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By C. Dentler, Supervising Engineer
Albuquerque, N. M.

U. S. INDIAN SERVICE

U. S.
INDIAN
IRRIGATION
SERVICE

DISTRICT
NO. 5.

ANNUAL
REPORT

1 9 3 1

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Supervising
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Albuquerque
New Mexico

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GANADO PROJECT

This project is located on the Navajo Reservation. It consists of a concrete diversion dam, feeder canal, and storage dam having a capacity of 2600 acre feet. The main canal is 9.69 miles long with 3 miles of laterals. The irrigable area of the project is estimated at 1200 acres of which 703 are under cultivation; 552 by Indians, and the balance by J. L. Hubbell and the Ganado Mission. The Indians produced crops during the past year valued at $35,790.30.

During the early part of the fiscal year torrential rains fell over the project area and on August 8th one of the highest floods of record occurred in the Rio Pueblo Colorado from which stream the project receives its water supply. There was sufficient water available in the storage reservoir during the past year to supply the needs for irrigation and at the close of the irrigation season there were approximately 1200 acre feet in storage. At the inception of the 1931 season, which began on May 27th, there were 1656 acre feet of water in the reservoir.

During the past year the North and South side canals were enlarged and a flume on the south side

constructed to replace one previously washed out which will make an additional 150 acres of land available for cultivation.

A silt trap was constructed in the main canal 300 feet below the head gates. This was to replace a small sluice gate 18 inches in diameter placed at approximately canal grade. The silt trap constructed consists of a 36-inch corrugated culvert pipe placed 4 feet below the present grade of the canal, complete with head wall and gate. A weir wall was placed across the canal at right angles to the head wall of the sluice gate structure, the lip of the weir being at the present canal grade. This structure provides a silt trap 4 feet by 12 feet wide at the sluice gate, the grade tapering back 300 feet to the canal gate elevations. During flood stages of the river and when water is being diverted, the sluice gate is left slightly open, depending upon the volume of water in the canal. During low water stages the gate is opened several times during the day and all of the sand deposited in the trap sluiced back into the river.

There were a number of brush and rock jetties placed in the Rio Pueblo Colorado to prevent erosion

to farm lands. Most of this work was done voluntarily by the Indians without compensation from the Government.

The Indians farming on the Ganado Project have been organized into a water users association which meets regularly on the 4th day of the month to discuss any problems in connection with the project. This organization has performed certain work on the project without cost to the Government and during the early spring months removed 1000 cubic yards of earth and rock from a slide at a contract price of $100.00.

The Indians performed their proportionate share of the annual spring cleaning of the canals, and the J. L. Hubbell Ranch and the Ganado Mission employed the Indians to perform their proportionate share of the annual maintenance. During the past year the Indians performed labor on the project without cost to the Government in the amount of approximately $1,820.00.

RED LAKE PROJECT

This project is located fifteen miles north of Fort Defiance, Arizona, on the Navajo Reservation, and consists of a diversion dam, feeder canal, and storage reservoir having a capacity of 4500 acre feet, with three miles of main canal and several miles of laterals which have been extended by the Indians. There are 700 acres of irrigable land of which 146 were under cultivation during the past year, producing crops valued at $10,725.00.

Repairs were made to a flume which had been partially destroyed by flood waters from a side arroyo on the project. This work consisted of replacing one bent and about 15 feet of new flume material was required in this replacement.

WATER SUPPLY, NAVAJO AND HOPI

Water development on the Navajo and Hopi Reservations is for the purpose of developing stock and domestic water for the Navajo and Hopi Indians which total 40,500 in population, and their combined flocks of sheep and goats amount to approximately 1,200,000 head. In addition to this they have a number of cattle and horses ranging on the reservation. The entire area of the Navajo Reservation comprises some 14,360,000 acres on which the rainfall varies from 4 to 14 inches per annum.

In the development of stock water for the entire reservation, which has been over a period of some twenty years, it has been impossible to keep the water supply development apace with the grazing demand on account of the rapid increase in the flocks and herds. As fast as water could be developed there was an immediate influx of excess stock and as a consequence of this overgrazing of the reservation the grass and forage has been practically depleted and it is now estimated that on the areas adjacent to water supplies the grass coverage is about 20%.

To meet the situation which confronts the Indians

at this time, according to grazing experts it appears to be necessary to reduce the flocks to about 700,000 head and the water development program will have to be speeded up in order to meet the range conditions sufficient to allow the grass to reseed itself around the areas which are now overgrazed.

During the past year the construction work was confined to the development of springs, building small earthen dams to create reservoirs, digging shallow wells, drilling deep wells, and constructing reinforced tanks and troughs.

In deciding upon the locations of water development, the superintendents were consulted and as far as possible the development undertaken on the areas where the greatest benefit to the Indians would be derived.

There is very little live water on the Navajo Reservation and that is confined to a small area in the northcentral part of the Southern Navajo Jurisdiction on the west slope of the Choiska Mountains.

In addition to the construction work as outlined above, maintenance work is performed on all of the

water developments. In this connection one crew is employed continuously and another crew part of the time. As many of the wells were drilled some twenty years ago, it is now found necessary to replace the casing, windmills, tanks, and troughs, as well as keep all windmills and other equipment in repair.

During the past year the maintenance crew constructed 70 reinforced concrete troughs to replace metal ones which had deteriorated beyond use and in addition constructed small reservoirs at windmills to impound excessive water over the amount held in the concrete storage tanks.

The following is a summary of the development work for new water supplies during the fiscal year 1931:

	Springs & Conc.troughs	Dug wells & Conc.troughs	Reservoirs	Drilled Wells	Total
Northern	5	15			20
Southern	10	12			22
Western		1	6		7
Eastern			6		6
Hopi	9	4			13
Leupp	4	1		2	7
TOTALS	28	33	12	2	75

Table of Developments to date as to
Type and Jurisdiction

Jurisdiction	Springs	Dug Wells	Stock Water Reservoirs	Artesian Wells	Drilled Wells	Totals
Eastern	4	4	19	8		35
Southern	52	46		4	35	137
Leupp	23	6	4		4*	37
Western	55	26	28		4	113
Hopi	78	15		4	30	127
Northern	105	54		7	4	170
TOTALS	317	151	51	23	77	619

*Drilled fiscal years 1930-31; others drilled 1910-26.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Antelope Spring and Two Troughs 386
Other Names
Reservation Hopi
Location 3½ miles N. E. Low Mt. Store

Date Developed June 1930
Flow in gals. per minute:
Before Development 1 After 2½

Development (or remarks):

This spring was excavated through sand and into blue shale. A cross cut was made 100 feet long and 8 feet deep, perforated pipe was laid and backfilled with gravel, and the water piped to two reinforced concrete stock watering troughs.

