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REPORT ON D&RGW TERMINALS

Transmit herewith preliminary report on the Rio Grande's terminal operations. The report summarizes the findings thus far obtained in connection with the general study undertaken several months ago at the direction of the Trustees and yourselves.

As originally stated, the purpose of this study was: to critically analyze the D&RGW's present yard and terminal facilities-operations; to bring together under one cover all factors pertinent to consideration of this company's present and future yard needs and policies; in the latter connection, to explore all possibilities for improving yard layouts, terminal facilities and switching operations from the standpoint of effect such changes might be expected to have upon the company's transportation capacity, service, and cost; to consider present and proposed changes in the light of present and future traffic requirements, anticipated improvements in other aspects of the company's operations, probable post-war competitive schedule requirements, etc.

Major attention in this study to date has been directed toward evaluating the more controlling aspects of the Rio Grande's terminal operations as a whole, with particular emphasis on the larger yards.

The survey has been carried on in closest cooperation with the Transportation, Engineering, Mechanical, and Accounting Departments of the company. Most helpful in this connection have been the work and ideas of the division officers and the local yard committees. Special mention is likewise due Messrs. M. B. Davies and M. F. Schmidt for their numerous contributions.

This preliminary report is submitted with the thought that some of the findings may be immediately useful; also that more experienced critical review at this stage will insure future efforts being directed along the most worthwhile lines. In the interest of submitting this report promptly, it is possible some errors in the draft may have been overlooked. Findings and conclusions are briefly summarized on the first three pages of the report. More detailed summary is given at the end of each part.

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cc: Trustees

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PART XII - SALT LAKE CITY TERMINAL

History and Importance: Measured in terms of switch engine hours and cars handled, the Salt Lake terminal is the Rio Grande's most important. As indicated in Chart II and Exhibit V, it accounted for 29% of all the switch engine hours accumulated for the system in 1941. Since 1929 its terminal operations have shown a greater increase than any other Rio Grande yard. There are two yards at Salt Lake City, namely: the old yard at Salt Lake City, capacity approximately 290 cars, and the new yard at Roper, built in 1928 which now has a capacity of approximately 2,160 cars. The trackage arrangement and the location of the yard facilities at Salt Lake City and Roper yard are shown on the following three maps.

The yard at Salt Lake City was the original Rio Grande yard. However, in 1906 the Church Farm, containing an area of 480 acres, was purchased from the L.D.S. Church. This yard is located approximately 2.6 miles west by time-table direction from Salt Lake City. The records indicate that at the time of purchase it was the intention to abandon, in its entirety, the Salt Lake City property and move all of the then existing facilities to the new yard at Roper. Up to the present time Roper is only a classification yard and contains a repair track and ice dock together with water for steam locomotives and fuel and sand for diesel locomotives. The roundhouse, the car shops, and the locomotive shops, remain located in Salt Lake City.

From 1906 to the present date, the question has constantly arisen as to whether these facilities should be moved to Roper or whether they should remain as at present. The records indicate that in 1913 the move became almost an actual fact but because neither the Rio Grande nor the Western Pacific were then in a financial condition to make the move, it was more or less permanently abandoned.

It is unfortunate that over the period of years since the purchase of the Church Farm yard, considerable money has been spent on the facilities in the Salt Lake City yard, and to make the move at this time would require an expenditure in excess of \$2,000,000.00

As indicated in Part V, while definite operating benefits would accrue thru location of these terminal facilities at Roper, the probable economies do not appear sufficient on the basis of normal operations to justify any wholesale abandonment of existing facilities.

The entire terminal at Salt Lake City is joint with the Western Pacific, the Rio Grande being the operating line. The cost of operation is divided on the basis of the cars handled, including both passenger and freight, and the Western Pacific pays interest rental on all facilities furnished by the Rio Grande. The Rio Grande pays to the Western Pacific an interest rental on the portion of investment which the Western Pacific included in the joint yard.

The total capacity of both Roper and Salt Lake City yards, for purpose of storage and classifications, is approximately 2,450 cars divided as follows: Roper - 2,160 cars; and Salt Lake City - 290 cars.

Yard Layout - Roper: Group I: The ten tracks adjacent to the main line have a capacity of 973 cars. This group of tracks is used to receive Rio Grande westbound trains and to make up trains for the Western Pacific, Ogden and Union Pacific interchange cuts. In normal times a portion of these tracks is used for storage of surplus equipment. The maximum capacity (length) of any of these tracks is 116 cars and the minimum length 49 cars.

Group II: In this group there are ten tracks with a maximum length of 50 cars and a minimum of 46, with a total capacity of approximately 546 cars. This yard is referred to as the classification yard and is so used. The tracks in this yard have a regularly assigned purpose:

- No. 11 Used to assemble bad-order cars.
- No. 12 Collection of stock cars, empties for the wash track and hold cars.
- No. 13 Accumulation of Ogden and Southern Pacific loads.
- No. 14 Assembling of interline loads from the Western Pacific.
- No. 15 Assembling of city loads and empties.
- No. 16 Collection of Western Pacific through -- not manifest -- loads and empties.
- No. 17 Western Pacific short loads.
- No. 18 & 19 Used for the accumulation of Sunnyside empties.
- No. 20 For the accumulation of cars for destination between Salt Lake City and Ogden.

Scale Track: Between the tracks in Group II and IV located about one-half mile east of the yard office, is the track scale. This scale track No. 21 is approximately 43 cars in length with the scale located about midway on the track. Cars are not weighed singly, but cars to be weighed are put on the scale track during the day and are weighed only when there is an accumulation of "Weighers".

Group III: In the vicinity of these two yards there are three pocket tracks ranging from 18 cars to 21 cars in length. These tracks are used by switch engines to run around cars and for making up and receiving Western Pacific "TV" Local. In addition to this, yard engines use these tracks in switching operations.

Group IV: The short yard contains five tracks, 44 to 28 cars in length, with an approximate capacity of 177 cars. This yard is used to make up Park City trains, trains for the Garfield Branch, and principally for use in making up Rio Grande eastbound trains. The tracks in this group are regularly assigned as follows:

- No. 22 Park City-Sugar House cars.
- No. 23 Local east -- for loads Salt Lake City to Helper.
- No. 24 Loads for the "TV" Local.
- No. 25 A running track.
- No. 26 Used for empties and Kearns loads.

Group V: The Ice Dock Tracks: This group comprises five tracks, maximum length 87 cars, minimum length 77 cars. Two of these tracks serve the icing dock which will accommodate approximately 22 cars on each track.

This yard is the arrival yard for Western Pacific eastbound trains, trains from Ogden and a departure yard for Rio Grande eastbound trains.

In this group the tracks are used for the following purposes:

- No. 27 Make up Rio Grande red balls east.
- No. 28 Head in for Ogden.
- No. 29 Handling east line empties.

Ice houses 1 & 2 are used for heading in Ogden and Western Pacific trains, and as departure tracks for Rio Grande eastbound trains.

Stock Car Cleaning Facilities: Stock cars are cleaned between 9th South Street and 13th South Street adjacent to the eastbound freight main.

The yard at Salt Lake City is not used for make up and break up of trains or as an arrival or departure yard; its uses are listed below:

- a. Storage of cars awaiting spotting at freight house, wagon or industry tracks.
- b. Storage of cars returning from above awaiting movement to Roper.
- c. Storage of cars awaiting shopping.
- d. Storage of cars from shop awaiting movement to Roper.
- e. Storage of Company coal and other Company materials.

There are eleven tracks in the old yard suitable for storage with an approximate capacity of 290 cars.

In Roper yard there are also the following other tracks and facilities:

The Repair Tracks - - which will hold approximately 60 cars.  
The Wash Tracks - - three in number, which are stub end at the east end.

These tracks are used for cleaning cars in preparation for loading. During certain periods of the year these tracks are used as storage tracks auxiliary to Roper yard. Their capacity is 156 cars and they range in length from 56 cars to 46 cars.

The Stock Yard Track - - One track which will hold approximately 33 cars. This track is also stub end on the east end. The stock yards at Roper are little used. Most stock shippers prefer to use the yards at North Salt Lake City on the Ogden Line. Therefore, this track may, on occasions, be used as a storage track.

