

Fort Huachuca, Ariz.

Book No. 1

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FORT HUACHUCA, ARIZONA.

COMPLETION REPORT - GARDEN CANYON WELL

PROJECT COMMENCED JUNE 16, 1930.

PROJECT COMPLETED OCTOBER 16, 1931.

February 1, 1932

Memorandum For: Mr. Anderson

A copy of Completion Report with map and log of Well at Ft. Huachuca, Ariz., forwarded for your files.

*Wilcox*  
WILCOX

QM 600.93 C-NE (Ft Huachuca Ariz)

February 5, 1932.

SUBJECT: Corrections to map

TO: Mr. Wilcox

1. Notation has been made on the Post Map in accordance with the attached completion report, showing well at Fort Huachuca, Ariz.

KPG  
2 incls  
unchanged

*Anderson*  
ANDERSON

FEB 1 1932

USF20000441

ALPHABETICAL INDEX

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*Plans filed - Mrs. Coates  
6203-1078X*

OFFICE OF THE QUARTERMASTER.

CLR/lw

Fort Huachuca, Arizona.  
November 3, 1931.

Subject: Completion Report, Garden Canyon Well.

To: The Quartermaster General, Washington, D.C.

In compliance with instructions contained in paragraph 20, A.R. 30-1435 and Circular Letter #96, O.Q.M.G., dated November 27, 1929, the following completion report is submitted:

(1) General:

The depth of the well is 199'6". The well has a 10" guide casing for 60'. Installed on the inside of this 10" casing is an 8" standard well casing. This is at a depth of 152'6". The well is capped with a screwed-in iron cap.

(2) Description of completed project:

(a) General statement relative to the work showing -

1. Composition:

Various strata through which well was drilled is shown on log of well prepared in office of Quartermaster, 8th Corps Area, dated September 18, 1930, and incorporated in this report.

2. For what service constructed: Q.M. Corps.

3. For what purpose constructed:

To augment water supply for Fort Huachuca, Arizona, to ensure an ample supply during seasons of drought.

4. Full description of the land, its location, and ownership:

This well is located on the Fort Huachuca Military Reservation, in the flat at the mouth of Garden Canyon (Tanner Canyon) above the 5,050' contour. It is approximately 6 miles from the post proper to the well by wagon road.

(b) Post map incorporated in this report shows location of well.

(c) There are no adjoining buildings. There is a wagon road to the well and no railroad in vicinity. When pumps are installed, the well will be joined to the present water system in Garden Canyon, which is a pipe line from springs. This is a distance of about 3,000'.

(d) Full name-plate data of each unit of equipment installed or, where such data are insufficient, a detailed description of each unit, including maker's name, the catalog number, and date:  
None.

(e) Photographs with title noted on each, if available or if they can be obtained from a local Government agency:  
None.

(f) Soil data including statement of soil characteristics, i.e., bearing capacity, length of piling necessary, etc.:  
As shown on log of well incorporated in this report.

(3) Construction data:

(a) General conditions:  
Drilling began June 16, 1930. The rainfall during July and August, 1930, was heavy, and occasioned some delay on the part of the contractors getting their rig on the location and setting up same, and in changing a light rig for a heavier one on account of encountering a very hard granite formation. A delay of about 14 days in completion of the work, from August 29, 1930 to September 11, 1930, inclusive, occurred on account of acts of the Government.

(b) Operations by contractor:

- 1. Organization:  
3 Drillers,  
1 Tool sharpener.
- 2. Methods, equipment, material, and labor used:  
Churn type drilling rigs for drilling.  
Air compressor, pumps, meter and weir, for testing.
- 3. Difficulties encountered and the solution thereof:  
At a depth of 106', a very hard granite

formation was encountered of such a degree of hardness that the light rig then over the hole was not making satisfactory progress. The contractors removed this light rig and replaced it with a heavier rig of the same type.

4. Definite appraisal of the manner in which the contractor executed the contract:

The contractors pursued the execution of their contract with all reasonable diligence and completed the well to the depth of 199'6" to the satisfaction of the military authorities. When this depth had been reached, the contractors were directed to cease drilling at this well site and to begin drilling at a selected well site in Huachuca Canyon.

(c) Progress:

Log of well incorporated in this report shows rate of progress throughout the construction period for the total and for the principal items entering into the completed work.

(d) Supervision:

During the period of drilling, close touch with the progress being made by the contractors was kept by a Commissioned Officer and the Chief Plant Operator.

(4) Financial data:

(a) List of appropriations involved and the expenditures by purpose numbers:

B&Q, OB&U. 1930.	QM 2608 P 3405 A605-0	\$1149.58	✓
B&Q. 1931.	QM 2608 P 3405 A600-1	371.59	✓
B&Q. 1932.	QM 2608 P 14-1220 A212-2	500.00	✓

(b) Contractors:

Haney and Runte, ( Drilled the well.  
P.O. Box #929, ( Warren, Arizona. (

Lane and Flick, ( Cleaned, cased,  
Drilling Contractors, ( and capped well.  
P.O. Box #333, ( Bisbee, Arizona. (

Estimated amount of original contract \$2,000.00, dated June 11, 1930, for drilling one or two wells on the Military Reservation, Fort Huachuca, Arizona, first at entrance to Garden Canyon (Tanner Canyon), and second at entrance to Post Canyon (Huachuca Canyon).

