ANNUAL REPORT

FISCAL YEAR

1916

#1

USPRI000871

A CONFERENCE OVER THE WATER SITUATION
ON THE FIRST MESA.

NAVAJO GANADO PROJECT.

This project has been the construction of a reservoir about three miles from Ganado, Arizona, in which the waters of the Rio Pueblo Colorado may be conserved together with the necessary diversion structures and canal and the distributing canal. On a flat north of the stream a small storm water lake has existed for many years and by the construction of a dike about 5000 feet long, with a maximum height of 22 feet, a considerable quantity of water can be impounded and used for the irrigation of lands along the stream below.

Plans and estimates were made of this project and Congress appropriated $60,100.00 for its construction. The plans prepared were for a diversion of the stream, the construction of the reservoir, the construction of the distributing ditch several miles long, the enlarging and rebuilding of a ditch formerly owned by J. L. Hubbell for several miles further and the extension of this ditch to cover lands below the Hubbell place. The ditch as planned was to cover something over 700 acres of land. After the preparation of the plans and before the construction commenced, the stream shifted its course from where it formerly ran on rock bed to a place in deep alluvial soil, and the channel was cut

down some 15 feet below its former level. This made the diversion cost a great deal more than was anticipated. By instructions from your office, the plans were also changed providing for the construction of a concrete head works instead of wooden.

Heavy floods, both from the stream and cloud bursts enlarged both the main stream and the side drainage so that larger flumes were necessary than planned and one large flume was entirely washed out after being constructed. From a combination of these causes, the money appropriated was not sufficient to complete the project.

An estimate was made for completing the original project and for an extension to bring more land under ditch. The amount necessary was included in the Indian Appropriation Bill for 1916, which failed passage. The construction therefore was closed down during the fiscal year 1916. The only work done was that necessary for maintenance.

The Indian Appropriation Bill for 1917 contained an item of $20,000.00 to complete the project and work will commence immediately to carry it to completion.

During the past year water was impounded in the reservoir to a depth of 12 feet and has been furnished for purposes of irrigation as needed.

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In addition to water furnished Mr. Ebbell under his contract with the government, water has been furnished to ten Indians who put in small tracts of land.

The General Land Office has made a survey of the lands under the ditch and sub-divided the same into ten acre tracts for allottment to the Indians, but no steps have been taken as yet to allot any of them. Orders were given the caretaker that until such time as the land was allotted, if any Indians desired to put in a tract, and made a request for water, that he was to be furnished with such water as was necessary.

A reservation has been made by the Indian Office of approximately 270 acres of land on which it is proposed to build a school and to use the land for school purposes.

It is hoped to complete this project before the end of the fiscal year.

The amount expended last year is as shown in detail on the accompanying cost data sheets.

NAVAJO. MARSH PASS PROJECT.

The Marsh Pass Project is a small one in the Navajo Reservation to the north of the Black Mountains. This point is 90 miles north of Tuba or about 180 miles from Flagstaff. It is about 150 miles from Gallup and 130 miles from Farmington. On account of the roads, all freight should be hauled from Gallup. The elevation is about 6000 feet and the average annual rainfall is estimated from 7 to 8 inches.

At this point is a small boarding school, and I have been unofficially advised within the last few days that a new agency will be established here with jurisdiction over the northwest part of the Navajo Country.

The project is to divert water from Laguna creek which has a normal flow of from 6 to 10 second feet and flood flows of considerable magnitude.

The water is to be diverted from this creek by the construction of a rock filled crib dam, the water being carried a couple of miles to an old lake bed, which, by the building of a small earthen dam will form a small storage and equalizing reservoir. The water is then dropped into a natural channel and diverted some distance below where by the construction of about

three miles of distributing ditch approximately 1000 acres can be brought under irrigation, if the water supply warrants it.

At the end of the year, the work was practically completed with the exception of the dam and some minor work in various parts along the system. The crib construction was within two feet of its ultimate height and will have to have about 75% of the filling yet placed and the planking put on. It is hoped to have the work completed by the first of August.

Authority was given for the sub-division of the land under the ditch into approximately ten acre tracts. The topographical survey necessary has been completed and the staking of the different tracts should be completed by the time the construction work is finished.

The cost data on this project will be found on another page.

A complete preliminary report was made under date of June 26th, 1912 and with the exception of a few minor particulars, the entire project has been constructed exactly as planned.