The Engine Tracks - - There are two engine tracks: the inbound track is 1043 feet in length and the outbound track, 1032 feet in length. All inbound steam engines, both Rio Grande and Western Pacific, are placed on this track by the incoming crew. All outbound engines are taken from the outbound track by outgoing crews to their respective trains. There is a water column on the outbound engine track. The only other water column in Roper is located at the 30th South end of the yard on the lead track. At both locations water is obtained from artesian wells and is used in the engines without treatment.

Caboose Tracks - - A portion of the Wash Tracks is used to hold cabooses while being conditioned and supplied. Wash Tracks have a stub end on the east end and are very undesirable for this use. Therefore, it is proposed that in 1944, when the running track is constructed, that suitable caboose tracks be built additional to the thoroughfare track, connected at both ends so it will not be necessary to switch the entire track to get the desired caboose.

Diesel Fuel and Sand Track - - One track which is long enough to permit fueling, watering and sanding of 5400 H.P. diesel engines. All diesel switch engines, working in Roper yard, receive fuel and sand at this facility.

There is no track except this fuel facility on which either Rio Grande or Western Pacific 5400 H.P. diesel engines can be stored while awaiting call. However, a storage track is not now necessary under present operation, as most Rio Grande diesels are turned back at Soldier Summit, while Western Pacific diesel engines are called to depart before they arrive in this terminal.

It is expected that the trend of post-war locomotive operations will be toward diesel power, both for use in the yard and on the road. Based on the experience gained in present day operations, these diesel engines are usually in Roper yard only two to three hours, until they are called for movement east in the DARGEN, or west on the Western Pacific, as the case may be. However, if more of these locomotives are in road service, it will be impossible to continually turn them upon arrival, therefore, it is desirable (and incidentally, Western Pacific has requested) that a storage track be constructed or assigned at Roper yard upon which diesel engines can be stored while awaiting call. With the completion of improvements in 1943-44, there will be a track adjacent to the run-around at the 21st South Street end of the yard suitable for this purpose.

#### YARD LAYOUT - OLD YARD, SALT LAKE CITY

In the old yard at Salt Lake City are located the following facilities:

Freight House: Consisting of an outbound and inbound house, eight tracks, approximate capacity 140 cars together with transfer platforms. The outbound house is now leased to the following firms: National Carloading Corp., Merchants Shippers Ass'n., Zellerbach Paper Co., and F. S. Harmon, wholesale furniture. The inbound house is used to handle all the inbound and outbound l.c.l. business of the Rio Grande-Western Pacific. There is also an automobile unloading platform with four tracks suitable for end-door unloading.

Wagon Tracks: There are three wagon tracks with an approximate capacity of 33 cars. These tracks range from 12 to 9 cars in length. The tracks are all stub end tracks. On one track is located a building presently under lease to the Salt Lake Tribune, for the storage of newsprint.

Round House, Back Shops, etc.: There are two round houses. One is an 18-stall brick structure built in 1883-84. Only 15 stalls in this house are available for servicing since 3 stalls are used to provide facilities for diesel repair shop. The other is an 8-stall corrugated iron house built in 1917 which has 5 stalls equipped to handle mallet engines. \*

\* See Part V - for analysis covering desirability of roundhouse at Roper vs. Salt Lake City.

There are also Back Shops, Car Shops and Storehouses used in connection with the necessary maintenance work to rolling stock and power. The repair yard at Roper is used primarily for making only running repairs and not rebuilding.

Fuel and Water Facilities: The coal chute has a capacity of 300 tons and was built in 1917. This chute handles between 400 - 500 tons per day. Nearby is the Carbonaceous Zeolite type water treating plant, built in 1942, which has a capacity of 750,000 gallons treated water daily. This water is used for washing boilers as well as for boiler water. D&RGW diesel fuel facilities include an underground tank with a capacity of 12,000 gallons, also, near the roundhouse, fuel oil facilities for fueling Western Pacific oil-burning locomotives.

Passenger Facilities: There are five tracks at the coach washing platform which hold approximately 30 passenger cars. This facility is complete with wheel pit, pit for Prospector type trains together with fuel facilities for these trains. Running repairs are made to passenger equipment at this facility.

Overhead Traveling Crane: No Gantry Crane is located on the wagon tracks but heavy loads may be loaded in open top cars by using the 10 ton overhead crane on the Saucer tracks. Incidentally, because none are located at Roper, this means that shifted loads detected at Roper must be moved to this crane frequently for adjustment.

Track Scale: There is a track scale at Salt Lake City used to ascertain light weight of cars returning from Car Shops to service, also for weighing loaded cars when necessary.

Turntable and Wye: At the roundhouse is a 110 foot turntable. When necessary to turn 5400 H.P. diesel engines this can be accomplished by using a combination of tracks on First South Street, thereby avoiding breaking the units.

Switch Engine Requirements: The following is a list of operations required of switch engines in the Salt Lake-Roper Terminal:

Salt Lake City - Old Yard

1. Break up cuts from Roper preparatory to final disposition.
2. Spot Industry loads.
3. Spot freight house and wagon tracks.
4. Spot coal at chute.
5. Handle cars at repair tracks, storehouse, and other company work as requested.
6. Push cuts to Union Pacific Yard.
7. Assist in passenger train switching when necessary.
8. Deliver and receive both freight and passenger interchange business with SL&W.
9. Handle wrecking equipment in the yard when required.
10. Switch company coal at storage pile.
11. One engine assigned three tricks to do passenger work at Union Depot.

Roper Yard

1. Make up and break up all trains including interchange and city cuts.
2. Deliver interchange to Union Pacific (usually three trips per 24 hours).
3. Deliver and receive interchange to and from Salt Lake and Utah.
4. Handle two industries - (a) Arms Plant, (b) Kalunite Plant.
5. Handle repair tracks, stockyard and ice dock work, also spot fuel oil at diesel fuel tanks.
6. Take cars to stock cleaning track.
7. Handle stock business to and from stockyards at North Salt Lake.
8. Take cars to Salt Lake, company material, Industry loads, empties for loading.
9. Deliver and receive interchange with SLG&W.
10. Handle wrecking outfit when required.

The relative amount of time used for each major type of switching operation at Salt Lake, is shown in Exhibit IX-A and the following table:

TIME REQUIRED IN VARIOUS CLASSES OF YARD SERVICE BY D&RGW  
SWITCH ENGINES AT SALT LAKE-ROPER  
MAY 23-29 INCL., 1941

Classification	Percent of	Average Time
	Total Time	Per Car
	(1)	(2)
	%	Mins.
Classification	49.83	1.8
Transfer Service		
Yard to Yard	5.75	5.0
Industry	7.25	5.8
Interchange	4.82	4.8
UP	1.43	7.5
SL&U	1.43	7.5
Total Transfer Service	19.25	5.4
Handling Cars at Conn.	.03	6.2
Weighing Cars	.87	4.1
Ice House Switching	.12	3.8
Switching Company coal		
Docks and Ash Pits	.60	*
Swg. Shop, repair and stores		
dept. tracks	4.46	*
Work for M. of W. Dept.	.17	*
All Passenger Work	5.16	*
Freight House Switching	4.47	3.1
Team Track Switching	.31	4.0
Industrial Switching	7.63	4.7
Other	7.10	
	<u>100.00</u>	

\* No record kept of cars handled in this class of service.



Operation: Because the run to North Salt Lake involves the use of the main line outside yard limits, as a consequence crews, while doing this work, receive a differential in pay. One engine on each trick is assigned to do this work.

As a general rule the 6:30 a.m., 2:30 p.m. and 10:30 p.m. 21st South engine makes the Union Pacific delivery. Presently this volume is so great on each trip that only occasionally can "city" loads be handled on these cuts. However, since these engines return light from Union Pacific Yard they stop at Salt Lake Yard and bring to Roper what business is ready to move.

The city loads are not brought into Salt Lake as they arrive. It is the practice to take loads into Salt Lake sufficiently early to permit spotting so industries may have them early in the morning. Usually two trips are required to handle this business. The engines on the return trip to Roper take back what cars are available.

