EXHIBIT U

PUBLIC SERVICE COMMISSION

OF THE

STATE OF MISSOURI

Report of Miscellaneous Orders, Authorities, Accidents, Inspections, and Conference Rulings

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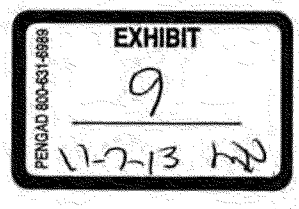
VOLUME I

April 15, 1913, to December 31, 1914

COMMISSIONERS

JOHN M. ATKINSON, Chairman
WM. F. WOERNER*
EDWIN J. BEAN**
JOHN KENNISH
HOWARD B. SHAW
FRANK A. WIGHTMAN

*Resigned, November 18, 1914.
**Appointed, November, 19, 1914, vice Woerner, resigned.



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In the Matter of the Annual Inspection of the ILLINOIS SOUTHERN RAILWAY COMPANY.

On June 25, 1914, Commissioner Wightman, assisted by Engineer Gass' made an inspection of the railway lines of the Illinois Southern Railway Company within the state of Missouri. The commission was accompanied by the following officials of the railway company: Mr. J. W. Walsh, vice-president; Mr. W. H. Ogborn, G. F. & P. agent. The inspection was made from the observation platform of an inspection car pushed in front of the engine at a speed of about fifteen miles per hour.

The Illinois Southern is a single track class "C" railroad operating between Salem, Ill., and Bismarck, Mo. The line enters Missouri from Illinois at Little Rock, a point on the Mississippi river in Ste. Genevieve county, and extends southwesterly through Ste. Genevieve and St. Francois counties to Bismarck, a point on the St. Louis, Iron Mountain & Southern Railroad, a distance of 43.1 miles.

There are two trains each way daily between Little Rock and Elvins, and one passenger train each way and one freight train two or three times a week between Elvins and Bismarck.

Seventy per cent of the tonnage is coal from the Illinois territory, delivered to the mines and mills in the vicinity of Esther and Derby, twenty per cent is chats ballast hauled north, and ten per cent local business along the line.

The maximum and ruling grade is one per cent. All curves are spiralled and compensation of grades was made for curvature. There are seventy-four curves along the line; 16.1 miles of the line are curvature and 27.06 miles are tangents.

The maximum speed of passenger trains is thirty-five miles per hour and twenty miles per hour for freight trains.

All curves are elevated for the average speed of trains.

With reference to the mile markers along the line, it was stated by Vice-President Walsh that in placing these markers originally a mistake had been made, the measurements starting from the Salem depot, instead of the connection with the C. & E. I. R. R. All of the data in this report is based on the markers as located at present.

Roadbed and Right of Way:

The roadbed and right of way are in a fair condition only. The cut ditches at the following places should be cleaned out and opened for drainage: 85/34, 86/30, 88/15, 89/7, 89/12, 89/16, 89/28, 90/2, 90/5, 90/10, 90/32, 91/17, 93/5, 93/25, 94/5, 94/10, 94/17, 94/33, 95/10, 95/18, 95/25, 96/20, 97/0, 97/6, 97/25, 98/15, 98/20, 99/20, 99/8, 101/10, 101/25, 102/6, 102/28, 103/6, 103-14, 103/23, 103/27, 104/1, 104/5, 104/13, 104/18, 104/25, 105/2, 105/15, 106/10,

106/26, 107/11, 107/23, 108/8, 108/25, 109/18, 110/0, 110/25, 110/32, 111/17, 111/23, 112/33, 113/2, 114/17, 115/27, 118/10, 118/17, 120/15, 120/22, 122/3, 122/20, 123/0, 124/6, 124/15, and 12/7. There are a few places where the embankments need widening, as the shoulder ballast has run down to the toe of slope.

The right of way in many places shows no indication of having been cut this season or last, and it is suggested that this work be done as is provided by section 3150, R. S. 1909.

The fences and farm gates need repairing in many places and the cattle guards and wing fences are almost entirely gone.

Bridges and Openings:

The following table indicates the bridge number, milepost, location and type of bridge:

Bridge number.	Milepost, location.	Type.
85-3	85.12	Pile trestle.
85-8	85.28	Frame trestle.
86-3	86.9	Pile trestle.
87-5	87.18	Concrete abutments.
88-3	88.7	Pile and frame.
89-4	89.14	Frame trestle.
89-6	89.20	Frame trestle.
91-1	91.3	Concrete abutments.
114-3	114.11	Concrete abutments.
115-3	115.11	Frame and steel.
117-1	117.3	Frame trestle.
118-0	118.29	Pile trestle.
120-2	120.6	Concrete abutments.
120-5	120.14	Frame trestle.
121-5	121.14	Frame trestle.
100-8	100.22	Deck plate girder.
115-3	115.11	Through girder.

All of the bridges are apparently in good condition and are ample for the loading now in service, with the exception of the pile trestle No. 85.3 north of Ste. Genevieve, which should have new piling.

Ballast:

Chats, the tailings from the lead mines, are used for ballast. The depth beneath the ties will average from twelve to eighteen inches, and in most places the ballast section is well filled out.

There is an abundance of ballast at the various mills along the line of the railroad, and the only charge item against the ballast is the loading, transportation and application.

Ties and Tie Plating:

The tie condition from Bismarck to Elvins is very poor, and there are many places in the track from Elvins to Little Rock where the tie condition is but little better. White oak ties, six inches by eight inches by eight feet, sixteen to a thirty-foot rail, or 2,816 to a mile, is the standard of this company. The ties are obtained locally at a very reasonable cost. At four places along the line of the Illinois Southern permanent slow orders of five miles per hour are maintained, due to the condition of the ties. This deterioration in the track condition is to be severely criticised, and it is suggested that a minimum of 7,500 ties be applied to the track each month until the condition has been brought to normal.

