

**REPORT OF COMPLETED BATTERIES, ETC.,**

**DEFENSES AT MOUTH OF COLUMBIA RIVER, OREGON AND WASHINGTON,**

Submitted by Major W. C. Langfitt, Corps of Engineers, U. S. Army,  
in accordance with instructions contained in Cir. No. 18, dated  
Office Chief of Engineers, Washington, September 22, 1903

Name of Harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks.
Mouth of Columbia River	PORT STEVENS, OREGON. Battery Lewis.			Garrisoned.
	Mounted:			
	6 10-inch B.L. Rifles, Model 1888, MII., Nos. 11, 33 and 32, Bethlehem Iron Co., and Nos. 49, 52 and 48, Watervliet Arsenal.			Magazines dry. Electric appliances, including storage battery, located in emplacement No. 5, in good condition. Storage battery serves emplacements 5 and 6 only. Emplacements 1 to 4 served by storage battery in emplacement 2 for 6-inch gun on disappearing carriage..
	6 10-inch disappearing carriages; L.F. Model 1894, Nos. 3 <sup>a</sup> , 4 <sup>c</sup> , and 5, Kilby Manufacturing Co.; L.F. Model 1896, No. 4 <sup>d</sup> , Niles Tool Works; A.R.F., Model 1896, Nos. 2 and 3 <sup>b</sup> , Watertown Arsenal.	Apr. 5, 1898 2-4- Apr. 3, 1898 5-6- June 28, 1900	\$302,014.08	
	Empl. 1, Rifle 11, Car. 4 <sup>d</sup> , " 2, " 49, " 3 <sup>a</sup> , " 3, " 52, " 4 <sup>c</sup> , " 4, " 48, " 5, " 5, " 33, " 2, " 6, " 32, " 3 <sup>b</sup> .			
	Battery Clark.			
	Mounted:			
	8 12-inch B.L. Mortars, MI., Model 1890, Nos. 29, 32 and 35, Builders Iron Foundry; Nos. 34, 48, 50, 51 and 52, Watervliet Arsenal.			
	8 12-inch mortar carriages, Model 1896; Nos. 119, 120, 121, 122, 123, 124, and 133, American Hoist & Derrick Co., and No. 237, Watertown Arsenal.	Jan. 17, 1899	71,546.63	Magazines dry. Electric appliances, including storage battery, in good condition.
	Pit A:			
	Platf. 1, Mortar 32, Car. 121, " 2, " 48, " 119, " 3, " 50, " 122, " 4, " 52, " 120.			
	Pit B:			
	Platf. 1, Mortar 51, Car. 237, " 2, " 35, " 123, " 3, " 34, " 133, " 4, " 29, " 124.			

Name of Harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks.
	<p>Battery.</p> <p>Mounted:</p> <p>2 6-inch B.L.Rifles, Model 1897, Nos. 4 and 11, M.I., Watervliet Arsenal.</p> <p>2 6-inch disappearing carriages, L.F., Model 1898, Nos. 7 and 8, Watertown Arsenal.</p> <p>Empl. 1, Rifle 4, Car. 7, " 2, " 11, " 8.</p>	<p>June 28, 1900</p>	<p>\$ 59,860.19</p>	<p>Magazines dry. Electric appliances, including storage battery, located in 6-inch emplacement No. 2, in good condition. Storage battery serves also emplacements 1 to 4 of Battery Lewis.</p>
	<p>Battery.</p> <p>2 emplacements for 6-inch R. F. guns on Ordnance Dept. pedestal mount. Mounts and guns not yet received.</p>	<p>Jan. 17, 1902</p>	<p>34,538.37</p>	<p>Magazines dry. Electric appliances, including storage battery, located in right flank of the emplacements, in good condition. Storage battery also serves 3 emplacements for 3-inch R.F.guns.</p>
	<p>Battery.</p> <p>Mounted:</p> <p>2 3-inch R.F.guns, Model 1898, Nos. 30 and 35, Driggs-Seabury Co.</p> <p>2 3-inch balanced-pillar mounts, Nos. 30 and 35, Driggs-Seabury Co.</p> <p>Empl. 1, Gun 30, Car. 30, " 2, " 35, " 35.</p>	<p>June 28, 1900</p>	<p>11,954.57</p>	<p>Magazines dry. The 3-inch emplacements are lighted from storage battery in 2 6-inch emplacements for R. F. guns on pedestal mounts. Electric appliances in good condition.</p>
	<p>Battery.</p> <p>Mounted:</p> <p>1 3-inch R.F.gun, Model 1898, No. 115, Driggs-Seabury Co.</p> <p>1 3-inch balanced-pillar mount, No. 115, Driggs-Seabury Co.</p>	<p>Nov. 12, 1900</p>	<p>5,398.05</p>	

Name of Harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks.
	Central Electric Plant.	Jan. 19, 1901		The central electric power station is located in the right end of the Parados of Battery Lewis. Station and plant in good condition. Cost included in cost of Batterie Lewis and Clark.
	B. C. Station, Emplacements 5 and 6, Battery Lewis	Nov. 29, 1900	\$ 2,729.00	Ref. of site, 54.65. Ref. of instrument axis, 60.0. One room; 14 feet by 14 feet. Concrete structure; steel roof. Conspicuous at 4 miles, in usual channel of approach.
	1 Mining Casemate,	Apr. 30, 1901	7,885.25	In good condition and rooms dry.
	1 Torpedo Store-house,	Apr. 30, 1901	8,148.75	In good condition
	2 Cable Tanks,	Apr. 30, 1901		H?

Name of Harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks
Mouth of Columbia River	FORT COLUMBIA, WASHINGTON. Battery.	July 16, 1898	\$137,298.79	Garrisoned.
	<p>Mounted:</p> <p>3 8-inch B.L.Rifles, Model 1888, Nos. 20, MI., 23 MI., and 44 MI., Watervliet Arsenal.</p> <p>3 8-inch disappearing carriages, L.F. Model 1896, Nos. 1 and 10, Pond Machine Tool Co.; Model 1894, experimental Southwark Foundry and Machine Co.</p> <p>Empl. 1, Rifle 20, Car. 1, ✓  " 2, " 23, " 10, ✓  " 3, " 44, experi- ✓  mental</p>			Magazines dry. Electric appliances, including storage battery in emplacement No. 2, in good condition.
	Central Electric Plant	Oct. 29, 1900		The central electric power plant for the 8-inch emplacements is an oil engine plant located in rear of emplacement No. 3, of 8-inch battery. Station and plant in good condition. Cost included in cost of 8-inch emplacements.
	Battery.			Magazines, <sup>dry</sup> Electric appliances in <sup>good</sup> condition. The power is supplied by a duplicate oil engine plant one located in emplacement No. 1 and one in emplacement No. 2. They may be connected in parallel or each run separately. Three 3-inch emplacements also serve from this plant.
	<p>Mounted:</p> <p>2 6-inch B.L.Rifles, Model 1897, Nos. 15 and 24, MI., Watervliet Arsenal.</p> <p>2 6-inch disappearing carriages, L.F. Model 1898, Nos. 9 and 10, Watervliet Arsenal.</p>	June 28, 1900	58,623.82	
	<p>Empl. 1, Rifle 15, Car. 9, ✓  " 2, " 24, " 10. ✓</p>			

Name of Harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks
Mouth of Columbia River	<p style="text-align: center;">Battery.</p> <p>Mounted:</p> <p>3 3-inch R.F. guns, Model 1898, Nos. 97, 98 and 104, Driggs-Seabury Co.</p> <p>3 3-inch balanced-pillar mounts, Nos. 97, 98 and 104, Driggs-Seabury Co.</p> <p>Empl. 1, Gun 97, Car. 97,  " 2, " 98, " 98,  " 3, " 104, " 104.</p>	<p>2- June 28, 1900</p> <p>1- Oct. 29, 1900</p>	\$ 15,462.61	<p>dry. Magazines, Electric appliances in good condition. Served from duplicate plant in two 6-inch emplacements, disappearing carriage.</p>
	<p>B. C. Station, 8-inch battery,</p>	<p>Nov. 29, 1900</p>	<p>1,666.00</p>	<p>Ref. of site, 327.45. Ref. of instrument axis, 329.0. One room; 14 feet by 14 feet. Concrete structure; steel roof. Not conspicuous at one mile, in usual channel.</p>
	<p>1 Mining Casemate,</p>	<p>Apr. 30, 1901</p>	<p>7,885.00</p>	<p>In good condition rooms dry.</p>
	<p>FORT CANBY, WASHINGTON.</p> <p style="text-align: center;">Center Battery.</p> <p>Mounted:</p> <p>1 15-inch smooth-bore gun</p> <p>2 8-inch converted rifles.</p> <p style="text-align: center;">Right Battery.</p> <p>Mounted:</p> <p>2 8-inch converted rifles.</p> <p>Not mounted:</p> <p>1 8-inch converted rifle,</p>			<p>Garrisoned by detachment from Ft. Stevens, Oreg.</p> <p>Masonry platform, serviceable.</p> <p>Service magazine caved in. Platforms unserviceable.</p> <p>Platforms unserviceable. Service magazines caved in.</p>

Respectfully submitted,

*W. Churnitt*  
Major, Corps of Engineers, U.S.A.

REPORT OF COMPLETED BATTERIES, ETC.,  
DEFENSES AT MOUTH OF COLUMBIA RIVER, OREGON & WASHINGTON.

For the year ending December 31, 1910.

In charge of Major J. F. McIndoe, Corps of Engineers, U.S. Army.

Name of harbor	Name and Armament of Battery.	Date when turned over to Artillery	Total cost.	Remarks.
Mouth of Columbia River	<p>FORT STEVENS, OREGON</p> <p><u>Battery Lewis.</u></p> <p>Mounted:</p> <p>2-10" B.L. Rifles, Model 1888, MII, No. 11: Bethlehem Iron Co., &amp; No. 49 Watervliet Arsenal:</p> <p>2-10" Disappearing carriages; L.F., Model 1894, Nos. 3<sup>a</sup>, Kilby Mfg. Co., L.F. Model 1896, No. 4<sup>d</sup>, Niles Tool Co.</p> <p>Emp. 1, Rifle 11, Car. 4<sup>d</sup></p> <p>Emp. 2, " 49, " 3<sup>a</sup></p>	<p>Emp. #1- Apr. 5, 1898</p> <p>Emp. #2<sup>p</sup> Apr. 3, 1898</p>	<p>\$302,014.00</p> <p>also included cost of Batteries Mishler and Walker.</p>	<p>Garrisoned.</p> <p>Magazines dry. (Battery rewired in 1909 &amp; 1910. Current for light and power supplied from Central Power Plant.)</p> <p>Taylor Raymond shot hoists installed, both back delivery.</p> <p>Serial Nos. Emp. #1, No. 81 " 2, " 82</p> <p>Motor: Voltage 220. Speed 1050: capacity 5 H.P. Transferred to Artillery April 29, 1905.</p> <p>No powder hoists installed.</p> <p>Retracting Motor installed on carriage #1 emplacement only.</p>

Name of Harbor:	Name and Armament of Battery.	Date when turned over to Artillery.	Total cost.	Remarks.
South of Columbia River	<p><u>Battery Walker.</u></p> <p>Mounted:                      2-10" B.L. Rifles,                      Model 1888, M II, No.                      52 &amp; 48. Watervliet                      Arsenal.</p> <p>2-10" disappearing                      carriages, L.F., Model                      1894, Nos. 4<sup>c</sup>, 5,                      Kilby Mfg. Co.</p> <p>Emp. 1, Rifle 52, Car. 4<sup>c</sup>                      " 2, " 48 " 5</p>	Apr. 3, 1898	<p>See cost of                      Battery                      Lewis. Fig-                      ures could                      not well be                      segregated.</p>	<p>Magazines dry. Battery                      rewired in 1909 &amp; 1910.                      Current for light and                      power supplied from                      Central Power Plant.                      Taylor Raymond shot                      hoists installed. Both                      back delivery. Serial                      Nos. Emp. #1 No. 83                      " #2 " 84</p> <p>Motor: Voltage 220.                      Speed 1060, capacity                      5 H.P. Transferred to                      Artillery Apr. 25, 1905                      June 27, 1905. No powder                      hoists installed. No                      motors installed on                      gun carriages.</p>
	<p><u>Battery Lyman Mishler.</u></p> <p>Mounted:                      2-10" B.L. Rifles,                      Model 1888, M II, Nos                      33 and 32, Bethlehem                      Iron Co.</p> <p>2-10" disappearing                      carriages; A.R.F.                      Model 1896. Nos. 2 and                      3b, Watertown Arsenal</p> <p>Emp. 1, Rifle 33, Car. 2,                      " 2, " 32, " 3<sup>b</sup></p>	June 28, 1900.	<p>See cost of                      Battery                      Lewis. Fig-                      ures could                      not well be                      segregated.</p>	<p>Magazines dry. Battery                      rewired in 1909 &amp; 1910.                      Current for power and                      lighting supplied from                      Central Power Plant.                      Taylor-Raymond shot                      hoists installed. Both                      front delivery. Serial                      Nos.: Emp. #1 No. 97                      " #2 " 98</p> <p>Motor: Voltage 220,                      Speed 1060; capacity                      5 H.P. No powder hoists                      installed. No motor in-                      stalled on gun carriages</p>

Name of harbor:	Name and Armament of Battery.	Date when turned over to Artillery:	Total cost:	Remarks.								
South of Columbia River	<p align="center"><u>Battery Clark.</u></p> <p>Mounted:            8-12" B.L. Mortars, M I., Model 1890, Nos. 29, 32 and 35; Builders Iron Foundry; Nos. 34, 43, 50, 51 and 52, Watervliet Arsenal.</p> <p>8-12" mortar carriages, Model 1896, M I, Nos. 119, 120, 121, 122, 123, 124 and 133, American Hoist &amp; Derrick Co. &amp; No. 237, Watertown Arsenal.</p>	Jan. 17, 1899	\$71,546.63	Magazines dry. Storage battery in poor condition. Battery rewired in 1909 and 1910. Current for lighting supplied from Central Power Plant.								
	<p align="center"><u>Pit A.</u></p> <table border="0"> <tr><td>Platf. 1, Mortar 32, Car. 121</td></tr> <tr><td>" 2, " 48, " 119</td></tr> <tr><td>" 3, " 50, " 122</td></tr> <tr><td>" 4, " 52, " 120</td></tr> </table> <p align="center"><u>Pit B.</u></p> <table border="0"> <tr><td>Platf. 1, Mortar 51, Car. 237</td></tr> <tr><td>" 2, " 35, " 123</td></tr> <tr><td>" 3, " 34, " 133</td></tr> <tr><td>" 4, " 29, " 124</td></tr> </table>	Platf. 1, Mortar 32, Car. 121	" 2, " 48, " 119	" 3, " 50, " 122	" 4, " 52, " 120	Platf. 1, Mortar 51, Car. 237	" 2, " 35, " 123	" 3, " 34, " 133	" 4, " 29, " 124			
Platf. 1, Mortar 32, Car. 121												
" 2, " 48, " 119												
" 3, " 50, " 122												
" 4, " 52, " 120												
Platf. 1, Mortar 51, Car. 237												
" 2, " 35, " 123												
" 3, " 34, " 133												
" 4, " 29, " 124												
	<p align="center"><u>Battery James Pratt</u></p> <p>Mounted:            2-6" B.L. Rifles, Model 1897, Nos. 4 and 11, M I., Watervliet Arsenal.</p>	Jun. 28, 1900	\$59,860.19	Magazines dry. Battery rewired in 1909 and 1910. Current for lighting supplied from Central Power Plant. Hodges type of shot hoist installed. Back delivery. No serial No. on hoists. Hand operated.								
	<table border="0"> <tr><td>Emp. 1, Rifle 4, Car. 7.</td></tr> <tr><td>" 2, " 11 " 8</td></tr> </table>	Emp. 1, Rifle 4, Car. 7.	" 2, " 11 " 8									
Emp. 1, Rifle 4, Car. 7.												
" 2, " 11 " 8												



