A HISTORY OF NEW MEXICO STATE UNIVERSITY'S WELL DEVELOPMENT AND GROUND WATER USE

by

Calvin Lashway
Principal Investigator
New Mexico Water Resources Research Institute

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A number of people deserve credit in helping me with this work. The person who deserves the most credit is Julia Tuten Lee. Ms. Lee and I did the essential research on this topic during the summer of 1986. In 6 weeks we identified most of the wells discussed in this work, and wrote the report "Historical Survey of New Mexico State University Water Wells, 1888-1986." That report is the foundation of this current work. I would also like to thank the staff of the New Mexico Water Resources Research Institute for their help. Specifically I wish to thank Linda Harris for her editorial comments and stories, Janice Apodaca for her patience as I constantly caused her computer to malfunction, and Lucy Gaines for teaching me the fine art of making popcorn. The Las Cruces office of the U.S. Geological Survey was also of great assistance, especially Bob Myers and his filing cabinet. Finally, I would like to thank Bruce and Tina Carson for putting up with me.

ABSTRACT

During the past one hundred years, New Mexico State University (NMSU) students, faculty and staff, have had an increasing demand for water to meet their domestic, educational and research needs. The Experiment Station, an integral part of NMSU, has also required water to fulfill its agricultural research responsibilities to the people of New Mexico. Because of the Rio Grande's uncertain flow, and NMSU's continual growth, the river has never been able to meet these educational and research needs. The university found the only way it could meet these needs in a semiarid climate was to drill wells for access to ground water. The drilling of these wells is a vital part of the university's history. Without access to underground water NMSU would not exist as it is known today, an institution providing education in agriculture, engineering, and the humanities to 14,000 students.

This study will examine how the university has used its surface and ground water resources during the past one hundred years. Emphasis will be placed upon the development of wells for domestic, irrigation and economic purposes. The study is confined to NMSU's main campus, as well as other university properties located in the Mesilla Valley, but which are not a part of the main campus.

Key words: ground water, surface water, domestic water, irrigation water, wells

JUSTIFICATION OF WORK PERFORMED

A history of the university's use and development of its water resources, especially ground water, is important in light of the claims of El Paso, Texas to ground water in the Mesilla Valley. This report can help the university in establishing and defending its water rights in the Mesilla Valley by documenting its water development history. In addition, the report can assist the university in planning for future water use by showing who had a major influence on water development at NMSU, how water was used in the past, and why the university's water system developed in the way it did.

METHODOLOGY

This report is based on primary and secondary documents, with primary documents used where possible. In chapters one and two, a number of secondary documents, such as university and Experiment Station bulletins and annual reports, and reports prepared by the United States Geological Survey (USGS), were used heavily in piecing together the history of NMSU's water development during its first 50 years. The information in these documents was rigorously compared to, and judged in the light of available primary documents, such as the records of Hiram Hadley, minutes of regents meetings, and Sanborn maps.

Because Physical Plant Department records from 1888 to 1930 were not found, it appears that these records no longer exist. In addition, only a few documents dating from the 1930s and early 1940s were found.

Sources for chapter three (1946 - 1960) came primarily from Physical Plant documents located in the university archives, and records still in their possession. These documents dealt mainly with the 1930s through the 1980s. Records still in the possession of the Physical Plant, and the records of the Las Cruces State Engineer Office were primarily used in chapter four (1960 - 1987). The Physical Plant allowed complete access to its files.

The problem with using Physical Plant documents to trace the well history is that over the years the university has changed its well numbering system, which often resulted in two or more wells being documented under the same number. This inconsistency has caused confusion, particularly when individual documents use different well reference systems to refer to the same well. However, a USGS report published in the 1950s has helped decipher which primary document referred to which well.

INTRODUCTION

Many factors were important in the historical evolution of New Mexico State University (NMSU), one of which was ground water development. The availability of water is important to NMSU because of its location in the semiarid southwest. The university is situated in the green and fertile Mesilla Valley where the Rio Grande is the primary source of water for the many farms of this southern New Mexico agricultural area. The valley is an ideal location for the state's agricultural land grant university. When NMSU was established as the state's land grant institution in 1889, it was located three miles south of Las Cruces and one-half mile east of Mesilla Park. The original campus consisted of about 120 acres of valley farm land, and another 100 acres of desert foothills. It is in these foothills east of the valley where most of the university's present buildings are located. In the one hundred years since its founding, the university's campus has grown to 5,800 acres. The city of Las Cruces has expanded to the university's boundary, and Mesilla Park borders the campus on its western edge.