(c) Statement and tabulation showing-

1. Total cost of work: \$2,021.17.
2. Cost of the various items entering into the work:
 

For furnishing all labor and equipment for drilling well 199'6" .....	\$997.50
60'10" Well casing, 10" .....	152.08
1 Pump, Rose, 1 1/2" .....	2.25
100' Air hose, 5-ply, 1/4" .....	16.00
2 Couplings, 1/4" .....	.54
1 Gauge, pressure, graduated to 160 1/2, 5" .....	3.00
For furnishing all labor, equipment and material, for pump testing well .....	350.00
For furnishing and installing 155' of 8" Std. well casing .....	350.00
For perforating well casing with 3/8" x 10" slots, for a distance of 100' down .....	60.00
For cleaning out sand in bottom of well .....	70.00
For capping well, furnishing cap .....	20.00
	\$2,021.17

3. Amounts of contracts: ..... \$1,999.58
4. Expenditure under purchase and hire ..... 0.00
5. Overhead and other charges ..... 21.59

(d) Date of final payment: October 22, 1931.

(e) Amount and disposition of unexpended balance: None.

(5) Amount expended in cash:

B&Q, OB&U. 1930. QM 2608 P 3405 A605-0	\$1149.58
B&Q. 1931. QM 2608 P 3405 A600-1	371.59
B&Q. 1932. QM 2608 P 14-1220 A212-2	500.00
	\$2021.17

The value of soldier and post labor: None.

The value of surplus and salvaged materials: None.

Specific amount approved by the Secretary of War:  
 See 3d Ind., A.G.O., Oct. 3, 1929 (File A.G. 671.4-Ft. Huachuca. (9-11-29) Misc. Div. (D).

*G.H. Huddleson*  
 G.H. Huddleson,  
 Lt. Col., Q.M. Corps,  
 Quartermaster,

I N D E X

General Information . . . . .	Page 1
Description of Completed Project . . . . .	1,2,3,4
Blueprint of portion of Military Reservation . . . . .	2a
Blueprint of Engine Driving Compressor . . . . .	3a
Blueprint of Engine Driving Centrifugal Pump . . . . .	3b
Photographs . . . . .	3c
Blueprint #6203-2 . . . . .	3d
Blueprint #6203-4 . . . . .	3e
Blueprint #6203-7 . . . . .	3f
Blueprint #6203-8 . . . . .	3g
Construction data . . . . .	4
Progress Chart . . . . .	4a
Financial Data . . . . .	5,6,7

\* \* \* \* \*

Plan No. 6203-1042x (4 sheets)

Details of Pumping Plant Well Derrick - Plan No. 6203-1050x

OFFICE OF THE CONSTRUCTING QUARTERMASTER  
Fort Huachuca, Arizona  
August 23, 1934

SUBJECT: Completion Report - Well Pump and Surface Booster Pump  
Installation.

TO: The Quartermaster General, Washington, D. C.

(1) General - A pumping plant was constructed which, with a concrete settling tank, a hoisting derrick, and a connecting pipe line, was intended to serve the water supply needs of the post during dry-season periods, one of the most severe of which occurred in this summer of 1934. The entire lay-out was for use in connection with the existing facilities now used in delivering water from Garden Canyon to the Post reservoir and has now become a part of them and its equipment will be operated only when the springs fail to deliver the minimum amount of water required.

(2) Description of completed Project -

(a) General statement as follows:

1. Building -

- (h) A power house, 20'x20' built of galvanized corrugated iron on wooden supports containing piping, two gasoline engines, one centrifugal type pump, one air compressor, two V-belt drives, one water meter, one expansion sleeve and one gate valve.
- (i) One concrete tank for settling divided into three compartments for convenience in cleaning out sediment from the well and to provide an entrance head of pressure to feed the pump. The capacity is 24,000 gallons.
- (j) One wooden derrick provided with a sheave wheel, a steel rope and a winch for use in raising and lowering the foot-piece and pipe connections forming the air lift operating in the well to supply water to the settling tank.
- (k) One pipe line, 8" diameter, 900 feet long connects pumping plant to main pipe line.

2. Utilities -

- (b) The equipment is located in a place adjacent to an established road leading to the Garden Canyon Springs and its transport required no additional road work.

(d) There is no electricity required.

3. The plant was designed to serve the needs of the post at times when the established water supply system failed to deliver the required amount to the Post reservoir.
4. In other years, the springs from which water is obtained have been found sufficient to supply post needs although at times drastic regulations had to be made to reduce the amount used to an uncomfortable minimum. This winter of 1933-34 proved to be exceedingly dry, not snow whatever falling in the mountain region feeding the springs. In February it was decided that something would have to be done to increase the amount of water flowing to the reservoir. The Garden Canyon well had been drilled and cased two years previous, at which time it was tested and found able to deliver 200,000 gallons of water daily. The purpose therefore, of this installation was to utilize this supply of water.
5. The land on which the plant was built is government owned being situated within the reservation boundaries and no easements or licenses were involved.

(b) A blueprint of a portion of the Military Reservation is attached on which the location of the plant is shown. Because of the large amount of territory involved, a much smaller scale had to be used in order to show the relations existing between the location of the springs, the post reservoir and the pipe line connecting the two.

(c) Name Plates:-

Footpiece: Standard equipment made by the Ingersoll Rand Co. of New York, Catalog #6 V.A. Outer tube is standard steel casing, inner tube is brass tubing, body made of bronze.