Name of harbor:	Name and Armament of Battery.	Date when turned over to Artillery:	Total cost	Remarks.
Mouth of Columbia River	<u>Battery Constant Freeman</u> Mounted: 2-6" B.L. Rifles, Model 1900, Nos. 4 and 8, Watervliet Arsenal.	Jan. 17, 1902	\$34,538.37	Magazines dry. Battery rewired in 1909 and 1910. Current for lighting supplied from Central Power Plant. Hodges type shot hoist installed. Back delivery. No serial number on hoists. Hand operated.
	Mounted: 2 Ord. Dept. Barbette carriages, Model 1900. Nos. 24 and 25, Watervliet Arsenal: Emp. 1, Rifle 8, Car. 25, " 2, " 4, " 24			
	Mounted: 1-3" R.F. gun, Model 1898, No. 115, Driggs-Seabury Co. 1-3" balanced-pillar mount, No. 115, Driggs-Seabury Co.	Nov. 12, 1900	\$5,398.05	
	<u>Battery Elias Smur</u>			
	Mounted: 2-3" R.F. guns, Model 1898: Nos. 30 and 35, Driggs-Seabury Co.			
	2-3" balanced-pillar mounts, Nos. 30 and 35, Driggs-Seabury Co.	Jun. 28, 1900.	\$11,954.57	Magazines dry. Current for lighting supplied from Central Power Plant. Battery rewired in 1909 and 1910.
	Emp. No. 1, Gun 30, Car. 30 " 2, " 35, " 35			

In column of "Remarks", pages 1, 2 and 5, Report of Completed Batteries, etc., Defenses at Mouth of Columbia River, Oregon and Washington, for the year ending December 31, 1910, amend words "No powder hoists installed" to read "Type-C powder hoists installed, see sheet 4a".

The following table gives the location and data for each powder hoist installed:

Location.	Type	Hoist No.	Volt- age	M o t o r.		Date trans- ferred to Artillery.
				Speed.	Capac- ity.	
Bat. Lewis, Emp. No. 1	C-10"	31	220	1600 RPM	5 h.p.	1912 May 6
" Lewis, " " 2	C-10"	32	220	1600 RPM	5 h.p.	May 6
" Walker, " " 1	C-10"	33	220	1600 RPM	5 h.p.	May 6
" Walker, " " 2	C-10"	34	220	1600 RPM	5 h.p.	May 6
" Mishler, " " 1	C-10"	35	220	1600 RPM	5 h.p.	May 6
" Mishler, " " 2	C-10"	36	220	1600 RPM	5 h.p.	May 6
" Russell, " " 1	C-10"	37	220	1600 RPM	5 h.p.	May 6
" Russell, " " 2	C-10"	38	220	1600 RPM	5 h.p.	May 6

Name of harbor	Name and Armament of Battery.	Date when Turned over to Artillery:	Total Cost	Remarks.
Mouth of Columbia River	<u>Battery David Russell</u> Mounted: 2-10" B.L. Rifles, Model 1900, Nos. 4 and 11, Watervliet Arsenal. 2-10" disappearing carriages, L.F. Model 1901, Nos. 4 and 5, Watertown Arsenal.	Aug. 12, 1904.	\$125,000.00	Magazines dry. Em- placements being re- wired, and Power Plant being installed. Taylor Raymond shot hoists installed. Back delivery. Serial Nos. Emp. #1, No. 2141 * " 2, " 2141 * Motor: Voltage 220, speed 1060, Capacity 5 H.P. Transferred to Artillery Aug. 12, 1904. No powder hoists installed. Retracting, elevating and travers- ing motors installed on carriages Emplace- ments #1 & #2. Ordnance motor generators and switchboard not in- stalled.
	F. C. Station,	Sept. 13, 1904	\$ 7,832.20	Ref. of site 23.00. Ref. of instrument axis 73.00. Lower room 15'3/4" x 15'3/4". Upper room 8'4" x 8'4". Concrete column and steel tower. Can be distinguished on account of wire glass roof at about three miles when loca- tion is previously known. Surrounding trees and background are favorable for concealment.

\*The only numbers which could be found on hoists. Number evidently wrong.

Name of Station of Harbor	Name of Station	Date when turned over to the Artillery.	Total Cost:	Remarks.
Mouth of Columbia River.	Battle Commander's Station, C.	Mar. 30, 1911.	\$ 6,300.00	Ref. of site 103'. Ref. of Inst. axis 105.75'. Two rooms: observing room 18' x 16', booth room 18' x 32', with 12 booths 3'9" x 3'3", and C.O. room, 7' x 9'6". Reinforced concrete structure with asphaltum and gravel roof. Not con- spicuous at 4 miles in usual channel of ap- proach.
	Combined primary station for first fire command and Battery Commander's station, Battery David Russell; F <sub>1</sub> , and B.C. (David Russell)	Mar. 30, 1911.	\$ 2,130.00	Ref. of site 67'. Ref. of Inst. axis 69.085'. One room 15' x 15'. Reinforced concrete structure. Not conspic- uous at 4 miles in usual channel of approach.
	Combined primary station of the third fire com- mand and battery commander's sta- tion, Battery Clark; F <sub>2</sub> and B.C. (Clark)	Mar. 30, 1911.	\$ 8,072.68	Ref. of site 20'. Ref. of Inst. axis 72'. Six rooms: observing room 14' x 16'; three unfinished rooms: officers' dormi- tory, 25' x 19' with lava- tory; men's dormitory 28' x 30' with lavatory. Wood frame building covered outside with corrugated iron, with reinforced concrete in- strument pier. Not con- spicuous at 4 miles in usual channel of ap- proach.

Name of Harbor	Name of Station	Date when turned over to the Artillery	Total Cost	Remarks.
Mouth of Columbia River.	:Secondary Station: :second fire com- :mand, F <sub>2</sub> <sup>1</sup> .	:Mar.30,1911:	:\$1,050.00	:Ref.of site 95' :Ref.of Inst.axis 98' :One room 12'x12' :Reinforced concrete :structure.Not con- :spicuous at 4 miles :in usual channel of :approach.
	:Secondary station: :third fire com- :mand, F <sub>2</sub> <sup>1</sup> ,	:Mar.30,1911:	:\$1,050.00	:Ref.of site 95'. :Ref.of Inst axis 98' :One room 12'x12' :Reinforced concrete :structure. Not con- :spicuous at 4 miles :in usual channel of :approach.
	:Primary station, :Battery David Rus- :sell, B <sub>1</sub> , (David :Russell)	:Mar.30,1911:	:\$1,050.00	:Ref.of site 95'. :Ref.of Inst.axis 98' :One room 12'x12' :Reinforced concrete :structure. Not con- :spicuous at 4 miles :in usual channel of :approach.
	:Secondary station: :Battery Lyman :Mishler, B <sub>2</sub> , (Lyman :Mishler)	:Mar.30,1911:	:\$1,050.00	:Ref.of site 95'. :Ref.of Inst.axis 98'. :One room 12'x12'. :Reinforced concrete :structure. Not con- :spicuous at 4 miles :in usual channel of :approach.
	:Combined plotting: :room for third :fire command and :switchboard room.:	:Mar.30,1911:	:\$6,870.00	:Three rooms; operat- :ing room, 16'x20' :with 6' basement; :storage battery :room, 5'x20' with :6'basement; plotting :room, 19'x20'. Re- :inforced concrete :structure.

Name of Harbor	Name of Station	Date when turned over to the Artillery	Total Cost.	Remarks.
Mouth of Columbia River.	Battery Commander's Station, Battery Lewis, B.C. (Lewis),	Nov. 9, 1911.	\$3,398.67.	Ref. of site 32.75' Ref. of Inst. axis 35.20' Reinforced concrete structure; two rooms; observation (upper) 15'x15'. plotting (lower) 15'x15'. Not conspicuous at 4 miles in usual channel of approach.
	Battery Commander's Station, Battery Walker, B.C. (Walker)	Nov. 9, 1911.	\$3,448.18.	Ref. of site 32.75' Ref. of Inst. axis 35.15'. Reinforced concrete structure; two rooms, observation (upper) 15'x15'; plotting (lower) 15'x15'. Not conspicuous at 4 miles in usual channel of approach.
	Combined Plotting Room and Dormitory of Second Fire Command, F2 & Plotting Room, Batteries Mishler Lewis #1 and #2, Walker #1 and #2,	Nov. 9, 1911.	\$8,356.16.	Frame structure covered with diamond mesh and plaster; asphaltum gravel roof. Three rooms; plotting room 18'x25' with four telephone booths; officers' dormitory 10'x25' with lavatory; men's dormitory 25'x64' with lavatory.
	Dormitory for Primary Stations B3 and B4. Batteries Lewis and Walker,	Nov. 9, 1911.	\$1,396.34.	Wood frame structure with diamond mesh and plaster sides and asphaltum gravel roof. One room 12'x20' with lavatory.
	Combined Supplementary Stations of Second and Third Fire Commands, F2 (Walker) F3 (Clark),	Nov. 9, 1911.	\$3,496.29.	Ref. of site 13.00'. Ref. of Inst. axis 40.00'. Wood frame structure covered with corrugated iron, with asphaltum roof; two concrete instrument piers. 4 rooms, two 10'x10' observation rooms on top floor; 10'x20' dormitory, 2d floor and 10'x20' dormitory below. Not conspicuous at 4 miles in usual channel of approach.

Name of Harbor.	Name of Station	Date when turned over to the Artillery	Total Cost.	Remarks.
Mouth of Columbia River.	Dormitory at Battle Commander's Station "C"	Nov. 9, 1911	\$7,680.93	Wood frame structure covered with expanded metal and plaster; asphaltum gravel roof; two rooms, officers' dormitory 12'x32', with lavatory; men's dormitory, 32'x46' with lavatory.
	District Signal Station,	Nov. 9, 1911	\$2,948.02	Concrete structure with asphaltum gravel roof. Three rooms; operating room 12'x16' with lavatory; work room 7-1/2' x 10'; generator room 8' x 10'.
	Secondary Station: Battery Russell, B <sub>1</sub> (Russell),	Nov. 9, 1911	\$2,717.57	Ref. of site 10.00' Ref. of Inst. axis 40.00' Wood frame structure covered with corrugated iron; asphaltum gravel roof; concrete instrument pier; Three rooms, 10'x10' observation room above, one 13'x13' on second floor and 16'x16' with lavatory on ground floor.

Name of harbor:	Name and Armament of Battery.	Date when turned over to Artillery:	Total cost	Remarks.
Mouth of Columbia River	B.C. Station, emplacements 1-2 Battery Lewis, and 1-2 Battery Walker	Oct. 4, 1904.	\$ 7,572.98	Ref. of site 25.00. Ref. of instrument axis 73.00. Lower room 15'3/4" x 15'3/4". Upper room 8'4" x 8'4". Concrete column & steel tower. Conspicuous at 4 miles in usual channel of approach. Growth of trees in time can be made to render it very much less conspicuous.
	B.C. Station, emplacements 1 and 2, Battery Mishler.	Nov. 29, 1900	\$ 2,729.00	Ref. of site 54.65. Ref. of instrument axis 60.00. One room 14' x 14'. Concrete structure; steel roof. Conspicuous at 4 miles in usual channel of approach.
	B. C. Station, Battery Clark.	Sept. 13, 1904	\$ 7,844.57	Ref. of site 20.00 Ref. of instrument axis 72.00. Lower room 15'3/4" x 15'3/4". Upper room 8'4" x 8'4". Concrete column and steel tower. Can be distinguished on account of wire glass roof at about 3 miles when location is previously known. Surrounding trees and background are favorable for concealment.



Name of Harbor	Name of Station	Date when turned over to the Artillery	Total Cost	Remarks.
Mouth of Columbia River.	Primary station, first mine com- mand, M <sub>1</sub> .	Mar. 30, 1911	\$ 5,660.80	Ref. of site 13'. Ref. of Inst. axis 50'. Four rooms: observing room, 17'8" x 17'8"; plot- ting room, 17'8" x 17'8", with two telephone booths 4' x 3'3" each; officers' dormitory, 17'8" x 17'8", with lava- tory 3'6" x 7'6", two telephone booths, 4' x 3'3" each and hallway; men's dormitory, 40' x 18', with lavatory 7'6" x 14'6". Wood frame building covered with corrugated iron, with reinforced concrete instrument pier. Not conspicuous at 4 miles in usual channel of approach.
	Secondary station first mine com- mand, M <sub>2</sub> .	Mar. 30, 1911	\$ 1,510.36	Ref. of site 53'. Ref. of Inst. axis 55.45'. One room 12' x 12'. Reinforced concrete structure. Not con- spicuous at 4 miles in usual channel of ap- proach.
	Torpedo Loading room and service dynamite room.	Mar. 30, 1911	\$ 4,910.00	Loading room; one room 45' x 21'7" with testing tank 33' x 7'. Service dynamite room 8' x 10'. Both buildings wood frame on reinforced concrete platform.

No of harbor:	Name and Armament of Battery.	Date when turned over to Artillery :	Total cost:	Remarks
South of:	1 Mining Casemate,	: Sep. 22, 1909:	\$5,155.98	: In good condition
Columbia:	1 Torpedo Storehouse,	: Apr. 30, 1901:	8,148.75	: " " "
River	: 1 " " Extension,	: Sep. 22, 1909:	5,244.40	: " " "
	: 2 Cable Tanks,	: Apr. 30, 1901:	2,348.75	: " " " ex-
				: cept woodwork.
	: 1 Cable Tank Cover,	: Sep. 22, 1909:	2,935.34	: In good condition
	: 1 Terminal Manhole.	: Sep. 22, 1909:	197.12	: " " "

### ELECTRIC LIGHT PLANT AT BATTERY LEWIS

The plant is located in concrete structure built into the east end of the paradors of Battery Lewis, having three rooms - one boiler room, 16' x 28'; two engine and dynamo rooms, each 11' x 28'.

One 80 H.P., vertical boiler, Erie Special, made by Erie Boiler Works, Erie, Pa. Date of purchase, July 1, 1901.

One 65 H.P., horizontal, high speed, steam engine, made by A. L. Ide & Sons, Springfield, Ill. Date of purchase, April, 1898.

One 56-1/4 K.W., 125 volt, direct current, multipolar, compound wound, belted generator, made by Westinghouse Company. Date of purchase, April, 1898.

No transformers used.

There is one (1) storage battery operated and charged from this plant, as follows: One 60-ampere, Type F-13, 52 cells in glass jars, installed in and furnishing current for power for the Ordnance Department shop. Date of purchase, April, 1898.

The above storage battery was made by the Electric Storage Battery Company, Philadelphia, Pa.

This plant is used temporarily for charging storage battery in Battery Clark, which is used for operating motors in the Ordnance Machine Shop. It is proposed to dismantle the plant and storage battery as soon as the Ordnance Department are supplied with other source of power for motors. No current supplied for post lighting, search-lights or telautographs.