Name Concrete Trough at Well No. 461 387
Other Names
Reservation Hopi
Location 20 miles north of Oraibi

Date Developed June 19 30
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this well. This makes two troughs sufficient in size to furnish water for a large flock of sheep at one time.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Navajo Well and Trough 388
Other Names
Reservation Southern Navajo
Location 15 miles east of Chin Lee

Date Developed June 19 30
Flow in gals. per minute:
Before Development none After 1½

Development (or remarks):

This well was excavated through sand clay and into gravel to a depth of ten feet. The diameter at the bottom is eight feet and at the top five feet. A rock wall was laid and backfilled with gravel to water level, a concrete slab with manhole and pouring box molded over the well, and a reinforced concrete stock watering trough constructed.

Name Red Rock Well and Trough 389
Other Names
Reservation Southern Navajo
Location 11 miles southwest of Chin Lee P. O.

Date Developed June 19 30
Flow in gals. per minute:
Refore Development none After 1¼

Development (or remarks):

This well was excavated through quicksand and a rock wall was laid and backfilled with gravel. The depth of the well is twelve feet, the diameter at the bottom seven feet, and at the top four feet. A concrete slab with manhole and pouring box molded over the top and a reinforced concrete stock watering trough were constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Bitziee Reservoir 390
Other Names
Reservation Eastern Navajo
Location 1 mile northwest of Hostis Butte Reservoir

Date Developed June 19 30
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir has 3,921 cubic yards in the embankment. (See drawing for further details.) Eastern Navajo Agency paid part of the expense in completing work on this reservoir.

Name Rat Spring Reservoir 391
Other Names
Reservation Western Navajo
Location ½ mile west of Rat Springs Trading Post

Date Developed June 19 30
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir has 3,000 cubic yards of dirt in the embankment. (See drawings for further details.)

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Dog Spring and three Troughs 392
Other Names
Reservation Leupp
Location 3 miles southwest of Indian Wells

Date Developed July 19 30
Flow in gals. per minute:
Before Development seeps After 2½

Development (or remarks):

This spring was developed by the Agency. The Fifth Irrigation District furnished the cement, lumber, forms, etc. There is no labor charge for this spring.

Name
Other Names
Reservation
Location

Date Developed 19
Flow in gals. per minute:
Before Development After

Development (or remarks):

Department of the Interior
U. S. INDIAN IRRIGATION SERVICE
District No. 5

WELL RECORD

Location Approx. Sec.2, T.21N., R.12½E. G. & S. R. M. WELL No. 1
Began well May, 1930
Finished well May, 1930
Diameter of well 7¾"
Depth of well 400 feet
Surface of ground to water 375 feet.
Quality of water good

Leupp
Reservation

Quantity of water on test run 14,400 gals. per day
Kind of casing standard well size 6 inch
Screen kind none length mesh
Windmill, date size 14 feet kind
Tank, date size kind
Tank foundation, kind height
Troughs, date kind length

Name of Driller
Fred H. Bentley
Remarks:

L O G

Depth From	Depth To	Formation	Remarks
0	3	Surface solid	
3	4	Red shale	
4	8	Yellow limestone	
8	10	White Sandstone	
10	23	Yellow Sandstone	
23	33	Kaibab Yellow Sandstone	(Very hard)
33	42	White Sandstone	Hard
42	47	Pink Sandstone	"
47	103	White Sandstone	"
103	107	Buff Sandstone	"
107	139	White Sandstone	"
139	200	Buff Sandstone	"
200	225	Buff Sandstone	Coconino
225	250	Gray Sandstone	
250	370	Buff Sandstone	
370	372	Yellow sandy shale	
372	377	White sandstone (water raised to 340 feet)	
377	400	Yellow sandstone	

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Department of the Interior
U. S. INDIAN IRRIGATION SERVICE
District No. 5

WELL RECORD

Location Approx. Sec.14,T.22N.,R.12E.,G.&S.R.M. WELL No. 2
Began well May 27, 1930
Finished well June 6, 1930
Diameter of well 8 inches
Depth of well 425 feet
Surface of ground to water 398 feet.
Quality of water good

Reservation

Quantity of water on test run 14,400 gals. per day
Kind of casing Standard well,387'7" size 6 inch
Screen kind none length mesh
Windmill, date size 14 feet kind Aermotor
Tank, date size kind
Tank foundation, kind height
Troughs, date kind length

Name of Driller Fred H. Bentley

Remarks:

L O G

Depth From	Depth To	Formation	Remarks
0	25	Broken Limestone	
25	75	White Limestone	
75	115	Buff Limestone	
115	130	White Limestone	
130	150	Buff Limestone	
150	175	Buff Limestone	Very hard
175	180	White Sandstone	Coconino
180	210	Buff Sandstone	
210	215	White Sandstone	
215	330	Buff Sandstone	
330	390	White Sandstone	Hard
390	395	White Sandstone	Medium hard
395	397	Yellow sandy shale	
397	404	White Sandstone (water raised to 375 feet)	
404	425	Yellow Sandstone	

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Cottonwood Well and Trough 395
Other Names
Reservation Hopi
Location 5 miles northeast Tees To Trading Post

Date Developed August 16 1930
Flow in gals. per minute:
Before Development * After 1

Development (or remarks):

Development work on this well was started years ago by the Indians. Old debris was removed and excavation continued into shale for storage purposes. The depth of the well is 13 feet, the width 7 feet, and the length 14 feet. It has a storage capacity of 10,305 gallons. A rock wall was laid; a concrete slab, with manhole, molded to cover the well; and a pouring box and reinforced concrete trough were constructed.

Name Shantoi Well and Trough 396
Other Names Sunrise Well
Reservation Hopi
Location 3 miles west of Cottonwood well, 10 miles southeast Jeddito Bridge Winslow and Keams Canyon Road.
Date Developed July 1930
Flow in gals. per minute:
Before Development ½ After ¾

Development (or remarks):

This well was excavated through sandstone and into shale. Depth of the well is nine feet, diameter of well eight feet. A rock wall was laid and backfilled with gravel, a concrete slab with manhole molded over well, and a reinforced concrete trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Dinnah Spring and two Troughs** 397
Other Names
Reservation **Hopi**
Location **6 miles north of Low Mt. Store**

Date Developed **July** 19 **30**
Flow in gals. per minute:
Before Development **seeps** After **4½**

Development (or remarks):

This spring was excavated through sand and into shale. The length of excavation is 75 feet and the depth 7 feet. Perforated pipe was laid and backfilled with gravel, and the water piped 340 feet to two reinforced concrete troughs.