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The following table indicates the tie renewals in both the main line and sidings for the fiscal years of 1911, 1912, 1913 and 1914:

1911	22,469
1912	12,174
1913	10,915
1914	11,069
Total	56,627

There are 43.16 miles of main line and 12.65 miles of sidings, a total of 55.81 miles of track within the State.

Assuming the life of a white oak tie to be eight years and that renewals should be made at the rate of fifty per cent every four years, the above table indicates a renewal of thirty-six per cent, or fourteen per cent below normal.

Approximately one per cent of the line is tie-plated.

Rail and Fastenings:

The line from Little Rock to Bismarck is laid with seventy-pound rail A. S. C. E., section 7010, rolled in 1902 and 1903 by the Illinois Steel Company, and laid in 1902 and 1903. The joints are fastened with standard four-hole angle bars without nut locks.

The joints are suspended and are laid broken on both the curves and tangents.

The rails and fastenings are in good condition.

Frogs and Switches:

The condition of the frogs and switches is good. It was noted, however, that the blocking in some of the frogs and guard rails needs renewing.

Highway Crossings:

The approaches of many of the crossings are too narrow and the crossing planks are not of the dimensions prescribed by law. The absence of whistling posts each side of the highway crossings was observed, also that a few of the crossing signs were not in place. It was stated by Vice-President Walsh that the material for the signs and crossing planks had been ordered and would be installed as soon as possible. The following table indicates the location of highway crossings and the method of protection:

Milepost location.	Protection.
83.25	Crossing sign.
85.20	Crossing sign.
85.23	Crossing sign.
86.0	Crossing bell.
86.13	Crossing sign.
86.15	Crossing sign.
91.9	Crossing sign.
92.27	Crossing sign.
96.30	Crossing sign.
97.5	Crossing sign.
97.29	Crossing sign.
102.1	None.
102.3	Crossing sign.
104.28	Crossing sign.
105.10	Crossing sign.
105.30	Crossing sign.
106.4	Crossing sign.
107.5	Crossing sign.
107.30	Crossing sign.
108.11	Crossing sign.

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Milepost location.	Protection.
109.26	Crossing sign.
111.7	Crossing sign.
112.15	Crossing sign.
113.32	Crossing sign.
115.25	Crossing sign.
116.28	Crossing sign.
116.31	Crossing sign.
117.0	Crossing sign.
118.3	Crossing sign.
119.15	Crossing sign.
119.28	Crossing sign.
121.0	No crossing sign. None.
121.11	Crossing sign.
123.18	Crossing sign.
125.23	Crossing sign.
126.2	Crossing sign.
Separated Crossings:	
85.27 Under grade	Frame trestle.
89.20 Under grade	Frame trestle.
95.0 Over grade	Frame trestle.
95.23 Over grade	Frame trestle.
99.0 Over grade	Frame trestle.
99.18 Over grade	Frame trestle.

There are forty-two crossings, of which one is protected by a crossing bell, two are under grade and four are over grade crossings. There are seven protected or 16 2/3 per cent.

Railway Crossings and Connections:

The following table indicates the crossings of the Illinois Southern with other railway lines and the method of protection:

Little Rock	St. Louis & San Francisco	Interlocked.
Derby	M. R. & B. T. R. R.	Interlocked.
Flat River	M. R. & B. T. R. R.	Not interlocked.
Central	Federal Lead Belt Ry	Not interlocked.

The crossings are in good condition, being full-bolted, and the rivets in base and angle plates are tight, there being no evidence of unusual wear.

The distant signals on both the Illinois Southern and the Mississippi River & Bonne Terre Railways of the interlocking plant at Derby are not being used. It was stated by Vice-President Walsh that hunters would shoot the glass out of the semaphores and that boys would steal the roller bearings on the lines to the signals from the tower.

Switching connections are maintained at the following points:

Little Rock	St. Louis & San Francisco R. R.
Esther	St. Francois County Ry.
Central	Lead Belt Ry.
Derby	Mississippi River & Bonne Terre Ry.
Bismarck	St. Louis, Iron Mountain & Southern Ry.

Clearances:

The clearances as recommended by the American Railway Engineering Association are adopted by the Illinois Southern Railway as their standard.

Depot and Station Facilities:

Bismarck: Oil and coal are stored in the baggage room. The platform needs resurfacing.

Elvins: The chats platform needs resurfacing. At present a new $1,200.00 depot is being erected and will be completed by July 15, 1914.

Flat River: Condition excellent.

Esther: The bulletin board was not dated.

Sprott: The bulletin board was not dated. The chats platform needs resurfacing. A combination toilet should be built.

Weingarten: The chats platform needs resurfacing. The bulletin board was not dated. A combination toilet should be built.

New Offenburg: Oil and coal are stored in the freight room. The bulletin board was not dated. A combination toilet should be built.

Ste. Genevieve: Conditions excellent.

Signal Apparatus:

With the exception of the interlocking plants at Little Rock and Derby, there are neither authomatic nor manually-controlled block signals on the line, train movements being governed by train dispatchers' orders.

Summary of Suggestions:

It is suggested that:

(1) Cut ditches be cleaned out and right of way cleaned twice a year. (Section 3150, R. S. 1909.)

(2) Fences, farm gates and cattle guards be built and maintained in accordance with section 3145, R. S. 1909.

(3) New piling be driven for bridge No. 85/3.

(4) A minimum of 7,500 ties be applied monthly until the tie condition has been brought to the normal.

(5) All frogs, switches and guard rails be blocked. (Section 3163, R. S. 1909.)