Compressor: Ingersoll Rand, two stage, air cooled, three cylinder, stationary #2-20-B type 40 with air inlet filter, muffler, air cooled intercooler, fan, and V-Belt drive. Plate as follows:

Cylinders - 2 low pressure, 6" bore x 5" stroke  
" 1 high pressure, 4 $\frac{1}{2}$ " bore x 5" stroke  
Speed - 609 R.P.M.  
Piston displacement - 115 cu.ft. per minute  
Altitude - 5,000 feet above sea level  
Discharge pressure - 80# gage, continuous  
B.H.P. required - 17.85 H.P.  
Serial Number - 125-SA-135

Engine driving the Compressor:- Gasoline powered, four cylinder, made by Waukesha Motor Co. of Waukesha, Wisconsin, complete with carburetor, fuel system, magneto, ignition, radiator, clutch power take-off, air filter and standard accessories. Plate as follows:

Industrial Unit - XAHU-1-V-2037

Unit Number - 9348

Performance characteristic curves are attached.

Air Receiver:- Vertical steel cylinder type, 24"x72" fitted with brass pop safety valve and drain cock.

Pump:- Made by Byron Jackson Co., Berkley, California. Centrifugal Type - 2 Stage.

Size - 2x10-D

Suction diameter - 2 $\frac{1}{2}$ "

Discharge diameter - 2"

Serial Number - 119045

Provided with outboard bearing carrying pulley for V-belt drive from engine.

Characteristics as shown on attached blueprint

Engine driving pump, gasoline powered:- Made by Waukesha Motor Co., Waukesha, Wisconsin. Four cylinder engine complete with carburetor, fuel system, magneto ignition, radiator, clutch power take-off, air filter, and standard accessories. Plate as follows:

Industrial Unit #9290

Model - VKF

Specification 1-V-2021

Performance characteristic curves are attached.

Meter:- Neptune Meter Company, New York, N.Y.

Type - Trident

Serial No. - 4676194

Gauges:- Federal and Marshalltown

- (d) Two photographs are attached herewith, one showing an exterior view of the pumping plant, and one showing an interior view of the pump house.
- (e) The soil upon which the plant is built is a compact ridge lying between two small arroyos. The material composing this ridge is boulders and sand eroded from the adjacent hills, loosely cemented together with about 10% of clay and loam. Its bearing capacity is over two tons per square foot and no piling was necessary.
- (f) The pumping plant was built by Purchase & Hire method from field plans made by local draftsmen under the supervision of the Constructing Quartermaster. The following blueprints are attached: 6203-2, 4, 6, and 8.

(g) The guarantee given by the contractor as to the maintenance of their work are given in detail on pages 6, 7 and 8 of the printed specifications issued from the office of the Constructing Quartermaster at Fort Huachuca, dated March 30, 1934, and signed by the Pratt-Gilbert Co., Cyril S. Gilbert, Treasurer, Phoenix, Arizona.

(3) Construction data -

- (a) General conditions - The conditions existing at the time of the commencement of the work were favorable in regard to the excellent weather for steady operations, the road leading to the plant from the Railroad depot was in fair condition. The small amount of labor required was readily supplied and all material furnished by the Post was already on the job. As shown on the Progress Chart, no more than ten days were required to install the contracted equipment and at no time during that period did anything happen to impede or interfere with the progress of the work, nor did any change take place in the weather or other operating conditions.
- (b) Operations by contractor -
1. The contractor's organization consisted of one mechanic, a helper and two occasional laborers.
  2. The methods used were simple in character, no machinery being needed to place the equipment, all of it being movable by hand with the aid of pinch bars and pipe rollers. The labor was efficient and the material was of good quality and all on hand.
  3. The only difficulties encountered were a few due to lack of cooperation between the contractor and the equipment manufacturers. The contractor failed to receive the necessary engineering data for the setting of his machinery in proper time; and consequently, much of the field lay-out work was delayed until the actual arrival of the machinery from which foundation information had to be secured by direct measurements.
  4. The contractor's mechanic was a very able man and did his work rapidly, accurately and in a workman-like manner. He paid his workmen promptly and no complaints were received from anyone on his payroll either in regard to the scale paid or the amount of work required.
- (c) A progress chart is attached herewith.
- (d) In the supervision of the work, an inspection was made twice daily by the Assistant Engineer acting under the supervision of the Constructing Quartermaster, and by the Constructing Quartermaster on occasional visits to the site as details requiring his decisions were brought to his attention.

(4) Financial Data.

(a) Appropriations involved, and Expenditures made, by purpose numbers: No appropriation was made specifically for this work. Letter from Constructing Quartermaster, Ft. Huachuca, to The Quartermaster General, of Feb. 12, 1934, requested authority to utilize savings expected to be realized in funds for Federal Projects Nos. 428 to 433 inclusive, for making changes in existing water system as proposed in para. 1d of said letter. 1st Indorsement from The Quartermaster General, Feb. 23, 1934, granted such authority, provided the assumption was correct that the new structures under Federal Projects Nos. 428 to 433 would materially increase the need of water on the Post. Appropriations from which funds were utilized are as follows:

QM 8068 P 99 A 640-35; F. P. 434, NIR War QMC 1933-35	
\$190,000 (amount of appropriation, not amount expended for Well Pump Installation).....	\$3439.79
QM 7308 P 1-3211 A 640-35; F. P. 428, NIR War QMC 1933-35; (amt. approp.: \$23,937).....	980.00
QM 7309 P 1-3211 A 640-35; F. P. 429, NIR War QMC 1933-35; (approp: \$3000).....	55.00
QM 7310 P 1-3212 A 640-35; F. P. 430, NIR War QMC 1933-35; (approp: \$15,606).....	1897.52
QM 7311 P 1-3211 A 640-35; F. P. 431, NIR War QMC 1933-35; (approp: \$16,500).....	1125.00

Expenditures from QM 7308-7311 inclusive were included as part of total cost of new construction under F. P. 428-431 inclusive and in Completion Reports already rendered for these Projects.

