VALUATION SECTION MONTANA 1

GENERAL LOCATION

Valuation Section Montana One covers the main line of the of the C.M. & St. P. Ry. Co's. Puget Sound Extension between the North Dakota-Montana state line and a point about three and three tenths miles west of Harlowton, Montana, and comprises about three hundred and thirty-seven miles of railroad.

RECONNOISSANCES

The explorations between the Missouri River and Miles City, Montana, made in 1901-02-05-06, are described in the Historical Sketch of Valuation Section South Dakota One. One hundred eighteen miles of main line in the state of Montana lies east of Miles City, consequently a considerable portion of this reconnoissance was in connection with Valuation Section Montana One. Another reconnoissance east of Miles City took place in March, 1906, starting at Terry, Montana; thence easterly up Fallon Creek; thence via Sandstone Creek up Carroll Creek; thence down Carroll Creek to the Little Missouri River at Marmarth.

A reconnoissance was started west from Miles City in September, 1904, a route being examined north of the Yellowstone to Alkali Creek, about forty miles west of Forsyth; thence up Alkali Creek over the divide between the Yellowstone and Musselshell Rivers and down to the present town of Musselshell; thence up the Musselshell River to Harlowton, which was situated on the Montana Railroad. This party continued explorations on west as will be described under other Valuation Sections.

A total of about one thousand and forty miles was covered in reconnoissance to obtain the three hundred thirty-seven miles of adopted and constructed line.

SURVEYS

Three survey parties were organized and equipped in Chicago, and sent to Miles City, Montana in January, 1906. The teams, wagons, etc., for the transportation of the parties were purchased in Miles City.

Two of these parties traveled over land to the head of Sheep and Ash Creeks at a point about ten miles southwest of Teedee, Montana, from which point they ran surveys east and west on the most

southerly route examined in reconnoissance. One party made a survey in a general southerly direction following drainage when practicable, crossing Fallon Creek and Little Beaver Creek to Box Elder Creek, which was followed to the Little Missouri River; thence down the Little Missouri to a crossing near the mouth of Hay Creek; thence up Hay Creek to the divide where connection was made with a survey from the east. This survey was made in March and April. During this time the other party ran a continuation of this line northwesterly from the point of origin near Teedee, down Sheep Creek to a crossing of the Powder River, near Mizpah; thence to the Tongue River, which was followed to Miles City. A secondary line was surveyed by one of these parties, starting at Marmarth and running westerly through Little Beaver and Lame Jones Creek Valleys to McKenzie's ranch about eight miles south of Teedee. In the meantime the reconnoissance from Terry to Marmarth had been completed and these parties were transferred to investigate the possibilities along the line. Their surveys developed the line as constructed.

The other party which was sent to Miles City, January, 1906, made preliminary and location surveys up the Yellowstone River past Forsyth; thence up Froze to Death Creek to a connection at a point about seven miles south of Thebes, Montana, with a line which had previously been surveyed from that point west to Summatra. A survey had also been made along the route adopted between Summatra and Melstone. Coincident with these surveys a survey was made up Big Porcupine Creek, from the Yellowstone Valley, which is west of Forsyth. This route was discarded and the party made the final survey along Big Porcupine and Horse Creeks.

Surveys west from Melstone along the Musselshell River were made by three parties in the early months of 1906. A large amount of preliminary survey work was necessary in the Musselshell Valley to avoid frequent crossings with the channel of the river and in this connection surveys and estimates for channel changes were made.

A summary of the surveys for this Valuation Section indicates that about twelve hundred seventy miles were covered to obtain the three hundred thirty-seven miles of adopted and constructed line or about three and three tenths miles covered in the surveys for one mile of constructed line. The surveys were made between January and May, 1906, and during the earlier months some extremely cold weather, and in many places deep snow, was encountered. The entire territory covered was sparcely settled and long hauls for supplies were necessary.

In addition to the locating parties, two engineers in charge of location were in the field to reconnoiter and direct the movements of the parties.