(6) Bell and whistle be used on approach of crossings (section 3140), and that whistling posts be installed 1,320 feet each side of all highway crossings.

(7) Crossing planks and crossing signs be installed. (Section 3141, R. S. 1909.)

(8) Separate isolated structures be erected for the storage of oil and coal for station use.

(9) The chats platform be resurfaced at Bismarck, Elvins, Sprott and Weingarten.

(10) Combination toilets be built at Sprott, Weingarten and New Offenburg.

(11) Bulletin boards be dated and marked daily. (Section 3096, R. S. 1909.)

(12) Distant signals in the interlocking plant at Derby be repaired and put in operation.

(13) The Commission be placed on mailing list and furnished current time cards.

(14) Progress reports of the work outlined herein be mailed the Commission each month.

General Remarks:

It was stated by Vice-President Walsh that chloral naphtholeum was being used as a disinfectant in the toilet with excellent results.

Mr. Walsh agreed that he would remedy any condition existing in violation

of the statutes, and that the foregoing suggestions with reference to the comfort and convenience of the public would be given immediate attention.

In conclusion, it is desired to thank the officials of the railway company for their courtesy in furnishing any desired information and the facilities for making the inspection.

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In the Matter of the Annual Inspection of the MISSISSIPPI RIVER & BONNE TERRE RAILWAY COMPANY.

On June 24th and 25th, Commissioner Wightman, assisted by Engineer Gass, made an inspection of the railway lines of the Mississippi River & Bonne Terre Railway Company within the State of Missouri. The following officials of the railway company accompanied the Commission on the inspection: Mr. F. J. Thomure, general manager; Mr. E. A. Rozier, general attorney; Mr. C. H. Fake, chief engineer; Mr. Richard Doyle, trainmaster; Mr. C. H. Flint, roadmaster. The inspection was made from the observation platform of an inspection car pushed in front of the engine at a speed of about ten miles per hour.

The Mississippi River and Bonne Terre Railway is a class "C" single track railroad and extends from Riverside, a point on the St. Louis, Iron Mountain & Southern Railroad in Jefferson county, to Doe Run in St. Francois county, a distance of 46.46 miles.

There are five branch lines in St. Francois county extending from the main line to the mills and mines of the St. Joseph Lead Company. The main and branch lines serve a population of approximately 30,000 people. Other lead companies maintaining small switching properties have switching connections with the Mississippi River & Bonne Terre Railway.

The line being built through a heavy rolling country necessitates the use of steep grades and very sharp curvature. Forty-five per cent of the main line is curvature and the maximum curve is eighteen degrees on the Hoffman Branch.

The track mileage and per cent of curvature are as follows:

Main line	46.46 miles	45 per cent curvature.
Crawley Branch	1.63 miles	47 per cent curvature.
Gumbo Branch	3.11 miles	64 per cent curvature.
Mitchell Branch	1.42 miles	28 per cent curvature.
Turpin Branch	2.99 miles	48 per cent curvature.
Hoffman Branch	7.56 miles	55 per cent curvature.

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Easement curves are not used and no compensation of grades for curvature is made. The maximum super elevation on curves is five inches.

On the main line the ruling grade is 1.8 per cent and on the branch lines is 3.0 per cent. The clearances as recommended by the American Railway Engineering Association have been adopted as the standard of this company.

There is one tunnel, 250 feet long, cut through limestone at milepost 23, plus 1,150 feet, and a switch back is used in making the descent to the Leadwood mine and mill on the Hoffman Branch.

Roadbed and Right of Way:

The roadbed is in excellent condition with the exception of the cut ditches, which should be cleaned out and opened for drainage.

The embankments have been widened with tailings from the lead mines, and many concrete boxes and culverts have been constructed for through drainage and cattle passes along the line.

The right of way generally is in fair condition, there being no rank overgrowth of grass or weeds.

Barbed and woven wire fastened with the Western Union loop to the Ohio and D. & A. type of concrete post is the standard fence of this company. It was observed, however, that in many places the right of way was not fenced. It was stated by General Manager Thomure that in the mining district where no farming was done no attempt is made to fence the right of way, there being little or no stock at large and the miners and hunters cutting the wire fence wherever they have occasion to cross the right of way, making it impossible to keep fence in good repair.

Bridges and Openings:

The following is a list of the steel bridges and characteristics:

MAIN LINE.

No.	Mile.	Name.	Spans.	Length span.	Year built.	Type.	Specifications.	Loading.
1	2	Joachim	1	153	1902	Thru. Pin	1899	E-40
17	8¼	Sugar Creek	1	60	1902	Dk. Pl. Gir.	1899	E-40
22	12	McClain Creek	1	64	1900	Thru. Pl.	G. A. Ry.	E-50
25	12¼	Flucom Creek	1	50	1902	Dk. Pl. Gir.	1899	E-40
39	25.2	Bee Run	1	40	1898	Dk. Pl. Gir.	1894	E-35
41	28¼	North Big River	1	133	1897	Thru. Skew pin	1894	E-35
44	34.6	South Big River	2	125	1897	Dk. Riv. Truss	1894	E-35
52	38.7	Flat River	4	50	1907	Thru. Pl. Gir.	Am. Ry.	E-50
61	44.5	St. Francois	1	101	1897	Dk. Pl. Gir.	1894	E-35

HOFFMAN BRANCH.

No.	Mile.	Name.	Spans.	Length span.	Year built.	Type.	Specifications.	Loading.
1	4	Big River	2	83	1902	Dk. Pl. Gir.	1899	E-40

Note.—Missouri Pacific Railway specifications, 1894, approximately Cooper's E-35 loading.

