoln	lv kr								3.15pFri	12.55aSat					
Omaha	lv								12.30pFri	9.00pFri					
Co. Bluffs	lv								12.01pFri	8.30pFri					
Salina	lv kr			10.00aFri lv No. Platte	10.00aFri lv No. Platte						6.30pSat 4.40pSat				
Ellis	CT MT kr										11.45aSat (370)10.05aSat				
Chicago	kr		10.00pSat	12.30aSun	12.30aSun		12.30aSun	12.30aSun							
Co. Bluffs	kr		4.00pFri	12.20aSat	12.20aSat	16'00"	7.45pFri	12.20aSat							
Grand Island	lv kr			5.00pFri 4.00pFri	5.00pFri 4.00pFri		12.30pFri 11.59aFri	5.00pFri 3.30pFri							
North Platte	CT MT kr		2.00aFri 11.00pThu	10.00aFri 6.00aFri	10.00aFri 7.00aFri	11'30"	7.00aFri 5.00aFri	10.45aFri 7.00aFri							
Julesburg	lv kr						2.30aFri 2.15aFri	4.45aFri 4.30aFri							
Denver	lv kr			CF 3.00aFri			6.30pThu	10.00pThu			(370)6.50pFri 11.50pThu				
Cheyenne	lv kr		3.30pThu 1.30pThu	11.00pThu 9.45pThu	11.45pThu 10.15pThu	5'30"					(334)7.00pThu				
Laramie	lv kr		9.45aThu 8.30aThu	6.00pThu 4.00pThu	7.00pThu 6.00pThu	14'00"									
Green River	lv kr	Eastern Dis. Consolid. Op. Mfst or	st. Traffic ated with Fruit Bks.	10.30pWed	5.00aThu 4.00aThu	9.00aThu 8.00aThu	9'00"								
Ogden	MT kr	6.30aWed	4.00pWed	7.40pWed 5.40pWed	1.00aThu 11.00pWed										
Salt Lake	lv kr	5.00aWed 3.00aWed	2.30pWed 11.30aWed	4.10pWed 2.10pWed	9.30pWed										
Milford	lv kr	4.00pTue 3.00pTue	12.15aWed 11.00pTue	4.30aWed 3.30aWed											
Callente	MT PT kr	9.00aTue 6.30aTue	5.00pTue 2.30pTue	10.00pTue 8.00pTue											
Las Vegas	lv kr	1.00aTue 11.00pMon	9.00aTue 7.00aTue	3.00pTue 1.30pTue											
Colton	lv	5.30aMon	2.30pMon	11.59pMon											
East Yard Los Angeles	lv	2.00aMon	11.00aMon	7.00pMon											
Ogden San Francisco	PT kr			4.40pWed 12.30aMon											
Green River	kr		CBX8.30pWed	3.00aThu	RK-8.15aThu	1'30"									
Granger	lv kr		7.00pWed	1.30aThu	7.00aThu	10'30"									
Focatello	lv kr		6.30aWed 3.30aWed	3.30pWed 12.30pWed	9.30pWed 7.30pWed										
Glenns Ferry	lv kr		6.30pTue 5.30pTue	4.00aWed 3.00aWed	11.00aWed 10.00aWed										
Nampa Boise Nampa	lv lv kr		1.30pTue 10.00aTue 12.05pTue	11.00pTue 8.00pTue 8.30pTue	6.30aWed 8.00pWed 3.30aWed										
Huntington	MT PT kr		8.00aTue 5.00aTue	5.00pTue 2.00pTue	10.30pTue 6.30pTue										
La Grande	lv kr		9.30pMon 8.30pMon	5.30aTue 4.30aTue	10.30aTue 9.30aTue										
Blith	lv kr		1.00pMon 11.00aMon	10.00pMon	2.00aTue 8.30pMon							Spokane 10.30pMon			
Umatilla	lv kr											6.00aMon 5.30aMon			
The Dalles	lv kr		2.00aMon 1.00aMon		11.00aMon 10.00aMon										
Albina Portland	lv lv		9.30pSun		6.00aMon							9.30pSun			
Argo Seattle	lv lv		2.30aSun		6.00pSun										
Spokane	lv														