CONSTRUCTION ORGANIZATION

For purposes of construction this Valuation Section was divided into four divisions, each under the supervision of a Division Engineer and the required residency parties. The Division Engineers had offices at points convenient to the work and reported to Engineers of Construction. One of the Engineers of Construction had charge of

the line from Montline to the twelfth crossing of the Musselshell River, east of Melstone, and maintained offices in Miles City. The other Engineer of Construction had offices in Lombard and had charge of the line betterment work being done on the Montana Railroad, in addition to the construction work between Melstone and Harlowton.

The clearing, grubbing, grading, bridge and culvers work, track laying and handling of stores and supplies was done by McIntosh Bros. under the general contract dated December 23rd,1905. McIntosh Bros. sublet the entire line and a large part of it was relet to small outfits and station men.

CHARACTER OF THE COUNTRY

The country between Marmarth and Terry was practically uninhabited in 1906, there being only one ranch house between Marmarth and Ismay and one cattle ranch between Ismay and Terry. At Ismay there was a ranch house and a small amount of land under irrigation. The bench lands on either side of Corral, Sandstone, and Fallon Creeks were unoccupied. The wide valley of the Yellowstone River between Bluff Port and Terry was devoted entirely to grazing but is now largely under cultivation. From the first crossing of the Yellowstone River, west of Terry, to Miles City, a lot of alfalfa was produced. Through the Fort Keogh Military Reservation, west of Miles City, the land was not under cultivation in 1906, but at the present time this is cultivated by dry farming methods. Leaving the west line of the Reservation, near Paragon, practically none of the wide valleys were under cultivation until Lock Bluffs was reached. The soil was largely gumbo but there is some good land next to the river which is being dry farmed at present. From Lock Bluffs to Forsyth the valley was under irrigation in 1906, and is now well occupied by farmers. Private irrigation systems were in existence in the valleys of the Yellowstone River and Big Porcupine Creek at the time of construction, being installed to facilitate the raising of hay for winter feed for the herds ranging over the territory lying to the north. Between Antwerp, in the Big Porcupine Creek Valley, and the first crossing of the Musselshell River, a distance of fifty miles, only one ranch was in existence in 1906. At the present time grain fields are scattered along the line between Vananda and Bascom and along the Musselshell River considerable irrigation farming is done.

CONSTRUCTED LINE

The line as constructed, leaving Montline follows Corral Creek through bad land formation on a maximum gradient of five tenths percent with light curvature to the divide between Corral and Sandstone Creeks at Kingmont; thence it decends along Sandstone Creek with a maximum gradient of four tenths percent and easy curvature for about thirty miles until Fallon Creek is reached near Ismay. From here Fallon Creek is followed for about thirty miles to Bluff Port; thence with side hill development the line decends into the Yellow Stone River Valley, near Terry, crossing the Northern Pacific main line between Bluff Port and Terry.

Several channel changes were made on Corral, Sandstone and Fallon Creeks to avoid bridge construction. Many of these were quite extensive. Large openings were required where crossings of these creeks were necessary, involving expensive bridge construction.

The south bank of the Yellowstone River is followed to a point about five miles west of Terry, where a crossing of the river is effected on a 1080 foot steel bridge. Thence the line remains on the north side for a distance of about twenty-four miles to another crossing of the river, from which point the Northern Pacific Railway is practically paralleled into Miles City. West from Miles City the line continues on the south side of the river for about five miles; thence crosses on another steel bridge and follows the north side to Mile Three Hundred Seventy-three, west of Forsyth, the maximum gradient along the Yellowstone River being five tenths percent.

West of Forsyth the line swings into Horse Creek Valley which it ascends on a maximum gradient of five tenths percent and with maximum curvature of two degrees. From a point east of Thebes to the summit west of Summatra a rough and rolling country is traversed. From this summit descent is made along Sunday Creek with comparatively light work and maximum gradient of five tenths percent to the first crossing of the Musselshell River about three miles east of Melstone. From Melstone west to Harlowton the line follows the valley of the Musselshell River, crossing the river eleven times on expensive steel bridges. Numerous channel changes were made to obviate other crossings, some of which were very expensive. The channel changes were necessarily well ripraped as was also the embankment adjacent to the river.

