

AB-7 (Sub-No. AB-7 (Sub-No. 86F)
WITNESS: Williamson Exhibit No.
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WRITTEN DIRECT TESTIMONY OF HARRY M. WILLIAMSON

My name is Harry M. Williamson and I am a self-employed railroad engineering consultant. My address is 14 Contra Costa Place, Oakland, California 94618. I received a B.S. degree in Civil Engineering in 1936 from the University of Utah and attended the Harvard Business School as a graduate student in 1940. Until my retirement in 1975 I had been employed for more than 40 years in the Engineering Department of Southern Pacific Transportation Company. I held many positions with SPTC, including Roadmaster, Division Engineer, and for the last 15 years Chief Engineer-System.

I am Registered Professional Engineer in the States of Oregon, California and Texas. I am a Fellow in the American Society of Civil Engineers, a life member of the Roadmasters' Association and of the Bridge and Building Association. I am a life member and past President (1970) of the American Railway Engineering Association.

As a consultant employed first by Booz, Allen and Hamilton and then by the Milwaukee Road, I have inspected a major portion of the system including all of the trackage west of Miles City, Montana. My inspections west of Miles City took place in July, 1978 and August, 1979. These inspections made by by-rail car, that is, an automobile equipped with flanged metal wheels for operation on railroad tracks. I made stops from time to time to look at specific problem areas, to make walking inspections and to take the photographs accompanying my testimony.

My contributions to the Booz, Allen and Hamilton report to the Milwaukee Road Trustee are found at Volume 1, pp. 19-20 and 29-30, including Exhibit VIII and in Volume II at pp. V-26 - V-27 and Appendix L. My contribution to the Application in this proceeding is Section(b) (1).

The purposes of my testimony are to describe what I saw in the course of my inspections and to estimate the cost of necessary rehabilitation were the abandonment application denied by the Commission. My testimony is limited to those lines owned by the Milwaukee Road or jointly owned with other railroads and maintained by the Milwaukee. These lines are listed in Appendix B to the Application.

The lines to be abandoned require substantial rehabilitation. Ties, rail, ballast and drainage condition are far below the standards required to provide a safe, dependable and competitive rail service. Derailments are occurring with alarming frequency due to the deteriorated condition of the track structure. On the transcontinental mainline west of Miles City, more than 200 miles is restricted to 10 M.P.H., and in addition more than 440 miles is restricted to 30 M.P.H. or less.

If the lines are to remain in service, material replacement will be very expensive. Approximately 40% of the ties and several hundred miles of rail must be replaced. Also required is a heavy program of ballast cleaning and replacement, surfacing, drainage work, cut cleaning and bank widening of eroded fill sections.. Rehabilitation also will require extensive mechanized equipment and training and housing for a greatly expanded labor force.

Substantial and expensive structural repair work cannot be deferred much longer. Some of the concrete-lined tunnels have deteriorated to the point that reinforcing steel is exposed and rusting, causing sections of concrete to fall. Some steel bridges -- particularly those subject to salty West Coast air -- are rusting to the point of losing metal. A major and costly bridge painting program is required to retard further weakening of these structures.

My estimates of rehabilitation costs are summarized in Appendix A. These estimates are based on unit costs expressed in 1979 dollars. The unit costs were developed by me after conferring with Chief Engineers of several major railroads, and I believe they are reasonable. The quantities were developed by me on the basis of my personal inspections.

My July, 1978 inspection was limited to mainline trackage and I developed an estimate of rehabilitation costs at that time. In order to restate mainline rehabilitation costs in 1979 dollars, I used updated unit costs and applied a 5% deferred maintenance factor determined through reinspection in August, 1979 of segments of the mainline.

The remainder of my testimony sets forth the results of my line inspections.

THE MAINLINE

The mainline (subdivisions A, B, F, G, H, J, P and S) extends from Miles City to Tacoma, a distance of approximately 1075 miles. My July, 1978 inspection began in Miles City and headed west.

West out of Miles City, the rail is becoming corrugated (worn, by surface wear, especially on curves) and approximately 800 ties per mile are required through here. The tonnage density west of Miles City is about six million gross tons per mile.