NORTHWARD		SALT LAKE - BUTTE		SOUTHWARD	
277	BFU	STATIONS	SLX	278	
8.00pMon	5.30aTue	lv Salt Lake	4.30pWed	11.45pTue	
9.30pMon	7.00aTue	lv Ogden	2.30pWed	10.00pTue	
10.30pMon	8.00aTue	lv Ogden	1.30pWed	9.00pTue	
3.00aTue	2.00pTue	lv Pocatello	7.30aWed	3.00pTue	
5.00aTue	5.00pTue	lv Pocatello	5.30aWed	1.30pTue	
7.00aTue	6.45pTue	lv Idaho Falls	3.00aWed	11.00aTue	
8.30aTue	7.30pTue	lv Idaho Falls	1.30aWed	10.00aTue	
1.30pTue	10.45pTue	lv Lima	8.30pTue	6.00aTue	
3.30pTue	11.45pTue	lv Lima	6.00pTue	4.30aTue	
11.30pTue	6.00aWed	lv Silver Bow	11.30aTue	10.45pMon	
12.30aWed	6.30aWed	lv Silver Bow	10.30aTue	10.00pMon	
1.00aWed	7.00aWed	lv Butte	10.00aTue	9.30pMon	

Trains on Connecting Lines are due to arrive at the larger terminals, and deliver traffic to the Union Pacific, as follows:

COUNCIL BLUFFS

Arrive	Train No.	At	Train No.	At
C&NW	251	7.00a	253	8.00p
			117	7.30p
CMStP&F	63	7.00a	61	7.00p
CB&Q	67	6.00a	61	6.00p
IC	661	8.30a	663	8.00p
CRi&P	91	7.00a	97	9.00p
CGW	83	8.30a	81	8.30p
Wabash	191	8.00a	95	4.00p
Del. to U. P. by		10.00a		10.00p
Fortrainleaving	MOS-MLA-MCS Colo.	12.30p and 1.00p	OS-LA-CS Colo.	12.30a

OMAHA

Arrive	Train No.	At	Train No.	At
CStPM&O	42	10.30a		
Del. to U. P. by				
Fortrainleaving	CK	8.30p		

DENVER

Arrive	Train No.	At	Train No.	At
CB&Q	CD	2.00a	67	4.00p
C&S	76	4.00a		
DRGW	66	2.00a	Frt. Blks.	7.00p
CRi&P	97	2.25a		
AT&SF	1-36	3.00a	2-36	1.00p
Del. to U. P. by		6.00a		3.00p
Fortrainleaving	D.F.	9.30a	R.O.	6.30p
Del. to U. P. by				9.00p
Fortrainleaving			Om. Spl.	10.00p

SALT LAKE

Arrive	Train No.	At	Train No.	At
DRGW	61	3.00p		
DRGW			75	5.00p
Del. to U. P. by		6.00p		7.30a
Fortrainleaving	MLA	10.00p	LA	10.30a

KANSAS CITY

Arrive	Train No.	At	Train No.	At
Wabash	97	5.15a	91	7.00p
MoPac	61	8.30a		
CRi&P	91	7.00a	95	6.30p
			93	2.00p
CB&Q	67	4.10a	75	3.30p
SL&SF	134	4.00a	136	5.20p
	138	9.00a	130	9.00p
AT&SF	43	8.00a	33	8.00p
MK&T	272	1.30a	276	9.00p
CGW	63	4.00a		
CMStP&F	75	6.15a	65	6.15p
	79	8.50a		
C&A	97	5.45a	93	6.00p
KCS	88	7.00a	42	3.30p
Del. to U. P. by		10.00a		10.00p
For train	MKC	11.00a	KC	11.00p

LOS ANGELES

Arrive	Train No.	At	Train No.	At
SP	806	9.15p	802	2.45a
Del. to U. P. by		11.30p		4.00p
For train	MS	2.00a	CUX	7.00p

Union Pacific trains are due to arrive and deliver through traffic for Connecting Lines trains leaving the larger terminals, as follows:

COUNCIL BLUFFS

Arrival of	250	7.45p	Fruit Trains 248	12.20a
Due del'y to Con. Lines		9.45p		2.20a
To	For Train No.	Departing At	For Train No.	Departing At
C&NW	252	3.30a	258	4.30a
CMStP&F	64	2.00a	68	5.30a
CB&Q	68	3.30a	68	1.00a
IC	CC-4	3.00a	CC-4	3.00a
CRi&P			92	4.00a
CGW	82	12.35a	84	9.10a
Wabash	96	12.15a		