CONSTRUCTION

As previously stated under the paragraph "Construction Organization" the line was divided into four divisions for construction purposes.

First Division

The first division extended from Montline to the Northern Pacific Railway crossing, near Cato, a distance of about seventy-five miles. The contractor's outfits for this section were shipped via the Northern Pacific to Fallon near the west end of the section, from where they were hauled to the points of operation by team. Fallon was the point of distribution for the contractor's materials and supplies throughout the construction. The country traversed yielded no supplies of any sort, nor were there any wagon roads in existence. It was necessary, therefore, to construct and maintain wagon roads over this entire section. The numerous creek crossings on this road required a large amount of bridge construction.

The grading material encountered in the Corral and Sandstone Creek Valleys were had pan, loose and solid rock. The side borrow was usually gumbo or hard pan. In the Fallon Creek Valley the various materials occurred in the same cuts.

An important incident in the construction of this section occurred in June, 1907, when the water from a cloud burst at the head of Sandstone Creek swept down the valleys, carrying away equipment, live stock and supplies, and in many cases finished embankments. Two men lost their lives in this flood and many of the sub-contractors lost their entire outfits of construction equipment, supplies and stock. The washed out grading had not been accepted by the Railway Company. It was imperative, however, to hold the forces together and prosecute the work vigorously to prevent delay in the forward progress of track laying. The contractors were, therefore, given assistance in reorganizing their demoralized forces and accorded liberal treatment to enable and induce them to proceed with the work. A further result of this flood was a change in the alignment of about twelve miles of line, portions of which had been graded. This change materially increased the expense of construction.

Second Division

The second construction division westward extended from the Northern Pacific Railway crossing, near Cato, to the present town of Carterville, a distance of about seventy-five miles. Contractor's equipment, material and supplies were shipped over the Northern Pacific Railway to various points located along the line, as that Railway was in close proximity, although in the majority of cases it was on the opposite bank of the Yellowstone River. For the work on the twenty-five miles between the first crossing of the Yellowstone River west of Terry and the second crossing east of Tusler it was necessary to ferry all material, etc., across the river. Between Tusler and Forsyth the transportation was facilitated by the presence of highway bridges over the river, although it was necessary to ferry heavier equipment across the river as the bridges were not constructed of sufficient strength for such heavy loading.

The material encountered in the cuts was almost universally a mixture of loose rock, sand rock and solid rock. The borrowed material was ordinarily common earth, gravel and hard pan. Extremely heavy work was necessary along the bluffs on the north side of the Yellowstone River between Calypso and Kinsey. A steam shovel was taken across the river from the Northern Pacific track for this work. This was accomplished by dragging the shovel on the bed of the river through deep water by capstan and cable. One man lost his life during this operation. West of Bonfield Bluffs about two miles of the embankment was built in the swift current of the river. It was necessary to select large masses of rock for this fill and after the river froze over a special gang was maintained cutting the ice to allow the rock to reach the proper position at the toe of the slope. A second shovel was dragged across the river for the heavy work at Lock Bluffs.

Considerable riprap was placed for bank protection on the river side and numerous wing dams were constructed for the same purpose.

Third Division

The third division extended from the present town of Carterville to the first crossing of the Musselshell River about

three miles east of Melstone, a distance of about seventy-nine miles.

Contractor's headquarters were established at Forsyth. Supplies and equipment for the work between Carterville and Forsyth were unloaded at various points along the Northern Pacific Railway, and taken across the river to the points of use. For the territory between Forsyth and Melstone no wagon roads were in existence, consequently it was necessary to construct and maintain roads for transportation of supplies by team from Forsyth. The soil was largely gumbo, which made these roads practically impassable in the wet seasons. Water was hauled for this construction work from Froze to Death Butte Springs. East of Forsyth Bluffs, the material encountered was easily handled. At Forsyth Bluffs about a mile of heavy work was encountered through gravel, loose rock, sand rock and solid rock.