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NAVAJO. RED LAKE.

In March, 1916 a request was made by Superintendent Paquette of the Navajo Agency, requesting authority to expend $1,500.00 in the repair of the Red Lake dam, stating that the water of the lake had gone over the top of the dam cutting out quite a section of the dam down to the bottom of the lake releasing all of the stored waters. Upon instructions from the Indian Office, Mr. Minney was detailed to make the investigation which he did, and a report was submitted showing that about 50 feet of the dike had been washed out and making an estimate of the cost of repairs.

At a later date Assistant Chief Engineer, Schanck being in this part of the country, visited Red Lake with me and it is presumed that a further report was made by him. No instructions have been given me regarding any repair work and I have not been advised whether Superintendent Paquette was given authority to make the repairs or not.

NAVAJO. LEUPP.

Flume. At the Leupp Agency, Navajo Extension Reservation, wells were put down and a pumping plant installed several years ago. This pumping plant was supposed to furnish water for the school grounds and a small farm. In order to cover the school grounds, it was necessary to carry the water some 3000 feet and as the ditch line crossed some low ground it must be carried at some elevation above the level of the ground. The Agency force built an elevated ditch of earth to carry this water but it was made so small that it would not stand a head of water and was continually breaking, hence no water has ever been delivered to the school ground in sufficient quantities to irrigate.

The present Superintendent desired to put the grounds under water and requested assistance. Surveys were made and it was decided that the level of the supply ditch should be raised two feet above that formerly attempted, as an embankment at this point would furnish protection against flood waters at the school. The Superintendent built a high, heavy bank, and authority was received from the Indian Office by the Irrigation section to furnish 3000 feet of metalic flume, which was laid on top of the dike. This enabled the Superintendent to furnish a full head of water at all times to

the school grounds.

River Protection.

The Little Colorado River reached a high stage last winter and threatened to change its channel in such a way that it was feared that the agency and school would be endangered. A request was made for assistance and an Engineer was detailed to make an examination and submit estimates. A report was made of the condition and methods suggested for protection. This report was forwarded to the Indian Office and upon certain objections being raised by you as to the plans suggested, I personally investigated same later in the year.

It was found that the river had again shifted its channel back to the old position, and it was thought that any expense for river protection work at this point would be wasted. The construction of two dikes as a further protection to the school from storm water and overflows from the river was considered necessary and this was approved by you but no authority had been granted by the Indian Office for such construction.

The Lakes.

About 12 miles north of Leupp Agency there are two storm water lakes at the lower end of the

Oraibi Wash. It was thought that these lakes might furnish water to irrigate a small tract of land, and Superintendent Janus made quite a glowing report on the matter. An Engineer was detailed who made surveys and thorough examinations and it was found that the quantity of water impounded was not great and that the lakes would not fill up every year. This fact, together with the cost of any development work at this point caused an adverse report to be made. For further details I would refer you to this report.

PUYALLUP. ACOMA.

All of the water diverted from the Dam done by the Acoma Indians is taken out in one ditch on the south side of the stream. About a mile below, the water that will be used on the north side of the stream is conveyed to the other side in a flume. The old flume which was a wooden structure was in very bad repair, and the wonder is, how it lasted as long as it did. A new flume with steel water way, wooden substructure and concrete piers was put in in place of the old flume. This work was done in the fall.

The cost data of this work will be shown on the following pages.

UNDERGROUND WATER SUPPLY.

The entire Navajo and Hopi Reservation is what might be termed " desert country" . It is an arid region. The rainfall records and the character and distribution of plant life show aridity at the present time. The geologic and archaeologic evidence alike indicate that it has been arid for thousand of years, and the geographical position, topographical surroundings, and climate history indicates that the aridity will continue. The deficient rainfall and its unfavorable distribution throughout the year; extensive drifting sands, a topography of canyon, mesa, and arroyo; drying winds; and the elevation above the sea determine for this region an unsatisfactory water supply.

Water is desired in this country both for stock raising and irrigation. Water supply for a grazing country involves not a few large supplies but many small ones; not an increase in quantity where water now exists, but a moderate supply where at present it is not found. Water is needed where advantage may be taken of natural feed on the reservations. But in considering this it must also be remembered that too great a quantity of water at any one place, when there is a scarcity at others, will have a tendency to cause the Indians to overstock that part of the range, for at no

place is the grass and natural feed very luxurious, and thus do more harm than good.