To do this work required in this terminal, as many as 34 switch engine assignments per day frequently are necessary. To bring about full utilization of switch power, foot board changes are made where diesel power is used, fuel and sand being taken during crews' lunch periods when practicable. To secure maximum output of steam power it is the policy to relay engines from shift to shift, use the steam power on Union Pacific interchange and city cuts and have these engines take coal while they are in the "Old Yard" (to eliminate necessity of handling the engines light for coal).

Trend of Traffic: The trend of traffic in Salt Lake-Roper yard is shown graphically in Chart XXV, Exhibit VI-A and in the following table:

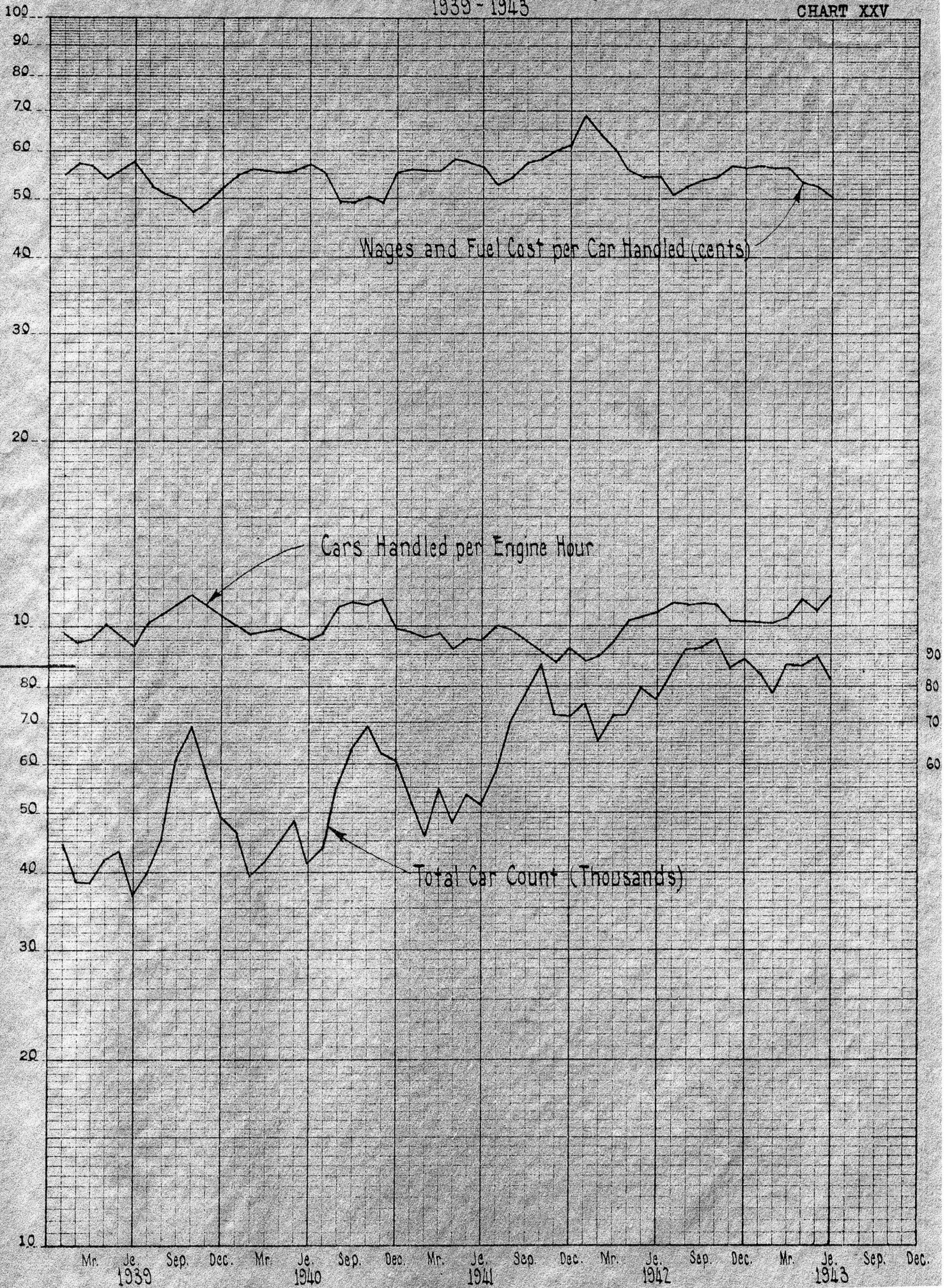
SALT LAKE-ROPER YARD OPERATIONS -- 1924 - 1942

Year	Cars Handled	Switch Engine Hours
1924	*	37,420
1925	*	38,571
1926	*	38,412
1927	*	40,625
1928	*	53,979
1929	*	59,762
1930	*	53,424
1931	*	44,528
1932	*	40,783
1933	*	41,700
1934	465,417	47,515
1935	498,960	50,799
1936	564,493	58,242
1937	595,558	61,688
1938	520,670	50,663
1939	566,269	55,598
1940	616,839	60,511
1941	741,752	78,601
1942	977,137	95,859

\* No comparable figure account change in method.

TREND OF FREIGHT YARD OPERATIONS - by months - SALT LAKE CITY  
1939 - 1943

CHART XXV



KUFFEL & ESSER CO. N. Y. NO. 359-60  
 Semi-Automatic 2 Cylinder 8 (8) Division  
 MADE IN U. S. A.

The requirements for switch engine service, of course, vary with the seasonal requirements and some indication of this is given in Exhibit IV and Chart XXV.

In recent months yard operations at Roper have been somewhat slowed down because the connecting lines (the Western Pacific and Union Pacific at Salt Lake and Southern Pacific at Ogden) have not been able during the past year to take business currently. This has brought about unprecedented congestion in the yard and made it necessary, frequently, to hold trains out of the yard on both railroads (Rio Grande and Western Pacific). At present, the yard is currently holding on the average about 200 cars per day in the yard for the Western Pacific.

Considerable extra switching is made necessary because Salt Lake is a holding yard for the Army Control Office, meaning that cars have to be frequently held and subsequently switched out for movement west. This, together with holding cars for connections, has to a large degree reduced the efficiency of Yard operations.

Trend of Costs: The trend of yard costs and efficiency is shown in Exhibit VII-H, Chart XXV, and in summary form below:

Year	Cars Handled per Engine Hour	Wage & Fuel Costs per Car Handled
1939	10.2	52.6
1940	10.2	53.1
1941	9.4	57.3
1942	10.2	56.4

Prior to 1928, Roper yard was maintained as an auxiliary yard to Salt Lake. To keep a pace with the increased volume of traffic and also to keep the cost of handling cars at as low a figure as possible, Roper yard was opened August, 1928 and became the main yard, with Salt Lake acting as an auxiliary. In the intervening years from 1927 to the present time, Roper yard has been expanded and improved to meet the change of conditions. The traffic requirements at Salt Lake have changed over a period of years and, as has been pointed out, improvements have been made to bring about greater operating efficiency. Further improvements are necessary to meet the expected changed conditions, which will prevail in the post war period.

As previously mentioned, the Rio Grande is presently holding back an average of 200 cars a day for the Western Pacific -- in contrast with average of 25 held back in 1941. This present congestion, added to the probably increased demands, which will come as the emphasis is shifted to the Pacific War Theater, supports the conclusion that Roper yard is not adequate to handle present day business and maintain a high level of operating efficiency. The recommended changes which follow, it is believed, will not only be helpful in handling present traffic, but will be of material benefit in meeting the competitive freight requirements of the post war era.

Lead Tracks: The lead tracks at Roper are in need of improvement, if we are to handle our present day volume of traffic, and maintain as high as possible a standard of operating efficiency. Numerous delays, derailments, etc. have occurred at Roper because of poor track. This has been partially

taken care of by relaying the Lead at 21st South with heavier steel. It should also be noted that the Leads at the 33rd South end (East end, time table direction) lead to all tracks. The Lead serving the Ice House tracks, the Short Yard and the Classification Yard is not entirely adequate. Trains suffer delay because of the inability to leave the terminal because switch engines are working on the Lead.