Cost of plant installed in power house, including the three storage batteries now dismantled, was \$12,896.70. Date of transfer to the Artillery, January 19, 1901.

### CENTRAL POWER PLANT

(Supplying current to all batteries except Battery Russell)

The plant is located in a reinforced concrete building 250 feet from right flank of Battery Clark.

Boilers: Two 100 H.P., horizontal, water tube, oil burning, manufactured by E. Keeler & Co., Williamsport, Pa., date of purchase July 8, 1909.

Engines: Two 70 H.P., horizontal, single cylinder, center crank, non-condensing, with fly-wheel governor, 305 R.P.M., steam, direct connected to generators. Manufactured by Buffalo Forge Co., Buffalo, N. Y. Date of purchase June, 3, 1909.

Generators: Two 50 k. w., 220 volts no load, 250 volts full load, multi-polar, compound wound, direct connected. Manufactured by the Western Electric Co., Chicago, Ill.

Transformers: None.

Storage Batteries: None.

This plant furnishes current for lighting and power in the following emplacements and buildings:

Batteries - Mishler, Walker, Lewis, Pratt, Constant Freeman, Elias Smur, Clark, Mining Casemate and Gun Cotton Storage Magazine.

B. C. Sta. Lewis and Walker.

B. C. Sta. Mishler,

B. C. Sta. Clark,

and will be used for lighting all new R. F. Stations and dormitories, except those located in the vicinity of Battery Russell.

No current supplied for Post Lighting.  
No current supplied for Searchlights.  
No current supplied for Telautographs.

Kilowatts required for power and lighting:

Inside illumination,	20.7 K.W.
Outside "	4.9 "
Motors, shot hoists,	21.6 "
Motors, retracting	* 24.0 "
Fire Control, switchboard room	2.0 "
	<hr/> 73.2 "

\*Includes 5 retracting motors not yet installed.

The plant has been designed to allow for the installation of one additional 100 H.P. boiler, one 50 k.w., direct connected generating set and balancer set for Post lighting.

Total cost of plant, exclusive of conduit lines and underground cables, \$34,013.00.

Transferred to the Artillery December 15, 1910.

ELECTRIC PLANT AT BATTERY DAVID RUSSELL.

The plant is located on the right flank of the battery, in a concrete structure having three rooms; engine room 15' x 21', radiator room 15' x 11' and storeroom 10' x 32'. The structure was originally designed for and occupied by steam plant, which was transferred to the Artillery August 12, 1904. Steam plant has been dismantled. Cost of structure is indeterminate, as it was built in connection with the battery.

The new plant consists of two 25 k.w. direct connected sets, as follows: two 4-cycle, 4-cylinder, vertical gasoline engines, type G.M. 12 A-2, 43/54 H.P., 560 R.P.M., Nos. 6790 and 6792, direct connected to two Type M.P.C., class 6-25-560, Form A., 230-V., direct current generators Nos. 195141 and 195415 respectively. Manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. No transformers or storage batteries.

Generators furnish current for lighting and power in the following emplacements and buildings: Emplacements Nos. 1 and 2, Battery David Russell; R. F. stations, "C", B1, B2, F3, F5, F1, District Signal Station and Dormitory at Fire Control Hill. No current is supplied for post lighting, searchlights or telautographs.

Kilowattage required for power and lighting:

Inside illumination, - - - - -	10.2 k.w.
Outside " - - - - -	1.8 k.w.
Motors, shot hoists, - - - - -	7.0 k.w.
*Motors, powder hoists, - - - - -	7.0 k.w.
Motors, retracting, - - - - -	8.0 k.w.
Motor Generator set, Signal Sta. -	2.0 k.w.
	<u>36.0 k.w.</u>

\*To be installed later.

No provision has been made for additional parallel units. The cost of the new plant, including alteration of power house was \$9,930. Transferred to the Artillery March 30, 1911.

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 1 and 2,  
FORT STEVENS, OREGON.

The plant is located near the southwest end of the reservation, approximately 1500 feet southeast of Battery David Russell, and is housed in a fireproof, steel frame building, covered with expanded metal and plaster.

The plant consists of two 25 k.w. direct connected sets, as follows: two 4-cycle, vertical, gasoline engines, type G.M 12-A2-43/54 H.P., 560 R.P.M., Nos. 5514 and 5515, direct connected to two type M.P.C., class 6-25-560, Form A., 115-volt, direct current generators Nos. 195129 and 195122, respectively. Manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. No transformers or storage batteries.

Generators furnish current for two 60" projectors only. Kilowattage required: two 60" searchlights at 20 k.w. each, 40 k.w. No provision made for additional parallel units.

The cost of the plant was approximately \$10,430.00. Transferred to the Artillery on July 28, 1911.

SEARCHLIGHT PROJECTOR NO. 1.

60" - serial No. 8224, type EC, form N-2, class 60", manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter near south end of reservation at Fort Stevens. Returns made to the Engineer Department. Cost of projector, \$5,312; of shelter, cable, etc., \$1,100. Transferred to the Artillery on July 28, 1911.

SEARCHLIGHT PROJECTOR NO. 2.

60" - serial No. 8225, type EC, form N-2, class 60", manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter near south end of reservation at Fort Stevens. Returns made to the Engineer Department. Cost of projector, \$5,312; of shelter, cable, etc., \$1,100. Transferred to the Artillery on July 28, 1911.

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 3 and 4,  
FORT STEVENS, OREGON.

The plant is located 200 yards west of northeast corner of reservation, in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 1 - 25 k.w. direct connected set, as follows: one 4-cycle, vertical, gasoline engine, type G.M.-12, A-1-43/54 H.P., 560 R.P.M., No. 5512, direct connected to one type M.P.C., class 6-25--560, Form A., 115-volt, direct current generator No. 195130. Manufactured by General Electric Company. Purchased in 1910. No transformers or storage batteries.

Generator furnishes current for one 60" projector and for lights for torpedo loading room only. Kilowattage required: 1 - 60" searchlight, 20 k.w., inside illumination of Torpedo Loading Room, .7 k.w., and inside illumination of Power Plant, .7 k.w.; total, 21.4 k.w.

Provision has been made for installing similar 25 k.w. set for furnishing current for 36" searchlight No. 4.

The cost of the plant was approximately as follows: Power House, \$3,920; Machinery, \$3,630. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 3.

60" - serial No. 8222, type EC, form N-2, class 60", manufactured by General Electric Company, Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from 1 - 25 k.w. gasoline actuated generator set in power plant #3 and 4 described above.

Projector is mounted in a specially designed corrugated iron shelter, 100 yards north of power plant, equipped with a hoisting apparatus to elevate light to required height. Returns made to the Engineer Department. Cost of Projector, \$5,312; cost of shelter, \$2,225. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 4.

To be 36", under approved project. (Not supplied).

### ELECTRIC LIGHT PLANT AT BATTERY DAVID RUSSELL.

The steam plant, previously located in concrete structure on right flank of the battery, having two rooms 15'x32', and storage battery room 10'x32', has been dismantled and work is now in progress preparatory to the installation of two 25 k.w. gasoline actuated generating sets.

No transformers are to be used.

No storage battery installed.

The plant will furnish current for lights and motor service for Battery Russell, alone.

There are two motor driven chain hoists installed in this battery and the carriages are fitted with maneuvering motors.

No Post lighting will be done from this plant, and no searchlights are to be operated from it.

The current requirements from this station will be as follows: For inside and outside illumination of defensive works, 6-1/2 k.w.; for motors, 15 k.w.

*Elect plant, searchlights = 1 + 2, Ft. Stevens*  
Searchlight Projectors.

There are two searchlights at Fort Stevens, Oregon, both used in connection with the submarine mine defense. The oldest is 30-inches in diameter. It was made by the General Electric Co., and purchased in 1898. It is both electrically and hand controlled and has its own generator, steam connected, with boiler. Projector and plant are installed in separate buildings provided for them. The projector is movable, within a radius of 1,000 feet.

The returns for searchlights are made to the Engineer Department. The cost of the projector is not known.

Transfer was made by the Engineer Department to the Artillery Engineer in March, 1901.

The other has a projector 36-inches in diameter. It was made by the General Electric Co., and purchased in 1907. It is both electrically and hand controlled. The plant consists of a three cylinder 6"x6" gasoline engine direct connected to a 74 volt, 130 ampere generator. Both the projector and the plant are mounted on steel trucks, the whole forming a complete portable outfit. It is housed in a corrugated iron building constructed for this purpose and located near the Post power plant.

Returns are made to the Engineer Department. The cost of the outfit is not known. Transfer was made by the Engineer Department in January, 1908.

### Tide Gages.

There is one Artillery tide gage at Fort Stevens, located on the jetty tramway 4,660 feet out from the root of the jetty. It is a staff gage without any house and was established and turned over to the Artillery in November 1906. Its cost was \$5.00. Is serviceable.

A tide gage, originally located on the Engineer dock at Fort Stevens, has been moved to the Quartermaster dock. This gage is of the disk type, protected by a wooden house. Approximate cost \$200.00. Transferred to Artillery May, 1908.

*2-3-39*  
*all supplied by the Artillery*

ELECTRIC PLANT FOR 30" SEARCHLIGHT, FORT STEVENS, ORE.

Location.- The plant is located on the northeast end of reservation approximately 1,000 feet west from Quartermaster's Dock and is housed in a wood frame building covered with corrugated sheet steel, which also serves as a shelter for the searchlight.

Boiler.- 20 h.p. vertical fire tube, serial #3300, manufactured by the Lidgerwood Mfg. Co.

Direct connected, marine type, generating set. Manufactured by the General Electric Co., Schenectady, N. Y.

Engine.- Steam, 18 brake h.p. approximately, single cylinder, 6-1/2" bore x 5" stroke, 450 R.P.M., form A., serial No. 402.

Generator.- 10 k.w., 110 volts no load and full load, 91 amp., 4 pole, compound wound, form A., serial No. 13269, class 4-10-405.

Transformers and storage batteries.- None. This plant furnishes current for lighting the power plant and for 30" searchlight No.283.

No current supplied for post lighting or telautographs.

Kilowatts required for power and lighting:

1 - 30" searchlight, - - - -	8.8
Inside illumination, - - - -	.3
	<u>9.1</u>

No provision is made for the installation of parallel units. Cost of plant not known. This plant was transferred from Willets Point in 1898, together with the searchlight. Transferred to the Artillery, March, 1901.

Searchlight Projector.

30" - serial No. 283, type E.C.F., electric control, manufactured by the General Electric Co., Schenectady, N.Y. Purchased in 1898 and shipped from Willets Point, N.Y., July, 1898. Current supplied from 30" searchlight plant described above. Mounted on car with a track connecting with Columbia River jetty railway, and has sufficient cable to be moved 1,000 feet. Returns of the searchlight made to the Engineer Department. Transferred to the Artillery, March, 1901.

36" PORTABLE SEARCHLIGHT, FORT STEVENS, OREGON.

Searchlight #3043.- Portable outfit No. 24, as described in the 4th supplement to mimeograph #39. Manufactured by the General Electric Co., Schenectady, N.Y. Type E.C., form M, 130 amp., D.L. 41418, electric control.

Engine.- #3905, 3-cylinder, 6" x 6". 4 cycle, gasoline, 600 R.P.M.



Generator.- #114889, multipole, differentially wound, -separately excited, 74 volts, no load. 9.6 k.w., 150 amp., type M.P.6, form C. Exciter #145918, 110 volts.

Outfit purchased in 1907 and shipped from Fort Totten, October 5, 1907. Used in connection with submarine mine defense, and housed in wood frame building covered with corrugated sheet steel, located approximately 200 feet south of mining casemate. Returns made to the Engineer Department. Cost not known.

Transferred by the Engineer Department to Artillery, January, 1908.

Name of Battery.	Name and Armament of Battery.	Date when turned over to Artillery	Total cost	Remarks.
outh of Fort Columbia, Wn. Columbia: Battery Jules Ord. River	Mounted: 3-8" B.L. Rifles, Model 1888, Nos. 20, MI., 23, MI., and 44, MII., Watervliet Arsenal.  3-8" disappearing carriages, L.F., Model 1896, Nos. 1 & 10. Pond Machine Tool Co. & No. 32. Lake Erie Engineer Works.  Emp. 1, Rifle 20, Car. 1 " 2, " 23, " 10 " 3, " 44, " 32	Jul. 16, 1898	\$137,298.79	Garrisoned. Magazines dry. Battery rewired, interior and exterior, in 1910. Current supplied from Battery Jules Ord Power Plant. Storage battery to be dismantled. Taylor Raymond shot hoists installed. All back delivery. Serial Nos.: Emp. #1 - No. 2 " 2 - No. 1 " 3 - No. 3 Motor: Voltage 110; Speed 1060; capacity 3-1/2 H.P. Transferred to Artillery, Mar. 1908.
Battery William Murphy.	Mounted: 2-6" B.L. Rifles, Model 1897, Nos. 15 & 24, MI., Watervliet Arsenal.  2-6" disappearing carriages, L.F., Model 1898, Nos. 9 and 10, Watervliet Arsenal.  Emp. 1, Rifle 15, Car. 9 " 2, " 24, " 10	Jun. 29, 1900	\$ 58,623.82	Magazines dry. Electric appliances in poor condition. The power is supplied by a duplicate oil engine plant, one located in Emp. No. 1 and one in Emp. No. 2. They may be connected in parallel or each run separately. Three 3" Emps. also served from this plant. Hodges type hand hoist installed. Back delivery. No Serial No. on hoist. Hand operated.

Name of Harbor	Name of Station	Date when turned over to the Artillery	Total Cost	Remarks.
Columbia River	FORT COLUMBIA, WM. Mining Casemate	Mar. 30, 1911	\$ 5,005.00	Four rooms: cot room, 8'10" x 21'10"; operating room, 15'9" x 21'10"; engine room, 11'8" x 21'10"; storage battery room, 10' x 21'10". Wood frame building covered with expanded metal and plastered.
	Switchboard room	Mar. 30, 1911	\$ 3,430.00	Two rooms: operating room, 16' x 20', with 5' basement; storage battery room, 5' x 20'. Wood frame building, covered with expanded metal and plastered.
	Dormitory for primary station of second mine command and for stations of fifth fire command.	Mar. 30, 1911	\$ 2,290.00	Four rooms: officers' dormitory, 9'6" x 17'; officers' lavatory, 6' x 6'; men's dormitory, 33' x 17'; men's lavatory, 10'6" x 6'. Wood frame building covered with expanded metal and plastered.
	Primary station, second mine command, M <sub>2</sub> .	Mar. 30, 1911	\$ 2,025.00	Ref. of site 326'. Ref. of Inst. axis 328.97'. Two rooms: observing room, 18' x 18'; plotting room, 18' x 18'; with two telephone booths, 3'9" x 3'3". Reinforced concrete building. Not conspicuous at 4 miles in usual channel of approach

Note.- Plane of reference of all stations refers to mean lower low water.

Name of Harbor.	Name of Station.	Date when turned over to the Artillery.	Total Cost.	Remarks.
Mouth of Columbia River.	Battery Commander's Station, Battery Ord, B.C. (Ord),	Nov. 20, 1911.	\$3,096.16	Ref. of site 107.5' Ref. of Inst. axis 109.08' Reinforced concrete structure; two rooms, observation (upper) room 15'x15'; plotting (lower) room 15'x15'. Not conspicuous at 4 miles in usual channel of approach.