Stock raising, and especially the raising of sheep on these reservations is proving the salvation of these Indians.

On the return of the Navajo from the Bosque Redondo at the end of their captivity in the late '60s they were a poor people, and comparatively few. In the space of less than two generations since that time they have increased three fold in number and their flocks have increased several hundred fold. Their great difficulty now is that their flocks are too numerous for the natural existing water supply, and it is to supplement this scant supply that the Indian service is putting down wells for domestic and stock water in the places where it seems possible to secure a supply and where needed.

It is now several years since this work commenced, and over extensive areas the developed water is the only means of keeping many flocks of sheep and a considerable population. Cut off this supply now, and it would mean the loss of flock after flock and the ruination of many self supporting families.

In the Hopi country it has been the endeavor of the Office for years to bring the people down from

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the mesa tops to live in the Valleys below. Until now, it has seemed a hopeless endeavor, but with the extending of the grazing areas by the drilling of wells and the development of springs, opening up new feeding places too far from the village for the daily trip of the flocks from the mesa to the feeding grounds, many of the Indians have moved down and built at the wells and springs, and by relieving the ground around the mesa from a portion of the flocks the remaining will have a chance to increase. For years, because of the limited area over which they ranged there had been no increase. They simply existed and held their own. This is now changing.

We can best consider the underground water development in this District by dividing it into five headings:

1. Deep well drilling.(Exploring for artesian water)
2. Shallow well drilling. (To 300 feet deep). Navajo
3. Well Maintenance.
4. Spring Development.
5. Shallow Wells. Pueblo.

For several years the large rig (No. 1) has been engaged in this work, following out the suggestions of Prof. H. E. Gregory, the eminent geologist, who has made a special study this country. A well was put down

at Teams Canyon, as Prof. Gregory had stated that a thorough test at this point would determine whether it was possible to secure artesian water at any point south of the Black Mountain Country. After going to a depth of over 1300 feet, it was decided, Prof. Gregory concurring, that is was impracticable to secure flowing water in this District.

The rig was then transferred to the Choiska Valley and a well put down at the head of that Valley, some nine miles southeast of the Tohatchi school and some 25 miles north of Gallup.

Over a year was spent on this well, owing to difficulties encountered, first of large beds of fire clay which would neither drill nor bale out with the sand bailer, and which was finally conquered by hauling in sand, dumping it into the well and mixing it in with the clay until it was of a consistence that it was workable, second, the encountering of some extremely hard rock, so hard in fact, that in one month of constant drilling, only 12 feet was made. We were also handicapped by bad water for drilling and camp purposes, and the fact that the best water found was such that it was very bad for boiler use, and not a month went by that it was not necessary to work over

the boiler and put in new flues or make other repairs to it.

However in spite of the difficulties encountered the well was a success, in that it demonstrated that Artesian water was to be found in the Choiska Valley.

Water was encountered at shallow depths, and a flow finally reached the surface- about 50 gallons an hour. Between 1050 and 1058 in light yellow sandstone another flow was struck increasing the amount to 300 gallons per hour. At 1082 another strata of the same material was found and the flow increased to 2500 gallons an hour, and just below 1100 feet in light grey sandstone more water was found giving a flow of 6000 gallons an hour. Drilling was then stopped and after some days another measurement was made finding that the flow had increased to 6500 gallons per hour.

The well was finished by capping it, placing a valve to control the flow and building an iron house to protect the well from molestation. A small constant flow was allowed to run for stock water.

The rig was moved to a point about six miles east of here while waiting for casing, and started to put down a small well which was expected to equip with pump and windmill, to furnish water for stock. To our surpise a flowing well was developed at 205 feet. This well

flows 500 gallons per hour. It was equipped about the same as the deep well.

As a demonstration that water is where it is found and not where the surface indications would point out, after finishing these two wells the rig was moved down the valley to a point below the junction of two valleys in which were found the two flowing wells, and at over 300 feet we have not found water of any kind, and the indications are not good for it now.

Under date of May 20 last, I received a letter from the Indian Office relative to the further deep well drilling in which it was said,

" It is well understood that this was an experiment after due preparitory precaution had been taken, for the purpose of determining whether or not there was available water for irrigation purposes from underground sources in the Navajo Country.