Expenditures made, with purpose numbers, as follows:

Contract for installation of Well Pump and Surface Booster Pump in Garden Canyon, Fort Huachuca, Arizona.....\$3,369.00,  
paid by

QM 7308 P1-3211 A 640-35; F.P. 428:	\$1,000.00
QM 7310 P1-3212 A 640-35; F.P. 430:	1,369.00
QM 7311 P1-3211 A 640-35; F.P. 431:	1,000.00
	<hr/>
	\$3,369.00

Less liquidated damages (credited to QM 7308 P1-3211).....	20.00
Total cost of contract:	<hr/>
	\$3,349.00

(4) Financial data (continued)

Expenditures under Purchase & Hire:

Material:

QM 8068 P 1-1220 A 640-35; F.P. 434:	\$2924.02
QM 8068 P 1-1210 A 640-35; F.P. 434:	27.47
QM 7310 P 1-3212 A 640-35; F.P. 430:	26.62
	<u>\$2978.11</u>

Labor:

QM 8068 P 1-1220 A 640-35; F.P. 434:	\$ 483.45
QM 7309 P 1-3211 do. 429:	55.00
QM 7310 P 1-3212 do. 430:	501.90
QM 7311 P 1-3211 do. 431:	125.00
	<u>\$1165.35</u>

Other Expenditures

Services (cutting pipe main)

QM 8068 P 1-1220 A 640-35; F.P. 434:	\$ 4.85
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Summary of Expenditures:

Contract	\$3,349.00
Purch. & Hire	4,143.46
Services, n.p.	4.85
Total:	<u>\$7,497.31</u>

Note: This total represents expenditures from NIR funds only, and is to be distinguished from Total Cost which includes, in addition, Civilian Conservation Corps labor and Enlisted Labor in the approximate value of \$80 and \$126, respectively.

b. Name and address of contractor: Pratt-Gilbert Hardware Co.,  
Phoenix, Arizona.

Date of original contract: May 3, 1934.

Amount " " \$3,369.00

Changes: Liquidated damages deducted in amount of \$20.00.

c. Tabulation and Statement of Cost:

Contract for Well Pump and Surface Booster Pump, installed, complete and ready for use, in accordance with specifications No. 428-430-431-434 dated March 30, 1934.....\$3,369.00

Less liquidated damages a/c delay in completion not excusable pursuant to Article 9 of Govt. Form No. P.W.A.

51; 2 days @ 10.00..... 20.00

\$3,349.00

c. Tabulation and Statement of Cost (continued). c.f. \$3,549.00

Purchase & Hire Work:

Derrick, Settling Tank, Pipe Line  
and Connections, Concrete Work,  
Forms, etc.

Material.....	\$2,712.85	
Labor.....	1,165.35	3,878.18

Construction of building  
described in paragraph  
2a<sup>h</sup> of this report,

Material.....	265.28	265.28
---------------	--------	--------

(Total spent by P&H: 4,143.46

Civilian Conser-  
vation Corps labor 80.00

Enlisted labor	126.00	206.00
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Cost of bldg.... \$471.28

Other Expenditures:

Services, non-personal....	4.85	4.85
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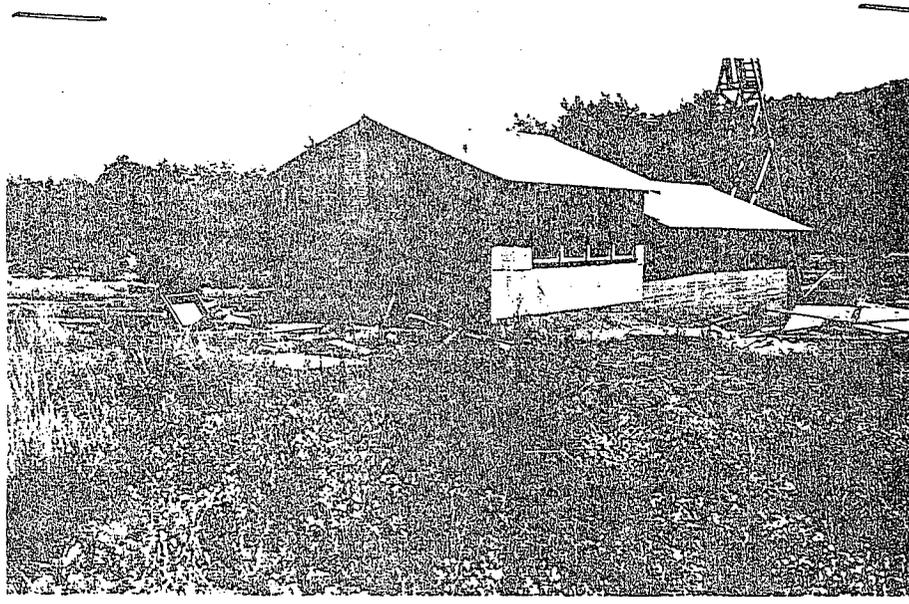
TOTAL COST:----- \$7,703.31

d. Date of final payment:

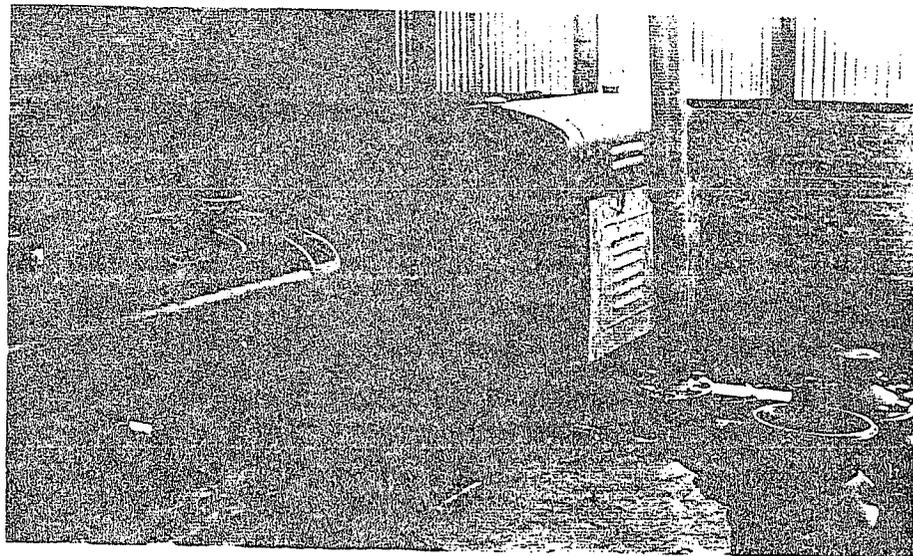
(to contractor) August 13, 1954.

e. Amount and disposition of unexpended balance of  
allotment: None.

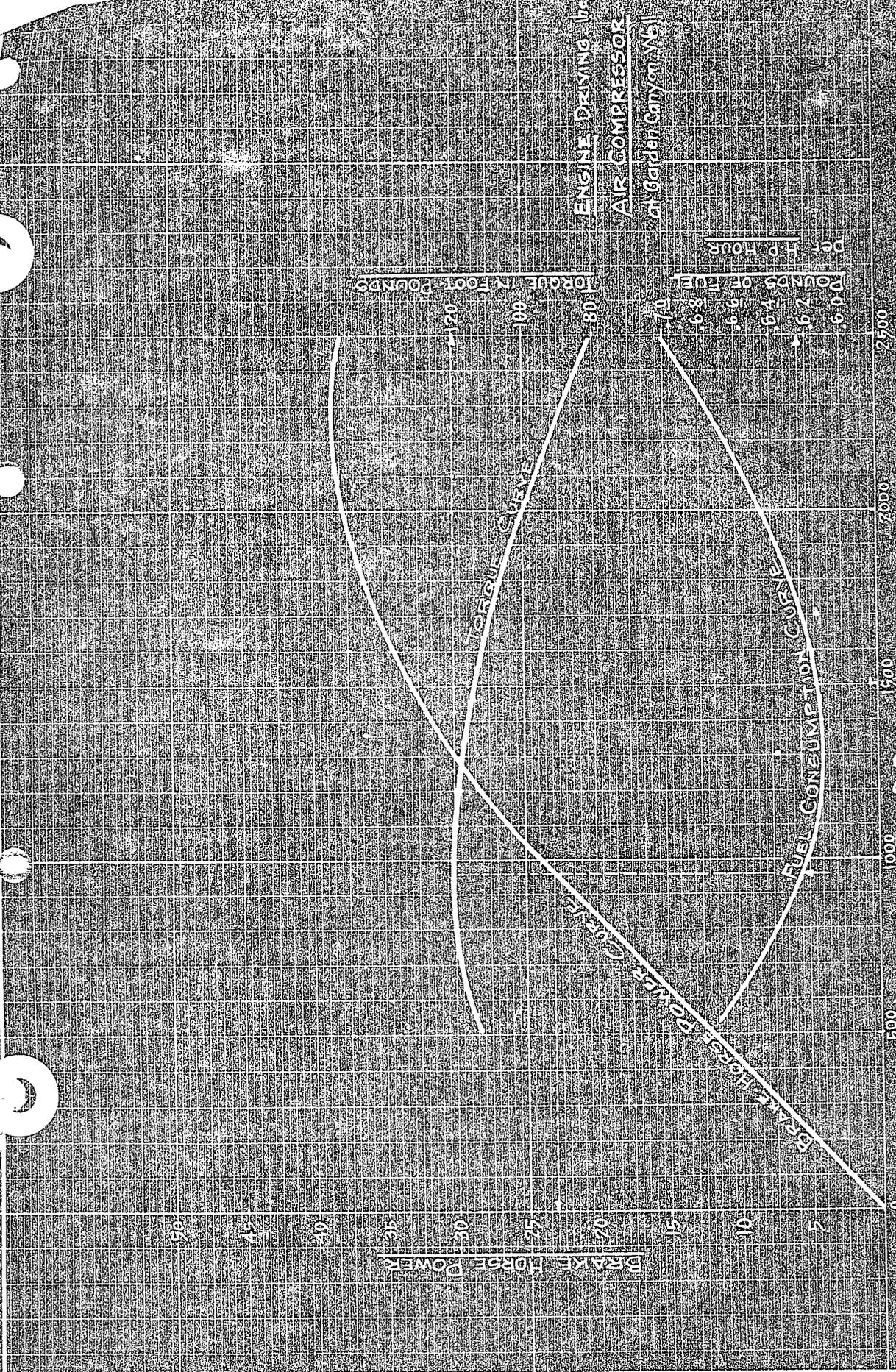
*Joseph W. Timmons, Jr.*  
Joseph W. Timmons, Jr.,  
Captain, Q.M. Corps,  
Constructing Quartermaster.



