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DESIGN AND CONSTRUCTION HISTORY

PROJECT C-185 RAILROAD CONNECTION SOUTH OF RICHLAND; CONSTRUCTION, RELOCATION, AND REHABILITATION

DECEMBER, 1951

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PROJECT C-185

RAILROAD CONNECTION SOUTH OF RICHLAND; CONSTRUCTION,
RELOCATION, AND REHABILITATION

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DESIGN AND CONSTRUCTION HISTORY

PROJECT C-185

**RAILROAD CONNECTION SOUTH OF RICHLAND; CONSTRUCTION,
RELOCATION, AND REHABILITATION**

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PROJECT C-185

RAILROAD CONNECTION SOUTH OF RICHLAND; CONSTRUCTION,
RELOCATION, AND REHABILITATION

INTRODUCTION

At the time Project C-185 was initiated, the Hanford Works was served only by the Chicago, Milwaukee, St. Paul & Pacific Railroad, with the resulting lack of opportunity for competitive freight rates. The Milwaukee connected with the Hanford Works railroad at the extreme northwest corner of the reservation, approximately 50 miles northwest of Richland. At this point, known as Riverland, there was a classification yard serving the entire rail traffic needs of the Works. In this situation, freight traffic from the south and southeast, or originating from any point in the United States and transported by carriers other than the Milwaukee, could not make reasonable connections with either the Hanford Works railroad system or the Milwaukee system for economical interchange. Carload shipments from the warehousing area located at Pasco, Washington, although only 12 miles from Richland, required a railroad movement of approximately 240 miles.

The Milwaukee connection to the reservation is a branch line parallel to the Columbia River from Beverly, Washington, to Riverland--a distance of approximately twenty-two miles. This line passes along the base of hills and steep slopes which are extremely vulnerable to sabotage, natural rock slides, and damage from floods. For these reasons, a supplemental rail connection was considered a vital necessity. §1§

Historically, the desirability of a southern railroad connection had been recognized at the inception of the Hanford Works. In 1943, preliminary planning and development actually proceeded to the point of agreement between the Manhattan Engineer District and the two operating carriers, the Union Pacific and Northern Pacific. *1 Some survey work was accomplished and foundation exploration for a Yakima River Bridge was being done when the Area Engineer decided that in the interest of conservation of materials and manpower the connection could be abandoned if the Milwaukee would improve their access line serving the reservation at that time. This the Milwaukee agreed to do, and further work on the southern connection was suspended.

In 1946, when it became evident that the Hanford Works would be a permanent installation, negotiations were again opened with the UP and the NP, and a final agreement (Contract AT-45-1-GEN-21) was reached and signed November 6, 1947. This agreement provided that the railroads were jointly to make an initial payment

*1. Manhattan Engineer District History; Volume 5, Construction,

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of \$100,000 and thereafter to pay \$4 per car moved over the road until the initial actual cost of construction for the connection between the UP line and the north end of the Yakima River Bridge was amortized. From a financial standpoint, the eventual recovery of construction costs for this portion of the project, plus the savings in freight charges, made Project C-185 extremely attractive.

Subsequent to agreement with the participating railroads, it was necessary for them to petition the Interstate Commerce Commission for a "Permit of Convenience and Necessity" to operate over the Government road. After numerous hearings, the ICC granted approval on September 28, 1948, stipulating certain changes in the operating contract between the roads and the Atomic Energy Commission. Instead of a \$4-per-car payment, the ICC stipulated that the construction costs to be borne by the railroads be paid off on the basis of a 2-percent-per-year annual payment by each road for 25 years; the \$100,000 cash payment remained unchanged. Accordingly, the operating contract was changed to agree with the new stipulations.

Simultaneously with the negotiations between the Hanford Works and the railroads and the subsequent ICC hearings, Project Proposal Gov't 5, (C-185) dated July 26, 1947, was prepared by the AEC and submitted to D. H. Lauder, GE Hanford Works Manager, and various other preliminary work was undertaken.

As conceived, this project included the construction of a railroad inter-connection from the southern end of the Hanford Works railroad to connect with the UP main line at a point approximately one mile east of the Richland "Y." Also included in the project was a classification yard, consisting of approximately 13,000 linear feet of tracks, to be built at a location near the 3000 Area. This proposal included the following main divisions of work:

- A. Track south of Yakima River to connect with UP main line.
(11,300 linear feet)
- B. Undercrossing of U. S. Highway 410.
- C. Yakima River Railroad Bridge.
- D. Track north of Yakima River to connection with Hanford Works railroad.
(6,700 linear feet)
- E. Classification Yard consisting of 13,000 linear feet of track, a yard office, scales, and other facilities.
- F. Irrigation Canal crossing.

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In order to proceed with this project, it was necessary to obtain right-of-way acquisition from the southern boundary of the Hanford Works to the intersection with the UP Railroad. Arrangements were made with the Corps of Engineers, Portland District, to initiate the necessary action. A total of 67.62 acres, providing a right-of-way boundary of 200 feet from a point slightly south of the river crossing to

station 53+00, and 100 feet south from that point to the interchange connection, was acquired. Of this total, 14.56 acres were obtained by direct purchase and 53.06 acres were obtained by condemnation.

The AEC obtained the following permits, which were required before actual construction could begin:

A. A permit from the State of Washington Department of Public Lands for right-of-way over the Yakima River bed and shores.

B. A franchise from the State of Washington Department of Highways to construct a railroad overpass over State Road No. 3. (U.S. 410)

C. Permission from the Corps of Engineers to erect a Yakima River Bridge. This permission was required because the river would be considered navigable upon creation of the McNary Dam pool and was given without stipulation of minimum navigation clearances during high water periods.

D. A permit from the Columbia Irrigation District to build a railroad crossing over their irrigation canal. The permit stipulated that all work be complete by February 15, 1949. Since the proposed railroad crossed the canal at an acute angle, it was planned to relocate a canal section to effect a right-angle crossing, thus simplifying the bridge design and resulting in considerable savings. Because of the urgency, this work was awarded to J. A. Terteling & Sons, Inc., on a cost-plus-a-fixed-fee basis as part of their Subcontract G-173.

E. Approval from Benton County to close three short sections of county roads which crossed the proposed right-of-way.

On December 15, 1948, the AEC stated that the railroad right-of-way was fully acquired with the exception of rights on the county and state road crossings. §10§ Efforts to secure the necessary permits continued for about a year thereafter; however, about eight months of this period were also occupied with the completion of design and the awarding of a subcontract. Notice to proceed with the construction was given on August 15, 1949.

It was mutually agreed to establish the elevation of the top of the Yakima River Bridge ties at 366.25. This agreement was reached after correspondence with the Portland Engineer District in consideration of the 1891 flood and the effect of the McNary backwater. The top of the fill south of the Yakima River was established at 363.5 elevation by the AEC after discussion with the Walla Walla Engineer District.

PART I - DESIGN

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AUTHORIZATION

As a result of a study of the transportation situation on the Hanford Works, the AEC prepared the original project proposal (Gov't 5, dated July 26, 1947) as pre-

viously mentioned. The total estimated expenditure was \$850,967, which included \$38,680 for engineering and field supervision and the same amount for contingencies. Authorization for the work was given in the form of AEC Directive HEW-76 on August 18, 1947. The original proposal stipulated that GE would perform the engineering and direct supervision and that the construction work would be accomplished by the Guy F. Atkinson Co. and the J. A. Jones Construction Co. (joint venturers). The completion date was established as January 1, 1948. After reviewing all ramifications of the proposal, F. R. Creedon, Construction Project Manager of the GE Design and Construction Department, requested AEC approval to invite bids. §7§

The work proposed to be done under this bid included clearing and grubbing, excavation, grading and drainage, and completion of track work and four turnouts.

Approval to issue bids was granted on December 30, 1947, with the stipulation that the list of prospective bidders was cleared for issuance only, and since construction of the railroad was contingent upon the outcome of the ICC proceedings, no award was to be made without prior approval of the AEC.

The invitations were mailed out December 22, 1947, on the scope of work outlined above (no bridges). The subcontract bids were returned to the bidders unopened upon receipt of notification from the AEC on February 13, 1948, that acquisition of land necessary for the relocation of an irrigation canal could not be effected until March 15, 1948. §8§

AEC Directive HEW-76, Modification No. 1, dated April 19, 1949, extended the completion date from March 31, 1948, to January 1, 1950. This action was taken in response to a letter from GE, dated March 25, 1949, which stated that the deferment was required because of delays in acquisition of right-of-way, foundation explorations, the establishment of backwater elevations, and other related work. §2§

Subsequently, it became apparent that the scope of work exceeded the original project proposal; therefore, Part II Project Proposal C-185 was issued by the GE D&C Divisions on May 6, 1949, showing the expanded scope, and requesting additional funds in the amount of \$2,292,533.

This proposal was sent to the AEC on June 6, 1949. It was proposed to build a single-track railroad from the point of connection with the Hanford Works railroad at ordinate N-43062.96 to connect with the main line track of the UP Railroad intersecting this track at a point approximately one mile east of the Richland "Y." The total length of the connection was approximately 10 miles, of which approximately 3 miles of new railroad west of the expanded Richland Village had been constructed previously under Project C-214, "Rehabilitation of Plant Railroad." The main items of work proposed included the following:

- A. Construction of a relocated irrigation canal and steel span canal crossing.
- B. Construction of a steel span overcrossing over U.S. Highway 410, and timber trestle approaches.

C. Construction of a steel spanbridge with steel pile piers and timber trestle approach over the Yakima River.

D. Construction of approximately 33,437 track feet of main line railroad.

E. Construction of approximately 5,800 track feet of siding track and spur connections.

F. Construction of approximately 19,802 track feet of classification yard track and "turn-around wye."

G. Rehabilitation of approximately 3,073 track feet of existing railroad.

H. Placement of approximately 501,260 cubic yards of compact fill. This quantity was increased considerably when the section of railroad fill was raised from 360.0 feet to 363.5 feet.

I. Placement of approximately 475 cubic yards of riprap.

J. Removal of approximately 2.11 miles of existing track.

K. Installation of miscellaneous flood-equalizer culverts, drainage facilities, right-of-way fences, gates, cattle guards, and grade crossings; relocation of existing power and communication poles; installation of track scales; relocation of irrigation lines; and sand stabilization for protection of the railroad.

L. Placement of approximately 37,200 cubic yards of ballast.

M. Construction of a steel span overcrossing and trestle approaches over a county road.

Approval for the Part II Project Proposal was contained in AEC Directive HEW-76, Modification No. 2, dated June 24, 1949. Total expenditures were approved in the amount of \$3,114,000. The county road overcrossing was deleted, with the result that \$30,000 was withheld from the requested authorization.

AEC Directive HEW-76, Modification No. 3, dated October 31, 1949, reduced the total authorized expenditures to \$2,489,000. This adjustment was made in order to bring the figure in line with the pertinent item in the 1950 Budget.

Modification No. 4 to Directive HEW-76, dated January 18, 1950, extended the completion date to April 10, 1950; Modification No. 5, dated April 3, 1950, extended the completion date to June 30, 1950; and Modification No. 6, dated July 7, 1950, extended the completion date to July 20, 1950. These extensions of time were requested by GE. §3§, §4§, §5§

DESIGN ORGANIZATION

General Electric: The basic work authority assigned C. O. Henning, Design Division Engineer of the 700, 1100, and 3000 Areas, the responsibility for design and

preparation of all railroad plans and specifications required for the construction of the railroad classification yard.

In addition to the above duties, C. O. Henning directed, coordinated, and approved the design prepared by DeWitt C. Griffin & Assoc. and that design work prepared by J. Gordon Turnbull, Inc., Graham, Anderson, Probst & White.

E. N. Hull was the Contact Engineer, representing the Transportation Department.

DeWitt C. Griffin & Assoc.: This firm, represented by W. Morton, Office Engineer, designed the single-track railroad extension connecting the southern end of the Hanford Works railroad to the UP Railroad.

J. Gordon Turnbull, Inc., Graham, Anderson, Probst & White: After the Part II Project Proposal had been approved, the design work was assigned to this organization, represented by D. M. Checkley, Project Manager. The duties of this engineering subcontractor included the checking of all drawings previously prepared by DeWitt C. Griffin, as well as the preparation of drawings necessary for the added work.

J. A. Terteling & Sons, Inc.: This concern, under Cost-Plus-A-Fixed-Fee Subcontract G-173, made foundation explorations for the track spur from the UP line to and including the crossing of the Yakima River. The work included excavation of test pits and setting up and operating a steel barge used by the drilling subcontractor, R. J. Strasser Drilling Co. Terteling was represented by H. A. Taylor, Project Manager.

R. J. Strasser Drilling Co.: This firm, represented by W. G. Strasser, drilled test holes to obtain information on which the safe and economical design of the foundation for the bridge piers could be based.

Frederick J. Converse: Frederick J. Converse performed consulting engineer services for the track spur foundation from the UP line to and including the crossing of the Yakima River.