Missouri Pacific Railway specifications, 1899, approximately Cooper's E-40 loading.

There are thirteen frame trestles, seven pile trestles and two creosoted pile trestles on the main line. There are three frame pile trestles on the Hoffman

Branch, one on the Crawley Branch and two each on the Gumbo, Mitchell and Turpin Branches.

All of the bridges are apparently in good condition and are ample for the loading now in service on this line.

Ballast:

Tailings from the lead mines are used for ballast. The depth of ballast beneath the tie averages from eight to eighteen inches and the ballast section is full. In many places the embankments have been entirely covered with chats or tailings. There is no scarcity of ballast as the Hoffman mine alone has been putting out approximately twenty cars of tailings a day for the past nine years. The only cost of ballast along the line of the Mississippi River & Bonne Terre is the transportation charge.

Ties and Tie Plating:

The tie condition is very good. White oak ties six inches by eight inches by eight feet are the standard of this company.

Thirty-two hundred to the mile, or eighteen ties to a thirty-foot rail and twenty ties to a thirty-three foot, is the standard.

The following table indicates the tie renewals for the past four years:

Date.	Main line.	Hoffman Branch.	Crawley Branch.	Gumbo Branch.
1910	33,197	4,501	3,110	4,410
1911	33,531	5,982	2,354	2,391
1912	27,121	4,075	1,534	1,466
1913	12,102	3,060	1,568	3,365
1914, six months	9,572	1,764	1,876	1,946
Totals	115,323	19,382	10,440	13,578

Total in main line and sidings	115,323
Total in branch lines and sidings	43,400
Total	158,723

It was stated by the chief engineer that the average life of a white oak tie on this road was from eight to ten years. It can be seen from the above table that the percentage of renewals is above normal.

Rails and Fastenings:

The following table indicates the consist of the rail in the main line and the five branch lines:

Milepost.	75-pound rail.			56-pound rail.
	Lineal feet.	Make.	Year.	Lineal feet.
0 to 1	9,676	National	1902	
	694	Illinois Steel	1909	
	30	Cambria	1906	
	110	Illinois Steel	1905	
	50	Illinois Steel	1902	
	10,560			

(CCS-Environ note: rest of this table not printed)

South of Elvins, on the main line, where one passenger train each way is operated daily and one or two local freight trains a week, the seventy-five pound rail is being taken up, except on curves of four degrees and sharper, and being replaced with fifty-six pound rail. The seventy-five pound rail taken up is used for relay rail on the main line curves where there is metal flow in the inner rail, due to low speed on curves which have been given an elevation for high velocities and where the outer rail is worn, due to sharp curvature.

All rail is laid with broken and suspended joints.

The seventy-five pound rail is fastened with four-hole, twenty-six inch angle bars, with seven-eighths by four-inch bolts without nut locks.

The fifty-six pound rail is fastened with four-hole, twenty-four inch angle bars, with three-quarter by three and one-quarter inch bolts without nut locks.

Frogs and Switches:

Number nine and ten frogs are used for the turnouts in the main line. The frogs, switches and guard rails are properly blocked as provided for by law and none of the material in the turnouts was observed to be worn or in bad condition. The switch stands were all locked and derails were maintained where protection is necessary against steep grades on the branch lines and sidings.

Highway Crossings:

The highway crossings generally are in fair condition, the principal criticism being that the approaches are too narrow, and the crossing planks are not of the dimensions required by law.

On the main line there are thirty-three street and highway crossings, thirty-nine private grade crossings, four public over-grade crossings, three public under-grade crossings and five private undergrade crossings, a total of eighty-four crossings. One of the crossings in Bonne Terre is protected by a watchman and another of the street crossings is protected by pneumatic crossing gates. There are fourteen crossings of the eighty-four protected, an average of approximately seventeen per cent.

There are five street grade crossings at Leadwood on the Hoffman Branch, seven grade crossings on the Crawley branch, three grade crossings and one over-grade crossing on the Mitchell Branch. The crossings all have the standard crossing sign of the company, and where there are fences, have wing fences, cattle guards and whistling posts.

Railway Crossings:

The following table indicates the crossings of other railroads and the method of protection:

St. Louis & San Francisco at Festus, Mo.	Overgrade.
St. Louis Smelting and Refining Co. at Desloge, Mo.	Overgrade.
Illinois Southern Railway at Derby, Mo.	Grade. Interlocking.
St. L., I. M. & S. at Doe Run Junction	None.

Other railway companies having switching connections with the Mississippi River & Bonne Terre Ry. are as follows:

St. Louis, Iron Mountain & Southern at Riverside.
Pittsburg Plate Glass Co. at Crystal Junction.
Desloge Consolidated Lead Co. Railway at Desloge.
St. Louis Lead Smelting and Refining Co. at St. Francois.
St. Francois County Railroad at Flat River.
Lead Belt Railway at River Mines.
Illinois Southern Railway at Derby.
St. Louis, Iron Mountain & Southern at Doe Run Junction.

The crossings are all in good condition, being full-bolted and riveted. The connections make a close fit and there is no evidence of wear.

Clearances:

The clearances as recommended by the American Railway Engineering Association have been adopted as the standard of this company.

Depot and Station Facilities:

Riverside: There are no sanitary drinking cups for sale. This station is used jointly with the St. Louis, Iron Mountain & Southern Railroad.

Herculaneum; There are no cuspidors. The toilet doors should be stenciled to denote sex compartment and the seats in both toilets need repairing.

Festus: There are no cuspidors. The bulletin board was not dated. The toilets need disinfecting.

Plattin: There are no toilets and no sanitary drinking cups for sale. Freight is stored in the waiting room.