PUMP HOUSE, SETTLING TANK & HOISTING DERRICK



PUMP, ENGINE, PIPING & WATER METER



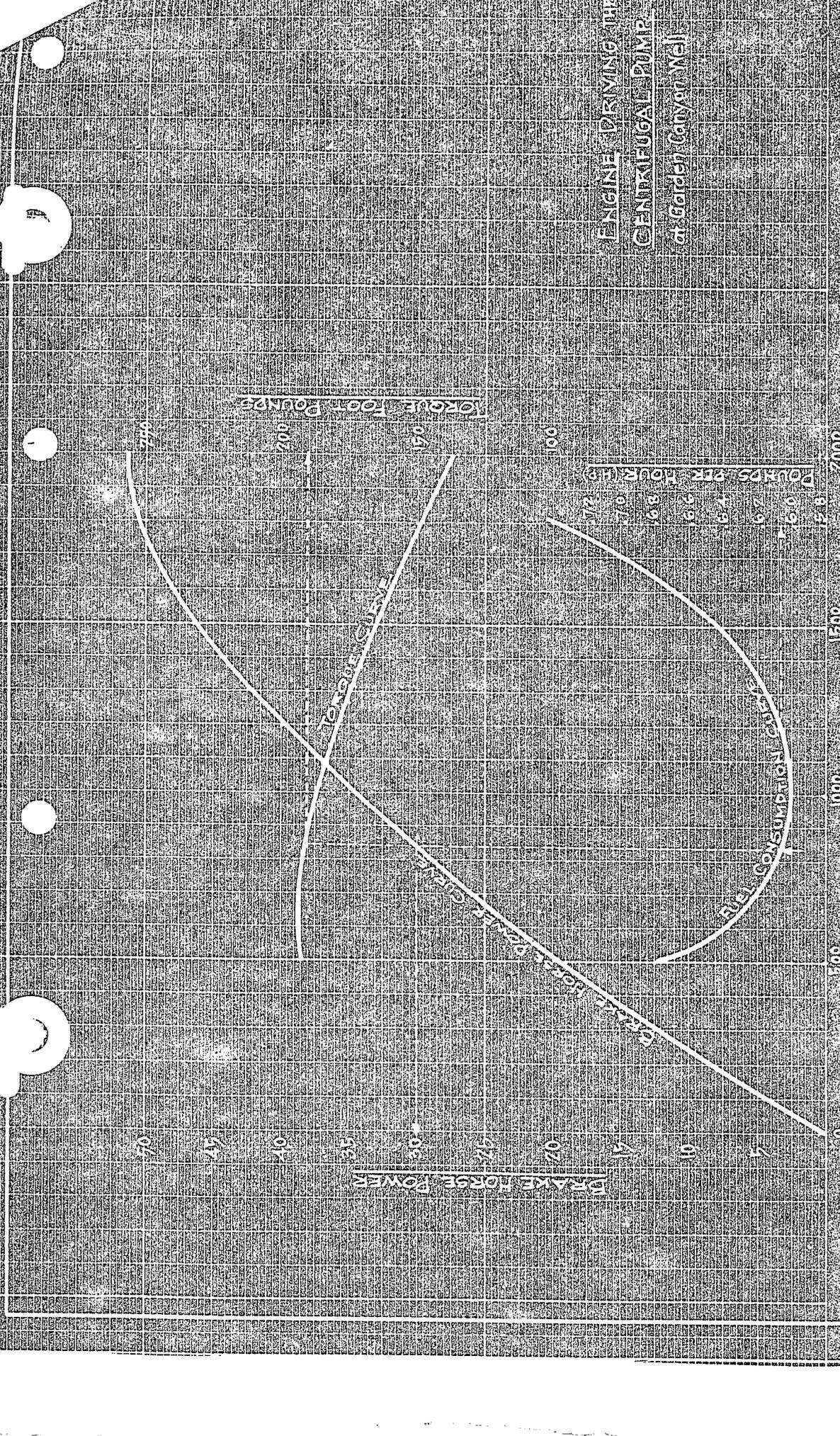
ENGINE DRIVING W/ AIR COMPRESSOR at Garden Canyon Well

**CHARACTERISTIC CURVES**  
 GASOLINE ENGINE MODEL XAH  
 WAUKESHA MOTOR CO  
 INDUSTRIAL UNIT No XAHU 9348  
 Dec. 11, 2037

Required HP 17.85  
 Continuous Load Equivalent 23 HP  
 Fuel required 16.79 lbs. per HP-hr  
 Total for 23 HP 144 lbs  
 @ 6 lbs. per gal 24.0 gals per operating hr

APPROVED

Drawn by Albert J. Houle, Asst. Engr.  
 Office of C. G. M. Fort Huachuca, Arizona



**CHARACTERISTIC CURVES**  
 GASOLINE ENGINE, MODEL V4K1  
 WAUKESHA MOTOR CO  
 INDUSTRIAL UNIT No 9250  
 Spec. 1-V-2021

**R.F.M.**

**APPROVED**

*W. Timmons*  
 Capt. Joseph W. Timmons, Jr. R.F.M., OMC

Drawn by Albert J. Houls, Asst. Engr.  
 Office of COM, Fort Huachuca, Arizona

Required HP: 78.7  
 Continuous Total Equivalent: 30 HP  
 Fuel Required: 20.1 lbs per HP Hr  
 Total for 30 HP: 18.2 lbs  
 @ 6 lbs per Gal, = 3.0 gals per Operating Hour



I N D E X

COMPLETION REPORT - LANDING FIELD

FORT HUACHUCA, ARIZONA

General Information - - - - - Page 1

Description of Completed Project- - - - - Pages 1, 2, & 3.