Name **Sa Betah Spring and Trough** 398
Other Names
Reservation **Hopi**
Location **12 miles north of windmill No. 461**

Date Developed **July 12** 19 **30**
Flow in gals. per minute:
Before Development **½** After **1**

Development (or remarks):

This spring was excavated through **sand and into red sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped 210 feet to a reinforced concrete stock watering trough.**

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Chil--Chinbeto Well and Trough** 399
Other Names
Reservation **Hopi**
Location **5 miles east of Windmill No. 461**

Date Developed **July** 19 **30**
Flow in gals. per minute:
Before Development **seeps** After **1/8**

Development (or remarks):

This well was excavated through sand and into shale. The depth of the well is 10 feet and the diameter 8 feet. Rock walls were laid and backfilled with gravel; a concrete slab, with manhole, molded over well; and a reinforced concrete stock watering trough constructed.

Name **Dry Spring and Trough** 400
Other Names
Reservation **Southern Navajo**
Location **12 miles north of Chin Lee P. O.**

Date Developed **July** 19 **30**
Flow in gals. per minute:
Before Development **seep** After **2¼**

Development (or remarks):

This spring was excavated through sand and soil into sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped 200 feet to a reinforced concrete trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Sheep Spring 401
Other Names
Reservation Southern Navajo
Location 17 miles northwest Chin Lee P. O.

Date Developed August 19 30
Flow in gals. per minute:
Before Development seep After 1

Development (or remarks):

This spring was excavated into sandstone, perforated pipe laid and backfilled with gravel, and the gravel covered with a blanket of concrete to protect it from flood water. It is a distance of 130 feet from the spring to the reinforced conrete trough.

Name Dove Spring and Trough 402
Other Names
Reservation Southern Navajo
Location 14 miles north of Chin Lee P. O.

Date Developed July 19 30
Flow in gals. per minute:
Refore Development seep After 1

Development (or remarks):

This spring was excavated through soil and coarse sand and into sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped to a reinforced concrete stock watering trough 200 feet distant.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Billy Peets Spring--Storage Reservoir and Trough 403
Other Names
Reservation Southern Navajo
Location ¼ mile southwest of Greasewood Community House

Date Developed July 19 30
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

This spring was excavated through clay and sand and into shale. Perforated pipe was laid and backfilled with gravel, and the water piped to a small concrete storage reservoir for domestic use. The reservoir is 4 x 4 x 4'. Overflow from the reservoir is connected with a reinforced concrete trough.

Name Greasewood Community Well 404
Other Names
Reservation Southern Navajo
Location Greasewood Community House

Date Developed August 19 30
Flow in gals. per minute:
Before Development none After 15

Development (or remarks):

This well was excavated through sand, and a rock wall laid and backfilled with gravel. The depth of well is 14 feet, the diameter at the bottom 8 feet, and at the top 3 feet. A concrete slab, with manhole, was molded over the top of the well. This well was developed for laundry and bathing puposes at the Greasewood Community House.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Horse Shoe Reservoir 405
Other Names
Reservation Eastern Navajo
Location 4 miles east of Maryana Lake

Date Developed July 1930
Flow in gals. per minute:
Before Development After

Development (or remarks):

There are 2,540 cubic yards of earth in the dam. The length of the dam is 620 feet, the greatest depth 11 feet, and the surface length of the reservoir is 475 feet. (See drawing for further details.)

Name Drilled Well Concrete Trough at Well No. 429 ?(439) 406
Other Names
Reservation Southern Navajo
Location 5 miles east of Round Rock Store

Date Developed September 1930
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete trough was constructed at this well to replace an old worn out metal trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Concrete Trough at Well No. 432?** 407
Other Names
Reservation **Southern Navajo (Dry)**
Location **3 miles south of Round Rock Store**

Date Developed **September** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this well to replace a worn out metal trough.

Name **Concrete Trough Well No. 438** 408
Other Names
Reservation **Southern Navajo**
Location **Near Round Rock Store**

Date Developed **September** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this well to replace an old and worn out metal trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Cedar Spring Storage Reservoir** 409
Other Names
Reservation **Hopi**
Location **4 miles southwest of Pinon Store**

Date Developed **August 7** 19 **30**
Flow in gals. per minute:
Before Development **none** After **¼**

Development (or remarks):

This spring was developed for domestic use. It was excavated into sandstone, perforated pipe laid and backfilled with gravel, and a small storage reservoir 4 x 4 x 3' was constructed of concrete with a slab and manhole molded over the top.

Name **To Tisse Well and Trough** 410
Other Names
Reservation **Hopi**
Location **7 miles south of Pinon Store**

Date Developed **August 20** 19 **30**
Flow in gals. per minute:
Refore Development **seep** After **⅛**

Development (or remarks):

This well was excavated through sand and into shale. The depth of the well is 9 feet and the diameter 6 feet. A rock wall was laid and backfilled with gravel, a concrete slab, with manhole, molded over the top of the well, and a reinforced concrete stock watering trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Straw Hats Spring and Storage Reservoir 411
Other Names
Reservation Hopi
Location 8 miles southwest of Pinon Store

Date Developed August 1930
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This spring was excavated through soil and into shale to provide a storage capacity below seepage area. The storage reservoir is 12 feet long, 3 feet wide, and 5 feet deep. A concrete slab, with manhole, was molded over the top of the spring. This spring was developed for domestic purposes.

Name Rainbow Spring and Trough (also storage reservoir) 412
Other Names Hostein Nez Spring
Reservation Hopi
Location 8 miles northeast Tees To Trading Post

Date Developed August 1930
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This spring was partly developed by Indians in the past. A ditch 90 feet long and 4 feet deep was excavated into shale, perforated pipe was laid and backfilled with gravel, and the water piped 30 feet to a small storage reservoir. From that place it is piped a distance of 580 feet to a reinforced concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATICN DISTRICT

Name **Snyder Reservoir** **413**
Other Names
Reservation **Eastern Navajo**
Location **Foot of Maryana Pass, 8 miles northeast Maryana Lake**

Date Developed **September** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir has 5,835 feet of earth in the dam. The length of the dam is 780 feet, the greatest depth 13 feet, and the surface length of the reservoir 400 feet. (See drawing for further details.)

Name **Red Bird Reservoir** **414**
Other Names
Reservation **Western Navajo**
Location **5 miles northwest of Rat Springs Trading Post**

Date Developed **August** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

There were 777 cubic yards of earth placed in this dam. The length of the dam is 110 feet, the width on top 10 feet, and the greatest depth 10 feet.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Yazzie Reservoir** 415
Other Names
Reservation **Western Navajo**
Location **6 miles north of rat springs**

Date Developed **August** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

This small reservoir has 333 cubic yards of earth in the dam. The length of the dam is 75 feet, the width on top 10 feet, and the greatest depth 8 feet.