Atomic Energy Commission: The AEC representative for Project C-185 was D. J. Brumley.

DESIGN SUBCONTRACTS

For a listing of the design subcontracts and sub-subcontract, refer to page 34 .

DESIGN CONSIDERATIONS

It will be noted from previous descriptions that most of the work was outside the boundaries of the Hanford Works. For this reason it was necessary to protect the rights of the general public as well as to avoid encroachment upon the adjacent privately-owned property. Consideration of this phase of the project included the installation of miscellaneous flood-equalizer culverts, drainage facilities, right-

of-way fences, gates, cattle guards, and grade crossings; construction of access roads; and relocation of existing power and communication poles.

Within the Hanford reservation it was necessary to relocate irrigation lines, including a ditch at the site of the classification yard. From the junction at the UP main line to the north end of the Yakima River Bridge, all design was approved by the two contributing railroads. It was necessary to bring the roadbed up to an elevation above the maximum backwater elevations to be expected when McNary Dam would be put in operation. Design of the embankment on the river side included riprap for protection against wave action. Design of the roadbed was affected by the discovery of quicksand at a point near the Richland "Y." Bridge piers were redesigned after consultation with F. J. Converse, when the pile-driving crew failed to reach the penetration required by the initial design. Design of the Yakima River Bridge was governed by the use of five spans which were purchased from the UP Railroad and which had formerly been used in Oregon and Idaho. In order to avoid certain interferences with an existing power transmission line, it became necessary to move the north limit of the project northward 230 feet to accommodate the "turn-around wye."

DESIGN PERFORMANCE

The design for work encompassed by the original project was accomplished by the correlated efforts of several groups. A survey was made of the right-of-way, and a preliminary sketch was prepared by the GE Construction Division under the supervision of R. T. Gardner, Roads and Railroads Specialist, showing alignment, topography, profile, and tentative grade lines. On October 3, 1947, this was turned over to DeWitt C. Griffin & Assoc. who wrote specifications and prepared design for the portion south of Richland, including the bridges. Work performed by Griffin was done under the GE surveillance of W. C. Royce, D&C Department Project Engineer, Design (Civil), and H. L. Friend, a Senior Engineer under the Project Engineer, Design (Civil), and was essentially complete on April 28, 1948.

Except for the preparation of a cost estimate, the expediting of railroad approvals on their drawings, and Washington State Highway Department approvals, no further efforts were expended by Griffin on this project, although other projects occupied their attention thereafter.

A work authority, dated April 19, 1948, named J. Gordon Turnbull, Inc., Graham, Anderson, Probst & White as engineering subcontractor. §6§ On May 17, 1948, this company submitted outline specifications for all railroad design and construction, a complete commentary with recommendations and proposals concerning existing drawings and certain redesign, and a key map of Project C-185 outlining existing and proposed design and design responsibilities and status. All Griffin drawings and specifications were turned over to JGT-GAPW for checking and revision as necessary. Also taken over by this company were preliminary classification yard plans which had been prepared by the GE Design Division under supervision of H. L. Friend. The JGT-GAPW specifications were completed on April 29, 1949, and their design was completed on June 7, 1949, including design of the railroad relocation.

After it was determined that the originally specified pile penetration could not be accomplished, it was necessary to redesign the bridge piers. This design revision was completed on March 21, 1950.

Under the foundation exploration phase of the work, the R. J. Strasser Drilling Co. drilled seventeen test holes. This work was finished March 21, 1949, and was accepted May 3, 1949. Frederick J. Converse performed his analysis concurrently with the drilling and sent in his final report on March 31, 1949.

On June 14, 1949, B. Blum, Chief Engineer for the NP Railroad, sent a detailed list of objections to the design drawings and specifications to J. T. Derrig, NP Division Engineer. The following points were listed as objectionable:

- A. The use of new 112-pound and new 90-pound rail.
- B. The specification of single-strength concrete culvert pipe.
- C. The preparation of a new set of drawings after the railroads had approved the original set.
- D. The use of 12-inch concrete drainage pipe behind a bridge pier.
- E. The specification of rail steel for concrete reinforcements.
- F. The number of rivets in the gusset plates.
- G. The lack of longitudinal bracing in the trestle.
- H. The elevation of 360 feet as a maximum assumed flood stage after McNary Dam was built.
- I. Specification of 2,500-pound concrete.
- J. The lack of insistence upon the use of concrete vibrators.
- K. Failure to specify an application of hot creosote on timber.
- L. The track-laying specifications.
- M. Dimensions of railroad ties.
- N. The specification of a grout mix for riprap.
- O. The specifications for laying of culverts.

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Copies of this letter were sent to the UP Railroad, whose approval of design was required. A copy of this letter was also sent to C. O. Henning of the GE Design Division by L. W. Althof of Union Pacific. J. T. Derrig of Northern Pacific also wrote Henning advising him of the objections which had been raised. On July 7, 1949, Henning sent J. T. Derrig a detailed reply in which each item was taken up separately. Concessions were made on a number of these points and explanations made on the others. It was pointed out in this letter that all rail and track materials, except bridge ties, were in stock at the Hanford Works. The necessity for issuing revised plans and specifications was explained as follows:

A. In order to consolidate the entire railroad construction (off reservation and on reservation) under one subcontract.

B. Acquisition of certain information and criteria after approval of the original plans caused a certain number of changes. Data from the Corps of Engineers relative to expected river conditions and from Frederick J. Converse regarding soil conditions made the following changes necessary:

1. Increased elevation of the fill south of the Yakima River.
2. Installation of flood-equalizer culverts under the fill.
3. Substitution of timber-frame trestle bents in place of pile bents due to sub-surface conditions encountered in the foundation investigation.
4. Substitution of a concrete pier at the south end of the Yakima River Bridge in place of a pile pier due to inadequate pile penetration obtainable at this location.
5. Provisions for dewatering a quicksand area encountered near the Richland "Y."
6. Adjustment of grade from 1.92% to 1.35%. This adjustment was made possible because of increased fill elevation and extended trackage adjacent to the main line junction, and was requested by the UP and NP railroads.
7. Adaptation of the Highway 410 overcrossing to fit the grade readjustment. After a further exchange of correspondence, L. W. Althof of Union Pacific, on July 20, 1949, withdrew criticism providing the agreed changes were made. §2§ On September 15, 1949, Henning received from J. T. Derrig of Northern Pacific a set of prints containing B. Blum's approval.

Upon the authority of the letter from L. W. Althof, the south limit of Project C-185 was established at the north property line of the UP right-of-way. This letter stated that the UP Railroad would provide their own rail connections up to that point.

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PART II - PROCUREMENT

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PROCUREMENT DIFFICULTIES

The bid form for Project C-185 indicated that an estimated 417,250 cubic yards of fill material would be required. Of this amount 328,600 cubic yards could be obtained from a Government-owned borrow pit, and 88,650 cubic yards would be supplied by the subcontractor from outside sources. On their successful bid, J. A. Terteling & Sons, Inc., the principal construction subcontractor, had quoted a price of \$260,690 for the 417,250 cubic yards. Their unit quotation, to be used for plus or minus adjustments, was 50 cents per cubic yard for material obtained from the Government pit, and 70 cents per cubic yard for material which they would furnish from outside sources.

On August 30, 1949, W. P. Cornelius stated that the Government had acquired additional acreage which made available considerably more borrow material than was originally anticipated. §13§ Therefore, all necessary material could be obtained from the Government pit, and it was requested that the construction subcontractor obtain all borrow material from that source. This was answered on September 9, 1949, by F. R. Creedon. §14§ Statement was made that the subcontractor would expect to receive the full lump-sum bid price of \$260,690 for the 417,250 cubic yards of material even though all material was obtained from the Government pit. It was further stated that the subcontractor had made arrangements for a tract from which to obtain additional borrow material prior to the time the AEC letter was sent notifying the availability of additional material. The matter was finally resolved on December 9, 1949; Ralph Davison, GE D&C Divisions Contract Supervisor, outlined the terms of a mutual agreement. §21§ Under this agreement, Terteling was to obtain the first 210,000 cubic yards of fill material from the Government-owned pit, the next 88,650 yards of fill material from the Terteling-owned pit, and any additional material from the Government-owned pit. The letter stipulated that quantities would be determined by field cross-section measurements. These measurements, as ultimately made, revealed that Terteling had withdrawn less than 88,650 yards from their pit. Although they requested payment at 70 cents for 88,650 yards, the request was denied.

It was stated on October 15, 1949, by J. A. Troxell, erection subcontractor to Terteling, that because the national steel strike was in effect there would be an indeterminate delay unless he was authorized to procure the necessary steel at retail prices. §15§ The increased expenditure was estimated at \$6,351.43 plus unknown cancellation charges from the factory under contract to fabricate the steel. It was stressed that an immediate decision was necessary so that work could progress prior to winter weather and bad ice conditions. The propriety of this request was considered reasonable by GE, and a request for the extra anticipated expenditure was forwarded to the AEC on October 20, 1949, by F. R. Creedon. Reply was received from the AEC on October 24 denying the request for the change order covering difference in cost of procuring the steel from local stock rather than from the mill. It was further stated that there was no change in conditions or other

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contract considerations which involved GE; it was suggested that Terteling should be advised to proceed in accordance with the terms of their subcontract and that no extension of time would be granted.

MATERIALS

GE furnished out of stock all railroad track material except bridge ties. At a cost of \$34,633.52, on Purchase Order HWC-7244, GE purchased five bridge spans with bearing shoes, bearing rollers, and all accessories from the UP Railroad. GE also purchased all steel pipe. As stated previously, the bulk of the material for the fill was also made available to the subcontractor; other borrow came from a sand dune and various pit sites in the area.

Terteling furnished and installed a Fairbanks-Morse track scales, furnished all bridge timbers, the bridge steel for the irrigation canal crossing, and through their subcontractor furnished and erected the necessary steel for other crossings. The old bridges purchased from the UP Railroad required a certain degree of remodeling which called for new material as well as labor, all of which was furnished by this sub-subcontractor. Terteling bought all their concrete from commercial mixing plants and furnished all concrete pipe.

PART III - CONSTRUCTION

AUTHORIZATION

Although construction was authorized within the scope outlined in the "INTRODUCTION" by Directive HEW-76, dated August 18, 1947, this authorization was rescinded in paragraph 2 of Directive HEW-76, Modification No. 2, dated June 24, 1949. Except for the canal work, no construction work had been accomplished, although foundation exploration and test drilling had been done as a corollary of the design.

Modification No. 2 authorized the work described in Part II Project Proposal C-185, dated May 6, 1949, and set the completion date as January 1, 1950. The total project expenditure authorized was \$3,114,000, which included \$152,000 for engineering design.

AEC Directive HEW-76, Modification No. 3, dated October 31, 1949, reduced the total authorized expenditures to \$2,489,000. This reduction was made to confine the authorized expenditures within the 1950 Budget figure presented to Congress.

PRELIMINARY CONSTRUCTION PLANNING

It was considered desirable to relocate the irrigation canal and build the railroad bridge over it during the winter season when the canal was dry.

Three sections of county road passing over the proposed right-of-way were abandoned to avoid the necessity of providing safe and adequate crossings. One county road was relocated with an acute angle turn to make a new junction with

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Highway 410. A new stretch of access road was built as an extension of another county road to serve private property along the west side of the right-of-way and south of the Yakima River. At the request of the AEC a barricade was erected along the northeast boundary of the railroad right-of-way and adjacent to the property of Dan Siemen, just south of Highway 410. The purpose of this barricade was to prevent trespassing of construction equipment on Siemen's property.

CONSTRUCTION ORGANIZATION

General Electric: General engineering supervision was assigned to C. O. Henning, Design Division Engineer of the 700, 1100, and 3000 Areas. R. T. Gardner, Construction Division Engineer of the 300, 700, 1100, and 3000 Areas, directed, coordinated, and approved the work of the construction subcontractor. Continuous surveillance was also maintained by the Transportation Department.

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Following his assignment on November 1, 1949, as Manager, Power and Mechanical Division, J. R. Kelly assumed active charge of all GE supervision over engineering and construction on Project C-185. On February 1, 1950, R. T. Gardner was assigned other duties and was replaced on this project by R. M. Kenady.

J. A. Terteling & Sons, Inc.: This firm and its subcontractors performed the construction work for C-185. Terteling was represented on this work by G. A. Grant, Project Manager.

Atomic Energy Commission: The representative for C-185 was D. J. Brumley.

CONSTRUCTION CONTRACTS

For a listing of the construction subcontracts, sub-subcontracts, sub-sub-subcontract, and work orders, refer to page 35.