Steam shovels were used for this work which were knocked down, carried across the highway bridge at Forsyth and reassembled at the site of the work. Between a point about three miles east of Vananda and the head of Sunday Creek, near Summatra, the soil was all gumbo and was difficult to handle. The bottom layers of the deep cuts in this distance required blasting, and isolated boulders caused constantly recurring damage to grading machines.

The summit cut near Summatra involved the removal of some 200,000 cubic yards of material, and to enable track laying to proceed, a temporary line, on a one and five tenths percent gradient, was built lying to the south of the present operated line.

The grading material between Summatra and Melstone was largely gumbo. West of Forsyth in Big Porcupine Creek Valley numerous channel changes were made and irrigation complications were encountered which required expensive construction.

Fourth Division

The fourth construction division extended from the first crossing of the Musselshell River, near Melstone, to the junction with the Montana Railroad west of Harlowton, a distance of about one hundred eight miles. Grading outfits and supplies were hauled from Billings and Harlowton.

The principal features of the construction of this division were the numerous and extensive channel changes for the Musselshell River and the large amount of riprap required for bank protection. A large amount of the riprap material was hauled by wagon as suitable rock could not be obtained adjacent to the places where riprap was required. Wing dams were also constructed for protection.

General Notes

In general it can be said that more than the average amount of bridge work and bank protection was required on this section due to the fact that it lies almost entirely in the river valleys.

Disturbance to irrigation dams, intakes, etc. was a matter of large expense in the way of litigation, etc., and the expense of replacing and changing these systems was considerable.

High wages were paid for labor during construction on this Valuation Section due to the scarcity of men, climatic conditions and the large amount of other construction work in progress.

BRIDGES, TRESTLES & CULVERTS

The sub-structure and super-structure of all steel bridges on this section were constructed by the Railway Company forces. Timber bridges and the culverts were in general constructed by the contractors.

Pile bridges were built in accordance with the Railway Company's standard plans. Piles were of Western cedar and in a few cases of Eastern pine. The material for these structures was shipped via the Northern Pacific Railway to the points in closest proximity to the structures. The more important points of unloading were Forsyth, Rosebud, Hathaway, Miles City, Tusler, Shirley, Blatchford, Terry and Cato. Material was hauled from the points of unloading to the points of erection by team. The material for the structures between Terry and Tusler was rafted across the river. For the territory between Forsyth and Melstone the material was hauled from Forsyth, with the exception that a small part of it was hauled from end of track as it progressed eastward from Harlowton. Delays in the delivery of material due to the difficulty and the distance of team haul made it necessary to temporarily crib or fill many openings to permit a proper disposition of grading material.

TRACK LAYING AND BALLASTING

McIntosh Bros. did the track laying using a Roberts Bros. machine on about three hundred miles of the work. Track laying proceeded from three different points determined from the availability of transportation of material. Thus track was laid west from Montline, material being delivered over the track already laid through South and North Dakota; from Cato east and west with material delivered over the Northern Pacific Railway to Cato; from Harlowton east material being delivered on the Northern Pacific Railway at Lombard; thence hauled to Harlowton by the Montana Railroad.

A material yard was established in Mile TwoHundred Seventy-one, near Cato, and a connection with the Northern Pacific Railway graded and track laid. At this yard material for about forty miles of track was received and stored. Work began from this yard on May 27th, 1907, using a machine and proceeded east reaching Mile Two Hundred Fifty-three on August 25th. A delay of about a month was experienced due to the flood in Fallon Creek. The track laying machine was then shipped to Harlowton. Track laying continued easterly by hand, reaching Mile Two Hundred Forty-one October 16th. Track reached Montline from the east on December 30th,1907, and proceeded west without interruption to a connection in Mile Two Hundred Forty-one with the track laid east from Cato.