Name **Weaver Reservoir** 416
Other Names
Reservation **Western Navajo**
Location **9 miles northwest of Rat Springs Trading Post**

Date Developed **August** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir has 977 cubic yards of earth in the dam. The length of the dam is 300 feet, the width on top 10 feet, and the greatest depth 6.5 feet.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Thomas Maze Reservoir** **417**
Other Names
Reservation **Western Navajo**
Location **5 miles southeast of Kaibeto Trading Post**

Date Developed **September** 19**30**
Flow in gals. per minute:
Before Development ____ After ____

Development (or remarks):

There were 900 cubic yards of earth placed in this dam. The length of the dam is 115 feet, the width on top 10 feet, and the greatest depth 9 feet.

Name **Cottonwood Spring and Trough** **418**
Other Names
Reservation **Southern Navajo**
Location **25 miles north of Chin Lee**

Date Developed **August** 19**30**
Flow in gals. per minute:
Before Development **seeps** After **1¼**

Development (or remarks):

This spring was excavated through sand and into sandstone. Perforated pipe was laid and backfilled with gravel, and the filtration bed covered with a blanket of concrete to protect it from flood waters. The water is piped 180 feet to a reinforced concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Round Rock Well and Trough** 419
Other Names
Reservation **Southern Navajo**
Location **4 miles south of Round Rock Store**

Date Developed **September** 19**30**
Flow in gals. per minute:
Before Development **seep** After **6**

Development (or remarks):

This well was excavated through sand and into sandstone. Rock walls were laid and backfilled with gravel. The well is 10 feet deep and has a diameter of 7 feet. A concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete stock watering trough was constructed.

Name **Jumbo Well and Trough** 420
Other Names
Reservation **Southern Navajo**
Location **17 miles north of Chin Lee P. O.**

Date Developed **August** 19**30**
Flow in gals. per minute:
Before Development **seep** After **½**

Development (or remarks):

This well was developed by Indians in the past. The walls in the well were in good condition. The well was cleaned out, removing old logs over the top, and a concrete slab, with manhole, was molded over the top of well. A reinforced concrete trough was also constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Concrete Trough at Well No. 310** 421
Other Names
Reservation **Southern Navajo**
Location **3 miles north of Corn Fields School**

Date Developed **August** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this well to replace an old and worn out metal trough.

Name **Concrete Trough at Well No. 311** 422
Other Names
Reservation **Southern Navajo**
Location **¼ mile southwest of Corn Fields School**

Date Developed **August** 19 **30**
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete trough was constructed at this well to replace an old and worn out metal trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Claw Benalle Reservoir 423
Other Names
Reservation Western Navajo
Location 10 miles west of Rat Springs Trading Post
Foot of Red Mesa
Date Developed July 1930
Flow in gals. per minute:
Before Development After

Development (or remarks):

There are 3,000 cubic yards of earth placed in the dam of this reservoir. The length of the dam is 255 feet, the width on top 10 feet, and the greatest depth 16.5 feet.

Name Wild Cat Reservoir 424
Other Names
Reservation Western Navajo
Location 3 miles north of Rat Springs Trading Post

Date Developed July 1930
Flow in gals. per minute:
Before Development After

Development (or remarks):

This is a small reservoir, having 800 cubic yards of earth placed in the dam.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name **Greasewood Spring and two Troughs** 425
Other Names
Reservation **Southern Navajo**
Location **3 miles south of Lukachukai**

Date Developed **October** 19**30**
Flow in gals. per minute:
Before Development **seep** After **2**

Development (or remarks):

This spring seeps from a crevice in the rock. It was excavated into the sandstone and the crevice opened and backfilled with gravel. The water was piped 180 feet to two reinforced concrete troughs.

Name **Horse Spring Storage Reservoir and Trough** 426
Other Names
Reservation **Hopi**
Location **7 miles southeast of Jeddito bridge on Winslow and Keams Canyon road.**
Date Developed **September** 19**30**
Flow in gals. per minute:
Before Development **seep** After **½**

Development (or remarks):

This spring was excavated through sand and into shale, a perforated pipe laid and backfilled with gravel, and the water piped to a storage reservoir. From the reservoir the water is piped 160 feet to a reinforced concrete stock watering trough. The reservoir is 8 feet long, 5 feet wide, 5 feet deep, and has a capacity of 1,500 gallons.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Sunshine Spring Storage Reservoir and Trough 427
Other Names
Reservation Hopi
Location 8 miles northeast of Billy Petes Spring and 8 miles southeast of Low Mt. Store
Date Developed September 1930
Flow in gals. per minute:
Before Development seep After ¾ gal.

Development (or remarks):

This spring was excavated through soil and into shale. Perforated pipe was laid and backfilled with gravel, and the water piped 20 feet to a storage reservoir of stone and mortar. The reservoir is 8 feet long, five feet wide, five feet deep, and has a capacity of 1,500 gallons. A concrete slab, with manhole, was molded over the top of the spring. The storage reservoir is 140 feet from the concrete trough.

Name Saya To Spring and Trough 428
Other Names
Reservation Hopi
Location 4 miles west of Hogan Hill windmill
Date Developed September 1930
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This seep came from the roof of an overhanging cave. Saturated rock was excavated back from face and the water concentrated by digging into shale where a gravel filter and perforated pipe were placed. The water is piped to a reinforced concrete stock watering trough 160 feet distant.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Chee Beto Spring and two Troughs 429
Other Names
Reservation Southern Navajo
Location 3½ miles east of Corn Fields Day School

Date Developed October 19 30
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

This spring was excavated through sand and into sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped to two reinforced concrete troughs.

Name Corn Fields Well and Pump House 430
Other Names
Reservation Southern Navajo
Location Near Corn Fields Day School

Date Developed January 19 30
Flow in gals. per minute:
Before Development none After 35

Development (or remarks):

This well was developed by sinking a reinforced concrete caisson to a depth of 55 feet. Sixteen infiltration ports were built in the walls of the caisson. A pump house was constructed over the well.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Gap Well and Pump House 431
Other Names
Reservation Western Navajo
Location Near Gap sheep dipping vat

Date Developed November 19 30
Flow in gals. per minute:
Before Development none After 8

Development (or remarks):

A concrete caisson was sunk through sand and into shale. A cross cut was made on the bottom of the wash and tiling laid to the well. Over this well a windmill was erected.