Name of Harbor	Name and Armament of Battery.	Date when turned over to Artillery	Total cost:	Remarks
outh of Columbia River	Battery Frank Crenshaw Mounted: 3-3" R.F. guns, Model 1898, Nos. 97, 98 & 104, Driggs-Seabury Co.	2 - Jun. 28, 1900: 1 - Oct. 29, 1900:	\$15,462.61:	Magazine dry. Electric appliances in poor condition. Serviced from duplicate plant in two 6" emplacements, disappearing carriages.
	3-3" balanced-pillar mounts, Nos. 97, 98 & 104, Driggs-Seabury Co.			
	Emp. 1, Gun 97, Car. 97 " 2, " 98, " 98 " 3, " 104, " 104			
	B. C. Station, 8-inch Battery.	Nov. 29, 1900:	\$ 1,666.00:	Ref. of site 327 45. Ref. of instrument axis 329.0. One room 14' x 14'. Concrete structure; steel roof. Not conspicuous at one mile, in usual channel.
	1 Mining Casemate.	Apr. 30, 1901:	\$ 7,885.00:	This mining casemate has been abandoned as such and new casemate under construction.

ELECTRIC LIGHT PLANT AT BATTERY JULES ORD.

The plant is located in a concrete structure protected against direct and indirect fire, and is located near the flank of emplacement No. 3 of the battery. It contains two rooms - one 16' x 32' called the boiler room, the other 11' x 32' called the engine and dynamo room. While built for the installation of a steam plant it is not proposed to install such a plant.

The present plant consists of one 16 H.P., Hornsby-Akroyd oil engine, purchased in September 1898. The engine is belted to a Westinghouse direct current, multipolar, compound generator 11-1/4 k.w., 150 volt capacity. The generator was purchased in September 1898.

ELECTRIC LIGHT PLANT AT BATTERY JULES ORD.

The plant is located in a concrete structure near the left flank of emplacement No. 3 of Battery Jules Ord. The structure was originally designed for the installation of a steam plant and contained two rooms - an engine and dynamo room 11' X 32' and a boiler room 16' X 32'. Instead of a steam plant, an oil engine plant (see "Old Power Plant" below) was installed in the engine room and a 25 k.w. gasoline set (see "New Power Plant" below) was installed in the boiler room.

OLD POWER PLANT. - The old plant consists of one 16 h.p. Hornsby-Akroyd oil engine, purchased in September, 1898. The engine is belted to a Westinghouse direct current, multipolar, compound generator, 11-1/4 k.w., 150 volt capacity. The generator was purchased in September, 1898. No transformers used. The storage battery is installed in emplacement No. 2 of the battery. It is type F-11, capacity, 50 amperes; No. of cells, 58; in lead lined tanks; made by Electric Storage Battery Co., Philadelphia, Pa; purchased in October, 1898. The generator and storage battery are used for post lighting only. The cost of the old plant, including storage battery, was about \$6,950. Transferred to the Artillery, October 29, 1900. (Under approved project for searchlight installation, this plant is to be removed and a 25 k.w. gasoline set installed in its place for operating searchlight No. 9).

NEW POWER PLANT. - The plant consists of a 4-cycle, 4-cylinder, vertical gasoline engine, Type G.M. A 2-13/54, #5372, 560 R.P.M., direct connected to a 25 k.w. generator, 115 volt, multipolar, Type M.P.C., class 6 - 25 k.w., Form A, #183184, direct current. Manufactured by General Electric Co., Schenectady, N.Y. Purchased in July, 1909. No transformers or storage batteries. Generator furnishes current for lighting emplacements #1, #2 and #3 of Battery Jules Ord, and for power for the shot hoists; also current for lighting stations F<sub>5</sub>, M<sub>2</sub>, B C (Ord), Dormitory and Switchboard Room. No current is supplied for post lighting, searchlights or telautographs. Kilowattage required for inside illumination, 1.00; for outside illumination of defensive works, 6.70; for motors, 10.00; for switchboard room, 1.00. Plant has been arranged so as to permit the installation of a duplicate gasoline actuated generating set in same room. The cost of the new plant, including alteration of power house, was \$5,175. Transferred to the Artillery Feb. 10, 1911.

*See new sheet  
preceding*

ELECTRIC PLANT AT BATTERY JULES ORD.

The plant is located in a concrete structure near the left flank of emplacement No. 3 of Battery Jules Ord. The structure was originally designed for the installation of a steam plant and contained two rooms, an engine and dynamo room 11' x 32' and a boiler room 16' x 32'. Instead of a steam plant, a 16 h.p. Hornsby-Akroyd oil engine, purchased in September, 1898, was installed in the engine room. This engine was belt connected to a Westinghouse direct current, multipolar, compound generator, 11-1/4 k.w., 150 volt capacity, installed in the engine room.

A storage battery, type F-11, capacity 50 amperes, number of cells 58, in lead lined tanks, made by Electric Storage Battery Co., Philadelphia, Pa., purchased in October, 1898, was installed in emplacement No. 2 of the battery.

During the years 1909-1910, the following set was installed in the boiler room; one 4-cycle, 4-cylinder, vertical gasoline engine, type G.M. A2-45/54, No. 5372, 560 R.P.M., direct connected to one 25 k.w. generator, 115-volt, multipolar, type M.P.C., class 6, 25 k.w., Form A., No. 183184, direct current. Manufactured by the General Electric Co. Purchased in July, 1909. No transformers. Transferred to the Artillery on February 10, 1911. Provision was made for a duplicate 25 k.w. gasoline actuated generating set in the same room.

During the year 1911, the Hornsby-Akroyd engine and 11-1/4 k.w. generator were removed, the partition between the engine and boiler rooms was removed, and provision made for the installation of one 25 k.w. gasoline actuated generating set to furnish power for the operation of Searchlight No. 9.

The storage battery in Emplacement No. 2 is still used for the lighting of the three emplacements in Battery Ord, and for Post lighting from about 10:00 P.M. to daylight. The storage battery is connected with the present generator.

The generator furnishes current for lighting emplacements Nos. 1, 2 and 3 of Battery Jules Ord, and for power for the shot hoists; also current for lighting stations F<sub>5</sub><sup>1</sup>, M<sub>2</sub><sup>1</sup>, B.C.(Ord), Dormitory and Switchboard Room. No current is supplied for searchlights or telautographs, but current is supplied for Post lighting from about 4:30 P.M. to 10:00 P.M.

Kilowattage required for inside illumination 1.00; for outside illumination of defensive works 6.70; for interior motors 10.00; for switchboard room 1.00, and for Post lighting approximately 2.8.

Cost of the old plant, including storage battery, was about .. .. .	..	\$6,950.00
Cost of installation of present generating set and provision for installation of 25 k.w. duplicate set .. .. .	..	5,175.00
Cost of removing partition and making provision for 25 k.w. set for S.L.#9, ..	..	1,565.00

No transformers used.

The storage battery is installed in emplacement No. 2 of the battery, for use when the generator is not running. It is Type F. 11, capacity, 50 ampere; No. of cells 58; in lead lined tanks; made by Electric Storage Battery Co., Philadelphia, Pa. Purchased in October 1898.

The generator furnishes light to the Battery Commander's Station, furnishes current for charging the storage battery, and for running the ammunition hoist motors, which are installed. This plant is too small for the requirements. A 25 k.w. gasoline engine actuated generating set has been installed and provision has been made for the installation of a duplicate set. The approved project for the searchlight installation provides for installing a third set, 25 k.w. gasoline actuated generating set, in the room now used for the Hornsby-Akroyd oil engine. This set will be for the operation of Searchlight #9 of the approved project. This plant is used for Post lighting.

The current required from this station is 9 k.w. for inside and outside illumination of batteries, 10 k.w. for motors.

The cost of the present plant, including storage battery, was about \$6,950.00.

Date of transfer to the Artillery, October 29, 1900.

#### ELECTRIC LIGHT PLANT AT BATTERY WILLIAM MURPEY.

The plant is located in the emplacement rooms of Battery William Murphy. There are no boilers in use.

Two (2) 7 H.P., Hornsby-Akroyd oil engines. Date of purchase, May 1900.

Two (2) 4 K.W., 110 volt, direct current, bi-polar, compound wound, belted generator, made by the General Electric Company. Date of purchase May, 1900. (This is a duplicate plant, which can be run singly or in parallel.)

No transformers used.

No storage battery installed.

This plant furnishes current for lights in Battery William Murphy and Battery Frank Crenshaw, and is intended only for these two batteries. No motors have been supplied for the chain hoists in Battery William Murphy, but this plant is amply large for all known light or power requirements.

No Post Lighting is done from this plant, and no searchlights are operated from it.

The current requirements from this electric plant will be as follows: (1) For inside and outside illumination of defensive works, 3-1/2 k.w.; (2) For motors, 4 k.w.

Cost of this duplicate plant, about \$4,100.00.

Date of transfer to the Artillery, October 29, 1900.



Searchlight Projectors.

There are two searchlights at Fort Columbia, both used in connection with the submarine mine defense. The diameter of the oldest one is 30 inches. It was made by the General Electric Company and purchased in 1898, shipment being made from Willett's Point, N. Y., July 19, 1898. It is both electrically and hand controlled, and has its own generator, steam connected, with boiler. The projector and plant are installed in separate buildings provided for them. The projector is movable within a radius of 1,000 feet.

The returns for searchlight are made to the Engineer Department. The cost of the projector is not known.

Transfer was made by the Engineer Department to the Artillery Engineer in March, 1901.

The other has a 36-inch projector. It was made by the General Electric Company, and purchased in 1907, shipment being made from Fort Totten, N. Y., on October 5, 1907. It is both electrically and hand controlled. The plant consists of a three cylinder 6"x6" gasoline engine direct connected to a 74 volt, 130 ampere generator. Both the projector and the plant are mounted on steel trucks, the whole making a complete portable outfit. It is housed in a corrugated iron building constructed for this purpose and located on Chinaman's Point.

Returns are made to the Engineer Department.

The cost of the outfit is not known.

Transfer was made by the Engineer Department in January, 1908.

Tide Gages.

There is one Artillery tide gage for Fort Columbia, established at Desdemona Light Station and turned over to the Artillery in August, 1905. It is a staff gage without any house, and its cost was \$15.00. Is serviceable.

A tide gage has been constructed on the Quartermaster's wharf at Fort Columbia, of the disk type, protected by a small wooden house, as recommended by 3rd. Supplement to Mimeograph No. 62, Serial No. 314. Its cost was approximately \$200.00, and was turned over to the Artillery in May, 1908.

ELECTRIC PLANT FOR 30" SEARCHLIGHT, FORT COLUMBIA, WASH.

Location.- The plant is located on the southwest end of the reservation, approximately 500 feet west of Battery William Murphy, and is housed in a wood frame building covered with corrugated sheet steel.

Boiler.- 20 h.p. vertical, fire tube, serial No. 3341, manufactured by the Lidgerwood Mfg. Co.

Direct connected, marine type, generating set. Manufactured by the General Electric Co., Schenectady, N. Y.

Engine.- Steam, 18 brake h.p. approximately, single cylinder, 6-1/2" bore x 5" stroke, 450 R.P.M., form A, serial No. 400.

Generator.- 10 k.w., 110 volts no load and full load, 91 amp., 4 pole, compound wound, form A, serial No. 13268, class 4-10-405.

Transformers and storage batteries.- None. This plant furnishes current for lighting of the power plant and 30" searchlight No. 261. No current supplied for post lighting or telautographs.

Kilowatts required for power and lighting-

1 - 30" searchlight, - -	8.8
Inside illumination, - -	.3
	<u>9.1</u>

No provision has been made for the installation of parallel units. Cost of plant not known.  
Transferred to the Artillery, March, 1901.

Searchlight Projector.

30" - serial No. 261, type E.C.F., electrical control. Manufactured by the General Electric Co., Schenectady, N.Y. Purchased in 1898 and shipped from Willets Point, N.Y., July 19, 1898. Current supplied from 30" searchlight plant described above. Searchlight mounted on truck and is movable within radius of 1,000 feet. Cost not known. Returns made to Engineer Department.  
Transferred to Artillery, March, 1901.

36" PORTABLE SEARCHLIGHT, FORT COLUMBIA, WASH.

Searchlight #3039.- Portable outfit, No. 25, as described in 4th supplement to mimeograph #39. Manufactured by General Electric Co., Schenectady, N.Y. Type E.C., form M, amperes 130, D.L.41418, electric control.

Engine.- #3906, 3-cylinder, 6" X 6", 4-cycle, gasoline, 600 R.P.M.

Generator.- #145880, multipolar, differentially wound, separately excited, 74 volts no load, 130 amp., 9.6 k.w., type M.P. 6, form C. Exciter #145909, 110 volts.

Outfit purchased in 1907 and shipped from Fort Totten, October 5, 1907. Searchlight used in connection with submarine mine defense and housed in wood frame building covered with corrugated sheet steel, located on Chinaman's Point. Returns are made to the Engineer Department. Cost not known.

Transferred by the Engineer Department to the Artillery, January, 1908.

Name of harbor	Name and Armament of Battery	Date when turned over to Artillery	Total cost	Remarks
Mouth of Columbia River	<p><u>Fort Canby, Wash.</u>  <u>Battery Harvey Allen.</u>                      Mounted:                      3-6" R.F.guns, Model 1905, Nos. 13, 17 and 16, Watervliet Arsenal.                      3-6" disappearing carriages, L.F., Model 1903, Nos. 86, 87 and 88, South Bethlehem.                      Emp. 1, Rifle 13, Car. 86                      " 2, " 17, " 87                      " 3, " 16, " 88</p>	Feb. 27, 1906	\$58,935.00	<p>Garrisoned                      Magazines dry.                      Emplacements fully wired. Electrical plant being installed. The cost does not include mounting carriages. No shot hoists installed.</p>
	<p><u>Battery Elijah O'Flyng</u>                      Mounted:                      2-6" R.F. guns, Model 1905, Nos. 1 and 11, Watervliet Arsenal:                      2-6" disappearing carriages, L.F., Model 1903 Nos. 84 and 85, South Bethlehem.                      Emp. 1, Rifle 1, Car. 84                      " 2, " 11, " 85</p>	Feb. 27, 1906	\$39,290.00	

Tide Gages.

A tide gage has been constructed on the dock at Fort Canby, of the disc type, protected by a small wooden house, as recommended by 3rd., Supplement to Mimeograph No. 62, Serial No. 314. Its cost was approximately \$155.00, and was turned over to the Artillery in August 1908.

*For central power plant: -  
 See supplemental sheet (h/w)  
 submitted with 3897/218*

Name of Harbor	Name of Station	Date when turned over to the Artillery	Total Cost.	Remarks.
Mouth of Columbia River.	Primary Station of Fourth Fire Command, Batteries Allen and O'Flyng: F <sub>4</sub> (Canby),	Nov. 6, 1911:	\$4,749.69	:Ref. of site 295 ft. :Ref. of Inst. axis 296'. :Three rooms; observing room 10'x10'; officers' dormitory, with lavatory, 10'x16'; men's dormitory 22'6"x26' including five telephone booths and lavatory. :Observation room, concrete dormitories, wood frame covered with diamond mesh and plastered, asphaltum and gravel roof. Not conspicuous at 4 miles in usual channel of approach
	Primary Station, Battery Harvey Allen, B <sub>5</sub> (Allen)	Nov. 6, 1911:	\$1,020.58	:Ref. of site 222'. :Ref. of Inst. axis 223'. :Wood frame covered with diamond mesh and plaster, asphaltum and gravel roof. One room 10'x10', observation. Not conspicuous at 4 miles in usual channel of approach
	Dormitory for B <sub>5</sub>	Nov. 6, 1911:	\$2,072.76	:Wood frame covered with diamond mesh and plaster, asphaltum and gravel roof two rooms, officers' dormitory 10'x12' with lavatory; and men's dormitory 15'7"x18', with lavatory.
	Switchboard Room	Nov. 6, 1911:	\$2,636.35	:Wood frame structure covered with diamond mesh and plaster, with asphaltum and gravel roof. Two rooms, storage battery room 5'x19'6" with cement floor and frosted windows; operating room 16'x19'6".