PRELIMINARY WORK

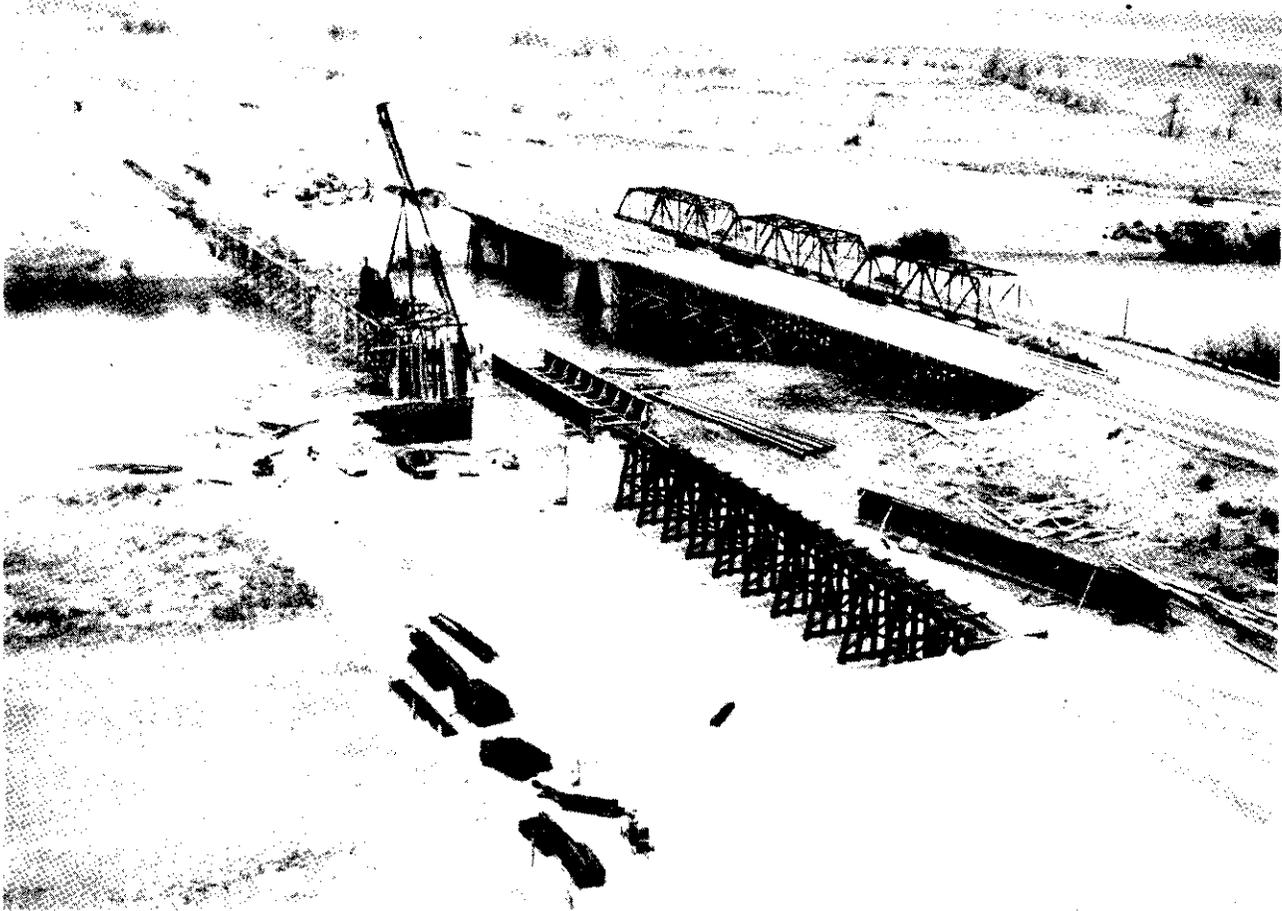
All layout, engineering, and inspection work normally required for construction purposes was accomplished by the GE Construction Division under the supervision of R. T. Gardner. The layout work consisted of all centerline stakes, right-of-way stakes, reference points, slope stakes, bluetop stakes, bench marks, centerline-of-track and top-of-rail stakes, and all stakes for centerline of pipes, headwalls, piers, and excavation.

A deposit of quicksand was discovered on the site of the right-of-way near the Richland "Y" during the soil test drilling. F. J. Converse, a soil mechanics consultant, stated that the quicksand area would have to be dewatered in order that a stable compaction be achieved. He suggested two methods of dewatering. The first was to drill holes through the quicksand into the lower strata, subsequently filling these holes with rocks. The other method suggested was the use of a well-point system. It was decided to use the well-point system, and this method was written into the specifications prior to going out for bids. After Terteling had been awarded the construction subcontract, they hired the John W. Stang Corp. to install and operate this well-point system. The quicksand deposit was about 20 feet deep. Based on the Converse recommendation that the dewatering process continue until the water level was lowered to within one foot of the bottom of the quicksand, the well-point pumping was only partially effective; the water level was lowered only about one-half the desired amount. Further consultation with F. J. Converse brought out his opinion that the water situation was acceptable provided that the fill material was laid in thin layers and adequately compacted. He qualified this opinion by stating that it would be necessary to check the underground hydrostatic pressure continuously, specifying that if the hydrostatic pressure should rise, the application of fill material should be stopped until the pressure was lowered again. This method was followed with satisfactory results. The well-point operation began on September 6, 1949, and ended on October 24, 1949.

Three concrete irrigation pipes, serving private property in the vicinity of the highway and railroad intersection, were replaced with heavier pipe prior to being covered with the railroad fill.

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Under Project C-231, "By-Pass Highway, Yakima River Trestle and Approaches," at the intersection of Thayer Drive and the By-Pass Highway, a 36-inch steel culvert was laid under both the highway and the railroad. Part of the cost of this work was charged to Project C-185.

All work performed under Terteling's Cost-Plus-A-Fixed-Fee Subcontract G-173 was finished before Terteling was awarded Lump Sum Subcontract G-245.

CONSTRUCTION METHODS

Excavation work was accomplished with draglines and bulldozers. A power shovel was set up at the borrow pit. Borrow material was hauled in Peterbilt, 12-yard,

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end dump trucks, and Euclid, 25-yard, bottom dump trucks. Tractor-scraper units were used where the cut and fill were in balance. Bottom dump Euclids and a motor grader were used to spread approximately 250,000 square yards of pit-run gravel, 4 inches deep, as a wind erosion blanket.

Concrete formwork and reinforcing steel were placed in the conventional manner.

Concrete for bridges and other structures was procured from a central mix plant, hauled in transit-mix trucks, and transferred to a concrete bucket which was swung over the form by means of a crane.

Backfill was placed with a bulldozer.

Trestle bents were pre-assembled on the ground and set on concrete bases with a boom tractor. All vertical members of the bent were fastened to the base--the outside members with strap anchors, the others with dowels. Bents were connected to each other by diagonal bracing.

A temporary bridge, supported by wood piling, was built over the Yakima River.

Piling was driven with a steam hammer. The pile-driving equipment operated from the temporary bridge.

Railroad rail was laid with a Burro crane and a travelling Nordberg spike hammer.

Approximately 3,000 feet of track near the AEC Airport was scheduled for rehabilitation. The work accomplished here included improvement of the subgrade to standard width, the application of new ballast, and the laying of 70 percent new ties to supplement the 30 percent already completed by maintenance forces.

A "shoo-fly" track was laid alongside the main track just north of the rehabilitated station. Building of this section permitted uninterrupted rail traffic while the main track was being rebuilt at a higher elevation.

Sections of an irrigation ditch crossing the right-of-way were abandoned and filled.

Other equipment used included welding machines, light plants, air compressors, rollers, trucks, a barge, and a boat. All necessary job assembly of structural steel work was accomplished by riveting.

CONSTRUCTION EQUIPMENT

For a tabulation of equipment owned by Terteling and their sub-subcontractors and used on C-185 work, refer to page 41.

The AEC procured a barge for use in drilling test holes in the Yakima River. Terteling was permitted to rent, with AEC approval, the following list of Government-owned equipment:

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1 Burro crane
1 Nordberg spike hammer
1 Nordberg rail jack

1 Lorain truck crane
1 Koehring crawler crane

Government-owned, subcontractor-maintained construction equipment was furnished to Terteling for that small portion of the C-185 construction work accomplished under their Cost-Plus-A-Fixed-Fee Subcontract G-173.

CONSTRUCTION EXPEDIENTS

Extended Work Periods: Terteling's steel erection subcontractor worked one Saturday in November, 1949, three Saturdays in December, one Saturday in March, 1950, two Saturdays in April, and three Saturdays in May, 1950. All Saturday work listed above occurred at the Yakima River Bridge. Subgrade work was conducted on a two-shift basis for that portion of the railroad from the Yakima River Bridge extending northward to the point of connection with another project. Terteling forces worked a total of five Saturdays.

Design Changes: Unexpected difficulties encountered in driving the pier piling added to the cost of Project C-185 and ultimately resulted in a design change. The first attempts at pile driving resulted in reaching a point of refusal from 30 to 35 feet above the design depths. The first pile was driven on October 27, 1949, and, due to delays from various causes, the last pile was not driven until April 13, 1950. Modification No. 9 to Subcontract G-245 covered extra expenses which were incurred in attempting to drive the piling in accordance with the original specifications; Modification No. 17 covered the additional expense incurred by the change in design of the pier piling. A chronological tabulation of the correspondence which portrays the sequence of events is listed below:

A letter from Terteling to R. T. Gardner referred to a verbal order given October 31, 1949, by Gardner to shut down pile-driving operations pending further instructions. §16§ This letter further referred to a written confirmation from Gardner, dated November 2, 1949.

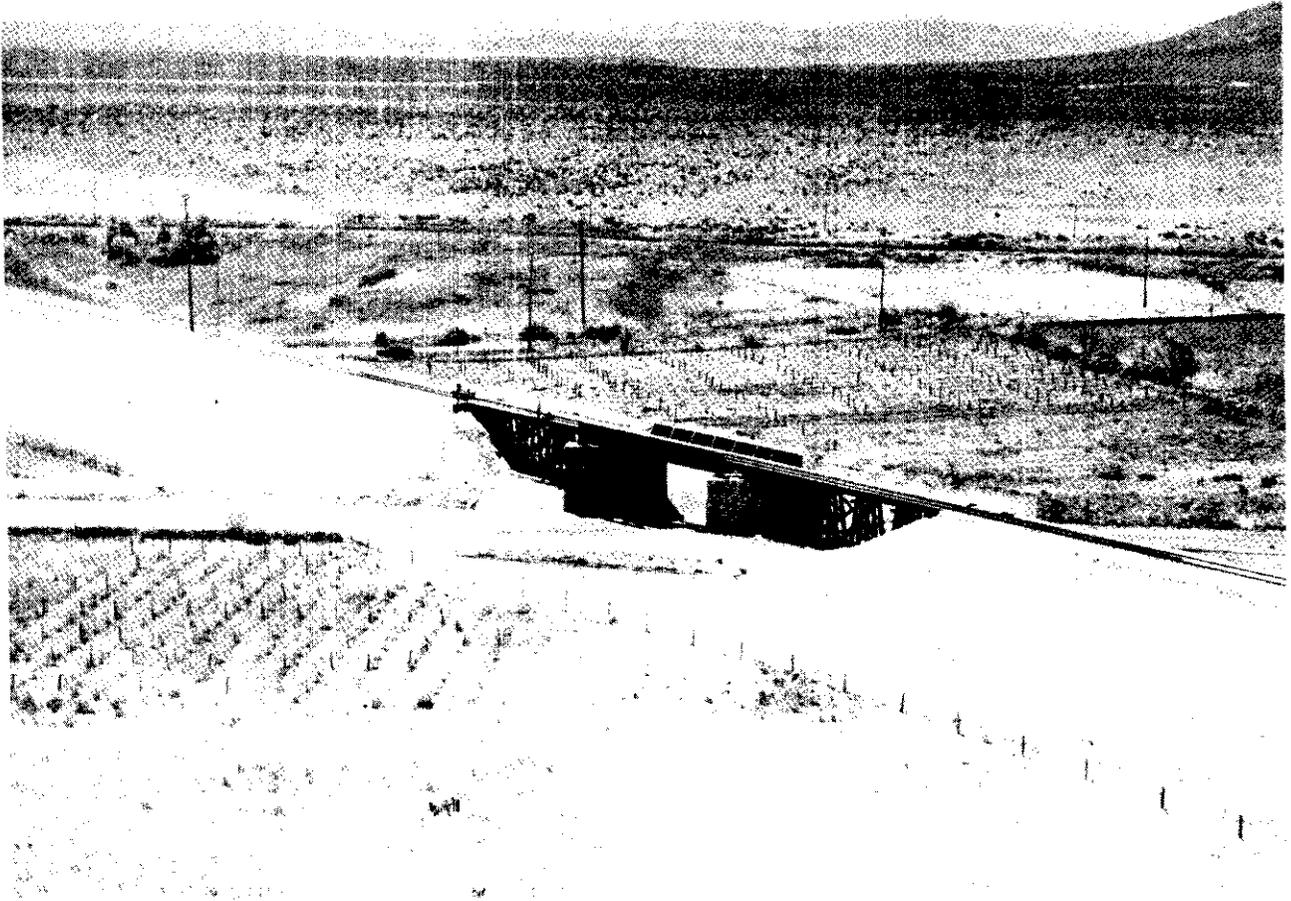
On November 8, 1949, Gardner confirmed to Terteling verbal instructions to cut off four high piling in pier No. 6 to the cut-off elevation shown on the original drawings. §17§

Another letter from Gardner to Terteling stated that it had been determined by GE Design that the McKiernan-Terry 11-B-3 pile hammer did not meet the specification requirement, and that the recommendation was made that a Vulcan 80-C hammer or equivalent to be used in its place. §18§ In another paragraph this letter requested the procurement of suitable jetting equipment in case the 80-C hammer did not attain the required penetration.