Name
Other Names
Reservation
Location

Date Developed 19
Flow in gals. per minute:
Before Development After

Development (or remarks):

432

Department of the Interior
U. S. INDIAN IRRIGATION SERVICE
District No. 5

WELL RECORD

Location Approx. Sec.12, T.21N., R.13E., G.&S.R.M. WELL No. 3
Began well August , 1930
Finished well September, 1930
Diameter of well 8 inches
Depth of well 253 feet
Surface of ground to water 254 feet.
Quality of water good

Leupp
Reservation

Quantity of water on test run 14,400 gals. per day
Kind of casing 214'9" Std. Well size 6 inch
Screen kind none length mesh
Windmill, date size 14 feet kind Aermotor
Tank, date size kind
Tank foundation, kind height
Troughs, date kind length

Name of Driller
Fred H. Bentley
Remarks:

L O G

Depth From	Depth To	Formation	Remarks
0	12	Surface soils and red	shale
12	20	Red limestone	
20	30	Red shale	
30	35	Yellow shale	
35	80	Yellow limestone	
80	200	Buff limestone	
200	210	Buff sandstone	(Coconino)
210	220	Gray Sandstone	
220	223	Yellow sandy shale	
223	229	White sand	(water at 224 feet)
229	253	Yellow sandstone	(water raised to 220 feet)

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Sweet Water Spring No. 3 and Storage Tank for Dipping Vat 433
Other Names
Reservation Northern Navajo
Location 3 miles southwest of Sweet Water Trading Post

Date Developed November 1931
Flow in gals. per minute:
Before Development seepage After 6

Development (or remarks):

Cross cuts were made on the bottom of the wash for a distance of 175 feet. These cuts ended in coarse sand and gravel, and the water was piped to a small storage reservoir or sump. From that place it was piped to a reinforced concrete storage tank which was constructed in the past at the dipping vat.

Name Buffalo Spring Storage Reservoir and Trough 434
Other Names
Reservation Southern Navajo
Location At Lukachukai P. O.

Date Developed November 1930
Flow in gals. per minute:
Before Development seepage After 6

Development (or remarks):

This spring was excavated through sand and clay and into shale. A concrete storage reservoir 10 x 11 x 4'8" was constructed, with the overflow so arranged to run into a trough. A valve was installed so that stock can be watered at any time.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Taylor Reservoir 435
Other Names
Reservation Eastern Navajo
Location Near Pinedale and Gallup road, seven miles from railroad crossing.
Date Developed May 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir is 500 feet long, and the highest point in the fill is 16 feet.

Name White Rock Reservoir 436
Other Names
Reservation Eastern Navajo
Location 6 miles north of Rehoboth Mission, Pinedale School Valley
Date Developed October 1930
Flow in gals. per minute:
Before Development After

Development (or remarks):

This reservoir is 400 feet long and 9 feet high. There are approximately 3,733 cubic yards of earth in the embankment.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

437

Name Tushin Beto Well and Trough
Other Names
Reservation Northern Navajo
Location West end of Shiprock

Date Developed October 1931
Flow in gals. per minute:
Before Development none After 1

Development (or remarks):

This well was excavated through sand and clay and into coarse sand. The well is 12 feet deep. A stone wall was laid up and backfilled with gravel to water level, a concrete slab, with manhole, molded over the top of the well, and a reinforced concrete trough constructed.

Name
Other Names
Reservation
Location

Date Developed 19
Flow in gals. per minute:
Before Development After

Development (or remarks):

Department of the Interior
U. S. INDIAN IRRIGATION SERVICE
District No. 5

WELL RECORD

Location Approx. Sec.16,T.21N.,R.13E.,G.& S.R.M. WELL No. 4
Began well September, 1930
Finished well October, 1930
Diameter of well 8¼ inches
Depth of well 225 feet
Surface of ground to water 187 feet.
Quality of water good

Leupp
Reservation

Quantity of water on test run 600 gals. per day
Kind of casing Standard Well size 6 inch 163'2"
Screen kind none length mesh
Windmill, date size 14 feet kind Aermotor
Tank, date size kind
Tank foundation, kind height
Troughs, date kind length

Name of Driller
Fred H. Bentley

Remarks:

L O G

Depth From	Depth To	Formation	Remarks
0	20	Red Shale	
20	38	Yellow Limestone	(Full of crevices
38	130	Yellow Limestone	(Kaibab)
130	150	White Sandstone	
150	155	Yellow sandy Shale	
155	160	White Sand	(water, 3 gals. per min.)
160	180	Yellow Sandstone	
180	188	White Sand	(water raised to 143 feet)
188	203	Yellow Sandstone	(water bearing to 217 feet)
203	225	Yellow Sandstone	

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Blue Water Spring and StorageReservoir 439
Other Names
Reservation Southern Navajo
Location ½ mile south of Lukachukai P. O.

Date Developed November 19 30
Flow in gals. per minute:
Before Development seep After 1

Development (or remarks):

This spring was excavated through sand and into red sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped to a concrete storage reservoir. The reservoir is covered by a concrete slab with manhole molded in the top. Size of reservoir--7' x 6' x 5'.

Name To El Ce See Well and Trough 440
Other Names
Reservation Northern Navajo
Location 5 miles north of Sulphur Peaks or Stinking Springs

Date Developed November 19 30
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

This well was excavated into shale. A rock wall was laid and backfilled with gravel. The well is 10 feet deep and the water rises 5 feet in well. A concrete slab, with manhole, was molded over the top of the well and a reinforced concrete trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Red Rock Well and Trough 441
Other Names
Reservation Northern Navajo
Location 4 miles east of To El Ce See Dam on Tocito Wash

Date Developed November 1930
Flow in gals. per minute:
Before Development seep After 2

Development (or remarks):

This well was excavated through sand and gravel and into clay. A rock wall was laid up and backfilled with gravel, a concrete slab, with manhole, molded over top of well, and a reinforced concrete trough constructed. The well is 20 feet deep.

Name Alkali Well and Trough 442
Other Names
Reservation Northern Navajo
Location 10 miles northeast of Sulphur Peaks on west side of Charco Wash.

Date Developed December 1931
Flow in gals. per minute:
Before Development none After 2

Development (or remarks):

This well was excavated into liquid sand to a depth of four feet. A layer of slab rock was placed in the bottom and a rock wall laid up and backfilled with gravel to water level. A concrete slab, with manhole, was molded over the top of the well and a reinforced concrete trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name 3 Concrete Troughs and Valve Box at Artesian Well 443
Other Names
Reservation Eastern Navajo
Location 3 miles east of Crown Point

Date Developed 19
Flow in gals. per minute:
Before Development After

Development (or remarks):

These troughs were constructed of reinforced concrete. Each trough is 14 feet long.