Around Milepost 1173, sinkholes are resulting from side cutting by Great Porcupine Creek. Some areas have been riprapped, but a problem still exists. There is poor line and surface.

Photograph 1 at Milepost 1174 is a view of the line and surface problems in this area. The track is pretty rough, although the ties and ballast are a bit better and the rail is pretty good. The railroad has done some good protection work along the Yellowstone River using riprap from a quarry at Musselshell, Milepost 1265.

Photograph 2 is a view at Harlowton at Milepost 1336. The yard tracks here are marginal with very poor rail. A lot of ties are needed.

The track west of Harlowton carries about 11 million gross tons per mile because of traffic generated on the northern Montana grain lines. The track up the hill to Loweth, Milepost 1381, is 25 M.P.H. The rail is getting heavy curve wear and is developing gauge problems. Also, there is heavy vegetation in the track area, especially bad around Milepost 1393. The track from Milepost 1435 to Milepost 1450 at Three Forks is pretty good track. Yard tracks at Three Forks are fair.

West of Three Forks to Milepost 1467 there is quite a bit of fairly new 115# rail, then 100# to Milepost 1485. There is some heavier rail around Milepost 1475 which is heavy curve territory. The rail is starting to corrugate and should be ground. The 100# rail is rough, ties are needed, ballast is foul.

Photograph 3 shows a recent derailment site at Milepost 1416 on an eight degree curve. I saw almost continuous derailment marks on the ties through this territory, which is subject to a 10 M.P.H. slow order. The railroad has averaged more than one mainline derailment a day since the beginning of 1978 on the Montana Division.

In August, 1979 I reinspected the 25 mile segment between Three Forks and Jefferson Island, Milepost 1474. I found this segment had deteriorated since my July, 1978 inspection and would require approximately 5% more rehabilitation work. More derailments had occurred in the interim period. Photograph 4, taken during my reinspection, shows an eight degree curve at Milepost 1469.5. Photograph S shows new continuous welded rail laid at Milepost 1585. Leaving Piedmont, Milepost 1486 to Donald, Milepost 1505, there is a 2% rising grade. The line then drops on a 1.7% grade to Butte, Milepost 1520. The track on this hill is badly fouled with engine sand, the rail is corrugated, curves are worn and battered. Heavy rail renewal is required here. The ties are derailment marked. This is a pretty rough looking mountain railroad.

Photograph 6 shows heavy engine sand approaching Tunnel 11 at Milepost 1505, a very wet and rough tunnel.

Sidings at Butte and Alloy at Milepost 1523 need ties. A road crew was digging in ties at Milepost 1528. The track is rough in this area with poor ties, surface bent rail and poor ballast. The 100# rail to Deer Lodge is in poor shape.

West of Deer Lodge I saw a surfacing gang working -- this work is much needed. The track is rough and there is too much elevation on the curves. Tunnel 14 at Milepost 1574 has a 10 M.P.H. slow order.

Poor rail and ties to Milepost 1603. Fair 50 M.P.H. track to Milepost 1619. From Milepost 1629 to Milepost 1641 at Missoula, the railroad is very poor with a 10 M.P.H. order.

Photograph 7 shows the track at Bonner Junction, Milepost 1635. Note the many shims (wood blocks under tie plates), pulled line spikes and indications of pumping at the joints. Photograph 8 at Milepost 1635.5 shows 10 M.P.H. track. The track is muddy and a lot of drainage work is needed here.

The track west of Missoula is somewhat better and is operated at 30 M.P.H. Approximately 500 ties per mile and a smoothing lift are required. The track has had enough safety ties installed to get up to Class 3, but it will not hold unless more ties are installed and a good surfacing job is done. From Milepost 1691 to St. Regis, Milepost 1716, the tie situation is about the same. A lot of ditching is needed in this territory. For the first time in my mainline inspection, I noticed that fill shoulders are weak in places. Ditching machinery called a Gradall is needed to work here. Photograph 9 shows a very muddy railroad with bad tie condition at Milepost 1696. This is typical of the situation in this territory. Photograph 10 was taken at Milepost 1714.