The cost, about $12,000.00, does not seem to be justified by the results and from the records of the operations in sinking the well, the material encountered and the supply of water obtained, I do not think it advisable to continue at present the search for a well that will furnish an irrigation supply.

I desire that you utilize the funds available in securing a smaller supply of water at various places over a larger area."

The two other rigs have been operating in the country known as the Chin Loc Valley and along the east and north slopes of the Black Mountain. These rigs, too, have had their difficulties. Their remote locations; the necessity of hauling water from six to fifteen miles for boiler, drilling and domestic supply, bad weather,

long haul for fuel and other supplies all tend to make the work go slow and the costs to mount high.

An inspection of the map will show the area covered in the drilling operations and the accompanying table will give the actual work accomplished.

Cost data of well drilling will be found properly sub-divided on other sheets.

It has been difficult for me to keep in as close touch with the well drilling as desired owing to the necessity of visiting all parts of the District and attending to the other necessary work. The well rigs are working in the most inaccessible portions of the country and visits take a large amount of time.

In order to facilitate the work and keep in closer touch with what is being done, Foreman Womack, who heretofore has been in charge of the spring development and well maintenance only, has been placed in general charge of all water developments in the Navajo and Hopi Countries, with instructions not only to continue the work he has been doing but also to visit the well rigs at frequent intervals, give advice to the drillers as to their future movements which will avoid the necessity of the well driller leaving the rig and looking over the country for new locations, and in fact, for the general supervision of the well drilling as well as the other water developments. He is to report to

WELL DRILLING ON THE NAVAJO AND HOPI RESERVATIONS.

The well drilling on those reservations is for the development of domestic and stock water, with the exception of Well Rig No. 1 which is exploring for artesian water for the purpose of irrigation. All other wells are too small to furnish water for irrigation.

The following is the record for the wells on the Navajo and Hopi.

Rig	Fiscal Year	Holes	Good Wells Ft.Drilled	Holes	Dry Wells Bad Water	Total
1	1912-1913	1	1308			1308
	1914-15-16	5	3452	1	80	3532
		6	4760	1	80	4840

Well No. 113 or better known as the Deep Well is 1150 ft.deep and has an artesian flow of 6500 gallons per hour. Well No.114 is 210 ft. deep and has a flow of 500 gallons per hour.

2	1912	8	708	18	874	1582
	1913	6	533	15	1182	1715
	1915	1	103	1	60	163
		15	1344	34	2116	3460
3	1912	12	985	1	90	1085
	1913	7	516	5	637	1153
	1914	2	263	7	860	1123
	1915	5	718	10	1377	2095
	1916	3	438	3	704	1142
		29	2920	26	3658	6578
4	1912	3	475	1	144	619
	1913	10	346	2	170	516
	1914	6	205	5	160	365
	1915	5	431	8	655	1086
	1916	11	914	4	412	1326
		35	2371	20	1541	3912
Grand Total		85	11395	81	7395	18790

me at frequent intervals just what is going on enabling me to keep in closer touch.

As the well drillers, as a usual thing, are not educated men, it has been difficult to get them to make reports in such a shape that a full understanding can be had of what is being done, and, too, difficulty has been experienced in getting the cost of the various parts of the work. To facilitate matters blanks have been prepared on the mimeograph, copies of which will be found at the end of this report.

The following plans are in accordance with the instructions given Foreman Womack for the movements of the well rigs in the immediate future. (see map).

Rig No. 1 will be altered to lighten it to facilitate moving and the handling of light tools. The rig is now about ten miles north and west of well No. 113(a little north and east of Tohatchi), and will work north, down the Choiska Valley where there is a greatdearth of water with a good chance of finding it at shallow depths (and as has been demonstrated, artesian water at greater depth). There is a large population in this Valley . Working down this Valley will keep the wells in a line approximately following the east boundary of the Treaty Reservation. As this Valley approaches the San Juan there is a wide slope of

country both east and west to be developed, and another rig could be used to advantage here.

Rig No. 3 is now north of the Black Mountain (Nilh-le-jini Mesa), about eight miles north of well No. 354 and 11 miles north of Rough Rock Springs (Stage's Store). The rig will work over the large area west of the Treaty Reservation, north of Black Mountain as far west as Kayenta. Its further movements have not been definitely planned.