Name To Tsin Beto Spring and Trough 446
Other Names
Reservation Leupp
Location Sec.27,T.23.,R.21E., 4 miles southwest of Indian wells

Date Developed November 19 30
Flow in gals. per minute:
Before Development seep After 1

Development (or remarks):

This spring was excavated through clay and into gravel. Perforated pipe was laid and backfilled with gravel, and the water piped to a reinforced concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Billy Dalki Well and Trough 447
Other Names
Reservation Leupp
Location 6 miles southwest of Indian Wells, Sec.24,T.23, R.20E.

Date Developed December 19 30
Flow in gals. per minute:
Before Development none After 1

Development (or remarks):

This well was excavated through sand and into shale. A stone wall was laid up and backfilled with gravel to water level. A concrete slab, with manhole, was molded over the top of the well. A reinforced concrete trough was constructed, also. The well is 10 feet deep.

Name Cedar Spring Storage Reservoir, and Trough 448
Other Names
Reservation Leupp
Location Old Cedar Springs Trading Post--now Government property

Date Developed December 19 31
Flow in gals. per minute:
Refore Development After

Development (or remarks):

This spring was developed by the Agency. The cement, lumber, pipe, etc., and some of the labor on the construction of the reinforced concrete storage reservoir were furnished by the Fifth Irrigation District. A concrete slab, with manhole, was molded over the top of the reservoir. Size of reservoir--10' x 7' x 7'.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Kin le Chee Springs and Storage Reservoir 449
Other Names
Reservation Southern Navajo
Location At Kin le Chee Community House, 8 miles northeast of Ganado P. O.
Date Developed January 1930
Flow in gals. per minute:
Before Development seeps After 4

Development (or remarks):

These seeps were developed by excavating through red sandstone and into shale. A trench in the shale was cut to a sump for storage purposes, where it is proposed to erect a windmill and galvanized iron storage tank to supply water for the community laundry, etc.

Name Waro Reservoir 450
Other Names
Reservation Eastern Navajo
Location 10 miles north of Crown Point near the Bonita Road
Date Developed May 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

This is the largest reservoir constructed in this jurisdiction. There are 14,329 cubic yards of earth in the embankment.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Willie Pinto Well and Trough 451
Other Names
Reservation Northern Navajo
Location 6 miles east of Table Mesa Oil Wells

Date Developed December 19 30
Flow in gals. per minute:
Before Development none After 7

Development (or remarks):

This well was excavated into coarse sand. A rock wall was laid up and backfilled with gravel. A concrete slab, with manhole, was molded over the top of the well and a reinforced concrete trough constructed. The well is 16 feet deep.

Name Sand Well and Trough 452
Other Names
Reservation N. Navajo
Location 3 miles north of Alkali Well on east side of Charco

Date Developed December 19 30
Flow in gals. per minute:
Before Development None After 1½

Development (or remarks):

This well was excavated down to 10 feet in liquid sand. Flat slab rock was laid in the bottom, walls were laid up and backfilled with gravel, a concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete trough was constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Wild Cane Well and Trough 453
Other Names
Reservation Northern Navajo
Location 6 miles east of Table Mesa east side of Charco

Date Developed January 1931
Flow in gals. per minute:
Before Development none After 3

Development (or remarks):

This well was excavated into sand 17 feet. A rock wall was laid up and backfilled with gravel, a concrete slab molded over the top of the well, and a reinforced concrete trough constructed.

Name St. Michaels Community Well 454
Other Names
Reservation Southern Navajo
Location Near St. Michaels Mission

Date Developed February 1931
Flow in gals. per minute:
Before Development none After 15

Development (or remarks):

This well was excavated through liquid sand and into coarse gravel. A reinforced concrete caisson was sunk six feet, and the remainder of wall was laid up in rock. The diameter of the well at the bottom is 8 feet and at the top 3 feet. A concrete slab, with manhole, was molded over the top of the well. A windmill will be erected in the near future.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Teece Sosie Cah Well and Trough 455
Other Names
Reservation Southern Navajo
Location 10 miles southeast of Ganado P. O.

Date Developed January 1931
Flow in gals. per minute:
Before Development none After 15

Development (or remarks):

This well was developed by sinking a reinforced concrete caisson to a depth of 10 feet. A concrete slab, with manhole, was molded over the top of the well, and a concrete float valve box constructed.

Name Coal Mine Well and Trough 456
Other Names
Reservation Northern Navajo
Location 6 miles southeast of Table Mesa

Date Developed January 1931
Flow in gals. per minute:
Before Development seep After 7

Development (or remarks):

This well was excavated through coal and into shale, water coming in at contact of coal and shale. A rock wall was laid up and backfilled with gravel, a concrete slab was molded over the top of the well, and a reinforced concrete trough constructed. The well is 15 feet deep.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Curley Jims Spring and Trough 457
Other Names
Reservation Northern Navajo
Location 4 miles south of Midwest oil field, west of Chaco and east of Hogback
Date Developed February 1931
Flow in gals. per minute:
Before Development none After 1

Development (or remarks):

This spring was excavated into sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped to a reinforced concrete stock watering trough.

Name Ear Bob Well and Trough 458
Other Names
Reservation Northern Navajo
Location 9 miles southeast of Table Mesa, east side of Chaco
Date Developed January 1931
Flow in gals. per minute:
Before Development none After 5

Development (or remarks):

In the past this well was partly developed by Indians. Old timbers were removed and excavation was continued to 10 feet. A rock wall was laid up and backfilled with gravel. A concrete slab, with manhole, was molded over the top of the well. A reinforced concrete trough was constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Naschiti Chapter House Well 459
Other Names
Reservation Southern Navajo
Location Chapter House at Drolet

Date Developed March 19 31
Flow in gals. per minute:
Before Development none After 1½

Development (or remarks):

This well was excavated down into rock and shale at the bank of a wash. A cross cut 40 feet long and 4 feet deep was made across the wash and was backfilled with gravel. This well is 26 feet deep and has a diameter of 6 feet. A concrete slab was molded over the top of the well. It is proposed to erect a windmill over this well to pump water for the bath house, etc.

Name Wide Ruins Sheep Dip Well and Storage Reservoir 460
Other Names
Reservation Southern Navajo
Location At Wide Ruins Trading Post

Date Developed March 19 31
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

This well was excavated into sandstone. Rock walls were laid and backfilled with gravel. The well is covered with a concrete slab so arranged that a pump can be installed. A cross cut was made along the seepage area and the water piped to an underground reservoir. Size of reservoir--12 x 8 x 8½.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Say Zin Well 461
Other Names
Reservation Northern Navajo
Location 16 miles south of Shiprock, ½ mile east on highway

Date Developed February 19 31
Flow in gals. per minute:
Before Development none After ¼

Development (or remarks):

This well was developed for domestic use. It was excavated to a depth of 12 feet. A rock wall was laid up and backfilled with gravel, and a concrete slab, with manhole, was molded over the top of the well.