Over the years water has been used by students, faculty and staff, and for dormitories, classrooms, and research. The Experiment Station, an integral part of NMSU, also required water to fulfill its agricultural research responsibilities to the people of New Mexico. However, because of the Rio Grande's erratic flow, and NMSU's continual growth, the river has never been able to meet these educational and research needs. The university found the only way it could fulfill these needs in a semiarid climate was to drill wells for access to ground water. The drilling of these wells is a vital part of the university's history. Without access to underground water NMSU would not exist as we know it today, an institution providing education in agriculture, engineering, and the humanities to 14,000 students.

This study will examine how NMSU has used its surface and ground water resources, during the past one hundred years. Emphasis will be placed upon the development of wells for domestic, irrigation and economic purposes. The study is confined to NMSU's main campus, as well as other university properties located in the Mesilla Valley. A complete list of university wells is found in table 1, and on location maps, figures 1, 2, and 3.

TABLE-1 NMSU WELLS

LOCATION NUMBER*	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
1.	Agricultural College Well	College Farm, Agricultural Building, old pump near ditch.	1890	1894 Last known reference to well
2.	Old College Windmill Well	Behind McFie Hall	1890	1896
3.	Pulsometer Plant	Southwest corner of Espina St. and College Dr.	1892	1902 Appears to have been taken out of service when Irrigation Department Well No. 1 drilled
4.	College Windmill Well, New	Behind McFie Hall	1896	1909 Well is no longer in use by this date
5.	College Shops Well	College Machine Shop (Thomas-Brown Hall)	1898	1908 Last known reference to well
6.	College Farm, New Windmill Well	Northwest corner of the experiment stations old corral	1899	1927 Is gone by this date

* Numbers correspond to well locations on maps in figures 1, 2, 3.

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
7.	Selden	College Ranch	1900? Came into NMSU possession when College Ranch acquired in 1927	
8.	Cleofs	College Ranch	1900? Came into NMSU possession when College Ranch acquired in 1927	
9.	Irrigation Department Well No. 1	150 ft. east of the Seed House	1902	1906 Last known reference to well
10.	Low Lift Pumping Plant, or Irrigation Department Well No. 2, or Model Pumping Plant	Near Seed House	1904	1935
11.	Horticulture Well No. 1	Horticulture Farm	1905	Unsure of date, replaced by Horticulture Well No. 2

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
12.	Horticulture Well No. 2	Horticulture Farm	Well was drilled some time between 1905 and 1935	1935
13.	Headquarters	College Ranch	1905? Came into possession of NMSU when College Ranch acquired in 1927	
14.	Mesa Pumping Plant	West of Milton Hall	1908	1949
15.	Lytten	College Ranch	1909? Came into possession of NMSU when College Ranch acquired by NMSU	
16.	A & M Camp Well or Camp Well #1	College Ranch	1930	1980
17.	NMSU Well No. 1A	Northwest corner of parking lot north of heating and cooling plant	1930-1932 exact date unknown	1953 Last known reference
18.	Horticulture Well No. 3	Horticulture Farm	1935	1947

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
19.	Buckle Bar	College Ranch	1935	
20.	Irrigation Department Well No. 3	Seed House	1935	
21.	Oaks Well	College Ranch	1936	
22.	NMSU Well No. 2A	Northwest corner of parking lot north of heating and cooling plant	1941	1953 Last known reference
23.	LRG-1857	Horse Farm	Pre 1942 Exact date unknown	
24.	18-in. Irrigation Well	South side of parking lot north of heating and cooling plant	1946	1948
25.	NMSU Well No. 1	Southwest corner of parking lot north of heating and cooling plant	1947	
26.	LRG-34	Horse Farm	1947	The land this well is on was latter sold. The well no longer belongs to NMSU
27.	Horticulture Well No. 4	Horticulture Farm	1947	