Valley Mines: The bulletin board was not dated. There are no toilets and no sanitary drinking cups for sale. Oil and coal are stored in the freight room.

Bonne Terre: Station facilities excellent. At the shops it is suggested that a study be made to determine the advisability of the installation of septic tanks, as toilets now in use are insanitary.

Desloge: There are no sanitary drinking cups for sale. The bulletin board was not dated. The toilets need disinfecting. Oil is stored in the freight room.

St. Francois: The bulletin board was not dated. The platform needs surfacing.

Flat River: The bulletin board was not dated. Oil and coal are stored in the freight room. The toilets need disinfecting.

Rivermines: There are no cuspidors. The bulletin board was not dated. The toilets need disinfecting.

Elvins: The bulletin board was not dated.

Doe Run: The bulletin board was not dated.

Leadwood: Bulletin board not dated.

Signal Apparatus:

With the exception of the entrance to the Bonne Terre yards, the entire line is controlled by telegraph train orders.

The automatic block system installed by the Union Switch and Signal Company controls the movement of trains in and out of Bonne Terre yard. Its installation was necessitated by the long 3.0 per cent grade just south of the yards at Bonne Terre. Indicator boxes are located at all main line switches in the yards and a high semaphore is located at the top of the hill. Before a train can descend the hill and enter the yards the dispatcher, by levers in his office, throws the indicators at the switches to danger, which is a signal for all switch engines and trains to clear the main line. All main line switches must be closed and the main clear before the signal at the top of the hill can be lowered to "proceed."

Summary of Suggestions:

It is suggested that:

(1) All cut ditches be cleaned out and opened for drainage.

(2) The right of way be cut and burned twice a year.

(3) The right of way be fenced as required by law.

(4) All highway crossings be graded and the crossing planks be installed of the dimensions prescribed in the statutes.

(5) Sanitary drinking cups and cuspidors be installed in all stations.

(6) Bulletin boards be dated and marked daily.

(7) Combination toilets be built at all stations where sanitary toilets are not installed; that the doors be stenciled to denote sex compartments; a disinfectant be furnished and agent or section men be instructed to put same in toilet each week, and that the doors be locked and key kept by the agent.

(8) Separate isolated structures be erected for the storage of oil and coal.

(9) Freight unloaded from the trains not be left on the platforms.

(10) Platforms of chats be resurfaced where necessary.

(11) A study be made for the betterment of the toilet problem at the shops at Bonne Terre, and that the installation of new toilets be made as soon as is possible.

(12) The Commission be placed on the mailing list and furnished with current time-tables.

(13) Monthly progress reports be filed with the Commission as the suggestions herein are complied with.

General Remarks:

The company is to be congratulated on the general condition of the property. The track, equipment and station facilities of this class "C" road compare very favorably with some of the trunk lines.

It was stated by General Manager Thomure during the inspection that he would correct any condition existing in violation of the statutes.

The Commission desires to express its gratitude for the courtesy in furnishing any information desired and for the facilities in making the inspection.

In the Matter of the Annual Inspection of the ST. LOUIS, IRON MOUNTAIN & SOUTHERN RAILWAY COMPANY.

On September 1st, 2d and 3d, 1914, Commissioner Wightman, assisted by Engineer Gass, made the annual inspection of the St. Louis, Iron Mountain & Southern Railway Company's lines within the State of Missouri. The inspection was made from the observation platform of an inspection car pushed in front of the engine at a speed of approximately twenty miles per hour. The general superintendent, division superintendents and general roadmasters, accompanied the Commissioner.

The St. Louis, Iron Mountain & Southern Railway Company is a part of the Missouri Pacific Railway System and extends in a southerly direction from St.

Louis along the east line of the State, entering Arkansas just south of Neelyville in Butler county. There are several branch or feeder lines and the St. Louis Terminal. The track mileage is as follows:

	Miles.
St. Louis Terminal Division	21.70
Missouri Division, Barracks to Missouri-Arkansas State Line	177.21
Belmont Branch	120.30
Cairo Branch	70.77
Doniphan Branch	20.50
Jackson Branch	16.31
Potosi Branch	3.72
Total	430.51

The alignment and surface of the main line are excellent. All curves of two degrees and sharper are adjusted by the use of the Talbot Spiral. The beginning and end of both the simple curves and spirals are marked by posts along the track and opposite the points. On the back of these posts are painted the degree of curve and the amount of super-elevation. The super-elevation is figured for a given speed for each district and the maximum is six inches. The maximum and ruling grades are as follows:

MISSOURI DIVISION. MAIN LINE—ST. LOUIS TO MISSOURI-ARKANSAS STATE LINE.

	Northbound. per cent.	Southbound. per cent.
On miles 91 and 92	1.95	1.9
Belmont Branch	1.4	1.1
Jackson Branch	1.0	1.0
	Eastbound. per cent.	Westbound. per cent.
Cairo Branch	1.0	1.0
Doniphan Branch	1.433	1.593
Potosi Branch	1.0	1.0

The maximum speed allowable is as follows:

DeSoto district—passenger trains, 50 miles per hour; freight trains, 35 miles per hour.
Piedmont district—passenger trains, 50 miles per hour; freight trains, 35 miles per hour.
Belmont district—passenger trains, 35 miles per hour; freight trains, 25 miles per hour.
Cairo district—passenger trains, 40 miles per hour; freight trains, 30 miles per hour.
Poplar Bluff to Dexter Junction—passenger trains, 40 miles per hour; freight trains, 30 miles per hour.
Cairo to Dexter Junction—passenger trains, 30 miles per hour; freight trains, 20 miles per hour.
Dexter Junction to Birds Point—passenger trains, 35 miles per hour; freight trains, 25 miles per hour.
Doniphan Branch—mixed trains, 25 miles per hour.
Jackson Branch—mixed trains, 18 miles per hour.
Potosi Branch—mixed trains, 20 miles per hour.