Name Ram Rod Spring, Storage Reservoir and Trough 462
Other Names
Reservation Northern Navajo
Location 16 miles south of Shiprock on Gallup-Shiprock Highway

Date Developed February 19 31
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This spring was excavated into shale. Perforated pipe was laid and backfilled with gravel, and the water piped to a small storage reservoir and reinforced concrete trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Blue Water Well and Trough 463
Other Names
Reservation Northern Navajo
Location 12 miles southeast of Midwest oil field and 9 miles south of Fruitland.
Date Developed February 19 31
Flow in gals. per minute:
Before Development none After 1

Development (or remarks):

This well was excavated into shale. A rock wall was laid up and backfilled with gravel, a concrete slab, with manhole, molded over the top of the well, and a reinforced concrete trough constructed. Depth of well--15 feet.

Name Blue Canyon Well and Trough 464
Other Names
Reservation Northern Navajo
Location 9 miles southeast Midwest oil field and 4 miles southwest of Blue Water Well.
Date Developed February 19 31
Flow in gals. per minute:
Before Development none After 5

Development (or remarks):

This well was excavated into coarse sand and gravel to a depth of 10 feet. A rock wall was laid up and backfilled with gravel, a concrete slab, with manhole, molded over the top of the well, and a reinforced concrete trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Many Goats Seeps, five 465
Other Names
Reservation Leupp
Location 1 mile southeast of Indian Wells

Date Developed March 19 31
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

These five seeps were developed and connected with a storage reservoir 4'x 4'x 4'. The labor for this development was paid for by the Mission Hospital. The material was furnished by the Fifth Irrigation District. The Indians use part of this water supply for domestic use.

Name Tec So Well and Trough 466
Other Names
Reservation Northern Navajo
Location ¼ mile east of Roy Burnham Store

Date Developed March 19 31
Flow in gals. per minute:
Before Development seep After 2

Development (or remarks):

This well was excavated through clay and sand to a depth of 10 feet. This well has a diameter of 6 feet. A rock wall was laid up and backfilled with gravel, a concrete slab, with manhole, molded over the top of well, and a concrete stock watering trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Cornfields Well 467
Other Names
Reservation Northern Navajo
Location 4 miles west of Burnhams store

Date Developed March 19 31
Flow in gals. per minute:
Before Development seep After 2

Development (or remarks):

This well was excavated through sand and clay and into sand. A rock wall was laid up and backfilled with gravel. The well is 12 feet deep and has a diameter of 6 feet. A concrete slab, with manhole, was molded over the top of the well, and a concrete trough constructed.

Name Concrete Trough at Indian Wells 468
Other Names
Reservation Leupp
Location At Indian Wells P. O.

Date Developed March 19 31
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this place. Water is supplied by the well at the Trading Post.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Redrock Spring and Storage Reservoir, and trough 469
Other Names
Reservation Northern Navajo
Location 4 miles southwest of Redrock Trading Post

Date Developed March 19 31
Flow in gals. per minute:
Before Development 3 After 6

Development (or remarks):

This spring was developed by excavating through sand, clay, and gravel and into shale. Perforated pipe was laid and backfilled with gravel, and concrete poured over filtration bed to prevent damage by flood water. The water was piped to a concrete storage reservoir and trough 750 feet distant. This water supply is for a sheep dipping plant.

Name Drolet Sheep Dip Well and Trough 470
Other Names
Reservation Southern Navajo
Location ½ mile east of Drolet at dipping vat

Date Developed April 19 31
Flow in gals. per minute:
Before Development none After 2

Development (or remarks):

This well was excavated through sand and gravel and into shale. A rock wall was laid up and backfilled with gravel to water level--7 feet. The well is 20 feet deep and has a diameter of 6 feet. A concrete slab, with manhole and pouring box, was molded over the well, and a concrete stock watering trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Mike Julian Well and Trough 471
Other Names
Reservation Southern Navajo
Location 3½ miles southeast of Drolet Trading Post

Date Developed April 19 31
Flow in gals. per minute:
Before Development none After 1

Development (or remarks): This well was excavated through clay and sand, and into shale. The well is 18 feet deep, and has a diameter of 7 feet at the bottom and 5 feet at the top. A 5-foot concrete caisson was sunk into the well, and the remaining distance was walled with rock and backfilled with gravel. A concrete slab, with manhole, was molded over the top of the well and a concrete trough constructed.

Name Luki Spring and Trough 472
Other Names
Reservation Northern Navajo
Location 12 miles east of Burnhams Store

Date Developed April 19 31
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This spring was excavated through clay and sand, and into shale. Perforated pipe was laid and backfilled with gravel, and the water piped 200 feet to a concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Soze Well and Trough 473
Other Names
Reservation Northern Navajo
Location 1 mile north of Cornfields on Chaco Wash

Date Developed April 19 31
Flow in gals. per minute:
Before Development none After 7

Development (or remarks):

This well was excavated through sand and into gravel. A rock wall was laid up and backfilled with gravel, a concrete slab, with manhole, was molded over the top of the well, and a concrete stock watering trough constructed. The well is 12 feet deep and has a diameter of 7 feet.

Name Natanis Well and Trough 474
Other Names
Reservation Southern Navajo
Location ¾ mile south of Community House at Greasewood Valley

Date Developed April 19 31
Flow in gals. per minute:
Before Development none After 3

Development (or remarks): This well was developed by sinking a concrete caisson to a depth of 16 feet. The diameter of the well at the bottom is 8 feet. An 8-inch wall was built to a height of 8 feet, and for the remaining 8 feet, having a diameter of 5½ feet, a 6-inch wall was built. Water was encountered 2 feet below the surface in liquid sand and continued to a depth of 10 feet where red shale was found. A concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete stock watering trough constructed.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Reinforced Concrete Trough at Rattlesmake Oil Well No. 2 475
Other Names
Reservation Northern Navajo
Location At Oil Company's camp, 8 miles southwest of Shiprock

Date Developed April 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed at this well, so that Indians in this community can water their stock. The oil company supplied the necessary pipe.

Name Stinking Well 476
Other Names
Reservation Northern Navajo
Location 12 miles south of Shiprock on old highway

Date Developed May 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

This was formerly spring 49a, and was redeveloped into a dug well.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Concrete Trough at Well No. 459 477
Other Names
Reservation Hopi
Location At Well No. 459, 8 miles southwest of Pinon Store Wepo Wash

Date Developed April 19 31
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete stock watering trough was constructed to replace an old and worn out metal trough.