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 6 and 7,  
FORT CANBY, WASH.

The plant is located on McKenzie Head at Fort Canby, Wash., in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 2 - 25 k.w. direct connected sets, as follows: two 4-cycle, vertical, gasoline engines, type G.M.-12, A2-43/54 h.p., 560 R.P.M., Nos. 6845 and 6846, direct connected to two type M.P.C., class 6-25-560, Form A, 115-volt, direct current generators Nos. 324513 and 324584. Manufactured by General Electric Company. Purchased in 1911.

No transformers or storage batteries.

Generators furnish current for one 60" and one 30" projector only. Kilowattage required: 1 - 60", 20 k.w. and 1 - 30" searchlight, 8.8 k.w., inside illumination .7 k.w.; total, 29.5 k.w.

No provision has been made for additional parallel units. The cost of the plant is approximately as follows: Power House, \$5,400; Machinery, \$7,360. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 6.

30" - serial No. 269, type ECF., class 30", electrically controlled, manufactured by General Electric Company, Schenectady, N.Y., transferred to this District from Seattle District by authority of 1st indorsement dated Office Chief of Engineers, April 13, 1911. (E.D.38971/116..Def.721/192). Date of purchase not known. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter on McKenzie Head. Projector has controller booth located on high point about 1/3 mile northwest of McKenzie Head. Returns made to the Engineer Department. Cost of projector, not known; cost of shelter and booth, about \$850. Transferred to the Artillery on March 7, 1912.

(Temporary installation- E.D.68858/121 -- Def.721/172).

SEARCHLIGHT PROJECTOR NO. 7.

60" - serial No. 8223, type EC, form N-2, class 60", electrical control, manufactured by the General Electric Company, Schenectady, N.Y. Purchased in 1910. Current supplied from power plant described above. Projector is fixed and installed in a frame, sheet-iron covered shelter on McKenzie Head. Projector has controller booth located on McKenzie Head about 360 feet southeast of light. Returns made to Engineer Department. Cost of projector, \$5312. Cost of shelter and booth about \$850. Transferred to the Artillery on March 7, 1912.

ELECTRIC PLANT FOR SEARCHLIGHT NO. 8.  
FORT CANBY, WASH.

The plant is located on the southeast point of Fort Canby reservation in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 1 - 25 k.w. direct connected set as follows; one 4-cycle, vertical, gasoline engine, type G.M. 1-12, A-1-43/54 h.p., 560 R.P.M., No. 5513, direct connected to one type M.P.C., class 6-25-560, Form A, 115-volt, direct current generator No. 195123, manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Generator furnishes current for one 30" projector only. Kilowattage required: 1 - 30" searchlight 8.8 k.w., inside illumination .6 k.w., total, 9.4 k.w. No provision is made for additional unit. The cost of plant is approximately as follows: Power House, \$3,450; Machinery, \$3,500. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 8.

30" - serial No. 332, type ECF, class 30", electrical control, manufactured by General Electric Company, Schenectady, N.Y., transferred to this district from Seattle district by authority of 1st indorsement dated Office Chief of Engineers, April 13, 1911. (E.D. 38971/116). Date of purchase not known. Current supplied from one 25 k.w. gasoline actuated generator set in power plant No. 8 described above. Projector is fixed and installed in a frame, sheet-iron covered shelter at extreme southern point of Fort Canby reservation. Returns made to the Engineer Department. Cost of projector, not known; cost of shelter, about \$775. Transferred to the Artillery on March 7, 1912.  
(Temporary installation, E.D. 68858/121).

CENTRAL POWER PLANT, FT. CANBY, WASH.

The plant is located in a concrete building (15'x24') in the ravine between batteries Harvey Allen and Elijah O'Flyng, about 30 feet west of the Signal Corps Switchboard Room.

The plant consists of two 25 k.w. direct connected sets. The description of each set follows:

Set No. 1 consists of one 4-cycle, vertical, gasoline engine, type G.M. 12-A2-43/54 H.P., 560 R.P.M., No.5538, direct connected to one type M.P.C., class 6-25-560, Form A., 230-volt, direct current generator No. 189033. Purchased in 1910.

Set No. 2 consists of one 4-cycle, vertical, gasoline engine, type G.M. 12-A2-43/54 H.P., 560 R.P.M., No.6879, direct connected to one type M.P.C., class 6-25-560, Form A., 220-volt, direct current generator No. 368929. Purchased in 1912.

Both sets were manufactured by the General Electric Company. No transformers or storage batteries.

These generators furnish power for the lighting systems of batteries Harvey Allen and Elijah O'Flyng, for range finding stations F<sub>1</sub> and B<sub>5</sub>, and dormitory of each, and for the Signal Corps Switchboard Room.

Power Required:

Battery Allen, outside illumination	- 1.8 k.w.
Battery Allen, inside	" - 3.2 k.w.
Battery O'Flyng, outside	" - 1.2 k.w.
Battery O'Flyng, inside	" - 2.2 k.w.
Range Finding Sta. F <sub>1</sub> and dormitory	- 1.0 k.w.
Range Finding Sta. B <sub>5</sub>	- .2 k.w.
Dormitory for Station B <sub>5</sub>	- .5 k.w.
Signal Corps Switchboard Room	- 1.0 k.w.
	<u>11.1 k.w.</u>

No current is furnished for ammunition service, maneuvering of guns, post lighting, or for searchlights. No provision has been made for the installation of additional parallel units.

The cost of the plant is as follows:

Power House and installation set No. 1-	\$8,886.00
Installation of Reserve (No.2) set	- 200.00
Machinery (estimated)	- 7,500.00

Transferred to the Artillery on November 26, 1912.

38921  
218



Name of Harbor	Datum Point.	Date when turned over to the Artillery	Total Cost.	Remarks.
Mouth of Columbia River.	One Datum Point, L.R.Stevens, L.R.Columbia, S.R.Canby,	Nov. 9, 1911.	\$420.00	:Three pile dolphin, with 6-foot target at an elevation of 20 feet. Located approximately 200 yds. south of lower end of Sand Island.
	One Datum Point, L.R.Stevens,	Nov. 9, 1911.	\$ 22.50	:Six foot target on south side of jetty, 4 miles from Fort Stevens. Elevation of target 20 feet.
	One Datum Point, M.R.Stevens,	Nov. 9, 1911.	\$ 20.00	:Six foot target, elevation 20 feet, on south side of jetty. 2 miles from Fort Stevens.
	One Datum Point, S.R.Stevens,	Nov. 9, 1911.	\$ 20.00	:Six foot target, elevation 20 feet, on south side of jetty. 1 mile from Fort Stevens.
	One Datum Point, M.R. Columbia,	Nov. 9, 1911.	\$ 19.50	:Six foot target, elevation 20 feet, on north side of jetty. 1-1/2 miles from Fort Stevens.
	One Datum Point, M.R. Canby,	Nov. 9, 1911.	\$ 19.00	:Six foot target, elevation 20 feet, on north side of jetty. 4 miles from Fort Stevens.

Name of Harbor.	Datum Point	Date when turned over to the Artillery.	Total Cost.	Remarks.
Mouth of Columbia River.	One Datum Point S.R.Canby	Nov. 26, 1915	\$25.00	Six foot target, elevation of center line, 20 feet above M.L.L.W., at Bent 428, North Jetty, S.2506' W.6561' from Canby Light.
	One Datum Point M.R.Canby	Dec. 9, 1915	\$25.00	Six foot target, elevation of center line, 20 feet above M.L.L.W., at Bent 1574 South Jetty, S.15619' E 370' from Canby Light.

December 31 1905  
Washington, D.C.  
to the Chief of Engineers  
Department of War  
Washington, D.C.

Datum Points.

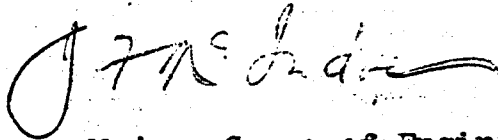
Three datum points, with locations, etc., have been established for Defenses, Mouth of Columbia River, as follows:

No. 1. On Desdemona Light Station, visible from Forts Stevens, Columbia and Canby, transferred to the Artillery in August 1905. Cost \$27.00.

No. 2. On dolphin located 8,487.61 feet south, and 26,863.32 feet east from Cape Disappointment Light, visible from Forts Stevens, Columbia and Canby, transferred to the Artillery in August 1905. Cost, \$150.00.

No. 3. On dolphin back of Sand Island, located 1,574.51 feet south, and 11,908.12 feet east from Cape Disappointment Light, visible from Forts Stevens, Columbia and Canby, transferred to the Artillery in August 1905. Cost, \$125.00.

Respectfully submitted,



Major, Corps of Engineers, U.S.A.

Def. 655/29

OFFICE OF ENGINEERS

P

48930

20.

WAR DEPARTMENT

Seattle, Wash.,  
Mar. 15, 1910.

KUTZ,  
MAJ. C. W.

Incluses additional sheets  
for insertion in his report of complet-  
ed batteries for December 31, 1909.

4 Inclos., E.D., not marked.

*File report*

A

UNITED STATES ENGINEER OFFICE  
SEATTLE, WASHINGTON

March 15, 1910.

The Chief of Engineers,  
United States Army,  
Washington, D. C.

Sir:

1. I have the honor to acknowledge receipt this date of Department letter of February 18, 1910, (E.D. 48920/18), in reference to omission of data in regard to hoists in my report of completed batteries for December 31, 1909.

2. Four additional sheets for insertion in the report are inclosed herewith. Copies of the additional sheets have been furnished the Division Engineer and the Chief Engineer Officer of the Department of the Columbia.

3. The omission occurred through misunderstanding the instructions contained in Circular No. 39 and the amended instructions of Circular No. 42, O. C. of E., 1909.

Very respectfully,



Major, Corps of Engineers.

- 4 inclosures. -

REPORT OF COMPLETED BATTERIES, ETC.,  
DEFENSES AT MOUTH OF COLUMBIA RIVER, OREGON & WASHINGTON.

For the year ending December 31, 1915.

In charge of Lieut. Col. Chas. L. Potter, Corps of Engineers, U. S. Army.

Name of Harbor.	Name and Armament of Battery.	Date when turned over to Artillery.	Total cost.	Remarks.
Mouth of Columbia:	<b>FORT STEVENS, OREGON.</b>			Garrisoned.
	<u>Battery Lewis:</u>			Magazines dry. (Battery rewired in 1909 & 1910. Current for light and power supplied from Central Power Plant.)
	Mounted:			
	2-10" B.L. Rifles, Model 1888, MII, No. 11:	Emp. #1 - Apr. 5, 1898.	\$302,014.00	also included in cost of Taylor-Raymond shot hoists installed, both back delivery. Serial Nos.: Emp. #1, No. 81 " #2, " 82
	Bethlehem Iron Co., & No. 49 Watervliet Arsenal:	Emp. #2 - Apr. 3, 1898.		
	2-10" Disappearing carriages; L.F., Model 1894, Nos. 3 <sup>a</sup> , Kilby Mfg. Co., L.F., Model 1896, No. 4 <sup>d</sup> , Niles Tool Co.			Motor: Voltage 220. Speed 1060; capacity 5 H.P. Transferred to Artillery April 29, 1905.
	Emp. 1, Rifle 11, Car. 4 <sup>d</sup> :			Type C powder hoists installed, Serial Nos.: Emp. #1, No. 31. " #2, No. 32.
	Emp. 2, " 49, " 3 <sup>a</sup> :			Motor: Voltage 220. Speed 1600; capacity 5 H.P. Transferred to Artillery May 6, 1912. Retracting Motors installed on carriage #1 & #2 emplacements. Magazines dry. Battery rewired in 1909 & 1910. Current for light & power supplied from Central Power Plant.
	<u>Battery Walker:</u>			
	Mounted:			
	2-10" B.L. Rifles, Model 1888, M II, No. 52 & 48, Watervliet Arsenal.	Apr. 3, 1898.		See cost of Battery Lewis. Figures could not well be segregated.
	2-10" disappearing carriages, L.F., Model 1894, Nos. 4 <sup>o</sup> , 5, Kilby Mfg. Co.			Taylor Raymond shot hoists installed. Both back delivery. Serial Nos. Emp. #1 No. 83. " #2 " 84.
	Emp. 1, Rifle 52, Car. 4 <sup>o</sup> :			Motor: Voltage 220. Speed 1060, capacity 5 H.P. Transferred to Artillery Apr. 25, 1908.
	" 2, " 48 " 5:			June 27, 1905, respectively. Type C powder hoists installed.

Name of Harbor:	Name and Armament of Battery.	Date when turned over to Artillery.	Total cost.	Remarks.
Mouth of Columbia River.	Battery Walker (Cont.)			Serial Nos.: Emp. #1, No. 33, " #2, " 34. Motor: Voltage 220. Speed 1600 RPM. Capacity 5 H.P. Transferred to Artillery May 6, 1912. Retracting motors installed on carriages, emplacements 1 & 2. Magazines dry. Battery rewired in 1909 & 1910. Current for power and light- ing supplied from Central Power Plant.
	Battery Lyman Mishler: Mounted: 2-10" B.L. Rifles, Model 1888, M. II, Nos. 33 and 32, Bethlehem Iron Co.	June 28, 1900.	See cost of Battery Lew- is. Figures could not well be seg- regated.	Taylor-Raymond shot hoists installed. Both front delivery. Serial Nos. Emp. #1, No. 97. " #2, " 98. Motor: Voltage 220. Speed 1060. Capacity 5 H.P. Transferred to Artillery June 17, '05 Type C powder hoists installed. Serial Nos.: Emp. #1, No. 35, " #2, " 36. Motor: Voltage 220. Speed 1600 RPM. Capacity 5 H.P. Transferred to Artillery May 6, 1912 No motors installed on gun carriages.
	Battery David Russell: Mounted: 2-10" B.L. Rifles, Model 1900, Nos. 4 and 11, Watervliet Arsen- al.	Aug. 12, 1904	\$125,000.00	Magazines dry. Battery rewired in 1910 & 1911. Power plant installed in 1910 & 1911. Taylor-Raymond shot hoists installed. Back delivery. Serial Nos.: Emp. #1, No. 2141* " 2, " 2141* Motor: Voltage 220.
	2-10" disappearing carriages, L.F. Model 1901, Nos. 4 and 5, Watertown Arsenal. Emp. 1, Rifle 4, Car. 4. " 2, " 11 " 5:			

\*The only numbers which could be found on hoists. Number evidently wrong.