Roadbed and Right of Way:

The roadbed generally was found to be in good condition. The cut ditches, most of which are subdrained, are free from vegetation and open for drainage. There were, however, a few of the embankments that should be widened at subgrade to prevent the unnecessary loss of ballast. With the exception of the first fifteen miles out of St. Louis all of the right of way on the Missouri Division has been cut this season and it was stated by the general superintendent that this work would be completed on the main and branch lines by October 1st of this year.

The entire right of way is fenced, except along the Mississippi river, across streams and through the towns. The fences are built of from four to eleven strands of barbed wire, hog-proofed barbed and woven wire, and field and shop-woven wire with barbed wire above. They were observed to be in good condition for the most part, but there are many stretches where repair work is necessary and it is suggested that this be attended to at once. All farm gates were closed.

Bridges and Openings:

All of the timber structures are apparently in good condition and are ample for the heaviest loading now in service. As renewals are made, a sheathing of galvanized metal is placed over the caps and stringers as a precaution against fire.

Steel tanks, filled with water, are in many places embedded in head of bank for emergencies. Some of the steel bridges should be repainted and the combination trusses should be replaced with structures of steel when necessary to make renewals thereon.

Ballast:

The main line of the Missouri Division is ballasted entirely with chats from the Mine LaMotte and gravel from the Black river at Mill Springs and Leeper, Mo. There is a sufficient depth beneath the tie, but there are many places in which the shoulder should be rounded out to complete the ballast section and thus insure good alignment and surface.

It was stated by the management that an application of fifty to sixty cars of ballast a month is being made with the regular section forces in conjunction with the local train service, and in this manner it is hoped to complete this work.

Ties and Tie Plating:

The tie condition was found to be very good. Standard white oak ties only are used in renewals and are laid twenty-inches on center, or 3,200 to the mile.

The following is a statement indicating the number of ties to be applied during the year 1914, the number applied in the seven-day period to September 7th, 1914, the total number applied to date, the per cent complete and the amount on hand yet to be applied:

	Main.	Siding.	Total.
Total required, 1914	165,500	67,100	232,600
Applied last seven days	2,800	563	3,363
Total applied to date	107,584	37,331	144,915
Per cent of 1914 complete	65.0%	55.6%	62.3%
Ties on hand	.....	.....	59,065

The statement hereunder shows the actual mileage of main line and sidings to which ties are applied, total number of ties in each, number of ties applied to each in 1912, 1913 and 1914, the per cent of the total applied each year:

Year.	Main line mileage.	Side track mileage.	Total in main line.	Total in sidings.	Applied in main line.	Applied in sidings.	Main line, per cent.	Siding, per cent.
1912	417.29	128.45	1,335,328	361,715	281,892	32,896	21.11	9.09
1913	417.29	128.45	1,335,328	361,715	171,370	41,728	12.83	11.53
1914	417.29	128.45	1,335,328	361,715	165,500	67,100	12.39	18.55

The information for 1914 is given as though the work were complete. There are yet 59,065 ties to be applied.

It is understood that the tie records for 1910 and 1911 are incomplete and in some respects incorrect, and to work up this information would entail the going through of approximately 3,500 time and material books.

All curves of two degrees and over are tie plated. The "Cellars" tie plate is the standard of this company. The intermediate plates have a corrugated bearing surface, while the joint plates have smooth bottoms. Plates are used on many of the bridges and on the treated red oak ties.

Rails and Fastenings:

The rail is in good condition. As only the passenger and local freight traffic is handled over the DeSoto and Piedmont Districts of the Missouri Division in Missouri, the rail section is heavier than the traffic demands.

The following is a consist of the rail at this date, location, weight and date laid:

From.	To.	Weight.	Laid.
St. Louis	Milepost 20	85-pound	1906
Milepost 20	Milepost 45	90-pound	1912
Milepost 45	Milepost 49.10	85-pound	1906
Milepost 49.10	Milepost 54.15	90-pound	1913
Milepost 54.15	Milepost 69¼	90-pound	1912
Milepost 69¼	Milepost 75¼	85-pound	1912
Milepost 75¼	Milepost 96¼	85-pound	1904
Milepost 96¼	Milepost 115¼	90-pound	1912
Milepost 115¼	Milepost 127	85-pound	1911
Milepost 127	Milepost 166	90-pound	1912
Milepost 166	Milepost 186	100-pound	1910

There are 62.8 miles of the eighty-five pound rail; 103.2 miles of the ninety-pound rail; and 20.0 miles of one hundred pound rail.

Since the inspection of December, 1913, new ninety-pound rail has been laid between milepost 49.10 and milepost 54.15. The first one hundred and sixty-six miles south of St. Louis is laid with four and six-hole angle bars, with broken and suspended joints. South of this the one hundred pound rail is laid even and suspended joists on account of the poor base under the track. It was noted that in many of the six-hole bars, only four bolts were used. All of the four-hole bars were full-bolted and the nuts fastened with Verona flat and tail nut locks. The joints are full bolted, tie-plated, full spiked and the ties are properly spaced.

Frogs and Switches:

All of the frogs and switches are in good condition. The frogs are full-bolted and riveted, with filler blocks snug. The guard rails are held with the Vaughn clamps and are blocked at the ends with solid and strip metallic fillers. The switch points are properly plated, fit snug to the main or stock rail at the point of closure and show no evidence of extreme or unusual wear.

It is suggested that the switch stand targets be repainted, to give better view from a distance when indicating an open switch.