Construction Data - - - - - Pages 3, & 4.

Financial Data - - - - - Pages 4, & 5.

List of Inclosures - - - - - Pages 5, & 6.

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*Plans*

*Camping House 6203-510-15*  
*Water Tank 6203-510-A* } *6203-1069*

*House for Project Supervisor 6203-506*

*Landing Field 6203-510*

*Field 6203-1070X*

*Plans File 6203-1498*  
*1 " " " 6203-1072X-*

OFFICE OF THE CONSTRUCTING QUARTERMASTER

Fort Huachuca, Arizona  
July 10, 1936

SUBJECT: Completion Report, Emergency Landing Field.

TO: The Quartermaster General, Washington, D.C.

A R-30-1435 Par 20 (1)

General. Official Project #13-82(a) is used to designate the improvements made on a tract of land lying within the reservation, and occupying the central part of the eastern boundary at a point where the Southern Pacific railroad has established a railway station named Garden Canyon, and, at which same point, a state highway also enters the Reservation.

Par 20(2)(a)

Description of Completed Project.

The improvements accomplished consist of the removal eastward of the old reservation fence a distance of about 250 feet to occupy the line of permanent monuments established several years ago by an authorized surveying party; the construction of two new buildings; the demolition of an old frame structure; the marking of the landing-lane intersections; the grading necessary to eliminate old ditches, fence lines, incipient erosion gashes, and the drilling of a well to supply water, and the installation of lighting and pumping system, and construction of system tank.

Par 20(2)(a)1.

Buildings. A stone building 14' x 28' located immediately over the top of the well casing, built of stone and designed to provide space and shelter for the operation of a power unit, pumping unit, water pressure system, shelves for storage, and a suitable work-bench. A stone building 20' x 50' to provide quarters for the provost guard established at that point, a detention cell in which suspicious characters may be held for investigation, and storage space for a limited amount of supplies that may be needed for airplane service.

Par 20(2)(a)2(a)

Water, Sewers, etc. About 50 feet in the rear of the Provost Guard House a small septic tank was constructed, into which the outflow of all basins, sinks and closets of the Guard House is conducted through four and six inch vitrified tile pipe, all properly vented and provided with suitable clean-outs.

## Par 20(2)(a)2(b)

Roads and Walks. Two walks four feet wide and ten feet long lead from the porch of the guard house to the edge of the new paved road, giving access to both ends of the building.

## Par 20(2)(a)2(d)

Electric Distribution. Electric service wires have been installed to supply current for nineteen outlets, the wires varying from No. 8 to No. 12 in size, the system being equipped with all necessary switches and outlets and conduit tubing with connections being used to enclose all wires.

## Par 20(2)(a) 3

For development of infantry practice and maneuvers as coordinated with airplane reconnaissance work.

## Par 20(2)(a) 4

The purpose of the construction work was to provide landing lanes; suitable servicing arrangements for ships; conveniences for aviators; shelter for the Provost Guard; opportunity to inspect all traffic entering the Post from Bisbee, Douglas and all communities lying to the east of the Reservation.

## Par 20(2)(a) 5

A Reservation outline Map No. 6203-492 is attached, whereon is shown the outline of the landing field, the road entering the Post, and their relations to the right-of-way of the Southern Pacific railway. The entire tract is a part of the Reservation and is owned outright by the Federal Government. No easements or licenses are involved.

## Par 20 (2) (b)

A map numbered 6203-510 is attached which, in addition to the information given on 6203-492, should provide all of the data necessary to give actual locations, and the designated building numbers.

## Par 20(2)(c)

Name plates and catalog numbers.

## Generator:

Kohler Electric Plant  
Model 5-A-1, 30696  
KVA-U  
Kohler Company, Kohler, Wisconsin

## Pump Jack:

Myers No. 664 AM  
17" stroke.

## Motor:

GE, 7 $\frac{1}{2}$  HP, Type CD-73  
1150 RPM, 115 volt, shunt wound,  
DC motor.

Magnetic Starter:  
Type CR, 4056-A-2, #3650396.

Water Pressure System:  
Float switch, Form P., Type CR, #2827795  
Pressure switch, M-11, CR-2927, #22484-G-5.

Par 20(2)(d)  
Photographs. Photographs of the project are attached.

Par 20(2)(e)  
Soil. The soil on which these structures are built is a compacted mixture of fine clay, with gravel of varying size in which is imbedded occasional boulders. The bearing capacity is rated at two tons per square foot.

No piling was necessary. From the drilling records, it was determined that ground water would exist for two or three months during the rainy season at a depth of 85 feet from surface.

Permanent water begins at a level of 470 feet below surface and continues to bed rock at 620 feet below surface.