Name of Harbor:	Name and Armament of Battery.	Date when turned over to Artillery.	Total cost.	Remarks.
Mouth of Columbia River.	Battery David Russell (Continued)			(Motor) Speed 1060. Capacity 5 H.P. Transferred to Artillery Aug. 12, 1904. Type C powder hoists installed. Serial Nos.: Emp. #1, No. 37 " #2, No. 38. Motor: Voltage 220; Speed 1600 RPM; Capacity 5 H.P. Transferred to Artillery May 6, 1911; Retracting, <del>switches</del> <del>and</del> <del>transmission</del> motors installed on carriages Emplacements #1 & #2. <del>Storage battery in</del> <del>poor condition</del> Battery rewired in 1909 and 1910. Current for lighting supplied from Central power plant.
	Battery Clark			
	Mounted: 8-12" B.L. Mortars, Model 1890, Nos. 29, 32 and 35, Builders Iron Foundry; Nos. 34, 48, 50, 51 and 52, Watervliet Arsenal.	Jan. 17, 1899:	\$71,546.63	
	8-12" mortar carriages, Model 1896, MI, Nos. 119, 120, 121, 122, 123, 124 and 133, American Hoist & Derrick Co. & No. 237, Watertown Arsenal.			
	Pit A.			
	Pltf. 1, Mortar 32, Car. 121 " 2, " 48 " 119 " 3, " 50 " 122 " 4, " 52 " 120			
	Pit B.			
	Pltf. 1, Mortar 51, Car. 237 " 2, " 35 " 123 " 3, " 34 " 133 " 4, " 29 " 124			



Name of Harbor:	Name and Armament of Battery.	Date When turned over to Artillery:	Total cost:	Remarks
Mouth of Columbia River.	<u>Battery James Pratt</u> Mounted: 2-6" B.L.Rifles, Model 1897, Nos. 4 and 11, M.I., Watervliet Arsenal. 2-6" disappearing carriages, L.F., Model 1898, Nos. 7 & 8, Watertown Arsenal. Emp. 1, Rifle 4, Car. 7. " 2, " 11, " 8.	June 28, 1900.	\$59,860.19	Magazines dry. Battery rewired in 1909 and 1910. Current for lighting supplied from Central Power Plant. Hodges type of shot hoist installed. Back delivery. No serial number on hoists. Hand operated.
	<u>Battery Constant Freeman</u> Mounted: 2-6" B.L. Rifles, Model 1900, Nos. 4 and 8, Watervliet Arsenal. Mounted: 2 Ord.Dept.Barbette carriages, Model 1900.Nos.24 and 25,Watervliet Arsenal Emp.1,Rifle 8, Car. 25 " 2, " 4, " 24 Mounted: 1-3" R.F.gun, Model 1898 No.115, Driggs-Seabury Co. 1-3" Non-Dis. carriage Model 1898 MI No.115, Driggs-Seabury Co.	Jan.17, 1902.	\$34,538.37	Magazines dry. Battery rewired in 1909 & 1910. Current for lighting supplied from Central Power Plant. Hodges type shot hoist installed. Back delivery. No serial number on hoists. Hand operated.
	<u>Battery Elias Smur</u> Mounted: 2-3" R.F.guns,Model 1898 Nos.30 and 35, Driggs <sup>2</sup> Seabury Co. 2-3" Non-Dis. carriages Model 1898 MI, Nos.30 & 35 Driggs-Seabury Co. Emp.No.1, Gun 30 Car.30. " " 2, " 35, " 35.	Nov.12, 1900. June 28, 1900.	\$ 5,398.05 \$11,954.57	Magazines dry. Current for lighting supplied from Central Power Plant. Battery rewired in 1909 and 1910.

Name of Harbor.	Name of Station.	Date when turned over to the Artillery.	Total cost.	Remarks.
Mouth of Columbia River.	Battle Commanders Station, C.	Mar. 30, 1911.	\$ 6,300.00	Ref. of site 103'. Ref. of Inst. axis 105.75' Two rooms: observing room 18'x16' booth room 18'x32' with 12 booths 3'9"x3'3", and C.O. room, 7'x9'6". Reinforced concrete structure with asphaltum and gravel roof. Not con- spicuous at 4 miles in usual channel of ap- proach.
	Combined primary station for first fire command and Battery Commander station, Battery David Russell; F'1 and B.C. (David Russell)	Mar. 30, 1911.	\$ 2,130.00	Ref. of site 67'. Ref. of Inst. axis 69.085'. One room 15' x 15'. Reinforced concrete structure. Not conspic- uous at 4 miles in usual channel of ap- proach.
	Primary station for second fire command. F'2. and Meteorological Station.	Oct. 4, 1904.	\$ 7,572.98	Ref. of site 25'. Ref. of Inst. axis 73'. Lower room 15'3/4"x15'3/4". Upper room 8'4"x8'4". Concrete column and steel tower. Conspicuous at 4 miles in usual chan- nel of approach. Growth of trees in time can be made to render it very much less conspicuous.
	Combined primary station for third fire command and Battery Commander station, Battery Clark; F'3 & B.C. (Clark).	Mar. 30, 1911.	\$ 8,072.68	Ref. of site 20'. Ref. of Inst. axis 72'. Six rooms: observing room 14'x16'. three unfinished rooms; officers' dormitory 25'x19' with lavatory; men's dormitory 28'x30' with lavatory. Wood frame building covered outside with corrugated iron, with reinforced concrete instrument pier. Not conspicuous at 4 miles in usual channel of approach.

Note.- Plane of reference of all stations refers to mean lower low water.

Name of Harbor:	Name of Station:	Date when turned over to the Artillery:	Total Cost:	Remarks:
Mouth of Columbia River.	Secondary Station second fire command F <sup>n</sup> 2.	Mar. 30, 1911	\$1,050.00	Ref. of site 95'. Ref. of Inst. axis 98'. One room 12'x12'. Reinforced concrete structure. Not conspicuous at 4 miles in usual channel of approach.
	Secondary Station third fire command F <sup>n</sup> 3.	Mar. 30, 1911	\$1,050.00	Ref. of site 95'. Ref. of Inst. axis 98'. One room 12'x12'. Reinforced concrete structure. Not conspicuous at 4 miles in usual channel of approach.
	Combined Supplementary Stations of Second and Third Fire Commands, F <sup>n</sup> 2 and 3.	Nov. 9, 1911	\$5,496.29	Ref. of site 13.00'. Ref. of Inst. axis 40.00'. Wood frame structure covered with corrugated iron, with asphaltum roof; two concrete instrument piers. 4 rooms, two 10'x10' observation rooms on top floor; 10'x20' dormitory, 2d floor, and 10'x20' dormitory below. Not conspicuous at 4 miles in usual channel of approach.
	Primary Station, Battery David Russell, B <sup>n</sup> 1 (David Russell)	Mar. 30, 1911	\$1,050.00	Ref. of site 95'. Ref. of Inst. axis 98'. One room 12'x12'. Reinforced concrete structure. Not conspicuous at 4 miles in usual channel of approach.
	Primary Station, and B.C. Station, Battery Mishler B <sup>n</sup> 2 (Mishler) & B.C.	Nov. 29, 1900	\$2,729.00	Ref. of site 54.65'. Ref. of Inst. axis 60'. One room 14'x14'. Concrete structure; steel roof. Conspicuous at 4 miles in usual channel of approach.

Name of Harbor:	Name of Station.	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River.	Primary Station Battery Walker B <sup>3</sup> (Walker)	Sep.13,1904:	\$ 7,844.57	Ref.of site 20.00' Ref.of Inst.axis 72' Lower room 15'x15' Upper room 8'4"x8'4" Concrete column and steel tower. Not conspicuous at 4 miles in usual channel of approach.
	Primary Station Battery Lewis, B <sup>4</sup> (Lewis)	Sep.13,1904:	\$ 7,832.20	Ref.of site 23.00' Ref.of Inst.axis 73' Lower room 15'x15' Upper room 8'4"x8'4" Concrete column and steel tower. Not conspicuous at 4 miles in usual channel of approach.
	Secondary Station Battery Russell B <sup>1</sup> (Russell)	Nov. 9,1911:	\$ 2,717.57	Ref.of site 10.00' Ref.of Inst.axis 40.00' Wood frame structure covered with corrugated iron; asphaltum gravel roof; concrete instrument pier; Three rooms: 10'x10' observation room above; one 13'x13' on second floor, and one 16'x16' with lavatory on ground floor.
	Secondary Station Battery Lyman Mishler, B <sup>2</sup> (Lyman Mishler)	Mar.30,1911:	\$ 1,050.00	Ref.of site 95'. Ref.of Inst.axis 98'. One room 12'x12'. Reinforced concrete structure. Not conspicuous at 4 miles in usual channel of approach.

Name of Harbor:	Name of Station:	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River.	Battery Commander's Station, Battery Lewis, B.C.(Lewis)	Nov.9,1911.	\$ 3,398.67	:Ref.of site 32.75'. :Ref.of Inst.axis 35.20'. :Reinforced concrete structure: two rooms: :observation room (upper) 15'x15'. Plotting(lower) 15'x15'. Not conspicuous at 4 miles in usual channel of approach.
	Battery Commander's Station, Battery Walker, B.C.(Walker).	Nov.9,1911.	\$ 3,448.18	:Ref.of site 32.75'. :Ref.of Inst.axis 35.15'. : Reinforced concrete structure. Two rooms: : observation room (upper) 15' x 15'; :plotting (lower)15'x15'. : Not conspicuous at 4 miles in usual channel of approach.
	Battery Commander's Station, Battery Mishler B.C.(Mishler) see B'2 (Mishler)			:(See B'2 (Mishler) sheet 6)
	Battery Commander's Station, Battery Clark. B.C.(Clark) (see F'3)			:(See F'3 sheet 5)
	Battery Commander's Station, Battery David Russell. B.C.(David Russell) (see F'1)			:(See F'1 sheet 5)
	Primary Station, first mine command M'1.	Mar.30,1911.	\$ 5,660.80	:Ref.of site 13'. :Ref.of Inst.axis 50'. :Four rooms: Observing room, 17'8"x17'8"; : plotting room, 17'8" x 17'8", with two telephone booths 4'x3'3" each; : officers' dormitory 17'8"x17'8", with lavatory 3'6"x7'6", two telephone booths 4'x3'3" each, and hallway; men's dormitory, 40'x18', with lavatory 7'6"x14'6".

Name of Harbor:	Name of Station.	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River.	Primary Station first mine command; M <sup>1</sup> (continued)			Wood frame building covered with corrugated iron, with reinforced concrete instrument pier. Not conspicuous at 4 miles in usual channel of approach.
	Secondary Station first mine command; M <sup>1</sup>	Mar. 30, 1911	\$ 1,510.36	Ref. of site 53'. Ref. of Inst. axis 55.45'. One room 12'x12'. Reinforced concrete structure. Not conspicuous at 4 miles in usual channel of approach.
	Combined Switchboard Room and Plotting room for third fire command; Swb. and P	Mar. 30, 1911	\$ 6,870.00	Three rooms: operating room 16'x20', with 6' basement; storage battery room 5'x20', with 6' basement; plotting room 19'x20'. Reinforced concrete structure.
	Mine Loading Room and service dynamite room.	Mar. 30, 1911	\$ 4,910.00	Loading room; one room 45'x21'7", with testing tank 33'x 7'. Service dynamite room 8' x 10'. Both buildings wood frame on reinforced concrete platform.
	1 Mining Casemate	Sep. 22, 1909	\$ 5,155.98	In good condition.
	1 Mine Storehouse	Apr. 30, 1901	\$ 8,148.75	" " "
	1 Mine Storehouse Extension	Sep. 22, 1909	\$ 5,244.40	" " "
	2 Cable Tanks	Apr. 30, 1901	\$ 2,348.75	" " "
	1 Cable Tank Cover	Sep. 22, 1909	\$ 2,935.34	In good condition.
	1 Terminal Manhole	Sep. 22, 1909	\$ 197.12	" " "

#### Tide Gages.

There is one Artillery tide gage at Fort Stevens, located on the jetty tramway 4,660 feet out from the root of the jetty. It is a staff gage without any house and was established and turned over to the Artillery in November, 1906. Its cost was \$5.00. Is serviceable.

A tide gage, originally located on the Engineer dock at Fort Stevens, has been moved to the Quartermaster dock. This gage is of the disk type, protected by a wooden house. Approximate cost \$200.00. Transferred to the Artillery May, 1908.

Name of Harbor:	Name of Station.	Date when turned over to the Artillery.	Total Cost	Remarks.
Mouth of Columbia River	District Signal Station	Nov. 9, 1911	\$ 2,948.02	Concrete structure with asphaltum gravel roof. Three rooms: operating room 12'x16', with lavatory; work room 7½'x10'; generator room 8' x 10'.
	Dormitory at Battle Commander's Station, C.	Nov. 9, 1911	\$ 7,680.93	Wood frame structure covered with expanded metal and plaster; asphaltum gravel roof; Two rooms: Officers' dormitory 12'x32', with lavatory; men's dormitory 32'x46', with lavatory.
	Combined Plotting Room and Dormitory for Second Fire Command, F <sup>2</sup> & Plotting Room Batteries Mishler Lewis, Walker.	Nov. 9, 1911	\$ 8,356.16	Frame structure covered with diamond mesh and plaster; asphaltum gravel roof. Three rooms: plotting room 18'x25', with 4 telephone booths; officers' dormitory 10'x25', with lavatory; men's dormitory 25'x64', with lavatory.
	Dormitory for Primary Stations B <sup>3</sup> and B <sup>4</sup> Batteries Lewis and Walker.	Nov. 9, 1911	\$ 1,396.34	Wood frame structure with diamond mesh and plaster sides, and asphaltum gravel roof. One room 12'x10' with lavatory.

## CENTRAL POWER PLANT.

(Supplying current to all batteries except Battery Russell.)

The plant is located in a reinforced concrete building 250 feet from right flank of Battery Clerk.

Boilers: Two 100 H.P., horizontal, water-tube, oil burning, manufactured by E. Keeler & Co., Williamsport, Pa., date of purchase July 8, 1909.

Engines: Two 70 H.P., horizontal, single cylinder, center crank, non-condensing, with fly-wheel governor, 305 R.P.M., steam, direct connected to generators, Manufactured by Buffalo Forge Co., Buffalo, N. Y. Date of purchase June 3, 1909.

Generators: Two 50 k.w., 220 volts no load, 250 volts full load multi-polar, compound wound, direct connected. Manufactured by the Western Electric Co., Chicago, Ill.

Transformers: None.

Storage Batteries: None.

This plant furnishes current for lighting and power in the following emplacements and buildings:

Batteries: Mishler, Walker, Lewis, Pratt, Freeman, Smur and Clark. and for lighting all fire and mine control buildings, except F<sup>no</sup> 2 & 3, the mine loading room and service dynamite room, and those located in the vicinity of Battery Russell.

No current supplied for Searchlights.

Kilowatts required for power and lighting:

Inside illumination,	24.1 K.W.
Outside "	4.9 "
Motors, shot hoists,	21.6 "
" powder hoists,	21.0 "
" retracting,	* 24.0 "
Switchboard Room, power & light	2.0 "
	<u>97.6 "</u>

\*Includes 2 retracting motors at Battery Mishler not yet installed.

The plant includes one 50 k.w., direct connected generating set and balancer set for Post Lighting.

The plant allows for the installation of one additional 100 H.P. boiler.

Total cost of plant, exclusive of conduit lines and underground cables, \$34,013.00.

Transferred to the Artillery, December 15, 1910.



ELECTRIC PLANT AT BATTERY DAVID RUSSELL.