Highway Crossings:

There are approximately one hundred and ninety highway crossings on the Missouri Division. The majority of these are in excellent condition. It was noted, however, that the crossing plank on many of these are not in accordance with the State statutes, being too short, and that a few of the crossings were narrow and of steep approaches.

The company is to be complimented on its efforts to make and maintain good crossings and approaches thereto of the highway and its tracks. At the present time, eighty-five of the crossings have been covered with crushed stone, ninety with chats, cinders and gravel, one with a rip-rap base covered with cinders and fourteen are of dirt, later to be covered with crushed stone as the crossings need repair.

On the first two street crossings south of the depot in DeSoto, Mo., it was suggested that no cars be allowed to stand within five hundred feet of the crossings in either direction. This was agreed to by the general superintendent and instructions issued to that effect.

Railway Crossings:

The following is a list of other railroads crossing the St. Louis, Iron Mountain & Southern Railway and the method of protection at the crossings:

MISSOURI DIVISION.

Location.	Railroad.	Station.	Protection.
De Soto District	.....	.....	None.
Piedmont District	St. L. & S. F. R. R.	Williamsville	Interlocked.
Piedmont District	St. L. & S. F. R. R.	Poplar Bluff	Interlocked.
Belmont District	M. R. & B. T. R. R.	Doe Run Junction	Not protected.
Belmont District	St. L. & S. F. R. R.	Delta	Not protected.
Belmont District	St. L. & S. W. R. R.	Dalia	Not protected.
Belmont District	St. L. & S. F. R. R.	Oran	Interlocked.
Belmont District	St. L., I. M. & S. R. R	Charlestown	Not protected.
Belmont District	St. L. & S. W. R. R.	Milepost 182 plus	Not protected.
Cairo District	St. L. & S. F. R. R.	Sikeston	Interlocked.
Cairo District	St. L. & S. F. R. R.	Morehouse	Not protected.
Cairo District	St. L. & S. W. R. R.	Dexter Junction	Not protected.
Cairo District	St. L. & S. F. R. R.	Dudley	Not protected.
Cairo District	Butler County R. R.	Linstead	Interlocked.

These crossings are all in good condition. There is no evidence of extreme wear and the wing and guard rails are full bolted with the intermediate filler, snug and well riveted to the base plate. There is no indication of deformation or permanent set at the joints and the ties under the crossings are in good condition and properly spaced.

Clearances:

The recommended clearances of the American Railway Engineering Association have been adopted as the standard of this company.

Branch Lines:

Potosi Branch:

Mineral Point to Potosi, 3.51 miles. This branch has a 50-foot right of way, the clearing and cutting of which it was stated would be completed by October

1st. The roadbed is in fairly good condition, although some of the cut ditches need cleaning. The entire length of the line is laid with sixty-six pound rail, which is in good condition. Four-hole angle bars with broken and suspended joints are used and it was noted that many of the joints were not full bolted. The tie condition is very good.

Cinder ballast is used and the section is ample for the traffic on this line.

Doniphan Branch:

Neelyville to Doniphan, 19.91 miles. Doniphan, the western terminus of this branch, is the assembling, storage and shipping point for the vast quantities of ties and lumber rafted down the Current river. The right of way, which has only recently been cleaned, is well fenced; also it was noted that all farm gates were closed. The roadbed is in fairly good condition, but many of the ditches should be opened for drainage. The line is laid with sixty pound rail, full-tied, bolted and spiked, and thirty per cent of it is raised on cinder and gravel ballast. A considerable amount of cinders were noted unloading along the line and these should be worked under as soon as possible. The alignment is good and the surface fair. Resurfacing the joints would do much towards improving this track, particularly where it is raised on earth. The tie condition is good. Three thousand to the mile is the standard, and renewals are made only when first grade white oak. At the present time, sixty per cent of the tie renewals for the calendar year of 1914 have been made and 220 per mile are yet to be applied this season.

The track needs weeding badly. The frogs and switches are properly blocked and the bridges are in good physical condition and are ample for the traffic.

Considering the traffic (four mixed trains daily) little criticism of this branch line is justified.

Jackson Branch:

Allenville to Jackson, 16.28 miles. Seventy per cent of the right of way is cut at the present time and will all be completed by October 1st. The right of way fences are in good condition. With the exception of a few cut ditches, which need opening for drainage, the roadbed is in good condition. All of the line is ballasted with cinders, chats and gravel, except about three quarters of a mile east of Allenville and one quarter of a mile west of Jackson. Only white oak ties are used, 3,200 to the mile. Seventy-five per cent of the tie renewals for the calendar year 1914 have been made and 125 ties per mile are yet to be applied. The tie condition is very good.

There are 10.7 miles of fifty-two pound rail, 0.2 miles of fifty-six pound rail, 2.6 miles of sixty pound rail and 2.9 miles of sixty-three pound rail. The joints are fastened with four-hole angle bars and are even and suspended, the track being originally laid on earth. Verona nut locks are used. There are many surface and line bent rails, occasioned by earth ballast, which should be replaced. The bridges are apparently in good physical condition and are ample for the present light traffic and equipment (four mixed trains daily).

It is suggested that the Commission Engineers make a detailed examination of the combination truss at Dutchtown and submit a report later.

On account of a drainage scheme, the reservoir of which will submerge some of the present track, the first five miles from Allenville to Dutchtown is to be relocated and rebuilt.

Cairo Branch:

Poplar Bluff to Bird Point, 70.04 miles. From Poplar Bluff to Dexter Junction, 25.65 miles, all of the heavy freight traffic from the main line is handled, from which point the movement is over the Cotton Belt to Thebes to the Illinois Division and into St. Louis.