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
28.	22-in. Irrigation Well	South of building located on the north side of the parking lot north of the heating and cooling plant	1948	1953 Last known reference
29.	NMSU Well No. 5	East of Agriculture Building on Espina St.	1951	1985
30.	LRG-33	Horticulture Farm	1951	1984
31.	NMSU Well No. 3	South of Garcia Hall	1952	1982
32.	NMSU Well No. 2	Southeast corner of parking lot north of heating and cooling plant	1953	1964
33.	NMSU Well No. 6	Wells St. and Espina St., near Dona Ana Branch College	1957	

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
34.	LRG-3929	Plant Science Research Center	1950s Exact date unknown. Well did not become property of NMSU until 1969	
35.	LRG-3929-s	Plant Science Research Center	1950s Exact date unknown. Well did not become property of NMSU until 1969	
36.	NMSU Well No. 4	Maintenance Building NMSU golf course	1961	1973 Had been taken out of service by this date
37.	NMSU Well No. 8	North side of Physical Plant Department Warehouse	1966	1983
38.	LRG-3926	Plant Science Research Center	Exact date well was drilled is unknown. Well came into the possession of NMSU in 1969	
39.	LRG-3927	Plant Science Research Center	Exact date well was drilled is unknown. Well came into the possession of NMSU in 1969	

TABLE-1 NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
40.	New Headquarters Well	College Ranch	1970	
41.	LRG-3929-s-3	Plant Science Research Center	1971	
42.	LRG-3929-s-2	Plant Science Research Center	1972	
43.	LRG-3928	Plant Science Research Center	1973	
44.	NMSU Well No. 9	Williams Ave. between Sweet Ave and Stanley Dr.	1975	
45.	NMSU Well No. 10	South of Espina St. at I-10 access road	1979	
46.	LRG-1860	Horse Farm	1979	
47.	NMSU No. PG-1	NMSU	1979	
48.	NMSU No. PG-2	NMSU	1979	
49.	NMSU Well No. 11	El Paseo Rd. near College Dr.	1980	
50.	Camp Well No. 2	College Ranch	1980	
51.	NMSU PG-3	NMSU	1981	

TABLE-1NMSU WELLS

LOCATION NUMBER	NAME	LOCATION	DATE	WELL TAKEN OUT OF SERVICE
52.	NMSU Well No. 12	Behind Knox Hall	1982	
53.	NMSU Well No. 13	Behind Knox Hall	1982	
54.	LRG-520-Inj.	NMSU	1982	
55.	LRG-33	Horticulture Farm	1984	
56.	NMSU Well No. 14	College Dr. and El Paseo Rd.	1985	
57.	NMSU No. PG-4	NMSU	1986	
58.	Mayfield	College Ranch	Unknown	
59.	Wagner	College Ranch	Unknown	