Par 20(2) (f)  
Plans. The guard house drawing No. 6203-506 originally submitted to the office of the Quartermaster General, was approved as far as lay-out and general dimensions were concerned. To improve the appearance of the exterior, the architects of the office of the Quartermaster General submitted several sketches numbered 6203-134-A, 1 to 5. Of these presentations, the Constructing Quartermaster selected Scheme B as being more desirable under local conditions, and the resulting structure is an assembly of ideas, the final result being shown on drawing 6203-506-A.

The structure at the well site was designed by the local office, as shown on drawing 6203-510, and approval of this design was made by the office of the Quartermaster General in March.

In the meantime, through letters and radiograms, a part of this structure, that represented by the tower and its accessories, was altered to accommodate a "water pressure system".

The pump house, therefore, shown on drawing 6203-510 was built up to appear as shown on drawing 6203-510-A, this giving the final details of construction.

Par 20(2)(g)  
The only contract let was for the digging and casing of well. The Government was protected by the conditions and terms of Contract 6203 qm-13. No guarantees were given by contractor as to production of water or for maintenance of well.

Par 20(3)(a)  
Construction Data.

General Conditions. The conditions existing at the commencement of the work were excellent. At the site, there were available both sand and stone in abundance. Other materials, such as cement, lumber

and water had to be hauled in by trucks from the Post, a distance of four miles.

Only a few men were needed for excavations and footings. When these were completed, the Post was fortunate in having a good supply of masons among the W.P.A. workers, and consequently, the work progressed satisfactorily and at a uniform rate of speed.

For the grading and levelling work on the landing field, it was found advisable to use the road building crew and equipment at times when the road building work was delayed for unavoidable reasons. By using the tractor, the blade, the scarifier and the scrapers, the work of this character was done very economically.

Par 20(3)(b)

When it was decided to drill a well for water supply, realizing that the special equipment required for this work was not readily available in this district, a contract was entered into, with the approval of the Quartermaster General, after the usual advertising period, to Lane & Flick, a local well drilling firm.

Within four days of the date of their notification, their equipment had been hauled into place and actual drilling work had been started.

The work was done by the two contractors personally, with the help of one assistant. Their equipment was above the average in standard, and their rate of drilling was rapid.

There were, with the exception of a few boulders, no difficulties encountered. There were no subcontractors, and their payments for wages to their one helper were made promptly.

The contractor's purchases of material, mainly casing, were also promptly paid for. The contractors were skilled men in their trade, and all operations were skillfully conducted and promptly executed.

Par 20(3)(c)

A progress chart, No. 6203-514 is herewith attached.

Par 20(3)(d)

The supervision of the work was conducted in the main by the Constructing Quartermaster in person, who visited the work several times daily, and by his assistants. The inspection of the work was done by a Civil Service Engineer and a Civil Service Building Inspector.

Par 20(4)(a)

Financial Data. (Expenditures). All under Procurement Authorization QM 8242 P99 A119-57.

Emergency Relief, War, QMC  
Official Project No. 13-82(a)  
N.E.C. No. 1296, W.S. No. 1990  
Total amount authorized \$12,638.00.

Par 20(4)(b)

Name and address of contractor, date and amount of original contract and list of change orders and extensions thereto showing the nature thereof and the amount added:

Name and address of contractor:

Lane and Flick, Bisbee, Arizona

Contract No. 6203 gm-13, Office Id. No. 190-CQM.,  
dated April 13, 1936.

Amount of original Contract \$1688.36  
for drilling and casing a well to a depth of 350 feet.

Change Order "A", dated May 11, 1936, to increase depth of  
well from 350 to 620 feet - a distance of 270 feet @  
\$4.83 per foot - \$1304.10 and to 60.42 feet of 8-inch  
casing in lieu of 6-inch casing @ .38 per foot - \$22.95.  
Total Amount of Contract -----\$3015.41.

Par 20 (4) (c)

Statement and tabulation showing:

1. Total cost of Work -----\$12,637.97

2. Cost of the various items  
entering into the work:

Materials, supplies and equipment ---- \$3744.82.

3. Amount of contract, including changes-- 3015.41

4. Expenditures under purchase and hire:  
Security wage scale, W.P.A. Force Account:

Skilled \$303.00

Unskilled and semi-skilled 4419.55

TOTAL LABOR

\$5198.52

5. Overhead and other charges:

Superintendence 303.00

Technical and Clerical 210.00

Contingent Expenses 166.22

TOTAL OVERHEAD

\$679.22

Par 20(4)(d)

Date of final payment to Contractor: June 12, 1936.

Par 20(4)(e)

Amount and disposition of unexpended balance of allotment:

\$0.03 to be reported.

ENCLOSURES

Print No:

Entitled:

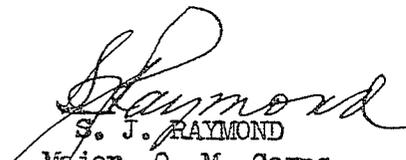
6203-492

Outline map of reservation boundaries.

6203-498

General Plan of Landing Field.

6203-505 ✓ Topography, Laiding Field. ✓  
6203-506 Psoposed Provost Guard House.  
6203-506-A Completed Guard House. ✓  
6203-510 Lay-out of Units at Landing Field.  
6203-510-A Pump House and Tank Details. ✓  
6203-510-B Details of Pump House. ✓  
6203-514 Progress Chart. ✓  
Photographs (2) pages.

  
S. J. RAYMOND  
Major, Q. M. Corps  
Constructing Quartermaster