From Dexter Junction to Birds Point, through Charleston, the traffic movement is very light, consisting of two passenger trains and one local freight each way daily. The right of way has just been cut and is in good condition; the fences are in good repair and the farm gates closed, except from Charleston to Bird Point, which is in the overflow district. Approximately all of the line is ballasted with cinders, chats and gravel. With the exception of a few cypress ties, all tie renewals are made with first-class white oak. The 1914 renewals are seventy per cent complete and there are yet 150 ties per mile to be applied. From Poplar Bluff to Dexter Junction, the track is laid with seventy-five pound rail, and is in good condition, being full tied, bolted and spiked, having a good ballast section, and being ample for the heavy freight movement thereon. From Dexter Junction to Birds Point, there are many surface bent rail and many with deformation and permanent set at the joints, due to operation without ballast. The rail, while light, is of ample section for the very light traffic east of Dexter Junction. All of the badly surface bent rail should be replaced and where the deformation is not too bad, the application of new angle bars will do much to improve the surface at the joints.

It was stated that approximately 600 pairs of angle bars of a heavier section had been applied on this and the Belmont branches during the fiscal year.

Belmont Branch:

The Belmont Branch extends from Bismarck, on the main line, to Belmont, on the Mississippi river, a distance of 120.05 miles and crosses the Cairo Branch at Charleston. The greater part of the line from Charleston to Belmont is subject to overflow, as is the case with the Cairo Branch between Charleston and Birds Point. This district is known as the "Mississippi River Flood Territory" and in 1912 the flood resulted in the destruction of bridges, embankments and track. The restoration work of 1912-13, which involved an expenditure of approximately $70,000.00, was made by the application of sand, gravel, chats and rip-rap and is complete, with the exception of short stretches of gravel which have been distributed and is yet to be put under the track to restore the original grade.

From Charleston to Delta, the track is much better and is ample for the present service. Between Delta and Bismarck some of the freight traffic from the DeSoto district is diverted to the Cotton Belt and the track conditions are much better. The outer rail on the curves are laid with seventy-five pound rail and orders have just been issued for the laying of ten miles more of the seventy-five pound rail. This work will commence about twenty-five miles east of Bismarck and will connect the present seventy-five pound rail on the curves.

Approximately sixty-five per cent of the right of way has been cut and cleaned and the section forces are generally engaged in completing the work. The fences are generally in fair condition, but there are many places that should be repaired, a few of the farm gates are gone and others open. Some of the highway crossing plank are too short and others need replacing. Sand cinders and gravel are used as ballast. Tie renewals are made of first grade white oak and seventy per cent of the 1914 renewals are in. There is much surface bent rail due to operation without ballast, but the application of heavier angle bars and ballast is improving the track condition. Considering the traffic and overflow conditions, this branch is in very good condition.

Depot and Station Facilities:

The depots were all found to be clean and in a satisfactory condition with the exception of the following notations:

There are no sanitary drinking cups for sale in any of the stations, as provided in section 1, page 188, Laws 1913.

The toilet at Fisk should be moved to a place more accessible to the public.

There was no water in the coolers at Hematite, Vineland, Cadet, Potosi and Iron Mountain.

Additional toilets should be erected at Kimmswick, Hendrickson, Iron Mountain and Glen Allen.

The bulletin boards were not dated at Horine, Vineland, Sabula, Belmont, Blodgett, Fredericktown, Knob Lick, Jefferson Barracks and Mine LaMotte.

The platforms should be resurfaced at Vineland, Blackwell, Middlebrook, Des Arc, Mill Springs, Hendrickson, Fisk and Dudley.

The water cooler at Horine is out of repair.

There were no water coolers at Iron Mountain and Naylor.

The toilets at Sulphur Springs, Fisk, Bertrand and Diehlstadt should be disinfected.

Signal Apparatus:

From St. Louis to Piedmont, a distance of 126.9 miles, the line is controlled by automatic block. From Piedmont to the State Line, the line is controlled by manual block, telephone circuit.

Summary of Recommendations:

It is recommended that:

All embankments be brought to a width at sub-grade in accordance with the standards of the American Railway Engineering Association for Class "A" railroads.

The right of way from St. Louis to White House be cut at once and the work of cutting and clearing the right of way be continued until completed over all districts of the main line and branch lines.

Some of the fence lines that need repairing be attended to at once.

The steel spans and girders on which the paint is blistering and peeling be repainted.

The work of ballasting be continued until such a time as the ballast section on both the main and branch lines has reached the standard section for that class of road.

Switch targets be repainted, so as to be easily seen at a distance sufficient to prevent accident in case of an open switch.

The cut ditches on the branch lines be cleaned out and opened for drainage.

The weeds in the track be pulled, being detrimental to good drainage and holding the moisture to the ties.

That cinders be put under ties on the Doniphan Branch where they have been unloaded along the track.

On the Jackson, Cairo and Belmont Branches that such of the surface bent rail as can not be improved by the application of new and heavier angle bars be replaced.

The work of straightening kinked rail on the Belmont and Cairo Branches south and east of Charleston be continued and that such of the rail as can not be made safe and serviceable be replaced.

Sanitary drinking cups be installed in all depots as provided in section 1, page 188, Laws 1913.

The toilet at Fisk be moved to a place more accessible to the public.

Water be maintained in the coolers in all depots as provided in the statutes.

Additional toilets be erected at Kimmswick and Hendrickson. All toilets be stenciled to denote sex compartments and that a disinfectant be used regularly in all closets.

All platforms of cinders or chats be maintained at a surface level with the surrounding curb and at a height sufficient to allow passengers to alight from and enter the coaches with comfort and safety.

In conclusion, it is the desire of the Commission to express its gratitude for the courtesy extended in furnishing any desired information and the facilities for making the inspection.