Challenging the GE decision, J. A. Troxell notified Terteling that a claim would be presented for the extra work encountered in changing the pile hammer. §19§ This letter disapproved the choice of a Vulcan pile hammer and disclaimed any possible responsibility for failure of piling in using it. The letter also stated

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the opinion that jetting was a waste of time and concluded with the statement that Troxell would not obtain jetting equipment unless he was properly assured of reimbursement by a modification to his sub-subcontract.

A letter, to Gardner from Terteling, outlined the main points of Troxell's letter, previously sent, and closed with the opinion that a price should be negotiated before the additional work was started. §20§

A reply from Gardner to Terteling acknowledged Terteling's letter and stated that any necessary adjustments would be made in accordance with the article of the subcontract dealing with changes. §22§

Terteling was informed by W. P. Duncan, a representative of the Construction Engineer, Power and Mechanical Division of the GE D&C Divisions, that it had

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been determined that jetting equipment would be required in connection with the pile driving. §23§ This letter requested that procurement of this equipment be effected as soon as possible.

Further information to Terteling stated that the GE Design Division had agreed to cut off at planned cut-off elevation all vertical piles which had reached a point elevation of 300.0 or lower. §27§

On December 22, 1949, W. E. Johnson, Manager of the GE D&C Divisions, ordered Terteling to procure jetting equipment at the earliest possible date and to proceed with the driving of the piles. §25§ The letter contained detailed specifications for the type of jetting equipment desired.

Terteling was notified by W. P. Duncan that the prescribed method of jetting had proved to be a failure. §27§ The letter further stated that the matter had been discussed jointly by J. R. Kelly, C. O. Henning, and W. P. Duncan, and that it was determined that another plan of jetting should be employed. The letter then outlined an alternate method of jetting in which the jet nozzle was welded to the pile web.

Protesting recent developments, J. A. Troxell outlined the points at which he considered that the work he was performing was outside the original scope of his sub-subcontract. The letter (addressed to Terteling) stated that when the extent of the delay and the cost could be determined, a claim would be made. §26§

A review of the situation by Terteling stated that jetting operations had been attempted. §28§ A request was made to consider additional compensation since the jetting operation was not requested by Terteling and since Terteling felt that the jetting operation would not prove feasible. The review closed with the statement that a detailed claim would be submitted at a later date.

On January 3, 1950, Terteling requested that a modification be written to show an increase of \$2,708.12 to cover extra expense incurred by Troxell from the period October 13, 1949, through November 8, 1949. §29§

W. E. Johnson replied that due consideration would be given to any claim submitted in accordance with the applicable provision of Terteling's subcontract. §32§

Troxell informed Terteling on January 4, 1950, that the heavy ice pressure made it unsafe to continue to drive piling until the Yakima River was again free of ice. §30§ Another letter, dated January 4, 1950, to Terteling from Troxell stated that the cumulative delay up to that point amounted to twenty-four calendar days. §31§ The letter further stated that additional delay could be expected and that Troxell would make a claim for full reimbursement for the cost of delay. This letter was forwarded to R. T. Gardner on January 13, 1950, by Terteling.

On February 4, 1950, W. E. Johnson directed Terteling to remove eleven bents of falsework as expeditiously as possible for a compensation of \$3,100. §33§

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A claim to R. M. Kenady from Terteling stated that Terteling would accept the lump-sum settlement of \$2,035 for all expenses incurred in obtaining, setting up, and using jetting equipment. §36§

On February 14, 1950, Terteling stated that they would accept a lump-sum settlement of \$2,710 for all expenses incurred in obtaining equipment, setting up, and pulling a pile as required by GE Construction. §35§

Terteling stated that they would accept a lump-sum settlement of \$3,560 for all expenses incurred in obtaining the 80-C Vulcan hammer and changing hammers as required by GE Construction. §34§

In another claim it was stated that Terteling would accept a lump-sum settlement of \$13,095 for all expenses incurred by reason of the change in pier design. §37§

A tabulation of these claims was sent to R. W. Stuck, Chief of the Engineering and Construction Divisions, AEC, by J. R. Kelly, who attached a proposed Modification No. 9. §38§

A letter to W. E. Johnson from R. W. Stuck referred to Modification No. 9 and requested Terteling's original estimate of pile driving. §40§ The letter stated in closing that any recommendations would be deferred until the above information had been received.

Terteling was notified on June 1, 1950, by J. C. Stover of the GE Contract Division that the AEC had declined to approve Modification No. 9. §41§ This letter expressed the belief that the Commission would approve three items of the modification totaling \$8,305 covering extra expense incurred in attempting to follow the original design, but would not approve an item of \$13,095 which was a claim by reason of revised design. The letter contained attachments of a revised modification showing an addition of \$8,305, with a request for signature.

A letter to D. F. Shaw, Manager of the Hanford Operations Office of the AEC, from F. K. McCune, GE Assistant Hanford Works General Manager, summarized the developments to date in which the Commission had approved three extras totaling \$8,305, but had disapproved a fourth extra of \$13,095--a claim for design revision. §42§ McCune's letter outlined the circumstances, expressed the belief that the claim was justified, and requested prompt approval.

A request to Ralph Davison, GE Contract Division Manager, from Terteling increased their claim to \$15,836.50 for extras incurred by design change. §43§ A breakdown of the expense, showing overhead and profit amounting to \$2,639.25, was attached. The statement was made that this claim was based on actual cost, and a request was made for final payment. (Final payment was made under the terms of Modification No. 17, dated October 13, 1950, in the amount of \$13,095.)

This design change specified that the piles would be driven on 4 different batters instead of 2 as before, that shear cleats would be welded to the web of each pile, and that a decrease in the required pile penetration was permissible.

Acceleration of Completion: Rising of the Yakima River in April, 1950, was the cause of deep concern by the Commission and GE Managements who were apprehensive that Richland might be isolated if the Richland-Richland "Y" road were flooded. Since the railroad right-of-way and bridge were being built at a higher elevation than the highway, the early completion of this alternate means of access became extremely urgent. Under the terms of the existing subcontract, the completion date was established as July 1, 1950; however, the flood was expected to crest about June 2, 1950. The Commission authorized GE to offer Terteling extra compensation of \$1,000 per day for each calendar day prior to June 2, 1950, that the railway connection and bridge were substantially complete. §39§ "Substantially complete" was defined as physical completion to the point of being ready to accept slow order (10 m. p. h.) rail freight traffic. This offer was made to Terteling in a letter dated May 1, 1950, and was agreed to be an equitable adjustment for extra expense incurred in the accelerated construction schedule. Modification



No. 12 to Subcontract G-245 (dated June 1, 1950; AEC approval, June 13, 1950) restated this offer, and Modification No. 13 (dated July 24, 1950; AEC approval, July 27, 1950) included \$9,000 as payment of this item.

Miscellaneous: All railroad rails and other track materials furnished by GE were stored at the Hanford rail yard. This material was loaded on railroad cars by Atkinson-Jones (by work order) and delivered to the siding nearest the point of usage.

Terteling built a temporary deck on the railroad bridge across the irrigation canal in order to provide an extra haul bridge. This extra bridge was useful in serving the heavy truck traffic from the Government borrow pit.

CONSTRUCTION DELAYS

Materials: The steel strike, previously mentioned, lasted from October 1, 1949, to November 12, 1949. After the steel mill resumed operations, there was a further delay in scheduling the production of the steel for Project C-185. It was estimated that the total delay of this situation was fifty-three calendar days.

Design: No steel piling was driven between 10:00 a.m. October 31, 1949, and the start of work on December 16, 1949. This period of inactivity was occasioned by a delay in crystallizing various engineering opinions into a definite course of action, and also by the delay in arrival of a pile hammer which was ultimately selected. About two-thirds of this time span was salvaged, however, as Troxell used his equipment to drive the falsework piling completely across the river. This was a change from his original plans which had been to advance the falsework from pier to pier as the pile driving progressed.

Weather: No piling was driven from noon on December 30, 1949, until the start of work on February 15, 1950. Extremely cold weather with severe ice conditions prevailed during this time. This situation resulted in an order to remove 11 sections of falsework to protect from damage 2 existing highway bridges immediately downstream from the site of the work.

No steel piling was driven between March 1, 1950, and March 15, 1950, as this time was occupied by replacing falsework previously removed.

SCHEDULE AND PROGRESS

See the chart on page 42.

INAUGURATION OF SERVICE

The previously mentioned efforts, which were expended to hasten the start of service, were successful. On May 23, at 6:30 p.m., a locomotive, pulling a flat car and caboose, crossed the bridge for the first time. This event was celebrated as an achievement by Management and supervisory personnel responsible for its consummation. Benches were installed on the flat car to accommodate the crowd who

rode the train on its initial trip. The local photographer took pictures, and the occasion was noted in the local press. Among the passengers on this trip were G. R. Prout, J. R. Kelly, R. T. Gardner, R. M. Kenady, G. C. Gabler, J. L. Dickson, H. H. Stephens, R. T. Cooke, M. F. Rice, E. G. Jones, E. N. Hull, H. Peden, E. R. Berges, G. A. Grant, and M. F. Moulton.

The itinerary was a round trip between the 3000 Area and the point of connection with the main line of the UP Railroad.

Final riveting and painting on the bridge was accomplished after May 23.

MANPOWER

See the manpower chart for Subcontract G-245 on page 43. No figures are available for the work done on this project under Subcontracts G-173 (construction), G-141 and G-150 (design), or G-241 (consulting service).

INSPECTION AND ACCEPTANCE

The Preliminary Inspection for the railroad bridge over the irrigation canal, the temporary tracking bridge over the canal, and the canal relocation was held on March 16, 1949; the Official Inspection was held on March 28, 1949; exceptions were removed on March 28, 1949; the using agency accepted the work on April 8, 1949; and the Commission accepted the work on April 13, 1949.

The Preliminary Inspection for the relocation of the irrigation ditch near the classification yard and for the wind erosion blanket was held on March 9, 1950; the official Inspection was held on March 9, 1950; exceptions were removed on March 9, 1950; the using agency accepted the work on June 19, 1950; and the AEC accepted the work on June 21, 1950.*2

The Official Inspections for all other work covered by this project were held from May 2, 1950, to June 13, 1950; the exceptions were removed from May 2, 1950, to June 13, 1950; the using agency accepted the work on July 26, 1950; and the work was accepted by the Commission on August 1, 1950.