In addition, the Ice House tracks, leading into the Lead on the east end, are on a reverse curve which is not ideally suited for the best trackage arrangement and switching operation.

At the 21st South end of the Yard (west end, time table direction) all trains from the Western Pacific and Ogden, as well as Union Pacific interchange and city cuts come in over one Lead. There is, however, a run-around track which permits incoming trains and such outbound trains to move without using the ladder track, serving the tracks in Group 1. With present trackage arrangement at the 21st South end of the yard, the vision on the Lead is impaired, particularly in the cold months, by virtue of the fact that inbound steam engines stand on the track next to the run-around, and the escaping steam, and smoke produces a hazard--which in turn, actually reduces the efficiency of both day and night operations. Also, in going to the Ice House, they must go around a reverse curve which makes it difficult to do any switching of trains on those tracks.

The Short Yard, used for making up local trains and other classifications work, has a good long Lead known as the "Hooky Lead". This Lead is adequate to serve this yard.

Work now being done on the 21st South end of the yard will provide a new lead to connect with the Ice House and Wash tracks. This additional Lead will bring about a substantial improvement in yard operations. However, in looking at the map of Roper yard it will be noted that the Wash tracks are stub end at the 30th South Street end of the yard, and that there is need as well as a ready opportunity for improving the leads. It is recommended that in 1944 an additional Lead be constructed and the Wash tracks be connected. It is also recommended that consideration be given to moving the repair tracks to another location adjacent to Wash tracks. (Present location impairs vision and in other respects is undesirable).

Generally speaking Roper Yard has been very poorly maintained. The tracks have been allowed to sink into the ground and we have been exceedingly fortunate that heavy snows in the winter have not tied up operations. However, this condition is now being corrected and there should be no hazards from heavy snows in the winter of 1943 and the spring of 1944. This lack of maintenance in recent months has been attributable to the shortage of man power and lack of proper supervision.

Handling Engines: With the roundhouse in Salt Lake, the Yard at Roper and trains originating and terminating at Roper, it is necessary to have all our road freight power, with the exception of our 540 Class Diesel and the Western Pacific Diesels, moved from the yard to the roundhouse at Salt Lake, a distance of approximately 2.6 miles through a heavily congested territory. The engines, as they come in, are placed on the inbound engine track by the incoming crews and, usually, three or four are handled in a group to the roundhouse. This brings about considerable congestion at the Cinder Pit. The outbound engines are handled from the roundhouse to the outbound engine track by

hostler where they are then taken by the outbound crew to the train. When trains are called close together and it is possible to do so, without causing train delay, two and sometimes three engines are moved to Roper at one time. These are matters which require constant supervision.

Engine Turning Time: This movement of engines from Roper to the cinder pit at Salt Lake usually requires 27 minutes and the movement from the coal chute at Salt Lake to the outbound engine track at Roper requires on the average of 22 minutes. In these movements, between the yard and the roundhouse, the engines are required to use the freight main tracks and often times get behind an inbound or outbound freight train, which results in some delay to the light engine movement and increases the time required to turn the power. The time required to handle power between Salt Lake and Roper is shown in the Exhibits XXIII and XXIV, while the time taken to "turn" freight power at Salt Lake in recent months is given below:

AVERAGE TIME REQUIRED TO TURN ENGINES  
SALT LAKE CITY  
FREIGHT ONLY

AVERAGE PER DAY

	No. of Engines	Transportation Delay	Total Mechanical	Total Time
February 1943	21.6	1'42"	7'31"	9'13"
March 1943	21.2	1'28"	7'40"	9'08"
April 1943	21.0	1'39"	7'53"	9'32"
May 1943	21.2	1'47"	7'36"	9'23"
June 1943	20.2	1'54"	7'56"	9'50"
July 1943	18.4	1'54"	8'43"	10'37"
August 1943	20.2	1'34"	7'48"	9'22"
September 1943	19.5	1'34"	7'41"	9'15"

While on the surface it appears that some time could be saved if the roundhouse were located at Roper instead of Salt Lake, the findings of this study (outlined in detail in Part V of Section I) fail to show that such a move could be economically justified on the basis of normal operations.

As a result of the lack of complete engine facilities at Roper it has often been necessary that outbound engines have their fires cleaned at Roper, before the firemen will take the engines to the train--this because of poor fire building and improper firing between Salt Lake and Roper, making it necessary to dump the ash pans at Roper. This also has been a contributing factor accounting for terminal delays. However, the matter of building better fires and of proper firing between Salt Lake and Roper has been handled by the Mechanical Department and also the Road Foreman. As a result, a marked improvement has been shown and there has been a decrease in the number of engines which have had to have their fires cleaned and ash pans dumped at Roper.

Supplying Engines: The engines are supplied and lubricators filled at Salt Lake while the engines are taking water. Engines are then moved to the coal chute where they are sanded and coaled. Generally speaking, 15 minutes is required to service an engine after it leaves the roundhouse until it is ready to go to Roper yard. This time is not excessive for the operations involved.

Running Track: There is now no regularly assigned running track at Roper. This has resulted in some delay in getting the engines to the trains and in the turning of incoming power. In addition to this it has hampered yard operations to a certain extent, and to overcome this it has been recommended that a thoroughfare track be built. This track should also have caboose tracks in connection for use in storing and servicing cabooses. Conditioning cabooses is now being done on the Wash tracks, which are stub end at the east end. It is hoped that this improvement can be made in the year 1944.

This thoroughfare track will be the equivalent of building an additional yard track, for under present conditions it is necessary to keep one of the yard tracks open for this purpose.

Inspection: Inspection is made promptly on arrival of trains. Under normal conditions there is no delay on the inspections. However, when trains are bunched as at present, there is on occasion some delay although this delay is not a serious problem. The inbound inspection on a train of normal length requires approximately 18 minutes. However, under present conditions, somewhat more than the average time is required.

Make-up of Trains: Outbound trains are generally made up in sufficient time, so as to be placed on yard air line, and this affords inspectors time to check for leaks and piston travel. When the road engine is on the train the set and release, test is made. This operation requires on the average of 14 to 20 minutes per train. The exception to the general rule occurs when the yard is blocked and trains are made up between 21st South and 13th South. In this territory there is no yard air line and no adjustments can be made until the road engine has pumped up the train line. In these cases 20 minutes to 45 minutes are required to permit inspection and adjustment.

The Assistant Superintendent in Charge of the Terminal, as well as the Car Forces, try to discourage the make up at this location as much as possible, but it is the only relief when the yard is congested. The entire operation is not economical from the make-up point of view, because of the great distance involved to throw out any bad orders which are found in the train after it is made up and tested. In this connection, it is recommended that reconsideration be given to having an air line placed across 21st South and 17th South Streets so that when this move is necessary the terminal delay may be kept to an absolute minimum. Because in normal times it is not necessary to make up trains between 17th and 21st South Streets, the question of this additional yard air in this territory must be considered purely from the standpoint of present war operations.

Bleeding of Cars: At Grand Junction, prior to the time present contract was executed between the management and the S.U. of N.A., it was customary—and the Assistant Yard Masters considered it a part of their duty—to bleed the train and make the cut. Since the execution of the above referred to contract, the Assistant Yard Masters are limited only to the bleeding of the train, it being necessary to send the field man along the train to make the cut. In Roper yard the work of bleeding cars has remained a task of the yard crew.

In the return to normal business, in the post war years, under terms of the present contract, delay will continue to accrue to yard engines because of the necessity for the crew to stand idle while the cut is being made and the joint being broken. It is estimated that this delay amounts to 15 minutes per train and, expressed in terms of costs of wages and fuel only, it amounts to approximately \$1.94 for a C-48 Class engine, \$1.56 for the 1,000 h.p. diesels and \$1.44 for the 660 h.p. diesel engine. In each case it represents a loss of .25 locomotive hours and the loss of 1.25 man hours. Other railroads have met this problem by the employment of a man who comes within the scope of S.U. of N.A. contract, whose duty it is to bleed the train and to make the cut. It would be of material benefit in present yard operations and of material assistance in bringing about a more complete utilization of power, if such a man were employed and the continued employment of such a man, in normal operations, would bring about the savings as have been outlined.