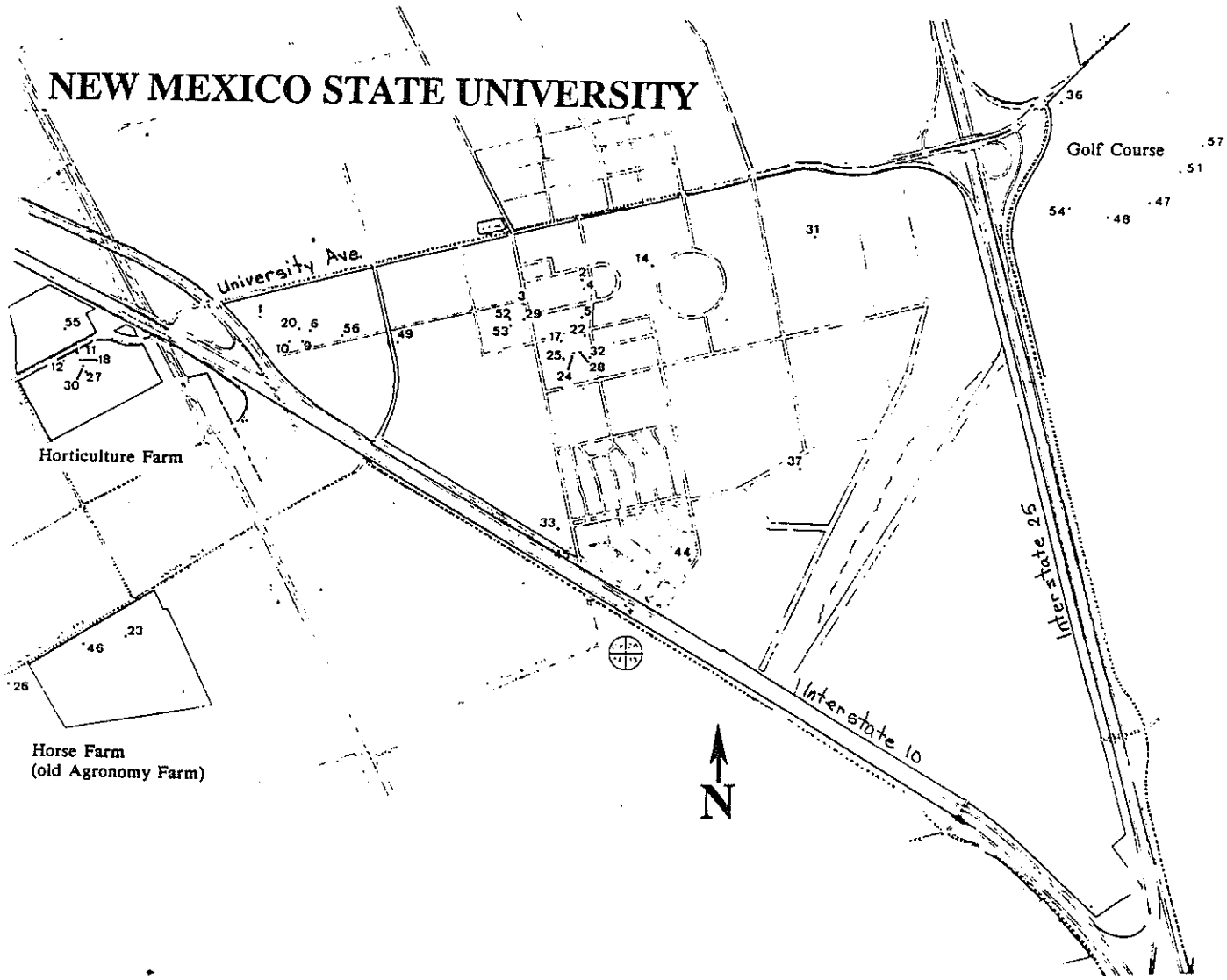


Figure 1. New Mexico State University. The well identification numbers on this figure are keyed to table 1. These numbers do not correspond to well numbers in the text.