Participants in the Official Inspections are listed below:

GE Construction Division:

R. M. Kenady, L. F. Reilly, C. H. Peden, I. N. Sorrells, D. J. McMillan

GE Design Division:

C. O. Hennig

GE Using Agency:

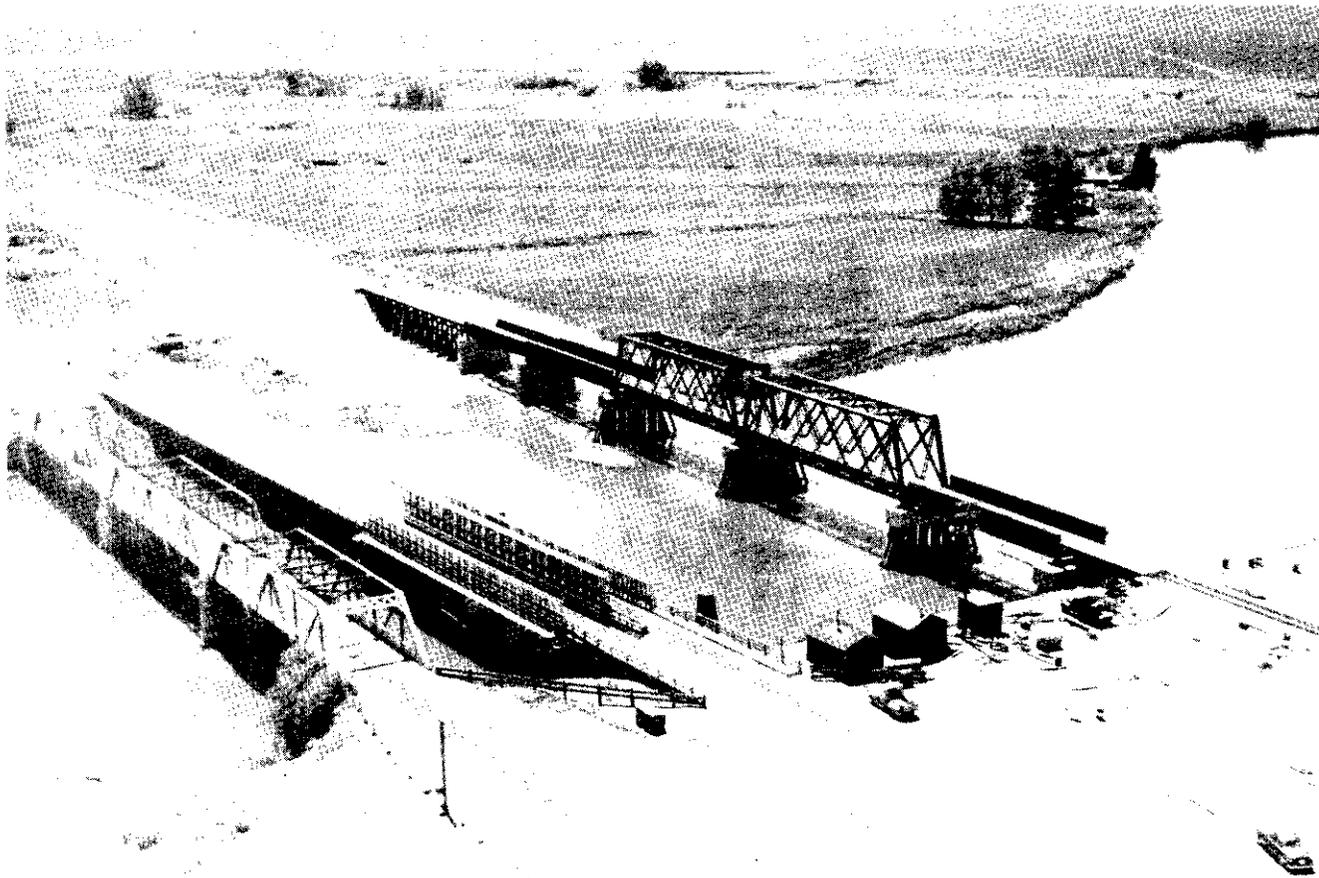
E. N. Hall, C. L. Working, M. D. McGruder

J. A. Terteling & Sons, Inc.:

G. A. Grant, J. M. Erwin, B. R. Rutledge, M. F. Moulton

*2. The lapse of time between the date exceptions were removed and the date of using agency acceptance was occasioned by a clerical delay.

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R. J. Strasser Drilling Co. :
AEC:

W. G. Strasser
F. R. McConiga

The certification and acceptance of the work was made by those listed below:

Certification for GE D&C Divisions:

L. S. Grogan, Manager, Construction Division; J. R. Kelly

Acceptance for GE Using Agency:

C. N. Gross, Manager, Manufacturing Divisions; E. L. Richmond, Manager, Community Divisions

Acceptance for AEC:

W. P. Cornelius; R. W. Stuck, Chief Engineer

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"AS-BUILT" PROJECT DESCRIPTION

The following is a list of the items comprising this project:

- A. Relocation of irrigation canal (575 feet long, relined with 371.25 cubic yards of concrete).
- B. Wooden temporary bridge over canal (36 feet long by 16 feet wide).
- C. UP Railroad bridge over canal (span 27 feet long). The bridge steel weighed 18,980 pounds. Two concrete abutments contained 223.5 cubic yards of concrete and 12,204 pounds of reinforcing steel.
- D. Pipe culverts in the following sizes: 312 feet of 6-inch steel, 330 feet of 8-inch steel, 265 feet of 8-inch reinforced concrete, 171 feet of 12-inch reinforced concrete, 180 feet of 18-inch reinforced concrete, 662 feet of 24-inch reinforced concrete, and 1,092 feet of 48-inch reinforced concrete.
- E. Complete structure for Yakima Bridge (639.2 linear feet).
- F. Complete structure for Highway 410 overcrossing (210.6 linear feet).
- G. Bridge ties and timber guard railing for Columbia Irrigation Ditch crossing (3,100 board feet).
- H. Track laying on Columbia Irrigation Ditch crossing (30 track feet).
- I. Metal decking on Columbia Irrigation Ditch crossing.
- J. Fill stabilization (25 days), common excavation (438,204.7 cubic yards), grading access road (1,640 square yards), embankment (72,742 cubic yards), wind erosion (210,597 square yards).
- K. Ballast in place (29,961.8 cubic yards).
- L. Track laying (112-pound rail) and surfacing main line and siding (12,960 track feet).
- M. Installing No. 10 turnout, tie set, on 112-pound main line (2 each).
- N. Track laying (90-pound rail and surfacing on main line and siding, 27,454 track feet).
- O. Installing No. 10 turnout on 90-pound main line track (6 each).
- P. Installing No. 10 crossover, tie set, and track (2 each).
- Q. Installing No. 8 turnout on 90-pound main line track (6 each).

- R. Track laying 90-pound rails and surfacing of classification yard and "Y" turn-around track (16,432 track feet).
- S. Installing No. 8 turnout in classification yard and "Y" track (7 each).
- T. Laying guard rails (2,904 lineal feet).
- U. Track scale complete with scale house, furnishing and installation (1 each).
- V. Removal of existing trackage (14,418 track feet).
- W. Construction of "shoo-fly" (1 each).
- X. Cattle guards (24 linear feet).
- Y. Bumping posts (1 each).
- Z. Greenlee bolt hole treater (1 each).
- AA. Pressure treatment of additional holes in timber trestle (250 each).
- BB. Placing 3-inch pit-run gravel on access roads (340 cubic yards), grading and shaping roads (5,333 cubic yards).
- CC. Borrow for approach fill (4,000 cubic yards).
- DD. Removing and replacing 11 falsework bents.
- EE. Repairing of Bailey Bridge.
- FF. Placing Government-furnished ballast on rehabilitated track (1,440 cubic yards).
- GG. Pulling steel "H" piling.
- HH. Classification yard irrigation ditch and irrigation culvert: common excavation (3,423.3 cubic yards), wind erosion blanket (2,684 square yards), reinforced concrete (63 cubic yards), 43-by-27-inch culvert (190 linear feet), removing concrete lining (173 square yards).
- II. One trash rack at Snyder Road.
- JJ. Installation of 7 plank crossings and 2 bituminous-type crossings.
- KK. Relocating and surfacing a portion of entrance road to the C.A.P. Airport. (Work accomplished by GE forces).
- LL. Installation of crossing signs, whistling post, and other pertinent sign posts. (Work accomplished by GE forces).

PART IV - COSTS

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COST REPORT

The Financial Closing Cost Report, issued on January 9, 1951, is on page 44. This report shows a total project cost of \$1,916,568. This expenditure was \$572,432 less than the authorized funds, which were in the amount of \$2,489,000.

DEVELOPMENTS AFFECTING THE COST

Certain underground pipe work was completed under both the By-Pass Highway (C-231) and the By-Pass Railroad (C-185) and the costs of these structures were to be split accordingly:

Canal and flume, vicinity of intersection of Thayer Drive and By-Pass Highway--charge 1/3 to C-231 and 2/3 to C-185.

Inverted siphon, vicinity station 215+70 on By-Pass Highway--charge 1/2 to C-231 and 1/2 to C-185.

This cost split between C-185 and C-231 was requested by F. W. Wilson, GE Design Division Manager, and was authorized by PM-351. §9§ Charges on the inverted siphon applicable to C-185 were to be transferred to Project C-214, (Rehabilitation of Plant Railroad) but this cost transfer was never consummated and all costs on this siphon, incurred by D&C Divisions, were charged to C-231. §45§

PART V - PROJECT MISCELLANEOUS

SAFETY

At approximately 4:15 p. m., November 23, 1949, an employee of J.A. Troxell disappeared from the falsework on which he was working. After a search it was assumed that he had drowned. Dragging operations in the Yakima River were started immediately by Troxell in his own skiff. The following morning, Troxell resumed dragging, and the GE Transportation Department also started dragging, using an army "duck." The body was found about 11:00 a. m., November 24, 1949.

The County Coroner performed an inquest, attended by the entire pile-driving crew, and pronounced the death, "accidental death due to asphyxiation." On November 28, 1949, a meeting was held which was attended by R. T. Gardner; W. P. Duncan; E. T. Macki and H. Peden, representatives of the Construction Engineer of the Power and Mechanical Divisions; M. H. Cooper, Safety and Fire Superintendent, GE D&C Divisions; L. L. Kelly, Safety Engineer, AEC; G. A. Grant of Terteling; and J. A. Troxell. The following recommendations were evolved from this meeting:

- A. With union cooperation, do not employ any men who cannot swim.

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- B. Provide safety jackets for all workmen and require the jackets to be worn. *3
- C. Provide catwalks 2 planks wide with 3-inch-by-10-inch planks, and a rail along the catwalks.
- D. Provide adequate lighting for all work after dark.

On May 15, 1950, with the Yakima River rising, a safety meeting was held, attended by the superintendents of J. A. Troxell, Terteling, and Consolidated Western Steel Corp., and also by J. R. Kelly, R. M. Kenady, and E. T. Macki of GE. It was agreed at this meeting to float life preservers on a 3/4-inch rope from the falsework; to keep a boat at the site; and to span the downstream open water with a 1-inch rope hanging about 2 feet above the surface.

BIBLIOGRAPHY

PERSONNEL INDEX TO BIBLIOGRAPHY

General Electric:

Carriere, J. G.; Manager, D&C Engineering & Construction Services Division
Creedon, F. R.; Manager, D&C Divisions
Davison, R.; Manager Contract Division
Duncan, W. P.; Asst. Construction Engineer, D&C Power & Mechanical Division
Gardner, R. T.; Construction Engineer D&C Power & Mechanical Division
Gavin, A.; Manager, Contract Unit
Henning, C. O.; Design Division Engineer of the 700, 1100 and 3000 Areas
Johnson, W. E.; Manager, D&C Divisions
Kelly, J. R.; Manager, D&C Power & Mechanical Division
Kenady, R. M.; Construction Engineer D&C Power & Mechanical Division
McCune, F. K.; Assistant Hanford Works General Manager
Ouren, G. F.; D&CM Section History Supervisor
Stover, J. C.; representative, Contract Division
Wilson, F. W.; Design Division Manager

Hanford Operations Office, Atomic Energy Commission:

Cornelius, W. P.; Chief, Construction & Maintenance Divisions
Fuller, N. G.; Chief, Community Management
Schlemmer, F. C.; Manager
Shaw, D. F.; Deputy Manager
Shugg, C.; Manager
Stuck, R. W.; Chief, Engineering & Construction Divisions
Travis, J. E.; Assistant to the Manager

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*3. Safety jackets had already been provided and were available at various locations on the job.

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J. A. Terteling & Sons Inc.:

Grant, G. A.; Project Manager
Moulton, M. F.; General Superintendent

Others:

Althof, L. W.; Union Pacific Railroad
Blum, B.; Chief Engineer, Northern Pacific Railroad
Derrig, J. T.; Assistant Chief Engineer, Northern Pacific Railroad

PROJECT PROPOSAL

- §1§ C-185; dated July 26, 1947; "New Railroad Connection South of Richland Village."
- §2§ Letter Request; dated March 25, 1949; F. R. Creedon to F. C. Schlemmer; Request for Extension of Completion Date.
- C-185, Part II; dated May 6, 1949; "Railroad Construction, Relocation, and Rehabilitation, Richland Village."
- Letter Request; dated December 7, 1949; C. N. Gross to F. C. Schlemmer; Request for Extension of Completion Date. (Approval withheld pending receipt of firm construction schedule).
- §3§ Letter Request; dated January 4, 1950; C. N. Gross to D. F. Shaw; Request for Extension of Completion Date.
- §4§ Letter Request; dated March 24, 1950; C. N. Gross to F. C. Schlemmer; Request for Extension of Completion Date.
- §5§ Letter Request; dated June 29, 1950; C. N. Gross to D. F. Shaw; Request for Extension of Completion Date.

AEC DIRECTIVE

- HEW-76; dated August 18, 1947; "Directive for New Railroad Connection South of Richland."
- HEW-76, Modification No. 1; dated April 19, 1949; "Directive for New Railroad Connection South of Richland."
- HEW-76, Modification No. 2; dated June 24, 1949; "Directive for New Railroad Connection South of Richland."
- HEW-76, Modification No. 3; dated October 31, 1949; "Directive for Construction of New Railroad Connection South of Richland."
- HEW-76, Modification No. 4; dated January 18, 1950; "Directive for Construction of New Railroad Connection South of Richland."
- HEW-76, Modification No. 5; dated April 3, 1950; "Directive for Construction of New Railroad Connection South of Richland."

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HEW-76, Modification No. 6; dated July 7, 1950; "Directive for Construction of New Railroad Connection South of Richland."