Well rig No. 4 is now near Round Rock, north of well No. 440 eight or ten miles. There are about two more wells to put down in this vicinity. The country north of this is rough with small chances for water by drilling, and moreover is fairly well watered by springs, hence will not try to work it until more promising and more important areas are covered.

The rig will move from this vicinity to the valley between Salahkai Mesa and Black Mountain-- between wells No. 347 and No. 205-- where four or five wells should be developed as there is much grass and little water. After completing this it will be moved to the west of the Hopi Reservation covering the country along the Denebito Wash, as far north as the Moonopi Wash and Blue Canyon, and then on west of Cedar Ridge.

The plans outlined are tentative, subject to change as the country is further explored or other needs develop.

WELL MAINTENANCE.

Under this heading we have the regular maintenance work of the constructed wells which consist in making frequent trips to each of the wells once a month or oftener for the purpose of keeping the windmills oiled and attending to all minor repairs that may be necessary to windmills, pumps, troughs and tanks. This maintenance work is absolutely necessary for any country and doubly so where the wind carries a great deal of sand and dust and the atmosphere is so extremely dry. Unless the windmills are regularly oiled, the bearings soon cut out. With the wells developed in fine material we find in this country, the pump leather lasts but a short time, in some wells, only a few weeks; then the pump rod must be pulled and new leathers inserted. At other times, wells that are pumping considerable sand are frequently badly damaged. During periods of calm when the windmills do not run, the sand settles on top of the valves in sufficient quantities to weigh it down or even to fill the cylinder and when the windmill begins to turn again, the valve is immovable, result-

ing in the breaking of the pump rods or the wrecking of the cylinder connection.

During the fiscal year 1915, from lack of funds, some of this maintenance work was neglected for a considerable time and a number of the wells got into such a condition that the ordinary maintenance was insufficient and it was necessary to send a drilling rig out to overhaul the well, either from an accumulation of sand in the wells or because the original well was finished up in a pocket that contained water, giving the idea that there was an amply supply for the well, but after pumping a while, this pocket would become exhausted and it would then be necessary to drill the well deeper to secure more water.

Well Rig No. 4 put in considerable time during the early part of the year in this work, and in addition, two outfits were patrolling the wells a considerable portion of the time, one in the Hopi and one in the Navajo country.

Spring Development.

During the time that the maintenance crews were not busy with the wells they put in some time developing springs and in general investigation work concerning water conditions in the reservation.

upon which to base future work.

To a person living in a country where there is sufficient water, the value of a very little water here is not understood. In this desert country, a trickle of a few gallons an hour must often be sufficient for a number of families.

In the country lying north of Pease Canyon and south of the Black Mesa, there is a population of from 40 to 50 families, each with their flocks of sheep and some horses. There is but half a dozen springs in this whole District of at least thirty miles by twenty.

The most important spring is known as the La Mas-a-mas spring. This spring has been measured and found to flow only 12 gallons an hour.

After thorough examination of this country it was decided that it was impossible to develop additional water in these springs, the only thing possible being to conserve the small supply by leading it into small reservoirs or tanks which should be constructed of concrete or stone laid in cement so that none of the precious fluid escapes. None of the other springs furnish as much water as this one does.

This is the section of the country referred to as the next place that well rig No. 4 would attempt to drill for water.

A number of springs have been developed in the Hopi country during the year and the following description of a few of them will give an idea of the class of work being done. There is also included in this report, drawings of the method of development of some 8 or 10 springs. Some of these were developed last year and some previous to this, but all of the springs are developed in the same manner.

Honana Spring is about 17 miles south of Oraibi and is located in a sand hill. This spring was used by the Indians to water a considerable number of sheep.

The sand was drifting over the spring and it had almost become lost. To develop it, it was necessary to excavate in this sand back to solid formation. The water did not come out at one point, but was a seep along the edge of the solid rock for some distance. A collection box (so called for want of better name) was put where the trickling water could be collected together, made of stone and cement with a tight cover. A pipe line was laid from this box for a distance of some 200 feet until it was clear of the sand dunes, and was delivered to a stone tank or reservoir 6 X 6 feet which is entirely covered to keep out the drifting sands. The overflow of this tank is con-

ducted to 24 feet of troughs for the use of the stock. There is another pipe from this reservoir tank, drawing the water from the bottom, which leads for a distance of about 50 feet; equipped with a gate valve, so that domestic water can be drawn from the spring to the amount of a few hundred gallons without waiting for the spring slowly to fill the bucket. As the Indians haul water from this spring to considerable distance to their camps, it enables them to fill their barrels without delay. The flow of this spring is 18 gallons per hour.