The plant is located on the right flank of the battery, in a concrete structure having three rooms: engine room 15' x 21'; radiator room 15' x 11'; and storeroom 10' x 32'. The structure was originally designed for and occupied by steam plant, which was transferred to the Artillery August 12, 1904. Steam plant has been dismantled. Cost of structure is indeterminate, as it was built in connection with the battery.

The new plant consists of two 25 k.w. direct connected sets, as follows:

Two 4-cycle, 4-cylinder, vertical gasoline engines, type G.M.12 A-2, 43/54 H.P., 560 R.P.M., Nos. 6790 and 6792, direct connected to two Type M.P.C., class 6-25-560, Form A., 230-V., direct current generators Nos. 195141 and 195415, respectively, manufactured by General Electric Co., Schnectady, N.Y. Purchased in 1910. No transformers or storage batteries.

Generators furnish current for lighting and power to the following emplacements and buildings:

Emplacements Nos. 1 and 2, Battery David Russell; R. F. stations C, B<sup>1</sup>, B<sup>2</sup>, F<sup>3</sup>, F<sup>2</sup>, F<sup>1</sup>, District Signal Station and Dormitory at Fire Control Hill. No current is supplied for post lighting or searchlights.

## Kilowattage required for power and lighting:

Inside illumination, - - - - -	10.2 K.W.
Outside " - - - - -	1.8 "
Motors, shot hoists, - - - - -	7.0 "
" powder hoists, - - - - -	7.0 "
" retracting, - - - - -	12.0 "
Motor Generator Set, Signal Station, - - - - -	2.0 "
	<u>40.0 "</u>

No provision has been made for additional parallel units.

The cost of the plant, including alterations of power house, was \$9,930.

Transferred to the Artillery, March 30, 1911.

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 1 and 2,  
Fort Stevens, Oregon.

The plant is located near the southwest end of the reservation, approximately 1500 feet southeast of Battery David Russell, and is housed in a fireproof, steel frame building, covered with expanded metal and plaster.

The plant consists of two 25 k.w. direct connected sets, as follows: two 4-cycle, vertical, gasoline engines, type G.M.12-A2- 43/54 H.P., 560 R.P.M., Nos. 5514 and 5515, direct connected to two type M.P.C., class 6-25-560, Form A., 115-volt, direct current generators Nos. 195129 and 195122, respectively. Manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. No transformers or storage batteries.

Generators furnish current for two 60" projectors only. Kilowattage required: two 60" searchlights at 20 k.w. each, 40 k.w.

No provision made for additional parallel units.

The cost of the plant was approximately \$10,430.00.

Transferred to the Artillery on July 28, 1911.

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 3 and 4,  
Fort Stevens, Oregon.

The plant is located 200 yards west of northeast corner of reservation, in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 1 - 25 k.w. direct connected set, as follows: one 4-cycle, vertical, gasoline engine, type G.M.-12, A-1-43/54 H.P., 560 R.P.M., No. 5512, direct connected to one type M.P.C., class 6-25-560, Form A., 115-volt, direct current generator No.195130. Manufactured by General Electric Company. Purchased in 1910. No transformers or storage batteries.

Generator furnishes current for one 60" projector and for lights for torpedo loading room only. Kilowattage required: 1 - 60" searchlight, 20 k.w., inside illumination of Torpedo Loading Room, .7 k.w., and inside illumination of Power Plant, .7 k.w.; total, 21.4 k.w.

Provision has been made for installing similar 25 k.w.set for furnishing current for 36" searchlight No. 4.

The cost of the plant was approximately as follows: Power House \$3,920; Machinery \$3,630. Transferred to the Artillery on March 7, 1912.

ELECTRIC PLANT FOR 30" SEARCHLIGHT,  
Fort Stevens, Oregon.

The plant is located on the northeast end of reservation approximately 1000 feet west from Quartermaster Dock and is housed in a wood frame building covered with corrugated sheet steel; which also serves as a shelter for the searchlight.

The plant consists of 1 20 h.p. vertical fire tube boiler, serial #3300, manufactured by the Lidgerwood Mfg. Co.; and 1 direct connected marine type generating set, manufactured by the General Electric Co., Schenectady, N.Y.: steam engine, 18 brake h.p. approximately, single cylinder, 6 $\frac{1}{2}$ " bore x 5" stroke, 450 R.P.M., form A., serial No.402; 10-k.w. generator, 110 volts no load and full load, 91 amp., 4 pole, compound wound, form A., serial No.13269, class 4-10-405. No transformers or storage batteries. This plant furnishes current for lighting the power plant and for 30" searchlight No.283. No current supplied for post lighting or telautographs. Kilowattage required for power and lighting: 1 - 30" searchlight 8.8 k.w.; inside illumination .3, total 9.1 k.w.

No provision is made for the installation of parallel units. Cost of plant not known. This plant was transferred from Willets Point in 1898, together with the searchlight.

Transferred to the Artillery, March, 1901.

## SEARCHLIGHT PROJECTOR NO. 1.

60" - serial No. 8224, type EC, form N-2, class 60", manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter near south end of reservation at Fort Stevens. Returns made to the Engineer Department. Cost of projector, \$5,312; of shelter, cable, etc., \$1,100. Transferred to the Artillery on July 28, 1911. A Controller Booth for this light on high ground is located approximately 170 ft. in rear (east) and 60 feet to the right (north) of the center of the light. Built in October, 1914. Cost \$145.00. Transferred to the Artillery Dec. 4, 1914.

## SEARCHLIGHT PROJECTOR NO. 2.

60" - serial No. 8225, type EC, form N-2, Class 60", manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter near south end of reservation at Fort Stevens. Returns made to the Engineer Department. Cost of projector, \$5,312; of shelter cable, etc., \$1,100. Transferred to the Artillery on July 28, 1911.

## SEARCHLIGHT PROJECTOR NO. 3.

60" - serial No. 8222, type EC, form N-2, class 60", manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1910. Electrically controlled. Current supplied from 1 - 25 k.w. gasoline actuated generator set in power plant #3 and 4 described above.

Projector is mounted in a specially designed corrugated iron shelter, 100 yards north of power plant, equipped with a hoisting apparatus to elevate light to required height. Returns made to the Engineer Department. Cost of Projector, \$5,312; cost of shelter, \$2,225. Transferred to the Artillery on March 7, 1912.

## SEARCHLIGHT PROJECTOR NO. 4.

To be 36", under approved project. (Not supplied).

## SEARCHLIGHT PROJECTOR, 30".

30" - serial No. 283, type E.C.F., electric control, manufactured by General Electric Co., Schenectady, N.Y. Purchased in 1898 and shipped from Willets Point, N.Y., July, 1898. Current supplied from 30" searchlight electric plant described above. Mounted on car with a track connecting with Columbia River jetty railway, and has sufficient cable to be moved 1000 feet. Returns made to the Engineer Department. Transferred to the Artillery in March, 1901.

## 36" PORTABLE SEARCHLIGHT, FORT STEVENS, OREGON.

Searchlight #3045.- Portable outfit No. 24, as described in the 4th supplement to mimeograph #59. Manufactured by General Electric Co., Schenectady, N.Y. Type E.C., form K, 130 amp., D.L.41418, electric control.

Engine.- #3906. 3-cylinder, 6" x 6", 4-cycle, gasoline, 600 R.P.M.

Generator.- #114889, multipole, differentially wound, separately excited, 74 volts, no load. 9.6 k.w., 130 amp., type M.P.6, form C. Exciter #145918, 110 volts.

Outfit purchased in 1907 and shipped from Fort Totten, October 5, 1907. Used in connection with submarine mine defense, and housed in wood frame building covered with corrugated sheet steel, located approximately 200 feet south of mining casemate. Returns made to Engineer Department. Cost not known.

Transferred to Artillery, January, 1908.

Name of Harbor:	Name and Armament of Battery.	Date when turned over to Artillery.	Total cost:	Remarks.
Mouth of Columbia River:	<u>Fort Columbia, Wn.</u>  <u>Battery Jules Ord.</u> Mounted: 3-8" B.L. Rifles, Model 1888, Nos. 20, MI, 23 MI, and 44 MII., Watervliet Arsenal.	Jul. 16, 1898:	\$137,298.79:	Garrisoned.  Magazines dry. Battery rewired, interior and exterior, in 1910. Current supplied from Battery Jules Ord Power Plant
	3-8" disappearing carriages, L.F., Model 1896, Nos. 1 and 10, Pend Machine Tool Co. & No. 32, Lake Erie Engineer Works.  Emp. 1, Rifle 20, Car. 1 " 2, " 23, " 10 " 3, " 44, " 32			Taylor-Raymond shot hoists installed. All back delivery. Serial Nos.: Emp. #1 - No. 2. " 2 - " 1. " 3 - " 3. Motor: Voltage 110; Speed 1060; capacity 3-1/2 H.P. Transferred to Artillery March, 1908.
	<u>Battery William Murphy</u> Mounted: 2-6" B.L. Rifles, Model 1897, Nos. 15 & 24, MI, Watervliet Arsenal.  2-6" disappearing carriages, L.F., Model 1898, Nos. 9 and 10, Watervliet Arsenal.	Jun. 29, 1900:	\$58,623.82:	Magazines dry. Battery rewired; interior & exterior, 1911 The current is supplied by a duplicate oil engine plant, one located in Emp. No. 1 and one in Emp. No. 2. They may be connected in parallel or each run separately. Three 3" Emps. also served from this plant. Hodges type hand hoist installed, Back delivery. No serial number on hoist. Hand operated.
	Emp. 1, Rifle 15, Car. 9 " 2, " 24, " 10			
	<u>Battery Frank Crenshaw</u> Mounted: 3-3" R.F. guns. Model 1898, MI, Nos. 97, 98 & 104, Driggs-Seabury Co.			Magazine dry. Battery rewired; interior & exterior, 1911. Served from duplicate plant in two 6" emplacements.
	3-3" Non-Disappearing mounts, Nos. 97, 98 & 104, Driggs-Seabury Co.	Jun. 28, 1900: Oct. 29, 1900:	\$15,462.61:	
	Emp. 1, Gun 97, Car. 97 " 2, " 98, " 98 " 3, " 104, " 104			

Name of Harbor:	Name of Station:	Date when turned over to the Artillery:	Total Cost:	Remarks.
Mouth of Columbia River:	Primary Station :fifth fire com- mand. F'5	Nov.29,1900:	\$ 1,666.00:	:Ref.of site 327.45'. :Ref.of Inst.axis 329.0'. : One room 14'x14'. :Concrete structure; :steel roof. Not con- :spicuous at one mile, :in usual channel.
	Battery Commander's Station, Battery Ord, B.C.(Ord)	Nov.20,1911:	\$ 3,096.16:	:Ref.of site 107.5' :Ref.of Inst.axis 109.08' :Reinforced concrete :structure; two rooms, :observation (upper) :room 15'x15';plotting :room (lower) 15'x15'. :Not conspicuous at 4 :miles in usual channel :of approach.
	Primary Station :second mine com- mand. M'2.	Mar.30,1911:	\$ 2,025.00:	:Ref.of site 326'. :Ref.of Inst.axis 328.97' : Two rooms: observing :room 18'x18';plotting :room 18'x18';with two :telephone booths, :3'9"x3'3". : Reinforced concrete :building. Not con- :spicuous at 4 miles in :usual channel of approach.
	Mining Casemate	Mar.30,1911:	\$ 5,005.00:	: Four rooms: cot room :8'10"x21'10";operating :room 15'9"x21'10"; engine :room 11'8"x21'10"; storage :battery room 10'x21'10". : Wood frame building :covered with expanded :metal and plaster.
	Mining Casemate	Apr.30,1901:	\$ 7,885.00:	:This mining casemate :has been abandoned as :such.
	Switchboard Room	Mar.30,1911:	\$ 3,430.00:	: Two rooms: operating :room 16'x20', with 5' :basement; storage battery :room 5'x20'. : Wood frame building :covered with expanded :metal and plastered.

Note.- Plane of reference of all stations refers to mean lower low water.

Name of Harbor:	Name of Station:	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River:	Dormitory for primary station of second mine command and for station of fifth fire command.	Mar. 30, 1911:	\$ 2,290.00:	Four rooms: officers' dormitory 9'6"x17'; officers' lavatory 6'x6'; men's dormitory 33'x17'; men's lavatory 10'6"x6'. Wood frame building covered with expanded metal and plastered.

#### Tide Gages.

There is one Artillery tide gage for Fort Columbia, established at Desdemona Light Station and turned over to the Artillery in August, 1905. It is a staff gage without any house, and its cost was \$15.00. Is serviceable.

A tide gage has been constructed on the Quartermaster's wharf at Fort Columbia, of the disk type, protected by a small wooden house, as recommended by 3rd Supplement to Mimeograph No. 62, Serial No. 314. Its cost was approximately \$200.00, and was turned over to the Artillery in May, 1908. Also used for Meteorological station.

CENTRAL POWER PLANT, FORT COLUMBIA, WASHINGTON.

The plant is located near the left flank of emplacement No. 3, Battery Jules Ord, in a concrete structure, 29 ft. x 32 ft., having two rooms; radiator room 12 ft. x 16 ft., and engine and work room occupying the remainder of the space. The structure was originally designed for the installation of a steam plant, but instead, a Hornsby-Akroyd oil engine and generator were installed. During the years 1909-1910, provision was made for the installation of two 25-k.w. gasoline actuated generating sets, one of which was installed at that time. In 1911 the Hornsby-Akroyd oil engine and generator were removed and provision was made for the installation of one 25-k.w. generating set to furnish power for the operation of Searchlight No. 9. In the early part of 1916 a reserve 25-k.w. generating set and cables connecting with Battery Murphy, were installed.

The present plant consists of two 25-k.w. direct connected sets as follows:

Set No. 1 consists of one 4-cycle, 4-cylinder, vertical gasoline engine, type G.M., 12-A2-43/54 H.P., 560 R.P.M., No. 5372, direct connected to one type M.P.C., 115-volt, class 6, 25-k.w. direct current generator, No. 183184, manufactured by the General Electric Co., purchased in 1909. Transferred to the Artillery, February 10, 1911.

Set No. 2 consists of one 4-cycle, 4-cylinder, vertical gasoline engine, type G.M., 12-A2-43/54 H.P., 560 R.P.M., No. 10965, direct connected to one type M.P.C., 115-volt, class 6, 25-k.w. direct current generator, No. 448814, manufactured by the General Electric Co., purchased in 1915. Transferred to the Artillery, April 6, 1916.

Generators furnish current for lighting and power for batteries Ord, Murphy, and Crenshaw, stations F'5 and M'2, Switchboard Room, Dormitory for F'5 and M'2, and Post Lighting. No current is supplied for searchlights.

Kilowattage required for power and lighting:

Inside illumination - - - - -	1.0
Outside illumination - - - - -	10.2
Motors, shot hoist, - - - - -	10.0
Switchboard Room, - - - - -	1.0
Post Lighting - - - - -	2.8

The cost of the plant, exclusive of the structure, is as follows:

Installation of No. 1 set and provision for installation of reserve set - - - - -	\$5,175.00
Provisions for installation of 25-k.w. set for S. L. No. 9	1,565.00
Installation of No. 2 set - -	3,745.00
Installation of cables connecting with Battery Murphy - -	610.00



*Approved  
As next sheet*

### ELECTRIC PLANT AT BATTERY JULES ORD.

The plant is located in a concrete structure near the left flank of emplacement No. 3 of Battery Jules Ord. The structure was originally designed for the installation of a steam plant and contained two rooms an engine and dynamo room 11' x 32' and a boiler room 16' x 32'. Instead of a steam plant, a 16 h.p. Hornsby-Akroyd oil engine, purchased in September, 1898, was installed in the engine room. This engine was belt connected to a Westinghouse direct current, multipolar, compound generator, 11-1/4 k.w., 150 volt capacity, installed in the engine room.