DENVER

Arrival of	Colo. CF	3.00a	3.00a	Adv. Colo.	6.00p
Transfer to	For Train No.	Departing At	For Train No.	Departing At	
ATSF Due del'y	31	10.00a	41	10.00p	6.30p
C&S Due del'y	73	10.00a	75	11.50p	9.00p
CRi&P Due del'y	92	3.50a	96	10.30p	9.30p
		2.50a		9.30p	36th St.
CB&Q Due del'y	68	4.30a	62	7.00p	4.00p
DRGW Due del'y	UTE	1.00p	75	12.01a	9.00p
		10.00a		8.00p	5.30p
			65	8.00p	5.30p

OMAHA

Arrival of	KO	9.00a		
Due del'y		10.30a		
To	Train No.	Departing At		
CStPM&O	45	1.00p		

SALT LAKE

Arrival of	LA	7.00aMT	MLA Frdr	8.30pMT
Due del'y		9.00aMT		8.00pMT
To	For Train No.	Departing At		
WP	61	12.01p	77	9.00pPT

KANSAS CITY

Arrival of	KF 154	3.00a		
Due Delivery To		5.00a		
Wabash Del. by	For Train No.	Departing At		
MoPac Del. by	90	5.30a		
CRi&P Del. by	269	5.30a		
CB&Q Del. by	98	5.00a		
		3.30a		
SL&SF Del. by	74	7.00a		
		5.30a		
ATSF Del. by	133	9.00a		
	135	9.30a		
	135	7.00a		
AT&SF Del. by	44	7.00a		
		5.30a		
MK&T Del. by	271	9.15a		
		8.15a		
CGW Del. by	62	4.00a		
		3.30a		
CMStP&F Del. by	64	5.30a		
		5.30a		
C&A Del. by	98	6.30a		
		5.30a		
KCS Del. by	41	10.15a		
		7.00a		

Blocking Westward Traffic:

Cars loaded with manifest and perishable traffic for movement westward will be assigned block numbers to indicate destination and class of traffic, as follows:

- Block 1:** Traffic billed west of Reno via Ogden SP (except Block 1A and 1B).
- Block 1A:** Ogden to and including Reno.
- Block 1B:** Forwarder and R. R. merchandise routed via Ogden SP.
- Block 2:** Ogden and destinations north to but excluding McCammon (except Block 2B).
- Block 2B:** Forwarder merchandise destined to or for transfer at Ogden.

- Block 3:** Traffic destined Salt Lake to and including Milford and north to but excluding Ogden and traffic covered by Blocks 3-BCD.
- Block 3B:** Forwarder merchandise destined Salt Lake Proper.
- Block 3C:** Traffic routed via Salt Lake WP (except Block 3D).
- Block 3D:** Forwarder merchandise routed via Salt Lake WP.
- Block 4:** Traffic destined all points west of Milford (except Block 4B).
- Block 4B:** Forwarder merchandise destined Los Angeles.
- Block 5:** All traffic destined to points on SCD

- Pocatello to Huntington inclusive, and Pocatello to Butte inclusive.
- Block 5A:** Granger to but excluding Pocatello.
- Block 6:** All traffic destined to points west of Huntington.
- Block 7:** Cheyenne to but excluding Ogden (excluding Block 7A).
- Block 7A:** Forwarder merchandise for transfer at Cheyenne.
- Block 8:** Traffic destined Denver and beyond and east to including Hugo (excluding Block 8A).
- Block 8A:** Forwarder merchandise destined Denver.
- Block 9:** Colorado shorts north of Denver.

Block 10: Nebraska and Kansas traffic destined points north and west of Marysville to but excluding Cheyenne.

THE THROUGH EASTBOUND MANIFEST TRAINS for Eastern District are to be made up as follows, from head end:

- 1st. Carload shipments of eggs.
- 2nd. Livestock.
- 3rd. Perishables, with cars requiring top ice service at Laramie blocked together, following live stock shipments.
- 4th. All Block 1, 2, 3 and 4 traffic, with shorts west of Laramie on rear.

LOCATION: Cheyenne, WY Roundhouse

DATE: August 21, 1971 at mile post 509.7



28 Two Alco switchers, 1280, an RSC-2 and 1120, an S-2, are receiving some minor repairs during their last days in service as switchers for the Cheyenne, WY yards. Photo by A. J. Wolff.