COLLEGE RANCH

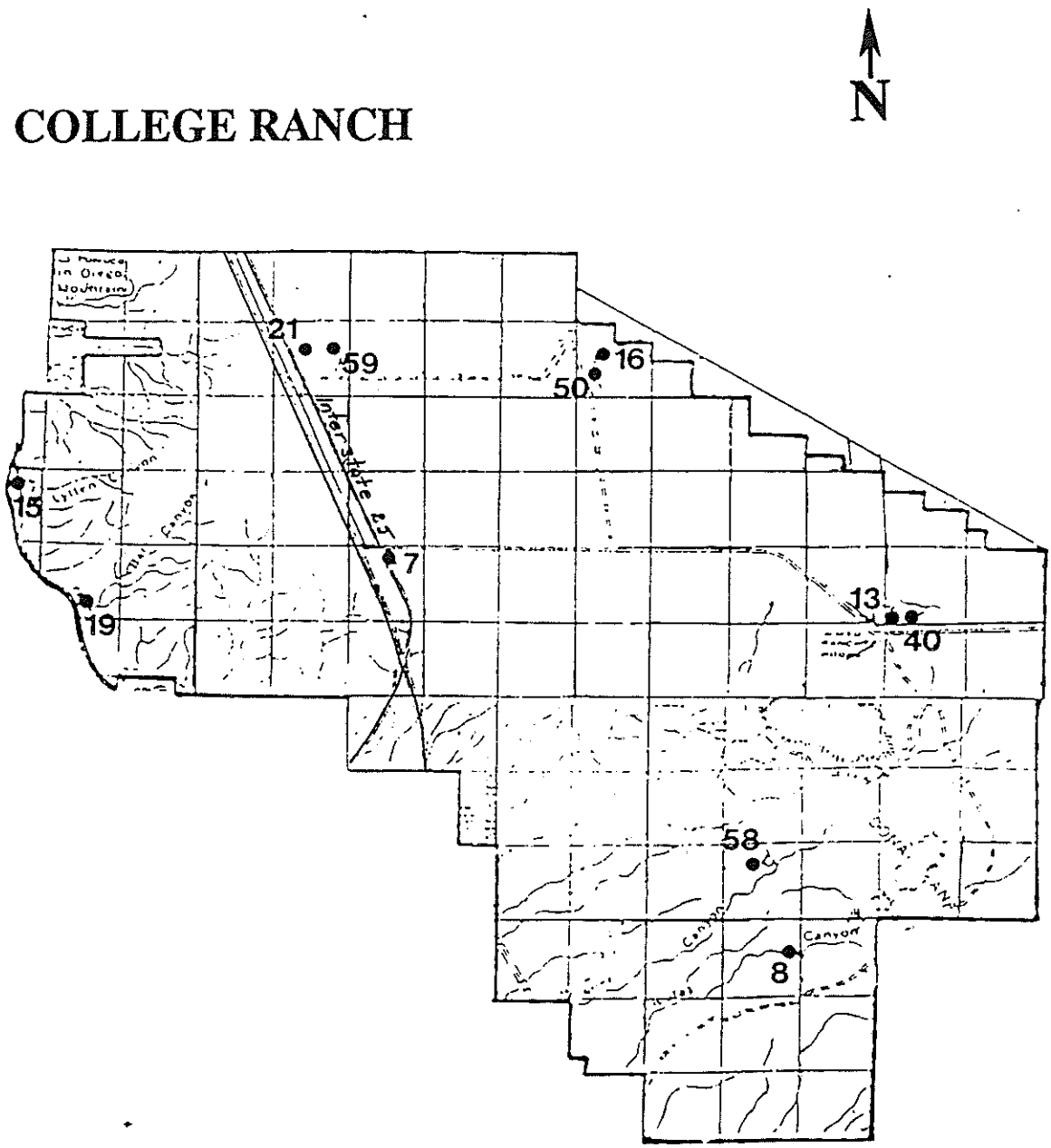


Figure 2. College Ranch. The well identification numbers on this figure are keyed to table 1. These numbers do not correspond to well numbers in the text.

PLANT SCIENCE RESEARCH CENTER

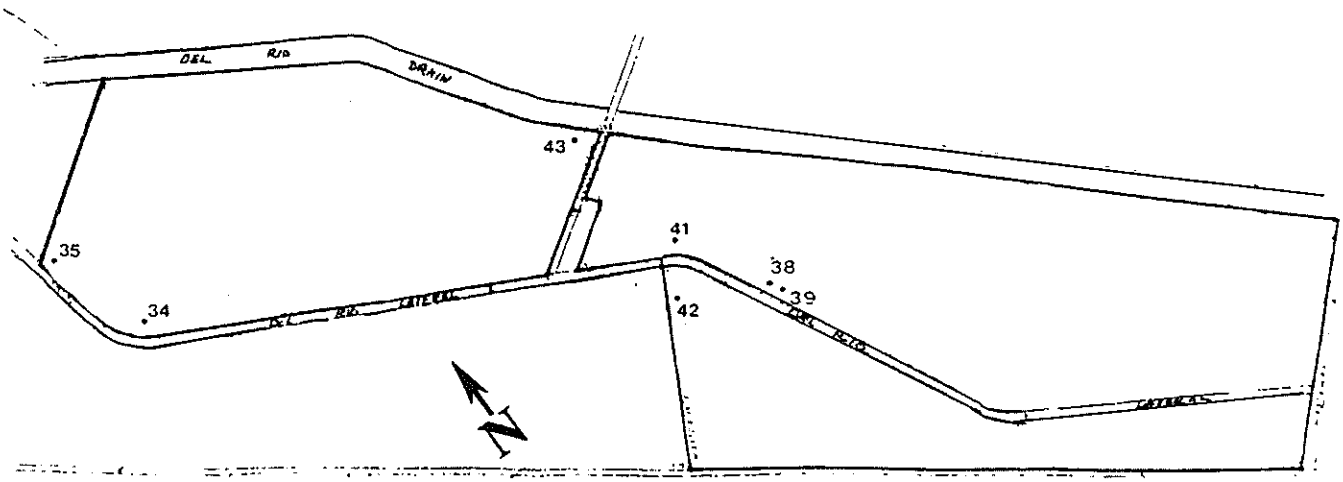


Figure 3. Plant Science Research Center. The well identification numbers on this figure are keyed to table 1. These numbers do not correspond to well numbers in the text.