PROJECT MEMORANDA

- §6§ PM-264; dated April 19, 1948; Basic Work Authority.
- PM-267; dated April 19, 1948; Increase in Scope.
- PM-351; dated May 11, 1948; Transfer of Certain C-231 Costs (By-Pass Highway) to C-185.
- PM-505; dated June 24, 1948; Request for Preparation of Plans.
- PM-540; dated July 7, 1948; "Award of Contract for Relocation of Railroad Only."
- PM-608; dated July 26, 1948; "Relocation of County Road from Dutch Mill South to Highway 410."
- PM-726; dated August 24, 1948; Confirmation of Availability of Steel for the Yakima River Bridge.
- PM-727; dated August 24, 1948; "Right-of-Way Application for Yakima River Bridge."
- PM-741; dated August 26, 1948; Completion Dates for Relocation of Railroad.
- PM-799; dated September 10, 1948; "Railroad Overpass at Primary Highway No. 3."
- PM-849; dated September 28, 1948; "Flood Protection and Highway Access Facilities; Railroad Construction, Relocation, and Rehabilitation; Design Data, McNary Dam."
- PM-882; dated October 4, 1948; "Elimination of Overpass Structure."
- PM-934; dated October 21, 1948; "Cost Estimate."
- PM-963; dated November 1, 1948; "Elevation Top of Levee."
- PM-964; dated November 1, 1948; "Right-of-Way for Rail Connection South of Richland."
- PM-976; dated November 4, 1948; "County Road Overpass."
- PM-1035; dated November 19, 1948; "Removal of Trackage West of Richland."
- PM-1061; dated December 1, 1948; "Right-of-Way Acquisition."
- PM-1087; dated December 7, 1948; "Irrigation Canal Crossing."
- PM-1094; dated December 9, 1948; "Construction Permits."
- PM-1115; dated December 17, 1948; "Transfer of Relocation Work."
- PM-1116; dated December 17, 1948; "Elimination of Consulting Engineer Services."
- PM-1123; dated December 20, 1948; "Road Relocation Information Required by Corps of Engineers."
- PM-1149; dated December 29, 1948; "Property Survey, Rennewick Subdivision."
- PM-1180; dated January 10, 1949; "Foundation Explorations."
- PM-1320; dated February 21, 1949; "Power and Telephone Line Relocation South of Yakima River to be by Utility Company."
- PM-1336; dated February 25, 1949; "Foundation Exploration."
- PM-1370; dated March 14, 1949; "Drawing List."
- PM-1379; dated March 15, 1949; "Construction of Barricade Along UPRR Connection Right-of-Way."

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PM-1440; dated March 30, 1949; "Irrigation Pipe Lines Crossing UP-NP Connection Right-of-Way."
PM-1506; dated April 20, 1949; "Extend North Limit of Work."
PM-1516; dated April 21, 1949; "Modification of Completion Date."
PM-1601; dated May 27, 1949; "Transmittal of Part II Project Proposal."
PM-1643; dated June 24, 1949; "Performance of Layout Engineering and Inspection by GE."
PM-1649; dated June 28, 1949; "Modification of Basic Work Authority."
PM-1785; dated November 9, 1949; "Reduction of Authorized Funds."
PM-1798; dated November 30, 1949; "Surfacing Access Roads."
PM-1852; dated January 26 1950; "Extension of Directive Completion Date."
PM-1914; dated April 7, 1950; "Extension of Directive Completion Date."
PM-1990; dated July 13 1950; "Stop Charge Notice."
PM-2006; dated August 15, 1950; "Construction Completion Statement."

FINANCIAL CLOSING COSTS

Project Financial Closing Statement; dated January 3, 1951.

REFERENCED CORRESPONDENCE

- §7§ Letter; dated December 15, 1947; F. R. Creedon to C. Shugg; Request for Approval of Bidders List.
- §8§ Letter; dated February 13, 1948; W. P. Cornelius to F. R. Creedon; Acquisition of Land.
- §9§ Memorandum; dated May 8, 1948; F. W. Wilson to F. R. Creedon; "By-Pass, Yakima River Trestle and Approaches Project C-231."
- §10§ Letter; dated December 15, 1948; N. G. Fuller to GE; "Railroad Connection Right-of-Way."
- §11§ Letter; dated January 5, 1949; F. R. Creedon to J. E. Travis; Additional Work Assigned to R. J. Strasser Drilling Co.
Letter; dated March 25, 1949; F. R. Creedon to F. C. Schlemmer; Request for Extension of Completion Date.
Letter; dated June 14, 1949; B. Blum to J. T. Derrig; Objections to Design Drawings and Specifications.
Letter; dated July 7, 1949; C. O. Henning to J. T. Derrig; Reply to NP Railroad Objections to Design Drawings and Specifications.
- §12§ Letter; dated July 20 1949; L. W. Althof to C. O. Henning; "Project C-185, UP-Richland Connection, Richland."
- §13§ Letter; dated August 30, 1949; W. P. Cornelius to GE; Borrow Material, Project C-185.

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- §14§ Letter; dated September 9, 1949; F. R. Creedon to W. P. Cornelius; "Borrow Pit and Railroad Construction."
- §15§ Letter; dated October 15 1949; Troxell to Terteling; Request to Purchase Steel at Retail Prices.
- Letter; dated October 20, 1949; F. R. Creedon to F. C. Schlemmer; Request for Sub-subcontractor to Purchase Steel at Retail Prices.
- Letter; dated October 24, 1949; D. F. Shaw to GE; Disapproval of Troxell Request to Purchase Steel at Retail Prices.
- §16§ Letter; dated November 4, 1949; M. F. Moulton to R. T. Gardner; Request to Pull One Pile, and Claim for Adjustment Due to Shutdown of Pile-Driving Operations.
- §17§ Letter; dated November 8, 1949; R. T. Gardner to M. F. Moulton; Confirmation of Verbal Instructions to Cut Off Piling on Pier No. 6.
- §18§ Letter; dated November 9, 1949; R. T. Gardner to M. F. Moulton; Changing Pile Hammers, and Procurement of Jetting Equipment.
- §19§ Letter; dated November 15, 1949; Troxell to M. F. Moulton; Claim for Expense of Changing Pile Hammers.
- §20§ Letter; dated November 18, 1949; M. F. Moulton to F. T. Gardner; Recommendations Regarding Troxell Claim for Additional Reimbursement.
- §21§ Letter; dated December 9, 1949; R. Davison to Terteling; Borrow Material, Project C-185.
- §22§ Letter; dated December 12, 1949; R. T. Gardner to Terteling; GE Review of Terteling-Troxell Claim for Additional Reimbursement.
- §23§ Letter; dated December 20, 1949; W. P. Duncan to M. F. Moulton; Jetting Equipment for Pile Driving.
- §24§ Letter; dated December 21, 1949; W. P. Duncan to M. F. Moulton; Agreement of GE Design to the Cutting Off of Vertical Piles.
- §25§ Letter; dated December 22, 1949; W. E. Johnson to Terteling; Order to Proceed with Driving of Piling and to Procure Jetting Equipment.
- §26§ Letter; dated December 29, 1949; Troxell to M. F. Moulton; Intention to File Claim for Use of Jetting Equipment and Changing of Pile Hammers.
- §27§ Letter; dated December 29, 1949; W. P. Duncan to Terteling; Change in Jetting Procedure.

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- §28§ Letter; dated December 30 1949; M. F. Moulton to W. E. Johnson; Request for Reconsideration of Additional Reimbursement for Jetting Operations.
- §29§ Letter; dated January 3. 1950; M. F. Moulton to R. T. Gardner; Request for Modification of Subcontract G-245 to Cover Extension of Time and Increased Costs.
- §30§ Letter; dated January 4, 1950; Troxell to Terteling; Discontinuance of Pile-Driving Operations Due to Heavy Ice Pressure.
- §31§ Letter; dated January 4, 1950; Troxell to Terteling; Delays in Pile Driving, and Possible Loss of Falsework Due to Ice Conditions.
- §32§ Letter; dated January 5, 1950; W. E. Johnson to M. F. Moulton; Acknowledgment of Terteling Claim for Additional Reimbursement for Jetting Operations.
- §33§ Letter; dated February 4, 1950; W. E. Johnson to Terteling; Removal of Bents Project C-185.
- §34§ Letter; dated February 14, 1950; M. F. Moulton to R. M. Kenady; Claim for Additional Costs.
- §35§ Letter; dated February 14, 1950; M. F. Moulton to R. M. Kenady; Claim for Additional Costs.
- §36§ Letter; dated February 14, 1950; M. F. Moulton to R. M. Kenady; Claim for Reimbursement for Obtaining, Setting Up, and Using Jetting Equipment.
- §37§ Letter; dated February 14, 1950; M. F. Moulton to R. M. Kenady; Acceptance of Lump-Sum Settlement for Additional Costs Incurred as the Result of Design Changes and Changes in the Specifications.
- §38§ Letter; dated March 21, 1950; J. R. Kelly to R. W. Stuck; "Compensation for Additional Work."
- §39§ Letter; dated April 28, 1950; D. F. Shaw to W. E. Johnson; Authorization for Terteling Bonus.
- §40§ Letter; dated May 5, 1950; R. W. Stuck to W. E. Johnson; Request for Information Concerning Terteling Request for Additional Compensation.
- §41§ Letter; dated June 1, 1950; J. C. Stover to Terteling; Submittal of Modification No. 9 to Subcontract G-245 for Review.
- §42§ Letter; dated June 6, 1950; F. K. McCune to D. F. Shaw; Request for Payment of Terteling-Troxell Claim.

- §43§ Letter; dated July 10, 1950; G. A. Grant to R. Davison; Increased Claim for Extras Incurred Because of Design Changes.
- §44§ Letter; dated January 5, 1951; P. D. Lee to J. G. Carriere; "Construction of Yakima River Trestle, By-Pass Highway and Highway Improvements."
- §45§ Letter; dated October 9, 1951; A. Gavin to G. F. Ouren; "D&C Project Histories, Contract Data."

MAJOR DRAWINGS

E-5-15; Clearances for Standard Gauge Tracks
E-5-31; Grade Crossing, Bituminous Pavement
H-6-160; Standard Railroad Turnouts No. 8 and No. 10
H-6-161; Typical Railroad Sections
H-6-162; Typical Panels for Rail Anchors
H-11-1034, Sheets 1 and 2; By-Pass Railway
H-11-1165; County Road Relocation
H-11-3094, Sheets 1 to 17; Yakima River Crossing
H-11-3095, Sheets 1, 2, 3, 4, 5, 6, and 8; Right-of-Way and Grading
H-11-3153, Sheets 1 and 2; Irrigation Ditch Crossing
H-11-3812, Sheets 1, 2, 3 and 4; State Highway No. 3 Crossing
H-11-4024; Irrigation Ditch Crossing, Details
H-11-4106; Connection to 700 Area Spur
H-11-4153, Sheets 1, 2, 3, 4, and 5; Classification Yard
H-11-4300; Temporary Trucking Bridge
H-11-4325; Map Showing Location of Foundation Exploration
H-11-4333, Sheets 1, 2, and 3; County Road Crossing
H-11-4334; County Road Relocation, Plan and Profile
H-11-4353, Sheets 1 and 2; Irrigation Ditch
H-11-4354; Relocation of County Road
H-11-4360, Sheets 1 and 2; Key Map of Project

SPECIFICATIONS

HW-3803; dated March 22, 1949; Specifications for Grading and Track Work.
HW-3803; dated March 22, 1949; Specifications for Structures.

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APPENDIX

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CONTRACTS AND WORK ORDERS

Design Subcontracts:

G-141; De Witt C. Griffin & Assoc.; Seattle Washington; Lump Sum; Entered into September 12, 1947; Effective July 24, 1947.

Modification No. 2, entered into December 1, 1947, effective September 30, 1947, was for design of a single-track railroad extension connecting the southern end of the Hanford Works railroad track with the main line track of the UP Railroad.

Modification No. 5, entered into June 30, 1949, stated that effective October 30, 1947, the subcontractor would make all test borings for the Yakima River railroad bridge from the north side of the Yakima River in lieu of operating from both sides of the river with a cable-controlled barge. This modification also stated that effective February 1, 1948, the subcontractor would coordinate design requirements for the railroad connection with the UP Railroad Co. and conduct necessary negotiations incident to the accomplishment thereof. *4

At that time it became apparent that schedules could not be met unless design work was subcontracted to the greatest extent practicable. This firm had administrative and professional people working in Richland; they were fully qualified to do the railroad design, familiar with the local requirements and in a position to proceed immediately. This work was added therefore to an existing subcontract which had been awarded to Griffin. §45§

G-150; J. Gordon Turnbull, Inc., and Graham Anderson, Probst & White, Inc., (Joint Venturers); Cleveland, Ohio, and Chicago, Illinois, respectively; Lump Sum; Entered into November 16, 1948; Effective September 30, 1947.