Track was laid west from Cato to the Yellowstone crossing by hand between August 19th and November 11th, 1907. Bridge material was delivered over this track from the Northern Pacific connection at Cato, thus expediting its erection. When track from the east was connected with the track from the west in Mile Two Hundred Forty-one, the machine was forwarded to the bridge and track laying continued westward with very little interruption. Track with this machine reached Mile Three Hundred Ten on February 19th, 1908, where connection was made with the track laid from Harlowton.

Track laying eastward from Harlowton was all done with the machine shipped from Cato, with the exception of about five miles west and two miles east of Miles City, which was laid by hand. Track reached Melstone December 30th, 1907, and the Yellowstone bridge, west of Miles City, Mile Three Hundred Ten, February 16th, 1908.

A material yard was constructed about two and a half miles west of Roundup, in which about two miles of temporary track was laid.

Ballasting on this section was begun in 1908, using material hauled from gravel pits at Thame, Kinsey, Paragon, Melstone and Harlowton. Since 1910 some gravel for ballast has been taken from a pit near Two Dot. Development of these pits and construction of tracks to them involved considerable expense. The pit at Thame is five miles from the main line. That at Kinsey is one mile from the main line and that at Paragon three and a half miles from the main line.

WATER STATIONS

Between Montline and Ismay the running water in Sandstone Creek is insufficient, therefore a reservoir was constructed at Baker. The dam required about 40,000 dubic yards of material and an area of about 150 acres was flooded. For construction purposes a temporary water station was installed in Mile Two Hundred Eighteen and water taken from Sandstone Creek.

It was necessary to dig wells in the creek bed at Ismay and Mildred as Fallon Creek becomes dry during the summer months. A dam was constructed at Ismay with the intention of impounding the water in Fallon Creek, but on account of the unsuitable nature of the banks, it could not be maintained. Originally the supply of water was obtained at Terry from a spring some distance north of the track. At present a well is used. Between Terrey and Forsyth water is obtained from the Yellowstone River, stations being maintained at Terry, Bonfield, Miles City, Paragon, Thurlow and Forsyth. From Forsyth west the situation was difficult. No permanent running streams existed between Forsyth and the Musselshell River. A reservoir impounding the water in Horse Creek was built at Vananda. About 68 acres were flooded at this place. Reservoirs were also constructed in Miles Three Hundred Ninety-two, Three Hundred Ninety-four, Three Hundred Ninety-six and Four Hundred.

The railroad embankments with an additional amount of material and riprap for wave wash protection were utilized as dams. These reservoirs collected a fair amount of water and were especially useful during track laying, saving long hauls on tank cars. Permanent stations are now maintained at Vananda, Thebes, Ingomar, Summatra, Melstone, Delphia, Roundup, Waldheim, Burgoyne, Shawmut and Harlowton.

SIGNS, FENCES AND CROSSINGS

The right of way has been fenced and the proper crossing facilities provided, except in inaccessible and isolated places, and through the important terminals and station grounds. The material was delivered by train. Snow fence is provided where protection is required.

BUILDINGS

Many temporary buildings were built and used during construction for supply and store houses, camps, etc.

The material for the permanent buildings was delivered by work train after the track was laid. Standard combination freight and passenger depots were installed at the important stations and smaller depots for the accommodation of operators, etc., at the less important sidings. Engine terminals were built at Miles City, Melstone and Harlowton and quite extensive shops at the former place.

TELEGRAPH AND TELEPHONE

Telegraph and telephone material was distributed by work train. The pole line averages about 35 poles per mile, and carries an average of 8 wires. Telephones have been installed in the depots and in booths at "blind sidings", and are used for train dispatching purposes.

OPERATION AND MANAGEMENT

This Valuation Section is all on the Musselshell Division. The local offices are in Miles City. Heavy main line equipment is used. The Manual Block system of operation is used over this entire Division.