CHAPTER ONE
1888 - 1907

Introduction

Water has been a crucial factor in the growth and development of New Mexico State University (NMSU) since its founding in 1888. The lack of a reliable source of water impeded its growth during its first 20 years.

University officials made repeated comments on the need for a reliable water system. The 11 wells drilled during these 20 years either did not pump enough water, or the water pumped was of such poor quality that it was unusable. A lack of funding prevented the university from improving its water system. Not until the turn of the century was an adequate alternative source of irrigation water developed. Financial as well as quality and quantity problems with the domestic water system were not solved until the construction of the Mesa Pumping Plant in 1908.

During this period, the campus water system failed to meet the demands required of it. Water used for irrigating the Agricultural Experiment Station farm primarily came from the Rio Grande, by way of the Las Cruces acequia. Domestic water for the campus administration building, classrooms, and dormitories was supplied from ground water pumped by two windmill wells located behind the administration building.

College Needs Supplemental Water Wells

In April 1889, NMSU acquired land for a campus and Experiment Station. The Agricultural College, as NMSU was first known, and Experiment Station were officially organized in November 1889. Throughout 1890 work progressed on the construction of a college classroom and administration building, McFie Hall. Work also began on the Experiment Station, where land was leveled and plowed, and crops were planted.

Classes began on January 21, 1890, but until the completion of McFie Hall, classes were held in Las Cruces. Not until February 1891 was the college able to move from its temporary classrooms in Las Cruces to the Agricultural College campus.

During construction it became immediately evident that water from the Rio Grande would not sufficiently meet the needs of the college and Experiment Station. In 1890 the college began developing alternative sources of water. In 1890, Hiram Hadley, college president and director of the Experiment Station (figure 4), wrote of the need for supplemental ground water in the Experiment Station's first bulletin.

> As [we are] depend[ed] largely on irrigation, a farm in reasonably good condition requires an immense amount of labor to prepare it for successful

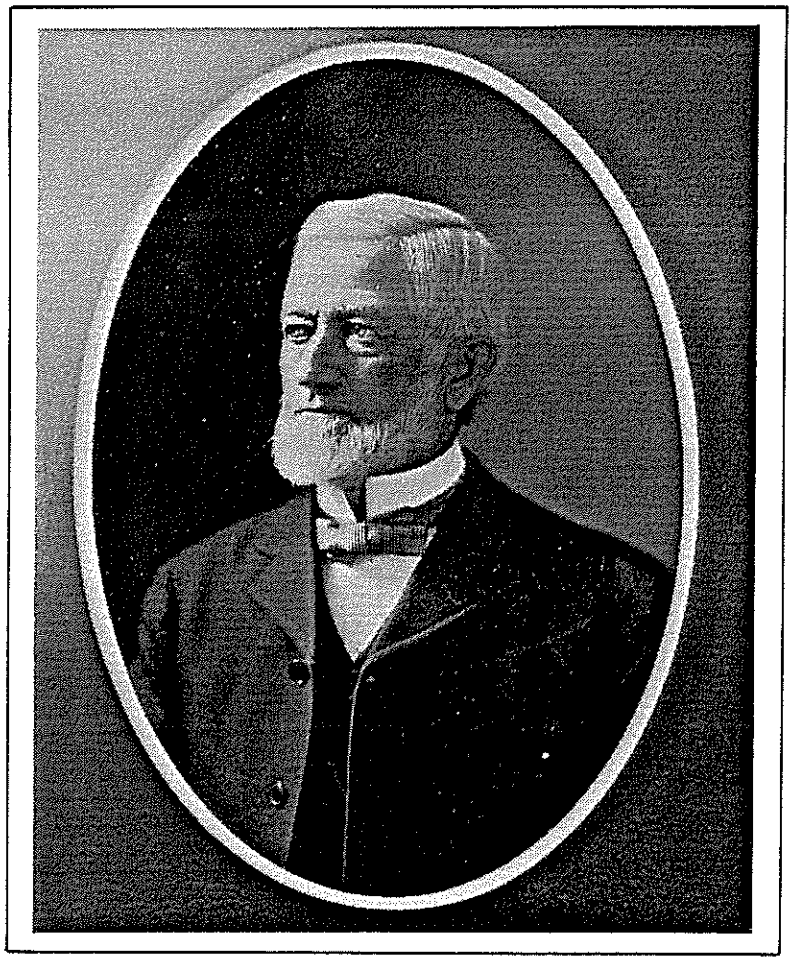


Figure 4. Hiram Hadley, NMSU President 1988-1894.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