Inspection of Lading: In addition to making mechanical inspection on inbound and outbound trains, the Car Men are making inspection of explosives for shifted loads as well as other cars containing commodities where the loads are liable to shift. This is done in line with existing instructions to prevent damage to lading and possible derailments.

Repairs and Shifted Loads: Light repairs are made to cars in the yard and cars are sent to the repair tracks when to do the work on the yard track would take too long and bring about delay. Every effort is made to do as much work outside the repair tracks as is economically possible. While it is true that in the post war operations the number of carloads of explosives being handled will decrease, and this inspection work will be accordingly reduced, lumber, piling and telegraph and telephone poles, etc. will continue to move in open top cars and the problem of shift loads, resulting from improper blocking and bracing at origin and rough handling enroute, will still be present. Such shifted loads are more promptly handled when they can be taken to an overhead crane, but in the case of Roper, no overhead crane is available and the car must be handled at Salt Lake to have the lading straightened. Because of this costly and time consuming operation, it would appear further study might be given to question of whether a crane should be provided at Roper for this purpose.

Handling of Bills: No study has been made to determine definitely to what extent the handling of bills in normal operation constitutes a bottle-neck. However, records indicate that only a relatively few trains were delayed in past normal operations because of the handling of bills. In report previously submitted, it was pointed out that considerable good office time could be saved if westward bills were passed at Denver or Pueblo and eastward bills at Ogden or Salt Lake. Present practice is to have passing report prepared on each car at both the eastern and western terminus of the railroad. While the matter has been over-ruled by Accounting and Traffic Departments, soundness of arguments appear doubtful in view of the great amount of information presently collected relative to car movements. It is therefore recommended the matter be reconsidered, looking toward an arrangement, if possible, which will overcome these objections of the Accounting and Traffic Departments.

It is further recommended that a study be made of yard office procedure in Roper, as well as in the other yards, looking toward the ultimate

standardization of procedure of all yard office work. As already indicated elsewhere, time has not permitted making of such a study for inclusion in this report.

The yard office is located at the 21st South Street end of the yard, a considerable distance from the caboose on trains arriving from the East, as a result some delay is occasioned in breaking up a train because the conductor walks up with the bills. This can be eliminated by the installation of a pneumatic tube system between 30th South Street and the yard office. On trains arriving from the Western Pacific and Ogden it is necessary for the General Yardmaster to telephone instructions to the Assistant Yardmaster at 30th South before he can go to work on this train. This operation is time-consuming and often-times results in yard engine delay and subsequent delay to trains. The 1944 budget will carry an item to provide for the pneumatic tube system. This system will accelerate switching operations.

The yard office at Salt Lake is located between 3rd and 4th South Streets, centrally located so that it is accessible. It would be inadvisable to construct a yard office at this location, where the yard master was elevated because his vision would be obscure because of the 4th South viaduct.

Communication: The chief means of intra-yard communication at Roper is by "dummy" phone. This phone system, like any other, requires someone in constant attendance at each end of the line. This is not possible as both the General Yardmaster and Assistant Yardmaster must of necessity be out in the yard and not available for the phone at all times. There is some delay in the yard as a result. Also to be considered is the time required by the Assistant Yardmaster in changing his instructions to his crews. To eliminate this delay observations have been made to determine how other lines have met this problem. Several officers have visited such loud speaker installations as are in use on the Chicago Junction Railroad, at Chicago, and the Alton and Southern, at East St. Louis, as well as in numerous other yards.

On the basis of these operations, it has been concluded to place in the 1944 budget an item to cover the purchase and installation of a two-way communication system between the yard offices and the Switch Foreman and also a loudspeaker paging system. This system provides for immediate communication with any person, within hearing range of the loud speaker system. It is impossible to evaluate the worth of this system but some users claim it will expedite certain operations as much as 20%. Its chief value lies in the fact that other personnel, not now immediately reached by phone, will be easily accessible, such as carmen, section foremen, switchtenders, etc.

Diversions: Diversions, particularly the diversions of perishable traffic away from the Rio Grande at Salt Lake, cause some additional switching. The cars arrive at Roper on the Western Pacific, routed east by the Rio Grande, or frequently they are enroute to Salt Lake from Ogden when a diversion is made. The diversion, often times, reaches the Rio Grande yard office after a car has been blocked for eastward movement. This then means that the car must be switched out and placed in line to go to the Union Pacific, calling for some extra switching. In 1941, an above average year, shipper diversions numbered approximately 3,705, being heaviest in October. In 1943, an abnormal year, diversions numbered 5,065, with the heaviest number of diversions being made in the month of October.



Blocking: D&RGW trains arriving from the east at Roper are blocked at two places, Pueblo and Grand Junction. At Pueblo, for example, the 61 train is blocked as follows:

1. Livestock
2. Provo (Geneva, Gomex, Heber, and Tintic Branch, as well as Provo proper)
3. S.L. & U. connection
4. Bamberger Electric
5. Salt Lake (UP Salt Lake business, Salt Lake proper and SLG&W)
6. WP loads Ogden (Ogden proper and SP connections)
7. Grand Junction and connections
8. Icers
9. Salida, if any, cabooses.

When these trains arrive at Grand Junction, cars moved via the cut-off are blocked and placed in these Pueblo blocks, while the cars to be set out at Provo are held at Grand Junction and moved from there in two trains daily. Therefore, when this train arrives at Roper Yard, the switch engine must then take off the fill put on at Soldier Summit, and make the necessary number of switch moves. The trains arriving from the Western Pacific are supposed to be blocked in line with J. P. Quigley's instructions, effective June 21, 1943, as follows: (such blocking is, however, the exception rather than the rule):

1. All perishables are blocked on the head end of the train.
2. All loaded cars for Salt Lake City and east, bunched in one solid block.
3. One block for all D&RGW initial and UIC empty cars.
4. One block for all UP initial cars.
5. One block for all UCR initial empty cars.
6. All eastern line empties, regardless of whether they are home to the WP or D&RGW at Salt Lake City to be bunched.

The number of trains, which have arrived at Roper yard blocked, have been exceedingly few in number. For a number of years, Mr. L. F. Wilson has been insisting that the Western Pacific make an improvement in their blocking; but so far the bulletin is the only tangible result. As indicated in Exhibits XVI-C-XIX, the Western Pacific trains arrive Roper in "mine run condition", and it is necessary for the yard forces at Roper to switch the entire train, removing from it business which does not go east of Salt Lake, so that the following blocking may be made for D&RGW eastbound symbol and redball trains:

1. Livestock
2. Shorts, Helper to Grand Junction
3. Pando loads for 70-M series, dumps for Belden
4. Miscellaneous empties, Pueblo
5. Orestod loads and empties
6. Miscellaneous empties, Denver
7. CB&Q empties
8. CB&Q perishables and non perishables
9. RI perishables and non perishables
10. Denver proper, UP via C&S, and AT&SF via Denver, all perishables and non perishables.

11. AT&SF and C&S via Pueblo, Pueblo proper and Pueblo to Denver, all perishables and non-perishables.
12. MP perishables, canned goods, dried fruit, and wine
13. MP non-perishables
14. Grand Junction and South End Shorts and Grand Junction to Pueblo.
15. Helper set out

The trains from Ogden arrive at Salt Lake unblocked and they must also be switched into the above blocks.

Western Pacific Blocking: On outbound Western Pacific trains the yard is required to make the following blocks:

HEAD END

1. Wendover
2. Nevada and Northern
3. Reno
4. Elko
5. Winnemucca
6. Portola and West

Southern Pacific and Union Pacific Blocking: In trains going to Ogden the cars destined points short of Ogden are blocked in station order on the head end. The Southern Pacific connection and Ogden local loads are thrown into another block to be segregated at Ogden. Interchange cuts, received from the Union Pacific, are unblocked and must be switched before they can be run. In October, 1942, to help relieve congestion on the Rio Grande and Western Pacific, Roper blocked trains for the Southern Pacific at Ogden so that all the Southern Pacific had to do at Ogden was to caboose the train, put an engine on and go.