Name Rough Rock Spring and Trough 479
Other Names
Reservation Northern Navajo
Location 12 miles northeast of Burnhams Store

Date Developed May 19 31
Flow in gals. per minute:
Before Development $\frac{1}{2}$ After $1\frac{1}{2}$

Development (or remarks):

This spring was excavated into shale. Perforated pipe was laid and backfilled with gravel filter, and the water piped 320 feet to a reinforced concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Cedar Berry Well for Domestic Use 480
Other Names
Reservation Northern Navajo
Location 1½ miles north of Luki spring

Date Developed May 19 31
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This well was excavated through a small layer of shale and into sandstone. The well is 8 feet deep and has a diameter of 6 feet at the bottom and 3 feet at the top. A concrete slab, with manhole, was molded over the top of the well.

Name Red Goat Spring and Trough 481
Other Names Red Mule
Reservation Northern Navajo
Location 14 miles north of Burnham Store

Date Developed June 19 31
Flow in gals. per minute:
Refore Development seep After 2

Development (or remarks):

This spring was excavated through clay and sand, and into shale. Perforated pipe was laid and backfilled with gravel filter, and the water piped 300 feet to a reinforced concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name One Eye Well and Trough 482
Other Names
Reservation Northern Navajo
Location 8 miles southwest of Shiprock Agency, 4 miles south of Rattlesnake
Date Developed May 1931
Flow in gals. per minute:
Before Development none After 1

Development (or remarks): This development was started several years ago in the form of a spring. Due to lowering of the water table, the water would flow only during the rainy season when the water level was raised. The well was excavated to a depth of 10 feet, and the original pipe line was continued into the well 6 feet above the bottom. During most of the season the water will flow into the original trough, and as the water level is lowered it can be bailed out and placed in the new trough at the well.

Name Concrete Trough Compton Well, two 483
Other Names
Reservation Northern Navajo
Location 2 miles southwest of Midwest Oil Field
Date Developed June 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

This Artesian well is in the Midwest Oil Field belt. As there is an abundance of water there, it was decided to construct two reinforced concrete stock watering troughs for the Indians in that section of the country.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Benanie Tog Spring Storage Reservoir and Trough 484
Other Names
Reservation Southern Navajo
Location 1½ miles southwest of Community House, Greasewood Valley

Date Developed May 1931
Flow in gals. per minute:
Before Development none After ½

Development (or remarks):

This seep was developed by opening crevices and excavating into sandstone. Perforated pipe was laid and backfilled with gravel, and the water piped 218 feet to a small storage reservoir. A reinforced concrete stock watering trough was constructed.

Name Becheen Betoh Spring, Storage reservoir and trough 485
Other Names
Reservation Southern Navajo
Location 2½ miles southwest of Community House, Greasewood Valley

Date Developed May 1931
Flow in gals. per minute:
Before Development seep After ¼

Development (or remarks):

This spring was developed on the side of a mesa, excavated back from the face. Perforated pipe was laid and backfilled with gravel, and the water piped to a small storage reservoir and concrete stock watering trough.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Willies Well and Trough 486
Other Names
Reservation Southern Navajo
Location 5½ miles east of Tohatchi

Date Developed May 19 31
Flow in gals. per minute:
Before Development seepage After 1

Development (or remarks): This well was excavated through 7 feet of soil and into 10 feet of sand. A concrete caisson 7 feet 9 inches in diameter and 5 feet high was sunk into the well, and the remaining distance was walled with stone and cement mortar. A concrete slab, with manhole, and a pour box was molded over the top of the well, and a concrete stock watering trough constructed.

Name Little Naschiti Well and Trough 487
Other Names
Reservation Southern Navajo
Location ½ mile north of Naschiti or Drolet Store

Date Developed May 19 1931
Flow in gals. per minute:
Before Development seepage After 1

Development (or remarks):

This well was excavated through sand and gravel and into shale. A concrete caisson 7 feet in diameter and 5 feet high was sunk into the well, and the remainder was walled with stone and cement mortar. A concrete slab, with manhole, and pouring box was molded over the top of the well, and a reinforced concrete stock watering trough constructed. This well is 16 feet deep.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Concrete Trough at Well No. 456 488
Other Names
Reservation Hopi
Location West of Pinon Store at sheep dipping vat.

Date Developed May 19 31
Flow in gals. per minute:
Before Development After

Development (or remarks):

A reinforced concrete trough was constructed at this well to replace a worn out metal trough.

Name Rock Dam Well and Trough 489
Other Names
Reservation Northern Navajo
Location 3 miles west of Red Goat or Red Mule Spring

Date Developed June 19 31
Flow in gals. per minute:
Before Development seep After ½

Development (or remarks):

This well was excavated through sand and into shale. A stone wall was laid up and backfilled with gravel to water level. A concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete stock watering trough constructed. The well is 14 feet deep and has a diameter of 7 feet at the bottom and 3 feet at the top.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Cedar Ridge Well and Trough 490
Other Names
Reservation Northern Navajo
Location 3 miles west of Red Mule Spring

Date Developed June 19 31
Flow in gals. per minute:
Before Development seep After 1

Development (or remarks):

This well was excavated through sand and into shale. A stone wall was laid up and backfilled with gravel to water level. A concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete stock watering trough constructed. The well is 16 feet deep and has a diameter of 7 feet at the bottom and 4 feet at the top.

Name Black Rock Well and Trough 491
Other Names Toms Well
Reservation Southern Navajo
Location 4½ miles north of Drolet store

Date Developed June 19 31
Flow in gals. per minute:
Before Development seepage After 3

Development (or remarks):

This well was excavated through clay and sand and into shale. A concrete slab, with manhole, was molded over the top of the well, and a reinforced concrete stock watering trough constructed. The well is 17 feet deep and has a diameter of 8 feet at the bottom and 4 feet at the top.

NAVAJO AND HOPI SPRING DEVELOPMENT

FIFTH IRRIGATION DISTRICT

Name Concrete Troughs at Artesian Well No. 120 (2 troughs) 492
Other Names
Reservation Southern Navajo
Location 8½ miles east of Drolet Store

Date Developed June 1931
Flow in gals. per minute:
Before Development After

Development (or remarks):

Two reinforced concrete stock watering troughs were constructed at this well to replace old worn out wooden troughs.

Name
Other Names
Reservation
Location

Date Developed 19
Flow in gals. per minute:
Refore Development After

Development (or remarks):