experimentation. A portion of the farm is mesa land lying above irrigation level, and it was covered with the native mesquite and tornillo. . . . Water can be had at a depth of fifty feet and we are now sinking wells and putting in hoisting apparatus hoping soon to show, on a small scale to be sure, the superior quality of the soil.[1]

In the Experiment Station's second bulletin, published in 1890, Hadley added more detail on the need for another water source.

> In this arid climate where the rainfall averages no more than seven inches, irrigation is absolutely necessary in fall plantings, and as the river supply is not always certain, measures are being taken to build artificial reservoirs to be filled from wells, for the purpose of facilitating the planting of as many trees and crops in the fall as possible.[2]

Agricultural College Well

Hadley's first bulletin indicated that a well or wells were drilled at the Experiment Station in 1890. The well or wells probably used a windmill to pump the water. In 1895, the university's annual report referenced the fact that windmill water was "unsatisfactory for Station work."[3] Arthur Goss, in Principles of Water Analysis, refers to a well, which may have been the college's first well, as the "College farm, Agricultural building, old pump near ditch (table 1)."[4] Willis T. Lee, in Water Resources of the Rio Grande Valley in New Mexico, refers to the same well. Lee called it the "Agricultural College" well.[5] Goss and Lee referred to the same well, although Goss's figures were recorded in parts per thousand and Lee's figures were in parts per million (ppm).[6] It appears this was an irrigation well. The last known date for the well's existence was in July 1894, when its water quality was tested.[7]

Old College Windmill Well

The Old College Windmill Well appears to have been drilled in 1890 when McFie Hall was constructed. The windmill was located behind McFie Hall on the eastern edge of the present day Horseshoe (table 1). The windmill is visible in photographs taken of the college before 1895 (figure 5). The well probably provided the college with domestic water since it was found unusable for irrigating the campus grounds.[8] Goss refers to the 45 ft. deep well as "College windmill well, old,"[9] while Lee called it the "Agricultural College, farm well."[10] Again both described the same well, since the wells they discussed had identical water sample data.[11] This well was replaced by the College Windmill Well, New, drilled in 1896.

Plans for Pulsometer Pumping Plant Approved

By October 1890, it was clear that the existing campus water system, which included irrigation water from the Las Cruces acequia, a windmill at the Experiment Station, and a windmill well located behind McFie Hall, could not produce enough water to meet the