When there is a sufficient volume of tonnage, for either the Southern Pacific or the Western Pacific, arriving in trains at Grand Junction, via "Cut-off" or Gorge routes, that yard endeavors to make up a solid train of Southern Pacific and Western Pacific traffic. This then eliminates switching at Roper except such as may be necessary for bad order cars. This is of material benefit in expediting the business, but unfortunately, as it worked out, little value was received because of the fact our western connections were not always in a position to take their business currently.

From time to time there has been considerable agitation, by various officers, to change our present system of blocking; that is, do it at some intermediate point rather than at the eastern and western terminals, as is now the practice. The economics of this has already been covered in Part IV of the first section of this report. Our conclusion is that the advantage definitely lies with Salt Lake rather than Grand Junction.

INTERCHANGE AT SALT LAKE-ROPER

Size and Seasonality: The size and seasonality of the D&RGW interchange operations at Salt Lake, together with the relative importance is shown in Exhibit IV, and the following tabulation:

SIZE AND SEASONALITY - D&RGW - INTERCHANGE OPERATIONS  
Salt Lake City-Roper - 1941

	Bamberger		Western Pacific		Union Pacific No. Salt Lake		Total Per Day
	Rec'd	Del'd	Rec'd	Del'd	Rec'd	Del'd	
	From	To	From	To	From	To	
January	0.3	5.1	83.2	81.3	5.5	74.2	249.6
February	0.6	5.1	75.3	87.8	6.0	62.0	236.8
March	0.2	4.7	80.4	104.3	8.0	63.4	261.0
April	1.3	5.8	94.1	86.4	8.7	27.7	224.0
May	0.2	5.4	99.9	91.6	6.5	37.0	240.6
June	0.1	4.7	93.4	101.5	6.5	29.1	255.3
July	0.4	7.7	102.2	109.6	5.8	35.1	260.8
August	0.6	10.7	114.0	112.4	5.9	63.0	306.6
September	2.3	10.1	143.6	122.7	8.0	87.0	373.7
October	1.4	12.1	171.4	134.3	7.8	80.5	407.5
November	0.5	6.7	137.1	130.9	7.1	79.4	361.7
December	1.6	8.1	120.6	126.3	6.4	80.3	343.3
Averages Per Day	0.8	7.2	109.6	107.4	6.9	59.9	291.8

It will be noted that the Western Pacific alone accounts for 62% of the Rio Grande interline deliveries and 93% of the Rio Grande interline receipts. The Salt Lake and Utah, and the Salt Lake Garfield and Western are omitted, on the basis that the total interchange handled with these two carriers is relatively unimportant in this terminal.

Interchange with Western Pacific: The interchange between Western Pacific and Rio Grande is made on the following basis:

- a. Dead freight - when the inspection of the Rio Grande inbound train has been completed.
- b. From the Western Pacific to the Rio Grande:
  - Dead freight - when the inspection of the inbound Western Pacific trains has been completed.
  - Perishable - when the icing has been completed.

Exhibits X-XV and the following table show the time required to interchange typical car through at Salt Lake based upon previously mentioned analysis of 2,161 cars which moved with reasonable dispatch in July, 1941, and 1,033 cars which moved in July, 1943.

\*Averages shown for the year are unweighted means of the individual months' averages.

TIME REQUIRED TO INTERCHANGE TYPICAL THROUGH CAR AT SALT LAKE

Based on checks of July, 1941, and July, 1943.

Salt Lake Terminal	WEST BOUND			EAST BOUND			
	From D&RGW to Other RRs	1941	1943	% Inc.	From Other RRs to D&RGW	1941	1943
Roper - WP	1'27"	2'06"	45%		6'21"	7'02"	11%
North Yard - UP	3'36"	9'48"	172%		4'25"	5'39"	28%
Roper - Through	2'53"	9'06"	216%		3'28"	6'01"	74%
All Cars	2'06"	5'15"	150%		4'58"	6'22"	28%

Further check on these same cars showed that the interval between interchange and departure (on business D&RGW turned over to Western Pacific) average 4'26" in July, 1941. This meant that the average typical westbound D&RGW-WP car was held an average of 5'53" in Roper in July, 1941 -- an appreciable period and sufficient to justify feeling that this time can be appreciably reduced. Similar check covering July, 1943 showed average westbound car was held 16'31" at Roper after interchange effected -- meaning it was held total of 18'37", when all terminal time considered. This latter was necessarily in no wise indicative of normal operations.

On the basis of total loaded cars interchanged to the Western Pacific in July, 1943, there were approximately 200 loaded cars held for the Western Pacific in the yard; whereas in 1941 the average was 25 loaded cars. To relieve the congestion at Roper yard it was also necessary to hold Western Pacific business at terminals east of Roper, at one time, as far west as Grand Junction, and some further relief was obtained through the O.D.T. Diversion Orders.

Interchange with Union Pacific: Interchange with the Union Pacific is made by Rio Grande delivering Union Pacific business to the Union Pacific in its north yard, a distance of approximately 5.3 miles from Roper yard. The Union Pacific delivers Rio Grande interchange business to the Rio Grande in the Roper yard. In each instance, the engines making the interchange return light. In normal operations the Rio Grande usually makes two trips per day to the Union Pacific which, in turn, make two trips to the Rio Grande.

In the operation of delivering cars to the Union Pacific, it is necessary that "Rio Grande cuts" use the freight main lines and travel through a very congested territory from Ninth South to First South and are subject to some delays in addition to delays incurred in getting into the Union Pacific "North Yard". In normal operations it requires approximately 2'10" to make this round trip. In present day operations a minimum of 3'40" is required, often times running as high as five or six hours. However, these conditions are abnormal, and also some of the causes are beyond the power of the Rio Grande supervision to correct, inasmuch as they occur in the Union Pacific yard.

Obviously the light return movement is wasteful in terms of men and locomotive hours -- and particularly objectionable in a period like the present. Some years ago it was the practice for each line to receive and deliver in the other's yard. However, this was changed during the depression, at which time the employees seemed to feel that this reciprocal arrangement was depriving the employees of each of the lines, of work which rightly belonged to them.

In present day operations it is possible that some reciprocal arrangement can be worked out between the management and the men with the aid of O.D.T. A similar situation prevailed in Los Angeles with reference to the interchange of business between the Union Pacific and Salt Lake, and conditions were ameliorated through intervention by the O.D.T.

Such intervention with the respect to the Rio Grande and the Union Pacific at Salt Lake would, in all probability, provide only a war time relief, and undoubtedly the employees would in the post-war operations feel that the continuing of the reciprocal arrangement, should it be instituted, would again deprive them of work which rightfully belonged to the employees of each of the roads.

The most ideal long term solution appears to lie in the construction of an interchange yard, located between Thirteenth and Ninth South Streets, between the Rio Grande passenger and freight main lines. Such an arrangement would permit the delivering and receiving at this yard, and in addition, permit the Union Pacific to use its own tracks from its north yard to its interchange yard. This would mean that the congestion between Ninth and First South Streets, in the Rio Grande Salt Lake yard, would be reduced and provide free movement of the Rio Grande-Western Pacific freight trains and light engines.

A study made in February, 1943, to determine the approximate economies of such an interchange yard, revealed that it would be possible for each of the lines to make the round trip from their respective yards to interchange yard in approximately 1'30", which is a saving of 40 minutes over the estimated time required for each road under normal operating conditions (would produce even greater savings on basis of present day operations). This proposed plan has been submitted to the Union Pacific, who reacted favorably with the exception that they intimated that their main lines were too congested to take on this additional load at this time. It may be that the war time solution lies in an O.D.T. order. However, the proposed interchange yard should be given consideration for peace time operation.

Interchange with Other Roads: Interchange to the Bamberger Electric is made at North Salt Lake by trains running between Roper and Ogden.

The interchange with the Salt Lake and Utah is made near Seventeenth South Street; the Rio Grande both receives and delivers on these tracks. For Rio Grande interchanges with the Salt Lake, Garfield and Western, the interchange tracks are on First South Street. These cars, as a general rule, are brought to Salt Lake with the city loads, and are delivered to the Salt Lake, Garfield and Western by the engines assigned in Salt Lake yard. The movement from the Salt Lake, Garfield and Western interchange to the Rio Grande is made when practicable, by engines returning light from the Union Pacific yard and taken directly to Roper.