Leaving Haugan at Milepost 1735 is a 1.7% grade to East Portal at Milepost 1750 on the Idaho State Line. There is heavy curvature here and the rail is getting badly curve worn. Flanges are striking the angle bars in many places. A heavy curve renewal program is needed here. Tunnel 20 at East Portal is about 800 feet long. It is concrete lined but spalling (peeling) very badly. A major reinforcing job, called "guniting," is required. (A cement and sand mixture is applied with air pressure.) This is a wet tunnel with a 10 M.P.H. slow order.

From Tunnel 20 the line descends the Bitter Root Mountains on a 1.7% grade. There are many 10 degree curves and the rail is corrugating. A grinding job is needed

here. I noted lots of engine sand and, again, many derailment marks. Photograph 11 shows a typical curve -- note derailment marked ties.

Photograph 12 is a view of one of six or seven very high steel viaducts, some 300 to 400 feet long. These structures are a potentially very high maintenance liability for the future. These are ballast decks (floored), which is good. Tunnels are concrete lined which is also good. Heavy rail renewal is needed, however. All the relay rail used in this area has been second-hand carbon rail -- no alloy or heat treated rail has been used to lengthen rail life.

Photograph 13 shows a recent derailment site at Milepost 1759.5 at Falcon. This was a descending grain train -- some of the hoppers are at the bottom of the canyon. Here again, derailment marks are almost continuous. Panels of rail have been laid to restore the track at many of these derailment sites, but poor line and cross level often exists where they tie back into the old track, thus setting up a condition that could cause another derailment and destroys the new ties in the panels.

Photograph 14 shows a derailment that occurred at Milepost 1761 two days before my inspection. I was told it took 20 hours and 600 ties to restore the track.

On the west side of the hill the ballast situation is better with crushed rock. There is a 10 M.P.H. slow order from Milepost 1737 to Milepost 1751, then 25 M.P.H. to Milepost 1760, then 10 M.P.H. again to Milepost 1777.

The yard at Avery, Idaho, Milepost 1773, is in poor shape with bad ties and rail. The mainline is muddy. The eight degree curves around Milepost 1783 are getting very badly corrugated. The track is muddy, although I am told it was surfaced in 1976. This confirms my belief that you cannot raise track on muddy ballast and get anything to last.

During my second inspection tour, I reinspected the 38 mile segment between Haugan and Avery. This territory over the Bitter Root Range is a very poor mountain railroad and is worse than it was a year earlier. Some locations have been improved, but additional bad areas are surfacing, resulting in a continuing acceleration of deferred maintenance. Derailment marks cover 65% of this territory, the track is very muddy in many places, much of the rail is surface bent and the track out of cross level with bad line. Tunnel 20 is very wet and now spalling badly and requiring a lot of work. Photograph 15 shows the results of a very recent derailment at Bryson, Milepost 1744. Photograph 16 is a view of Avery Yard, showing the east end torn up by a derailment.

Leaving St. Maries the track is poor and restricted to 10 M.P.H. from Milepost 1819 to Milepost 1825. The track is then fair looking and 25 M.P.H. up the hill to Plummer at Milepost 1837. Density is approximately 10 gross ton miles to the coast. From Milepost 1839 west for about nine miles the rail is welded. At this location, the railroad has been cross-slotting the joints (grinding to control flow of metal) on the conventional rail. This is good – the first I had seen on the Milwaukee. The CWR does not have enough ballast, however. They could fill the "crib" space between ties.

Photograph 17 shows continuous welded rail around Milepost 1843. This looks pretty good except for partially skeletonized cribs in the distance. Plenty of ballast is required to hold continuous welded rail.

The track to Milepost 1927 is 25 M.P.H., although rough around Milepost 1854. Some very poor 90# rail from Milepost 1855 to Milepost 1857. The track is muddy and the drainage poor. Photograph 18 shows surface bent 90# rail with joints swinging (not supported) at least 3/4" under trains with continuous joints that could break.

Much of the 100# and most of the 90# rail through here is about gone. The ties are not too had, with 500 per mile replacement required. The tunnels are rock with concrete portals and look good. The 112# rail, line and surface are not too bad to Othello at Milepost 1988. Weed control is very poor.