<u>CORNER SPRING</u> is located about one-half miles from Honana Spring and was a small seep half way up the side of a stony mesa. The Indians had atte pted a little development work here, by digging out a reservoir in a sandy formation but the water was practically all lost by seepage through the stone and sand. The development work on this spring was as follows:

By excavation, this spring was followed back up the hill to the point where it came out of the solid rock. There the water was concentrated into a small cemented box and the water was then piped down the hill for a distance of 100 feet to a level place where 24 feet of troughs were set. As the soil at this point was beyond the sand and would hold water, any overflow of

the troughs can be conserved in an earth reservoir. The flow of this spring is 16 gallons an hour.

It is not necessary perhaps to give detailed description of the development of the other springs, but with the above descriptions together with the drawings, a very good idea will be had of the efforts being made to develop and conserve a very small amount of water in this reservation.

Foreman Womack, when not otherwise engaged is continually making trips to the various springs that the Indians refer to him to make examination and to determine what development can or should be done. He makes a record of his findings and reports the same to this office. As an example, the following will suffice:

A trip was made to the north and east side of the Black Mountains and a number of springs were visited and reported upon.

CHIL-CHI-BI-TO. is located on the north side of the Mountains near Bradley's Trading store and is formed by water seeping out of soft sand stone for a distance of several hundred feet. This spring is located in the head of a rocky Canyon and as flood waters from local storms come down, any development work that was put in would probably be carried away, without expending an

unreasonable sum of money. The Indians utilize this water by putting a series of small earthen dams across the Canyon impounding the water and when the floods come and wash out their dams, they are easily replaced. Permanent dams would be filled with silt by the first flood. It is thought that nothing can be done with this spring to better conditions. The estimate flow is 25 gallons an hour.

LU-KAS-A-KAS is located on the foot hills of the Black Mountains three miles east of Coyote spring, and is at the head of a red sand stone gulch, and is as well developed as can be done for it would take a long line of pipe and a heavy expense to protect this pipe from floods, as the bottom of the gulch is of solid stone. The Indians have a small reservoir cut out of the solid rock and its capacity can be increased by a small earthen dam. There is no difficulty in the stock getting at this point and it is thought that any money available for development work can be spent where it will do much more good.

THE CHIZE spring is located on the east side of Black Mountains near the Rough Rock Trading store. The spring is simply a coop in the rock extending for 40 or 50 feet and the water is collected below in an earthen reservoir.

At present a great deal of stock waters here but the wells being drilled in the valley below will reduce the necessity of the use of this spring and it is not thought advisable to attempt to do anything at present.

SON A GOM spring is located 2 miles north of Chil-Chi-bi-to and is very good water. This spring can be developed and it is possible that the flow may be increased or rather a portion of the flow which is now lost by seepage can be conserved. Its present flow is estimated at 15 gallons an hour.

Data is being collected concerning the entire reservation as rapidly as possible that plans for future work may be made and the work conducted as rapidly as possible.

WELL DRILLING IN THE PUEBLOS.

Rig No. 5 has been at work in the Pueblo grant of Isleta during the entire year developing a water supply at that village for domestic purposes and in the surrounding country for both domestic and stock purposes. A great deal of difficulty has been experienced in this work as with the exception of one or two wells all of the holes put down have been in a country that has been at some time covered with a lava flow, and the drilling has

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DEPARTMENT OF THE INTERIOR
UNITED STATES INDIAN (IRRIGATION) SERVICE

PROJECT MONTHLY SUMMARY COST REPORT

Acoma Project ~~Month of~~ Fiscal Year, 1916

CODE NO.	PRINCIPAL FEATURE	COST: Current Month ~~Fiscal Year~~	COST: Total to date
	Expended by J.B.Harper,on dam,1905		169.59
	Topographic Surveys 1910 - 1911		642.23
	Repairs to Flume,1913		34.36
	Preliminary Surveys for Reservoir Sites		77.98
	Headquarters Pro Rata 1916	64.67	64.67
	Flume	930.25	930.25
	TOTAL,	994.92	1919.08
	Indians employed	185.00	
	Others employed	403.00	
	Indians employed by contractor		
	TOTAL		

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