A storage battery, type F-11, capacity 50 amperes, number of cells 58, in lead lined tanks, made by Electric Storage Battery Co., Philadelphia, Pa., purchased in October 1898, was installed in emplacement No. 2 of the battery.

During the years 1909-1910, the following set was installed in the boiler room: one 4-cycle, 4-cylinder, vertical gasoline engine, type G.M. A2-43/54, No. 5372, 560 R.P.M., direct connected to one 25 k.w. generator, 115-volt, multipolar, type M.P.C., class 6, 25 k.w., Form A, No. 183184, direct current, Manufactured by the General Electric Co. Purchased in July, 1909. No transformers. Transferred to the Artillery on February 10, 1911. Provision was made for a duplicate 25 k.w. gasoline actuated generating set in the same room.

During the year 1911, the Hornsby-Akroyd engine and 11-1/4 k.w. generator were removed, the partition between the engine and boiler rooms was removed, and provision made for the installation of one 25 k.w. gasoline actuated generating set to furnish power for the operation of Searchlight No. 9.

The generator furnishes current for lighting emplacements Nos. 1 2 and 3 of Battery Jules Ord, and for power for the shot hoists; also current for lighting stations F<sup>1</sup>, M<sup>2</sup>, B.C.(Ord), Dormitory and Switchboard Room. No current is supplied for searchlights, but current is supplied for Post Lighting.

Kilowattage required for inside illumination 1.00; for outside illumination of defensive works 6.70; for interior motors 10.00; for switchboard room 1.00, and for Post Lighting approximately 2.8.

Cost of the old plant, including storage battery, was about, - - - - -	\$6,950.00
Cost of installation of present generating set and provision for installation of 25 k.w. duplicate set, - - - - -	5,175.00
Cost of removing partition and making provision for 25 k.w. set for S.L.#9, - - -	1,565.00

### ELECTRIC PLANT AT BATTERY WILLIAM MURPHY.

The plant is located in the emplacement rooms of Battery William Murphy. There are no boilers in use.

Two (2) 7 H.P., Hornsby-Akroyd oil engines. Date of Purchase, May 1900.

Two (2) 4 K.W., 110 volt, direct current, bi-polar, compound wound, belted generators, made by the General Electric Company. Date of purchase May, 1900. (This is a duplicate plant, which can be run singly or in parallel.)

No transformers used.

No storage battery installed.

This plant furnishes current for lights in Battery William Murphy and Battery Frank Crenshaw, and is intended only for these two batteries.

No motors have been supplied for the chain hoists in Battery William Murphy, but this plant is amply large for all known light or power requirements.

No Post lighting is done from this plant, and no searchlights are operated from it.

The current requirements from this electric plant will be as follows: (1) For inside and outside illumination of defensive works,  $3\frac{1}{2}$  k.w.; (2) For motors, 4 k.w.

Cost of this duplicate plant, about \$4,100.00.

Date of transfer to the Artillery, October 29, 1900.

#### ELECTRIC PLANT FOR 30-INCH SEARCHLIGHT, FORT COLUMBIA, WASH.

A 15 k.w. generator, belt driven, and a Hornsby-Akroyd oil engine shipped from the Coast Defenses of San Francisco, May 14, 1914, have been installed in place of the direct current, marine type generating set formerly in use.

Location: The plant is located in the southwest end of the reservation, approximately 500 feet west of Battery William Murphy, and is housed in a wood frame building covered with corrugated sheet steel. The interior is ceiled.

Engine: 25 h.p. Hornsby-Akroyd, oil, serial No. 2748. Date of purchase, May 20, 1902.

Generator: 15 k.w., 125-volt, direct current, four pole compound wound, belt driven, Westinghouse, No. 96640. Date of purchase, May 20, 1902.

Transformers and Storage Batteries: None.

This plant furnishes current for lighting the power plant and for operating the 30-inch Searchlight, No. 261.

Provision has been made for this plant to relieve the electric plant at Battery Jules Ord in case of an emergency.

Kilowatts required for power and lighting:

1 - 30-inch searchlight	- - - -	8.8
Inside illumination	- - - -	.5
		<u>9.1</u>

No provision has been made for the installation of parallel units. Cost of plant not known.

Transferred to Artillery, August, 1914.

#### Searchlight Projector.

30-inch, serial No. 261, type E.C.F., electrical control. Manufactured by the General Electric Co., Schenectady, N. Y., purchased in 1898 and shipped from Willetts Point, N.Y., July 19, 1898. Current supplied from 30-inch searchlight plant described above. Searchlight mounted on truck and is movable within 1,000 feet radius. Cost not known. Returns made to Engineer Department.

Transferred to Artillery, March, 1901.

Name of Harbor:	Name of Armament of Battery.	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River:	<u>Fort Canby, Wash.</u> <u>Battery Harvey Allen:</u> Mounted: 3-6" R.F. Guns, Model 1905, Nos. 13, 17 and 16, Watervliet Arsenal. 3-6" disappearing carriages, L.F., Model 1903, Nos. 86, 87 and 88, South Bethlehem. Emp. 1, Rifle 13, Car. 86 " 2, " 17, " 87 " 3, " 16, " 88	Feb. 27, 1906:	\$58,935.00:	Garrisoned.  Magazines dry. Emplacements fully wired. Electrical current supplied from Central Power Plant.
	<u>Battery Elijah O'Flyng.</u> Mounted: 2-6" R.F. Guns, Model 1905, Nos. 1 and 11, Watervliet Arsenal: 2-6" disappearing carriages, L.F., Model 1903 Nos. 84 and 85, South Bethlehem. Emp. 1, Rifle 1, Car. 84 " 2, " 11, " 85	Feb. 27, 1906:	\$39,290.00:	The cost does not include mounting carriages. No shot hoists installed.

Name of Harbor:	Name of Station:	Date when turned over to the Artillery:	Total cost:	Remarks.
Mouth of Columbia River:	Primary Station of Fourth Fire Command, Batteries Allen and O'Flyng, F'4 (Canby)	Nov. 6, 1911	\$4,749.69	:Ref. of site 295 ft. :Ref. of Inst. axis 296'. :Three rooms: observing room 10'x10'; officers' dormitory, with lavatory, 10'x16'; men's dormitory 22'6"x26' including five telephone booths and lavatory. :Observation room concrete dormitories, wood frame covered with diamond mesh and plastered, asphaltum and gravel roof. Not conspicuous at 4 miles in usual channel of approach.
	Primary Station, Battery Harvey Allen, B'5 (Allen)	Nov. 6, 1911	\$1,020.58	:Ref. of site 222'. :Ref. of Inst. axis 223'. :Wood frame covered with diamond mesh and plaster, asphaltum and gravel roof. One room 10'x10' observation. Not conspicuous at 4 miles in usual channel of approach.
	Switchboard Room	Nov. 6, 1911	\$2,636.35	:Wood frame structure covered with diamond mesh and plaster, with asphaltum and gravel roof. Two rooms, storage battery room 5'x19'6" with cement floor and frosted windows; operating room 16'x19'6".
	Dormitory for B'5	Nov. 6, 1911	\$2,072.76	:Wood frame covered with diamond mesh and plaster, asphaltum and gravel roof; two rooms, officers' dormitory 10'x12' with lavatory; and men's dormitory 15'7"x18', with lavatory.

#### Tide Gages.

A tide gage has been constructed on the dock at Fort Canby, of the disc type, protected by a small wooden house, as recommended by 3rd Supplement to Mimeograph No. 62, Serial No. 314. Its cost was approximately \$155.00, and was turned over to the Artillery in August, 1908.

CENTRAL POWER PLANT, FORT CANBY, WASH.

The plant is located in a concrete building (15' x 24') in the ravine between batteries Harvey Allen and Elijah O'Flyng, about 30 feet west of the Signal Corps Switchboard Room.

The plant consists of two 25 k.w. direct connected sets. The description of each set follows:

Set No. 1 consists of one 4-cycle, vertical, gasoline engine, type G.E. 12-A2-43/54 H.P., 560 R.P.M., No. 5538, direct connected to one type N.P.C., class 6-25-560, Form A, 230-Volt, direct current generator No. 189033. Purchased in 1910.

Set No. 2 consists of one 4-cycle, vertical, gasoline engine, type G.E., 12-A2-43/54 H.P., 560 R.P.M., No. 6879, direct connected to one type N.P.C., class 6-25-560, Form A, 220-Volt, direct current generator No. 368929. Purchased in 1912.

Both sets were manufactured by the General Electric Company. No transformers or storage batteries.

These generators furnish power for the lighting systems of batteries Harvey Allen and Elijah O'Flyng, for range finding stations F'4 and B'5, and dormitory of each, and for the Signal Corps switchboard room.

## Power Required:

Battery Allen, outside illumination, -	1.8 k.w.
Battery Allen, inside illumination, -	3.2 "
Battery O'Flyng, outside illumination-	1.2 "
Battery O'Flyng, inside illumination-	2.2 "
Range Finding Station F'4 & dormitory-	1.0 "
Range Finding Station B'5 - - - - -	.2 "
Dormitory for Station B'5 - - - - -	.5 "
Signal Corps Switchboard Room - - - - -	1.0 "
	<u>11.1 "</u>

No current is furnished for ammunition service, maneuvering of guns, post lighting, or for searchlights.

No provision has been made for the installation of additional parallel units.

The cost of the plant is as follows:

Power House and installation set No. 1 -	\$8,886.00
Installation of reserve (No.2) set - - -	200.00
Machinery (estimated) - - - - -	<u>7,500.00</u>

Transferred to the Artillery on November 26, 1912.

ELECTRIC PLANT FOR SEARCHLIGHTS NOS. 6 and 7,  
Fort Canby, Wash.

The plant is located on McKenzie Head at Fort Canby, Wash., in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 2-25 k.w. direct connected sets, as follows: two 4-cycle, vertical, gasoline engines, type G.M.-12, A2-43/54 h.p., 560 R.P.M., Nos. 6845 and 6846, direct connected to two type M.P.C., class 6-25-560, Form A, 115-volt, direct current generators Nos. 324513 and 324584, Manufactured by General Electric Company. Purchased in 1911.

No transformers or storage batteries.

Generators furnish current for one 60" and one 30" projector only. Kilowattage required: 1 - 60", 20 k.w. and 1 - 30" searchlight, 8.8 k.w., inside illumination .7 k.w.; total, 29.5 k.w.

No provision has been made for additional parallel units.  
 The cost of the plant is approximately as follows: Power House  
 \$5,400; Machinery, \$7,360. Transferred to the Artillery March 7, 1912.

ELECTRIC PLANT FOR SEARCHLIGHT NO. 8.  
Fort Canby, Wash.

The plant is located on the southeast point of Fort Canby reservation in a fireproof, steel frame building covered with expanded metal and plastered.

The plant consists of 1 - 25 k.w. direct connected set as follows: one 4-cycle, vertical, gasoline engine, type G.M. 1-12, A-1-43/54 h.p., 560 R.P.?, No. 5513, direct connected to one type M.P.C., class 6-25-560, Form A, 115-volt, direct current generator No. 195123, manufactured by General Electric Company, Schenectady, N.Y. Purchased in 1910. Generator furnishes current for one 30" projector only. Kilowattage required: 1 - 30" searchlight 8.8 k.w., inside illumination .6 k.w., total, 9.4 k.w. No provision is made for additional unit. The cost of plant is approximately as follows: Power House, \$3,450; Machinery, \$3,500. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 6.

30" - serial No. 269, type ECF., class 30", electrically controlled, manufactured by General Electric Co., Schenectady, N.Y., transferred to this District from Seattle District by authority of 1st indorsement dated Office Chief of Engineers, April 13, 1911 (E.D.38971/116.Def.721/192.) Date of purchase not known. Current supplied from power plant above described. Projector is fixed and installed in a frame, sheet-iron covered shelter on McKenzie Head. Projector has controller booth located on high point about 1/3 mile northwest of McKenzie Head. Returns made to Engineer Department. Cost of projector, not known; cost of shelter and booth, about \$850. Transferred to Artillery on March 7, 1912. (Temporary installation- E.D.68858/121--Def.721/172).

SEARCHLIGHT PROJECTOR NO. 7.

60" - serial No. 8223, type EC, form N-2, class 60", electrical control, manufactured by the General Electric Co., Schenectady, N.Y. Purchased in 1910. Current supplied from power plant described above. Projector is fixed and installed in a frame, sheet-iron covered shelter on McKenzie Head about 360 feet southeast of light. Returns made to Engineer Department. Cost of projector, \$5312. Cost of shelter and booth about \$850. Transferred to the Artillery on March 7, 1912.

SEARCHLIGHT PROJECTOR NO. 8.

30" - serial No. 332, type ECF, class 30", electrical control, manufactured by General Electric Company, Schenectady, N.Y., transferred to this district from Seattle District by authority of 1st indorsement dated Office Chief of Engineers, April 13, 1911. (E.D.38971/116). Date of purchase not known. Current supplied from one 25 k.w. gasoline actuated generator set in power plant No. 8 described above. Projector is fixed and installed in a frame, sheet-iron covered shelter at extreme southern point of Fort Canby reservation. Returns made to the Engineer Department. Cost of projector, not known; cost of shelter, about \$775. Transferred to the Artillery on March 7, 1912. (Temporary installation E.D. 68858/121.)

DATUM POINTS

Name of Harbor:	Datum Point.	Date When turned over to the Artillery.	Total cost:	Remarks.
Mouth of Columbia River.	One Datum Point: No. 1.	Aug. ,1905:	\$ 27.00	:On Desdemona Light Station. :Visible from Forts Stevens, :Columbia and Canby.
	One Datum Point: No. 2.	Aug. ,1905:	\$150.00	:On dolphin located 8487.61 :feet south, and 26,863.32 :feet east from Cape Disap- :pointment Light, visible :from Forts Stevens, Colum- :bia and Canby.
	One Datum Point: No. 3.	Aug. ,1905:	\$125.00	: On dolphin back of Sand :Island, located 1,574.51 :feet south, and 11,908.12 :feet east from Cape Dis- :appointment Light, visible :from Forts Stevens, Colum- :bia, and Canby.
	One Datum Point: M.R. Stevens	Nov. 9, 1911:	\$ 20.00	: Six-foot target, :elevation 20 feet, on :south side of south jetty. : 2 miles from Fort Stevens.
	One Datum Point: S.R. Stevens	Nov. 9, 1911:	\$20.00	: Six-foot target, :elevation 20 feet, on :south side of south jetty. : 1 mile from Ft. Stevens.
	One Datum Point: M.R. Columbia	Nov. 9, 1911:	\$ 19,50	: Six-foot target, :elevation 20 feet, on :north side of south jetty. : 1½ miles from Ft. Stevens.
	One Datum Point: S.R. Canby	Nov. 26, 1915:	\$ 25.00	: Six-foot target, :elevation of center line :20 feet above M.L.L.W., :at Bent 428, North Jetty, :S.2506' W.6561' from :Canby Light.
	One Datum Point: M.R. Canby	Dec. 9, 1915:	\$ 25.00	: Six-foot target, :elevation of center line :20 feet above M.L.L.W., :at Bent 1574 South Jetty, :S.15619' E 370' from :Canby Light.