Othello Yard is fair and needs some ties. Ties are generally good to Milepost 1997 at Taunton. The 100# rail to Milepost 2008 is not too bad. Some sloughing at cuts and wash-ins are muddying up the track. The track is fair looking to Beverly at Milepost 2026. Ascending a 2.2% grade, the rail needs grinding and ditching; a Gradall is needed here also.

The tie condition is better west of the Columbia River at Milepost 2026. From Ellensburg, Milepost 2060 west, the ties are better and the line and surface fair. This is 50 M.P.H. track. West of Cle Elum, Milepost 2086 the track is muddy and west of Milepost 2098 it is a bit choppy. Grinding and surfacing are required.

Photograph 19 is a view on an ascending grade about Milepost 2105. Note the muddy track and poor drainage, ballast and line and surface. This is not good for a mountain railroad.

Photograph 20 shows an avalanche shed about Milepost 2112. Note the ineffectiveness of the guard rail. Many railroads are taking out guard rails as they don't help with heavy loads and are a nuisance to work around. A portion of this shed has been knocked down by a derailment.

Tunnel 50 at the summit, Milepost 2117, is 11,890 feet long and has pretty good line and surface, except that the last few hundred feet is choppy. The railroad on the west side is on a 1.74% grade and is in better shape.

Photograph 21 shows a typical curve around Milepost 2119. Ties, rail and ballast are all better on this side of the mountain. A pass or two with a rail grinding train to take out the rail corrugations would make this a pretty fair mountain railroad.

The track over the Cascades is much better than that over the Bitter Roots. There are some problems in line and surface between Mileposts 2129 and 2131, and the railroad has had some derailments in this territory. The track needs some line and surface to Milepost 2154 at Maple Valley.

Six or seven truss bridges in this area are exposed to salt air and will need painting soon to keep from losing metal.

The railroad from Black River Junction to Tacoma is jointly owned with Union Pacific. The 132# rail, ties, and line and surface are pretty good. The signal system is Centralized Traffic Control. There was a slow order at Milepost 2172.5 across a pretty rough trestle. Vegetation control is required.

BRANCHLINES

All my branch line inspections took place in August, 1979.

Northern Montana Lines (Subdivisions C, D and E). Heading north out of Great Falls, the 14-mile segment between Emerson Junction and Dracut Junction, Milepost 217 is maintained by the Burlington Northern and is badly out of cross-level and needs ties. The Milwaukee maintains the trackage from Dracut Junction to Choteau, Milepost 252. Between Dracut Junction and Fairfield, Milepost 234, ties are poor and the ballast is also poor and in insufficient amount. I observed several sun kinks because of insufficient ballast. Much of this lightweight 65# rail must be renewed, along with 50% of the ties. From Choteau to Agawam, Milepost 265, the track is in pretty good shape for Class 1. Only 100 ties per mile and several miles of surfacing is required.

Returning to Great Falls, the trackage through Great Falls is poor and needs drainage, ties and some rail. Falls Yard is fair and the track is fair to Salem at Milepost 186. Some fills have settled. Starting at Milepost 185 and heading east to Highwood, Milepost 168, the subgrade is very unstable. There are many slip-outs and slides and bridge and tunnel damage is evident. Major fill stabilization is needed in this area at a cost I estimate at \$4,000,000.

Photograph 22 at Milepost 185 shows one such slip being worked on at the time of my inspection. The fill failed on the left or north side and the track was shifted to the south.

Photograph 23 shows a failing portal at Tunnel 4 at Milepost 178. In order to minimize pressure from above, the overburden (earth above the tunnel) had been removed. Numerous derailments have occurred in this territory because of the tortured track alignment.

The track from Milepost 168 to Milepost 148 is fairly good for Class 2 track. The track from Milepost 145 to Milepost 143 crosses Crane Lake and has settled; it needs to be raised two feet. Photograph 24 illustrates.

The track to Milepost 133 is fair and then a bit rougher to Milepost 115. The track also is rough up the hill to Milepost 106. From there on the trackage is fair with a few sinks to Lewistown. Approximately 600-800 ties per mile and a few miles of rail are required.

Photograph 25 illustrates a slide on the Heath line, which otherwise is in pretty good shape for Class 1. The Winifred branch is in fair shape for Class 1 but requires 600-800 ties per mile. About 20% of the ties on the Winifred branch are not plated. Photograph 26 shows a typical view of the Winifred line at about Milepost 15. Photograph 27 shows a washout to the ends of the ties at Milepost 39.