The interchange operations with the Salt Lake and Utah and the Salt Lake, Garfield and Western, offer no problem either in normal operations or in peace time operations, which needs further consideration here. In the interchange of business at Salt Lake, some delay is encountered between the arrival of the Rio Grande trains and the physical interchange. The same is true on the outbound movement.

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YARD FACILITIES

Scale Track: At Roper the scale and scale track are located near the 30th South end of the yard. The method presently employed is to permit cars to accumulate, and weigh the group once during each shift (oftener if the accumulation warrants more frequent service). If there is a rush "weigher" then this car, together with the accumulation, is weighed. In other words, the governing factor for this service depends entirely upon the condition of the track or whether there is a rush car to weigh. This arrangement seems to be quite satisfactory, from all angles, and eliminates the necessity of having a clerk or weighmaster stationed at the scale house at all times.

At Salt Lake City the scale and scale house are located along Fifth West Street at the foot of Fifth South Street. This scale is used infrequently as most "weighers" are weight at Roper. The scale track is small, accomodating four cars on either side of the scale beam. Weighing at Salt Lake is done as required; there is no regular schedule of weighing. However, on cars loaded on the industry or wagon tracks at Salt Lake, requiring weighing, are weighed at Salt Lake, and upon arrival to Roper they are switched into proper block, instead of the scale tracks.

Ice Facilities: The Ice Dock at Roper has two tracks serving it, each having a capacity of approximately 22 cars at the end of the dock. There are no ice houses at Roper. Artificial ice is used and is purchased in carloads from Utah Ice and Cold Storage Company Plants (plants on Rio Grande tracks at Third South and Fifth West Streets also on Union Pacific rails). All perishable freight requiring ice being delivered by the Western Pacific to the Rio Grande or to the Union Pacific, Salt Lake, are re-iced before delivery. To ascertain time required, in normal periods for icing, study was made of 234 cars passing through the terminal during September, 1941, which required ice. The study revealed that an average of 3,711 pounds was put into each car's bunkers, and that an average of 34 minutes was required per car. This figure compares favorably with the time required at both Grand Junction and Denver, and does not appear to be excessive. However, the Western Pacific, as a general rule, in normal times has all of its icers together. This is of considerable help, and an agreement against requesting the Western Pacific to block their incoming trains, west of Salt Lake, similar to the blocks used by the Rio Grande out of Roper (as to block as Roper does, would undoubtedly result in icers being spread throughout the train -- requiring additional time to ice).

At a Staff meeting held in Mr. L.F. Wilson's Office, August 1, 1943, Mr. F.C. Hogue made the statement thrt if it was desired to keep the perishable business we would have to offer better service. Mr. Hogue's remarks were no doubt caused by service similar to that accorded to two trains in October, which are singled out here as an illustration of recent poor services:

W.P.F.178 arrived Roper October 3, 1943, with 16 cars to re-ice, grouped in two groups, one containing 9 cars, the other 7.

Arrived at dock	4:32 pm	----	1'12"
Ice Crew arrive	5:44 pm	----	

Icing began - 9 cars	6:16 pm	----	14"
Icing ended - 9 cars	6:30 pm	----	

Icing began - 7 cars	7:21 pm	----	24"
Icing ended - 7 cars	7:45 pm	----	

Delay of 27" presumably for second spot- Total of 2'17"

WP train engine 406 arrived at Roper October 4, 1943, at 11:25 am with 17 icers.

Arrived at Dock	11:25 am	----	1'50"
Ice Crew arrived	1:15 pm	----	
Icing began 8 cars	1:15 pm	----	30"
Icing ended 8 cars	1:45 pm	----	
Icing began 9 cars	2:20 pm	----	1'06"
Icing ended 9 cars	3:26 pm	----	

Delay of 35" spotting for second spot - Total of 4'06"

If the Ice Crew had arrived ahead of the train, 1'12" delay could have been eliminated. Also, if Western Pacific had bunched all icers, an additional 27 minutes could have been saved, reducing the icing time to 38 minutes.

In the case of W.P.406, the prompt arrival of the Ice Crew could have eliminated 1'50" delay, and had all icers been bunched another 35 minutes could have been saved, thereby reducing the icing time to 1'41".

It is understood this condition has been corrected, and the Ice Crew is called when the dispatcher issues the inbound call time. The Western Pacific is also now getting all icers together thereby eliminating delay in spotting.

With the improved methods in construction of refrigerated cars, and in loading the refrigerated cars, the ice dock facility of Salt Lake is assuming less importance with the passing of years, and it is now impossible that its importance will further decrease in future years. However, the ice facilities are presently in very poor and unsafe physical condition. It is believed steps should be promptly taken to insure needed repairs being made on the part of the ice company to insure the most expeditious type of service.

Carding of Cars: At the present time, Roper Yard is endeavoring to card all coal trains and city cars. The balance of the trains are switched from chalk marks made on the cars by the switch foreman. As mentioned elsewhere in this report, it is recommended that a study be made looking to the ultimate goal where a card may be applied at an original Rio Grande terminal, containing the necessary switch information for complete handling -- thus avoiding the necessity of having to card or chalk each car at each terminal where it is switched. Unfortunately, time and traffic conditions have not permitted any final conclusions being made on this matter, for inclusion in this report.

General Operating Practices: Generally speaking, operations in Roper yard are carried on with considerable efficiency. The interchange cuts delivered to the Union Pacific, presently, appear to be too long to be economically handled, always requiring an additional engine from Second South and Fourth West to First South and Sixth West. However, this is only a criticism of war time operations, and investigation reveals the fact that it is almost a necessity because of the congestion in the Union Pacific yard, When that line indicates that they will take a cut of cars and have

assigned a certain track, the Rio Grande Supervisors, in an attempt to deliver as many cars as possible, usually forward to the Union Pacific the number of cars which can be held on the assigned track. The uneconomical aspects of this movement are justified by the desire to provide as much room as possible in Roper yard and avoid the necessity of holding out of the yard Rio Grande or Western Pacific trains.

In the old yard at Salt Lake, so far as possible, it is the practice to keep Diesel engines in this yard so to comply with Salt Lake City Smoke Abatement Ordinance. However, in Roper yard both steam and Diesel power are used, the Diesel power, of course, being preferred because of the lack of coaling facilities for steam engines. While there are not enough engines available so that this yard can be 100% dieselized, as more diesel switch power is made available the number of diesels in Roper yard should be increased.

Crew and Power Assignments: Observations of present crew assignments indicate that the power is being used to the best advantage with the exception that in the old yard Diesel No.69 is assigned only two shifts per day, and is accumulating considerable unassigned time chargeable to the Transportation Department. It is difficult to say that this engine should be removed from this yard to a point where it could be assigned on full three assignments per day, because of the fact that in doing the industry switching at Salt Lake, engines are required to negotiate sharp curves which limit the size and type of power which can be used. It would seem to substitute for the 660 h.p., an engine of the S-33 type, if one is available. Generally speaking, a C-48 Class engine is too rigid, and because of this it can be used only on certain tracks. This question of unassigned time for the Diesel unit is receiving active consideration on the part of the Division Forces, and it is hoped that some solution will be reached whereby full utilization of this engine may be obtained.

The crews are of five men and there does not appear to be any necessity for adding the sixth man; however, should we now have an unexpected lull in business which would necessitate the reduction in assignments, it might be well in this case to add an additional man for the sole purpose of holding these men rather than cutting them off the board, and thus having them leave Salt Lake. This is proposed as a war time measure only, as a means of keeping sufficient help to carry on the work under present day conditions.

Non-revenue Switching: The non-revenue switching in the terminal causes little difficulty. The coal chute at Salt Lake is spotted during the first trick and each succeeding trick as is necessary. The roundhouse has a shop engine which handles movement of dead engines. The repair tracks at Roper and Salt Lake are switched at a time of day when they will least interfere with repair track work.