Review of all design work performed by others and preparation of necessary design as required to complete the construction and rehabilitation of the Hanford Works railroad system from ordinate N-42832.77 south to a connection with the UP Railroad, including construction of a classification yard, relocation of the railroad west of Richland Village, and connection to the existing Richland spur.

It was necessary to review the entire railroad project in relation to the probable effects of the McNary Dam construction. This architect-engineer had been awarded a subcontract to cover any engineering outside the barricade which GE wished to subcontract and was working on the Village Master Plan. It was, therefore, fully familiar with the basis of the then-current scope of the railroad project and could readily incorporate Griffin's original design into it, whereas rescoping the work for Griffin would have been wasteful of time and money. §45§

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*4. Other modifications did not directly affect this work.

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G-173; J. A. Terteling & Sons, Inc.; Boise, Idaho; Cost-Plus-A-Fixed-Fee; Entered into October 20, 1948; Effective February 27, 1948.

Modification No. 3, entered into January 31, 1950, effective January 12, 1949, provided for exploration of the foundation for the proposed railroad track spur from the UP line to and including the crossing of the Yakima River. The work included excavation of test pits, assembly and launching of a barge, and performance of all necessary services to set up and operate a steel barge to be used by the drilling subcontractor. *5

These services had not previously been provided for, were not suitable for bidding since their scope could not be readily determined, and had to be performed immediately. Terteling had men and equipment immediately available to perform the work. §45§

G-194; R. J. Strasser Drilling Co.; Portland, Oregon; Lump Sum; Effective May 10, 1948.

Modification No. 2, entered into January 7, 1949, effective November 15, 1948, covered drilling casing, taking samples, and pulling casing of eleven 6-inch test wells. Modification No. 3 entered into March 16, 1949, effective February 24, 1949, increased the number of test holes to twelve. Modification No. 4, entered into June 30, 1949, established the final quantities of work performed. *4

This work was added to an existing subcontract which had been awarded to Strasser on the basis of lowest bid. This work was added to G-194 for reasons of economy and the ready availability of Strasser's equipment on the Hanford Works. §11§

G-241; Frederick J. Converse; Pasadena, California; Lump Sum; Entered into January 3, 1949; Effective December 29, 1948.

Performance of consulting foundation engineer services in connection with the construction of a proposed railroad spur track from the UP line to and including the crossing of the Yakima River. Modification No. 1, entered into May 21, 1949, effective February 16, 1949, added to the scope of work.

Design Sub-subcontract:

Unnumbered under G-141; Jansen Drilling & Manufacturing Co.; Seattle, Washington; Lump Sum.

Foundation exploration for railroad connection.

*5. Modifications to this subcontract other than those pertaining to construction under C-185, did not directly affect this project.

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Construction Subcontracts:

G-173; J. A. Terteling & Sons, Inc.; Boise, Idaho; Cost-Plus-A-Fixed-Fee; Entered into October 20, 1948; Effective February 27, 1948.

Modification No. 2, entered into March 9, 1949, effective July 15, 1948, covered construction of an irrigation canal crossing (except rails) for the UP Railroad spur across the Columbia Irrigation Canal approximately 1/4 mile south of the Richland "Y." This work included relocation of approximately 575 lineal feet of the existing canal, including excavation and concrete lining; construction of concrete bridge abutments; erection of a structural steel railroad bridge; and erection of a temporary structural steel haul-road bridge.

Modification No. 3 entered into January 31, 1950, effective January 12, 1949, covered the construction of a barricade along the UP Railroad connection right-of-way south of Highway 410, adjacent to the property of Dan Siemen. *6

Inasmuch as the permit granted by the Columbia Irrigation District for the construction of a crossing over their irrigation canal stipulated that all work was to be completed on the canal on or before February 15, 1949, and since contractual negotiations for the construction of the steel bridge over this structure were not commenced until late November, 1948, time was not available for processing of bids. Terteling was in a position to proceed immediately, and was therefore selected. §45§

G-245; J. A. Terteling & Sons, Inc.; Boise, Idaho; Lump Sum; Entered into August 10, 1949; Effective August 2, 1949.

Construction of a railway connection from the Hanford Works plant railway system southerly to connect with the Yakima branch of the UP Railroad, including construction of a railroad bridge over the Yakima River, a railroad crossing over U.S. Highway 410, railroad sidings, a classification yard and access roads, the rehabilitation of some existing railroad track, the relocation of portions of roads, the demolition and salvage of certain structures, and all necessary work in connection with excavation, embankment, drainage, fencing and track laying.

Modification No. 1, dated October 3, 1949, covered design changes on the highway overcrossing and culverts. Modification No. 2 dated November 21, 1949, provided for design changes in trestles. Modification No. 3, dated January 31, 1950, allowed an extension of time due to unusually severe weather. Modification No. 4, entered into March 20, 1950, effective November 30, 1949, covered extra work on access roads, railroad crossings, and traffic maintenance; set up the procedure by which the subcontractor could rent Government-owned equipment; and established rental rates for a railroad crane and a spike hammer.

*6. Modifications to this subcontract, other than those pertaining to design work on C-185, did not directly affect this work.

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Modification No. 5, dated February 4, 1950, covered the removal of a portion of falsework in order to provide a free channel for the outward passage of accumulated ice. Modification No. 6, dated February 9, 1950, covered cable rigging to 8 pile bents to permit removal from falsework to facilitate the outward passage of ice. Modification No. 7, dated March 1, 1950, was for replacement of falsework which had been removed under Modification No. 5. Modification No. 8, entered into March 28, 1950, effective February 13, 1950, was for repairs to the Bailey Bridge necessitated by damage sustained by this structure during ice-blasting operations. Modification No. 9, entered into June 8, 1950, effective October 31, 1949, was for removal of one pile from pier No. 6, for a performance test with an 80-C Vulcan pile hammer, and for a performance test with jetting equipment.

Modification No. 10, entered into May 9, 1950, made an adjustment for wage increases. Modification No. 11, entered into May 9, 1950, effective March 27, 1950, provided for the rental of a Government-owned rail jack. Modification No. 12, entered into June 1, 1950, made provision for payment to the subcontractor in the amount of \$1,000 per day for every day the railroad could take slow order traffic (locomotive and loaded cars) prior to June 2, 1950. Modification No. 13, entered into July 24, 1950, made an adjustment for a wage increase and established the total reimbursement payable under Modification No. 12. Modification No. 14, dated June 26, 1950, covered the placing of additional roadbed ballast, and deleted certain demolition work.

Modification No. 15 entered into August 22, 1950, effective May 9, 1950, made provision for the rental of a Government-owned truck crane and a crawler crane. Modification No. 16, entered into September 12, 1950 established the actual quantities of work performed and the total rental charges for Government-owned equipment rented to the subcontractor. Modification No. 17, entered into October 13, 1950, provided compensation for additional work as the result of revised design for the piers of the Yakima River Bridge. Modification No. 18, entered into October 31, 1950, made an adjustment for wage increases.

Firms who submitted bids on this work included Terteling, \$1,060,976; Morrison-Knudsen Co., Inc., Seattle, Washington, \$1,066,897; Peter Kiewit Sons' Co., and MacRae Brothers, Longview, Washington, and Seattle, Washington, respectively (joint bid), \$1,233,938.77; James Construction Co., Seattle, Washington, \$1,533,125; Osberg Construction Co. and M. P. Butler, Seattle, Washington, \$1,456,779; Sharp & Fellows Contracting Co., Los Angeles, California, \$1,102,313.40; and Utah Construction Co., San Francisco, California, \$1,696,310. The work was awarded to Terteling on the basis of lowest bid.

G-287; Benton County, Washington; Special Agreement; Entered into November 30, 1949; Effective November 30, 1949.

GE was to build and maintain a temporary grade crossing at the point where the proposed railway crossed County Road No. 98 and was to keep it open to traffic at all times. Benton County was to accept the grade crossing and take all necessary action required by law, such as publication of notices of the alteration

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of this road. It was stipulated that this subcontract would be in force until all adjacent property was owned by the United States, or until the United States acquired the right to close the crossing by condemnation proceedings, or until the railroad construction work was completed.

Construction Sub-subcontracts:

No. 1, under G-245; J. A. Troxell (Columbia Dredging Co.); Portland, Oregon; Lump Sum; Entered into August 25, 1949.

Construction of Yakima River Bridge and Highway 410 overcrossing, with the exception of concrete and timber work.

No. 2, under G-245; Bergman-Lampson; Pasco, Washington; Lump Sum; Entered into November 4, 1949.

Laying of track for the UP Railroad connection.

No. 3, under G-245; Dayley Brothers Construction Co.; Boise, Idaho; Lump Sum; Entered into September 15 1949.

Earthwork for the UP Railroad Connection.

No. 4, under G-245; Curtis Gravel Co.; Spokane, Washington; Lump Sum; Entered into October 6, 1949.

Crushing and stockpiling and/or dumping ballast on the railroad grade.

No. 5, under G-245; H. P. Fisher & Sons, and Puget Sound Painters, Inc. (Joint Venturers); Seattle, Washington; Lump Sum; Entered into October 19, 1949.

Sandblasting and painting of Yakima River Bridge and Highway 410 overcrossing.

Sub-sub-subcontract:

Under No. 1, under G-245; Consolidated Western Steel Corp.; Los Angeles, California; Lump Sum; Entered into August 13, 1949.

Structural steel erection for Yakima River Bridge and Highway 410 overcrossing.

Work Orders:

FF-999; Dated May 25, 1949; Atkinson-Jones Co.; Labor. \$651.65.

Unloading fourteen carloads of structural bridge steel on the old Hudson railroad spur southwest of Duportail and Wright Streets.

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FF-1268; Dated August 24, 1949; Atkinson-Jones Co.; Labor. \$80.82; Material, \$439.

Furnishing and delivery of six 80-foot class 1 or 2 poles and two 65-foot class 1 or 2 poles to the proposed right-of-way south of the Yakima River.

EE-1393; Dated October 5, 1949; GE Electrical Division; Labor. \$293.70; Indirect Manufacturing Expense. \$396.48; Material. \$5.13.

Reroute power line crossing the railroad connection at station 179+00 near south Cullum Road to connect with the existing powerline crossing the railroad near station 188+00.

EE-1486; Dated November 4, 1949; GE Electrical Division; Labor, \$362.14; Indirect Manufacturing Expense, \$514.20; Material, \$120.22.

Furnishing labor and material for construction of one 6.9 KV overhead railroad crossing where the Richland C.A.P. Airport powerline crosses the new railroad.

EE-1547; Dated December 5, 1949; GE Electrical Division; Material, \$81.32.

Installation of a standard railroad crossing where Spangler Road crosses the new railroad grade.

EE-1548; Dated December 1, 1949; GE Transportation Division; Labor. \$62; Indirect Manufacturing Expense \$105.40.

Providing ballast and labor to raise railroad track from station 247+53.64 at the north end of the railroad connection to a point 600 feet north.

EE-1732; Dated March 8, 1950; GE Electrical Division; Labor, \$214; Indirect Manufacturing Expense, \$321; Material, \$80.63.

Furnishing labor and material to construct a temporary 7,200 volt line (approximately 800 feet long, calling for 4 poles and necessary wire) from the source on George Washington Way to the vicinity of the north bank of the Yakima River at the railroad bridge site.

EE-1739; Dated March 10, 1950; GE Electrical Division; Labor. \$60.80; Indirect Manufacturing Expense. \$91.20.

Providing and delivering eight poles to the junction of the UP Railroad and the AEC right-of-way.

EE-1910; Dated May 16, 1950; GE Transportation Division; Labor \$288.71; Indirect Manufacturing Expense. \$245.87; Material. \$289.86.

Providing and installation of 79 traffic signs for the railroad connection work.

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EE-1997; Dated June 28, 1950; GE Transportation Division; Labor. \$198.31; Indirect Manufacturing Expense. \$218.13.

Furnishing labor and material to surface the access road leading to the C.A.P. Airport.