South of Lewistown the 62 miles of railroad to Harlowton is much better than that between Lewistown and Great Falls. Approximately 700 ties per mile, 10 miles of second hand rail and some surfacing would make this a good Class 2 line.

Ringling to Dorsey. This 3.5 mile branch in Subdivision B is in very bad shape. It requires 50% tie renewal, complete resurfacing and some repair rail. Photograph 28 illustrates the condition of this branch.

Bonner Junction to Bonner. This 2.4 mile branch in Subdivision G is in fair shape for Class 1 track. Two hundred ties per mile and some surfacing is required.

St. Maries to Purdue (Subdivision I). The track from St. Maries to Milepost 14 is very bad. The 7501 rail is worn out as is the 62# rail between Milepost 42 and 52. The line requires ditching, surfacing and ties in addition to rail. Photograph 29 shows badly curve worn 75# rail at Milepost 8.5.

Plummer to Manito. This 20 mile segment of Subdivision K is pretty good track. Between Plummer and Milepost 1842 approximately 800 ties per mile are required. Surface is poor between Milepost 1842 and 1843. The 90# rail between Mileposts 1842 and 1856 at Manito is end battered and engine burned. Surface is poor and 1200 ties per mile are required. The entire segment needs vegetation control. Photograph 30 illustrates the general condition at. Milepost 1847.

Dishman to Coeur d'Alene. The 11.7 mile Milwaukee-owned segment between Dishman and Spokane Bridge (Subdivision M) is laid with 65# rail. The rail is fair between Mileposts 0 and 7 and surface bent between Mileposts 7 and 12. Eight hundred ties per mile, three miles of second hand rail and some surfacing are required. The 13.6 mile segment jointly owned with BN between Spokane Bridge and Coeur d'Alene sees heavier traffic because of BN operations. The 65# rail is surface bent between Spokane Bridge, Milepost 12 and McGuires, Milepost 15.5. The BN performs maintenance between Post Falls, Milepost BN 25 and Milepost BN 32. The Milwaukee-maintained portion needs rail and 100 ties per mile.

Metline Falls to Newport. This 61.1 mile branch (Subdivision L) is laid with 75# rail that needs some replacement. The northern end between Mileposts 104 and 98 is a serious slide area. The line has several tunnels and all are adequate for present movements except Blue Slide Tunnel at Milepost 82 which is in heavy moving ground. The high deck truss bridge at Milepost 98 will need painting soon. About 20% of the tied on tangent (straight) track are unplated, contributing to early tie failure. Approximately 800 ties per mile are required for Class 2. Photo number 31 illustrates the general condition on the line at Milepost 80.

Columbia Basin Branches. The 39 mile branch between Marcellus and Tiflis (Subdivision O) is laid with 6511 rail. The line does not see much traffic, especially at the end. Some repair and ties are needed and, through muddy areas, some surfacing. Fifteen per cent of the track is unplated. Photograph 32 illustrates vegetation growth at Marcellus, Milepost 47.

The 28.2 mile branch between Warden and Moses Lake (Subdivision N) is choppy and rough between Mileposts 3 and 6 with surface bent 90# rail. Some of the 80# and 85# rail between Tiflis and Moses Lake is surface bent. The branch is fairly good between Moses Lake, Milepost 15 and the Air Base, Milepost 19. The branch requires ten miles of rail, 15 miles of surfacing and 800 ties per mile.

The 5.2 mile branch between Royal City Junction and Royal City (Subdivision Q) is a new and good railroad laid with 100# and 131# rail. There are heavy curves and grades, but all that is needed is some cut cleaning of fallen rock.

Cedar Falls to Snoqualmie Falls (Subdivision R). This 11.2 mile branch is laid with 85# rail. From Milepost 0 to Milepost 2 the rail is worn out. This line is in poor shape, with heavy grades and curvature. The line requires ties, rail, surfacing, drainage and brush control. Photograph 33 at Milepost 7 illustrates general conditions.