Calling of Crews and Trains: For a number of years, it was the practice of Salt Lake to have the Chief Dispatcher call the trains. He based his call on the time the power would be "OK". This arrangement caused considerable transportation and terminal delays. Recently the plan has been changed and roughly is as follows:



The roundhouse gives the yardmaster an estimated time when a locomotive will be ready. The goal in this respect is to synchronize all movements, so that the crews may be called prior to actual time the locomotive is ready to leave the Cinder Pit, so that the power will arrive at Roper the moment the crews to on duty (so they can immediately get started to the train). The ultimate goal is, of course, no delay for making up, power, bills, or orders. So far this has shown a marked improvement over the previous practice and as time goes on and all are thoroughly acquainted with the procedure it should result in further improvement.

For a number of years the Enginemen's Board has been located in the roundhouse office at Salt Lake, and the Trainman's Board in a portion of the Fourth South Street yard office. This is rather an unsatisfactory arrangement since these two Boards could be logically consolidated, resulting in a monetary saving, by virtue of the reduction of one man, and possibly two. It was proposed in 1942 to make this consolidation in the new roundhouse office; however, this proposal was held in abeyance pending the removal of the roundhouse to Roper yard. This question has not been definitely settled, and in the interim one of the organizations involved has requested that these Boards be consolidated and located at Roper. There is no objection to such an arrangement, except that it will require an addition to the yard office, and a consequent expenditure. Regardless of location, it is believed, these boards should be consolidated.

Proposed Fourth West - Sixth West Track Change: In the movement from the Rio Grande to the Union Pacific, the Rio Grande goes from Sixth West Street to Fourth West Street, and in so doing, crosses the Ogden passenger line, the Western Pacific, and the Salt Lake, Garfield and Western. It also uses a portion of the Union Pacific's Leamington cut-off to reach the Union Pacific's Pedro tracks. In the crossing of these tracks, Rio Grande trains are forced to stop and often times after they reach the portion of the Leamington controlled block signals, the block goes red in their face, because of the Union Pacific's use of this portion of the track. In normal operations, the length of the cut being taken to the Union Pacific is considerably less than that of our present day operations; however, the fact still remains that time is lost in stopping and starting, even with lighter tonnage. To eliminate this necessity of stopping, and to produce a much more rapid movement, it is proposed to construct additional trackage to provide double tracks between Sixth West and Fourth West Streets, and install interlocking plant to permit continuous movement.

This proposed construction will be of material assistance in handling war time traffic and can be partially justified for peacetime operations on the following basis: The present route of the Rio Grande to Ogden, both passenger and freight trains, from First South Street, is in the center of Sixth West. The movement of trains in the territory is limited to twelve miles per hour because of the City Ordinance. In addition to this they are required to stop at the crossing of the Western Pacific, Salt Lake and Utah, and the Union Pacific tracks. It is proposed that when the Sixth West to Fourth West change has been made, the Rio Grande trains to and from Ogden will use this double track interlocking system, using a portion of Union Pacific tracks to Fifth North Street where they will then enter upon privately owned Rio Grande right of way. This change will expedite train movements be eliminating the stops and will be helpful to the extent that it will reduce the congestion in the old yard. The line between Salt Lake and Ogden

is single track and trains must pass at North Salt Lake or pass on the double track in the old yard. If the latter is the case, then operations in the old yard are completely tied up, until the opposing train is met. The proposed arrangement as shown in Chart XXII, is agreed to be a solution to this problem.

The Passenger Facilities: The passenger terminal is owned by the Salt Lake City Union Depot and Railroad Company, the owners of which are the Rio Grande and the Western Pacific. This facility appears adequate for all foreseeable demands and needs no further consideration in this study.

#### CONCLUSION - SALT LAKE

General: Generally speaking the Salt Lake-Roper yards are adequate to handle normal traffic. However, the service, as reflected by terminal detention, is far from good. The following recommendations are offered with view to expediting service and reducing costs:

Engine Tracks: A track should be provided for storing 5400 h.p. Diesel engines, both Rio Grande and Western Pacific, while these engines are awaiting call. (This tracks will be provided and ready for use after completion of 1943 improvement works.)

Caboose Tracks: Tracks should be provided adjacent to thoroughfare track, connected at both ends for purpose of storing and conditioning both Rio Grande and Western Pacific cabooses. (These tracks are provided for in 1944 improvement program.)

Roundhouse: As outlined, in detail in Part V of Section I, had it been practicable to anticipate Roper yard when the initial Salt Lake roundhouse was built, the latter might advantageously been placed at Roper instead of its present site. For reasons mentioned, however, it does not appear that the building of a new roundhouse at Roper would be financially justified.

Lead Tracks: An additional lead track is needed at the 21st South end of Roper yard (this being done under 1943 improvement program, which provides for lead only, no extra trackage or thoroughfare track).

An additional lead track is needed at 30th South Street. Also, present leads should be straightened. (This scheduled to be done under 1944 improvement program.)

Running Track: A Thoroughfare track should be constructed to provide free and unhindered access from one end of the yard to the other. (This is scheduled to be done under 1944 improvement program.)

Bleeding of Cars: It is recommended that a man, who comes within the scope of the S.U. of N.A. contract, be assigned to bleed cars and make cuts, whenever business conditions justify.

Handling of Bills: Question of eliminating duplicating passing of through cars should be again critically reviewed, with view to bringing about a change in Accounting and Traffic requirements so westbound bills be passed at Denver and Pueblo, and eastbound bills at Ogden and Salt Lake.

Communication: It is concluded that a loud speaker system and two-way communication will be most helpful at Roper and that same should be installed, along with a pneumatic tube, connecting 30th South with the yard office at 21st South. (This included in 1944 improvement program, and planned for installation in 1944, if equipment can be obtained.)

Blocking: As pointed out, in detail of Part IV of Section I, the results of this study indicate that the advantages lie with Salt Lake rather than Grand Junction, as the company's major classification point. In view of this, and other matters, herein reported, it is recommended that present blocking practice be continued, except that study be made to determine whether all icers should be bunched into Grand Junction.

In this connection, it is felt that the Western Pacific should keep all icers in one group into Roper.

While it would be helpful from the standpoint of the D&RGW, to have Western Pacific block all inbound trains into Roper, in line with J.P. Quigley's instructions of June 21, 1943, in view of the fact Roper is a joint yard; this appears unlikely of permanent accomplishment. For this reason, it is believed, emphasis of necessity must be placed upon improving facilities, procedures and supervision at Roper.

Interchange: It is urged that the Rio Grande and Union Pacific, with O.D.F. assistance, arrange to have the roads alternate on delivering and receiving interchange with view to prevent continued loss of engine and man hours.

As a more permanent solution, it is proposed that a new interchange yard be constructed between 9th and 13th South, between the Rio Grande passenger and freight main tracks, for each line, to deliver and receive interchange business.

Carding of Cars: It is suggested that a study be made looking toward adoption of system of carding, whereby one card, applied at origin point or receiving terminal, can be carried through to final D&RGW terminal.

Calling of Crews: It is believed advantages will accrue by having the Enginemen's and Trainmen's Board consolidated (preferably at Roper, to comply with the wishes of the men.

Line Changes: If further study indicates, conclusively, that it is impractical to operate freight trains through our Salt Lake Union Depot, it would appear that the most practicable plan would be to have the Ogden main line relocated, from 6th West Street to 4th West Street.

Yard Air Line: Further consideration should be given to placing yard air line across 21st South and 17th South Streets.

Ice Facilities: Immediate consideration should be given to matter of having needed improvements made to Roper icing facilities from both service and safety standpoint.

Yard Office Procedure: Study should be undertaken, on system basis, looking toward simplification and standardization of yard office procedures.

Rip Tracks at Roper: It is recommended that careful consideration be given to question of moving repair tracks at Roper to another nearby location (likely location possibly adjacent to wash tracks). Present location impairs vision and otherwise undesirable.

Additional Lead: For reasons outlined, it is suggested that, as soon as practicable, (preferably 1944) an additional lead be constructed at the 30th South Street end of Roper; also, that the wash tracks be connected.

Location of Other Terminal Facilities at Roper: While facts developed in this study have indicated it would not be sound to construct a new roundhouse at Roper, this report has not considered whether or not other facilities, such as car shops, cranes for adjusting shifted loads, etc., might not be advantageously moved or provided at Roper. This and related questions appear worthy of further study.