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TERTELING AND SUB-SUBCONTRACTOR-OWNED CONSTRUCTION EQUIPMENT

| | |
|--------------------------------------|---|
| 5 LaPlant-Choate earth movers | 1 Mack, 20-yd. end dump truck |
| 6 D-8 tractors w/scrapers | 5 Peterbilt, 12-yd. end dump trucks |
| 2 D-8 bulldozers | 2 water trucks |
| 1 D-7 bulldozer | 2 flatbed trucks |
| 1 TD-18 International boom tractor | 3 pickup trucks |
| 2 push tractors | 1 8-inch pump |
| 3 Model 12 Caterpillar motor patrols | 6 high-pressure pumps for the well-point system |
| 1 steam pile driver w/hammer | 2 300-amp. welding machines |
| 1 Northwest Model 80-D shovel | 1 200-amp. welding machines |
| 4 Euclid, 25-yd. bottom dump trucks | 1 315-foot air compressor |
| 2 210-foot air compressors | 1 1 1/2-yard dragline |
| 2 wobble-wheel rollers | 1 105-foot air compressor |
| 1 1/2-yard crane | 2 DeWalt saws |
| 1 band saw | |

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PROGRESS CHART

PROJECT C-185

RAILROAD CONNECTION SOUTH OF RICHLAND

| LEGEND | |
|---------------------|-----------|
| SCHEDULED % (ABOVE) | % |
| ACTUAL | % (BELOW) |

| YEAR | 1950 | | | | | | | | | | | | |
|---------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|--|--|
| | SEPT | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUNE | | | |
| MONTH | | | | | | | | | | | | | |
| Construction Total | 14 | 24 | 36 | 58 | 75 | 91 | 96 | 98 | 99 | 100 | | | |
| | 9 | 24 | 44 | 59 | 61 | 72 | 81 | 88 | 99 | 100 | | | |
| Yakima River | | | | | | | | | | | | | |
| Crossing | 3 | 13 | 23 | 27 | 62 | 90 | 94 | 97 | 99 | 100 | | | |
| Highway | 1 | 10 | 18 | 35 | 40 | 52 | 64 | 74 | 99 | 100 | | | |
| Overcrossing | 30 | 58 | 58 | 58 | 71 | 95 | 95 | 100 | | | | | |
| Irrigation Ditch | 20 | 50 | 62 | 71 | 71 | 88 | 98 | 98 | 99 | 100 | | | |
| Crossing | | | | | | | | 100 | | | | | |
| Roadbed | 25 | 45 | 75 | 99 | 99 | 99 | 100 | 0 | 89 | 100 | | | |
| 0+00 to 110+18 | 18 | 35 | 73 | 91 | 91 | 95 | 97 | 97 | 100 | | | | |
| Roadbed | 23 | 60 | 85 | 85 | 91 | 92 | 100 | | | | | | |
| 117+00 to 218+00 | 20 | 78 | 84 | 85 | 88 | 92 | 97 | 97 | | 100 | | | |
| North End & Classification Yard | 5 | 35 | 65 | 83 | 87 | 91 | 100 | | | | | | |
| | 25 | 64 | 64 | 65 | 65 | 91 | 97 | 97 | | 100 | | | |
| Track Laying | | | | 1 | 30 | 60 | 94 | 97 | 99 | 100 | | | |
| Const. Shoo Fly & Remove Exist. Track | 55 | 60 | 60 | 3 | 3 | 55 | 65 | 69 | 97 | 100 | | | |
| Miscellaneous Items | 10 | 60 | 60 | 60 | 60 | 60 | 60 | 75 | 100 | | | | |
| | | 5 | 10 | 40 | 60 | 90 | 94 | 97 | 82 | 97 | 100 | | |
| | 1 | 1 | 60 | 74 | 74 | 87 | 97 | 97 | 97 | 100 | | | |

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MANPOWER AS OF LAST DAY OF EACH MONTH
RAILROAD CONNECTION SOUTH OF RICHLAND;
CONSTRUCTION, RELOCATION AND REHABILITATION

PROJECT C-185

| | 1950 | | | | | | | | | | | |
|--------------------------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|------------|-------------|--|--|
| | <u>Sept.</u> | <u>Oct.</u> | <u>Nov.</u> | <u>Dec.</u> | <u>Jan.</u> | <u>Feb.</u> | <u>Mar.</u> | <u>April</u> | <u>May</u> | <u>June</u> | | |
| J. A. Terreling & Sons, Inc. (G-245) | 117 | 145 | 119 | 72 | 25 | 45 | 60 | 70 | 1 | 13 | | |
| Curtis Gravel Co. | | | 7 | 7 | 10 | 12 | | | | | | |
| Dayley Bros. Const. Co. | | 12 | 12 | 3 | | | | | | | | |
| Bergman-Lampson | | | | 29 | 26 | 27 | 33 | 34 | | 46 | | |
| J. A. Troxell | | 9 | 9 | 7 | 6 | 12 | 12 | 4 | | | | |
| Consolidated Western Steel Corp. | | | | 15 | 15 | 17 | | 20 | | | | |
| Fisher - Puget Sound Painters | | | 2 | | | 3 | 6 | 6 | | 1 | | |

DECLASSIFIED

GENERAL ELECTRIC COMPANY
NUCLEONICS DEPARTMENT

FINANCIAL CLOSING COST

Project No. C-185
Directive No. HEW 76 M-6

RAILROAD CONNECTION SOUTH OF RICHLAND
CUMULATIVE REPORT FOR PERIOD ENDING DECEMBER 31, 1950

| | MONTH OF DECEMBER | CUMULATIVE | |
|--|----------------------|--------------|--|
| | | TOTAL COST | ESTIMATE TO INDICATED COMPLETE TOTAL COST |
| Construction Costs (See attached statement of Detailed Costs) | \$ 12 549 | \$ 1 581 580 | |
| Construction Supervision ~ General Electric Architect-Engineer | | 68 826 | |
| Total | 12 549 | 68 326 | |
| J. A. Terteling (G-173) Fee | | 1 455 | |
| G. E. Indirect Construction Costs | | 64 362 | |
| Major Equipment Usage | | 12 774 | |
| Operation and Maintenance of North Richland Camp, Yards and Facilities | | 29 356 | |
| Total Construction Costs | 12 549 | 1 759 458 | |
| Engineering Design (Details attached) | | 157 115 | |
| Total Project Cost | \$ 12 549-a) | \$ 1 916 568 | |

(a) Consists of underliquidation of commitments accrued for Preliminary Final Costs.

Accountant
Design and Construction Divisions
CM-8-C-185
JMP/fb 1-9-51

Authorized Funds: \$2,489,000
Physical percent complete:
Design 100%
Construction 100%

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GENERAL ELECTRIC COMPANY
NUCLEONICS DEPARTMENT

FINANCIAL CLOSING COST

RAILROAD CONNECTION SOUTH OF RICHLAND
Job. No. 19
Project No. C-185
CUMULATIVE REPORT FOR PERIOD ENDING DECEMBER 31, 1950
AEC Directive HEW-76 M-6

| | GENERAL ELECTRIC | | SUBCONTRACTOR | | TOTAL |
|--|------------------|---------------------|------------------|------------------|---------------------|
| | LABOR | MATERIAL | LABOR | MATERIAL | |
| CONSTRUCTION COST | | | | | |
| <u>Grading and Road Accounts</u> | | | | | |
| 19301 Site work and general grading | \$ 11 | | \$ 98 | | \$ 109 |
| 19302 Permanent roads | 939 | | | | 939 |
| | 950 | | 98 | | 1,048 |
| <u>Permanent Buildings and Building Facilities</u> | | | | | |
| 19600 Accounts (See detail attached) | 1,550 | 1,517,424 | 35,451 | 10,116 | 1,564,541 |
| <u>Permanent Utilities</u> | | | | | |
| 19504 Electrical lines & substations | 4,550 | | | | 4,550 |
| <u>Temporary Construction</u> | | | | | |
| 19991 Structures | 605 | | 290 | 161 | 1,056 |
| 19994 Facilities | | | 394 | 92 | 486 |
| 19995 Maintenance | 78 | | | | 78 |
| | 683 | | 684 | 253 | 1,620 |
| <u>Other Direct Cost</u> | | | | | |
| Undistributed wage escalation | 9,821 | | | | 9,821 |
| Total Direct Construction Cost | \$ 1,550 | \$ 1,533,428 | \$ 36,233 | \$ 10,369 | \$ 1,581,580 |

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Accountant
Design and Construction Divisions
CM-8-C-185
JMP/fb 1-9-51

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GENERAL ELECTRIC COMPANY
NUCLEONICS DEPARTMENT

Job. No. 19
Project No. C-185
AEC Directive HEW-76 M-6
RAILROAD CONNECTION SOUTH OF RICHLAND
CUMULATIVE REPORT FOR PERIOD ENDING DECEMBER 31, 1950
GENERAL ELECTRIC SUBCONTRACTOR

| | LABOR | MATERIAL | LABOR | MATERIAL | TOTAL |
|--|-----------------|---------------------|------------------|------------------|---------------------|
| <u>Permanent Buildings & Building Facilities</u> | | | | | |
| 19601 R. R. South of Yakima River Bridge | \$ 157 | \$ 552 455 | \$ 2 582 | \$ 645 | \$ 555 839 |
| 19602 R.R. North of Yakima River Bridge | 157 | 325 872 | 885 | 137 | 327 051 |
| 19603 Yakima River Bridge | 896 | 303 497 | 3 814 | 371 | 308 578 |
| 19604 R. R. Turnout | | | | 25 | 25 |
| 19605 Fence along right-of-way | | 4 634 | | | 4 634 |
| 19606 Irrigation Canal | 89 | 5 510 | 27 084 | 8 791 | 41 474 |
| 19607 Bridge over 410 Highway | 90 | 69 880 | 8 | 1 | 69 979 |
| 19608 Classification Yard | 161 | 237 222 | 951 | 128 | 238 462 |
| 19609 Rehabilitation of tracks & track removal | | 18 354 | 127 | 18 | 18 499 |
| Total | \$ 1 550 | \$ 1 517 424 | \$ 35 451 | \$ 10 116 | \$ 1 564 541 |

Accountant
Design and Construction Divisions
CM-8-C-185
JMP/fb 1-9-51

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GENERAL ELECTRIC COMPANY
Hanford Works
Design and Construction Divisions

C-185
RAILROAD CONNECTION SOUTH OF RICHLAND
DETAIL COST STATEMENT
Project Design Cost

Period Ended
December 31, 1950

| <u>FINANCIAL CLOSING COST</u> | <u>This Month</u> | <u>Last Month</u> | <u>Fiscal Year To Date</u> | <u>Total To Date</u> |
|--|-------------------|-------------------|----------------------------|----------------------|
| Architect-Engineer Cost | 7 720 | | 7 720 | 125 842 |
| Consultant Cost | | | | |
| General Electric Cost | | | | |
| Within Division Expense | | | | |
| Salaries | 1 057 | 99 | | |
| Supplies and Materials | | | | |
| Drafting | | | | |
| Planning and Estimating | | | | |
| Reproduction | 612 | 25 | | |
| General Engineering | | | | |
| Miscellaneous | 2 | 13 | | |
| TOTAL WITHIN DIVISION EXPENSE | 1 671 | 137 | | |
| Other Expense | | | | |
| From Design and Construction Divisions | | | | |
| Design | 955 | 81 | | |
| Construction Services | | | | |
| From Other Nucleonics Department Divisions | | | | |
| From Subcontractors | | | | |
| TOTAL OTHER EXPENSE | 955 | 81 | | |
| TOTAL GENERAL ELECTRIC COST | 2 626 | 218 | 2 626 | 31 273 |
| PROJECT DESIGN COST | 10 346 | 218 | 10 346 | 157 115 |
| Transferred to General Division | <u>10 346</u> | <u>218</u> | <u>10 346</u> | <u>157 115</u> |

Accountant
Design and Construction Divisions
JMc:lc GM-3

DECLASSIFIED

OTHER EXPENSE

| FROM DESIGN AND CONSTRUCTION DIVISIONS: | This Month | Last Month | Fiscal Year to Date |
|---|------------|------------|---------------------|
| Design Staff | | | |
| Management | 1 | 8 | 1 |
| Administration | | 2 | |
| Accounting | | 16 | |
| Contract | | 4 | |
| Total Staff | 1 | 30 | 1 |
| Division Administration Liquidation | 4 | 35 | 4 |
| Other Engineering Services | | 16 | |
| Other | 950* | | 950 |
| TOTAL DESIGN | 955 | 81 | 955 |
| CONSTRUCTION SERVICES | | | |
| Rent | | | |
| General Office Services | | | |
| Telephone Service | | | |
| Equipment Usage | | | |
| TOTAL CONSTRUCTION SERVICES | | | |
| TOTAL FROM DESIGN AND CONSTRUCTION DIVISIONS | 955 | 81 | 955 |
| FROM OTHER NUCLEONICS DEPT. DIVISIONS: | | | |
| Community Division | | | |
| Work Orders | | | |
| TOTAL COMMUNITY DIVISION | | | |
| GENERAL DIVISIONS | | | |
| KAPL Charges | | | |
| Security | | | |
| General Accounting | | | |
| Law | | | |
| 700 Area Office Rental | | | |
| Employee and Community Relations | | | |
| Other Charges Not on Work Orders | | | |
| Washington State Business Tax | | | |
| TOTAL GENERAL DIVISIONS | | | |
| MANUFACTURING DIVISIONS | | | |
| Work Order Charges | | | |
| Manufacturing Expansion Program | | | |
| TOTAL MANUFACTURING DIVISIONS | | | |
| TOTAL FROM OTHER NUCLEONICS DEPT. DIVISIONS | | | |
| FROM SUBCONTRACTORS | | | |
| Work Order Charges | | | |
| TOTAL OTHER EXPENSE | 955 | 81 | 955 |

*D&C Indirect Expense. Re: W.O. EE-1985