Tacoma to Chehalis Junction (Subdivision T). The rail on the hill leaving Tacoma between Milepost 0 and 3 is completely worn out. Between Mileposts 3 and 11 the 100# rail needs a 25% renewal. Approximately 1200-1500 ties per mile and complete resurfacing is required. The 85# rail beyond Frederickson is not too good for a Class 3 mainline. Fifteen miles of relay rail, fairly heavy tie renewal and 30 miles of

resurfacing will be required, as there is a great deal of muddy track. Photograph 34 illustrates conditions at Milepost 29.

Frederickson to Morton (Subdivision U). This 56.1 mile branch line is laid with 85# and 90# rail in poor to fair condition. Photograph 5 illustrates. Between Mileposts 25 and 30 the trackage is very muddy and 85# rail is poor. Ties are generally poor and there have been many derailments. The bridges look good, as does the 100# rail between Mileposts 34 and 38. Lots of ditching, drainage and vegetation control is needed. For a Class 2 railroad, the line must take 20 miles of rail, 1200 ties per mile and 90% surfacing.

Maytown to Helsing Junction (Subdivision V). This 11.2 mile segment is presently out of surface. It is laid with 85# rail that requires two miles of relay rail, surfacing and 600 ties per mile.

Bellingham to Limestone Junction (Subdivision Y). This 32.9 mile segment is laid mostly with 85# rail. The trackage is very rough and the rail poor between Mileposts 0 and 6. There is a large timber two-span truss bridge at Milepost 18. Vines and brush extend over the track between Sumas, Milepost 25 and Limestone Junction, Milepost 33. The line requires 300 ties per mile, three miles of rail and ten miles of surfacing as well as vegetation control.

Lynden to Hampton (Subdivision Y). This 5.3 mile segment is laid mostly with lightweight 60# rail. It requires 200 ties per mile, 1 mile of rail and five miles of surfacing to attain Class 1.

Port Townsend to Port Angeles (Subdivision Z). This 50.8 mile line on the Olympic Peninsula is laid mostly with 75# rail with some 65# and several miles of 56# near Port Townsend. The ties are fair to poor with only about 90% plated. There are many high timber trestles on this line that appear to be in good shape, but these are always a fire hazard. Photograph 36 illustrates general conditions at Milepost 18. The line requires four miles of rail, 400 ties per mile and 12 miles of surfacing for a good Class 1 track.

State of California
County of Alameda

VERIFICATION

Harry M. Williamson, being duly sworn, deposes and says that the foregoing statement is true and correct to the best of my knowledge and belief.
August 29, 1979.

/s/ Harry M. Williamson

EXHIBIT A
COSTS TO REHABILITATE TO FRA STANDARDS

<u>MAIN LINE</u>	<u>CLASS 1</u>	<u>CLASS 2</u>	<u>CLASS 3</u>
Miles City to Tacoma			\$58,125,000
Tacoma Jct. to Chehalis Jct.			\$5,016,000
 <u>BRANCHES</u>			
Fredrickson - Morton	\$3,200,000	\$4,370,000	
Maytown - Helsing Jct.	531,000		
Bellingham - Limestone Jct.	690,000		
Hampton - Lynden	171,000		
Port Angeles - Port Townsend	1,135,000		
Cedar Falls - Snoqualamie Falls	739,000	\$1,254,000	
Royal City Jct. - Royal City	20,000		
Warden - Moses Lake		\$1,627,000	
Tiflis - Marcellus	472,000	\$1,175,000	
Plummer - Manito			\$1,460,000
Dishman - Spokane Br.	713,000		

Spokane Br. - Coeur d'Alene	825,000	
Newport - Metaline Falls	1,732,000	4,464,000
St. Maries - Purdue	2,970,000	4,350,000
Purdue - Bovill [Not owned MW]	139,000	231,000
Bonner Jct. - Bonner	181,000	
Ringling - Dorsey	307,000	
Harlowton - Emerson Jct.		11,607,000
Dracut Jct. - Eastham Jct.	1,900,000	2,915,000
Choteau Jct. - Agawam	125,000	
Lewistown - Heath	50,000	
Winifred Jct. - Winifred	1,983,000	
<u>YARD TRACKS</u>	3,975,000	
Equipment, special contract, ie weed control, grading, etc.		\$7,000,000

Stated in 1979 Dollars