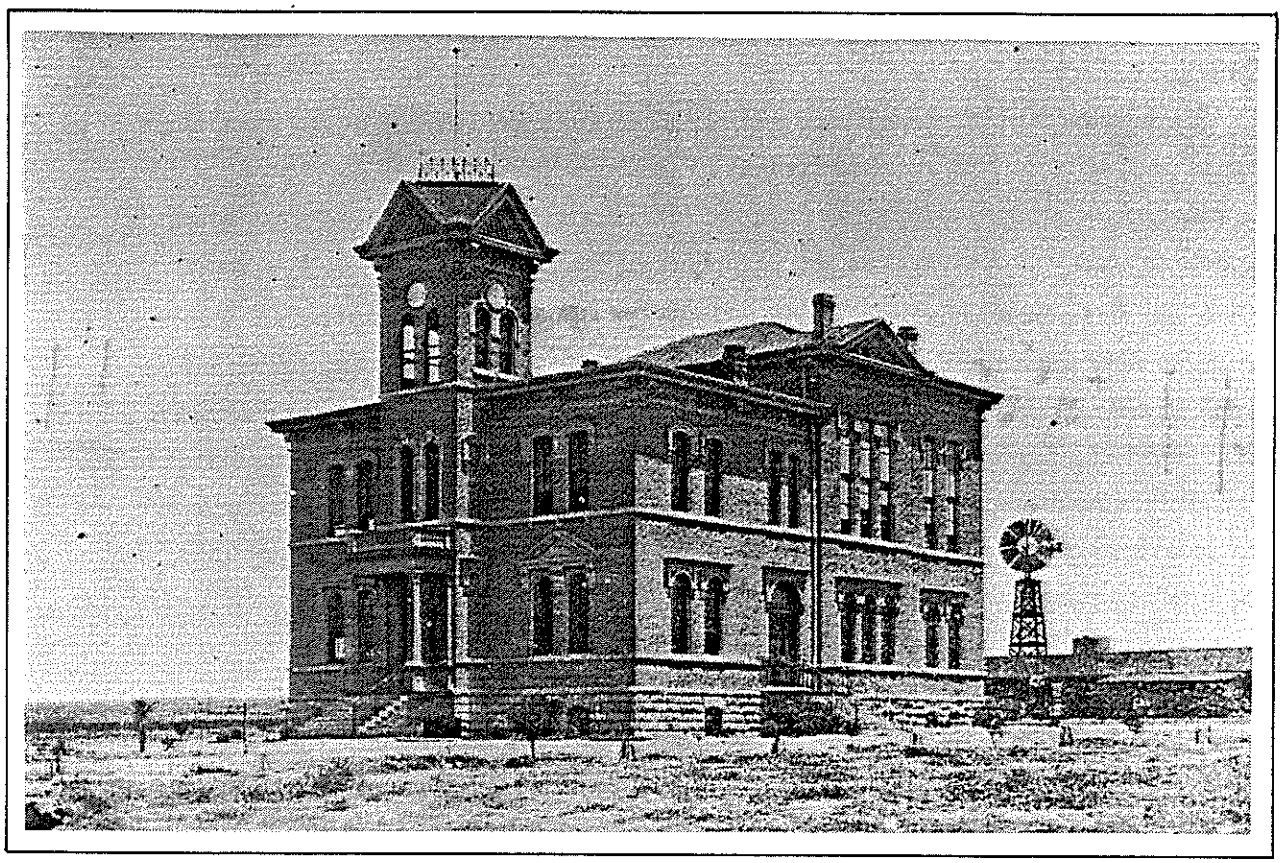


Figure 5. Old College Windmill Well. 1894.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

college's needs. Hadley, in an October 1890 letter to John R. McFie, president of the Board of Regents, expressed his concern about the water system.

> On the Experimental farm we have prepared at great expense, for the plabtin/g [planting] of some 400 varieties of fruit trees, grape vines &c. Experience has shown that if we depend wholly on the acequia, we are liable to lose much of our labor. We have also ploughed the College Campus and find a fine soil, well adapted as we think, to the growing of trees, vines &c., provided we had plenty of water. The wind-mill which we put up works finely, but it will not supply enough water to do much at irrigation.

Hadley recommended that the college develop an alternative water source by drilling wells, and using a pulsometer pump to bring the water to the surface.[12]

In an October 1890 letter to the Pulsometer Company, Hadley describes where the college wanted to place a well and pulsometer pump.

> At the foot of the mesa and a little above the level of the main body of the farm, so that we can lift the water to that height for the bottom land and lift to the same point for the mesa land and force it the remainder of the distance about 600 ft in a direct line with an additional elevation of about 25 feet.[13]

The site Hadley mentioned for the pumping plant is the southwest corner of Espina St. and College Ave. (figures 6 and 7, table 1).[14] Students and faculty moved onto the campus in February 1891 with the completion of McFie Hall, which housed classrooms and the administrative offices of the college and Experiment Station. It appears that this additional activity on campus increased the need for an alternative source of irrigation water, leading the Board of Regents to discuss this problem at their April 7, 1891, meeting.

The meeting resulted in the regents deciding that there was a need for another source of irrigation water in addition to the Rio Grande.

> On motion it was resolved to make preparation for irrigating the farm by a system of reservoir into which water shall be raised from the underflow in the valley by proper machinery so as to prevent loss if from any cause water should fail in the present irrigation ditches supplying the farm.

The board asked President Hadley and A. E. Blount, professor of horticulture and agriculture, to find the information needed to carry out this resolution.[15]

On June 8, 1891, the two reported back to the regents on Hadley's idea of using a well and pulsometer pump to supply the campus with additional water. They accepted Hadley's proposal.[16]

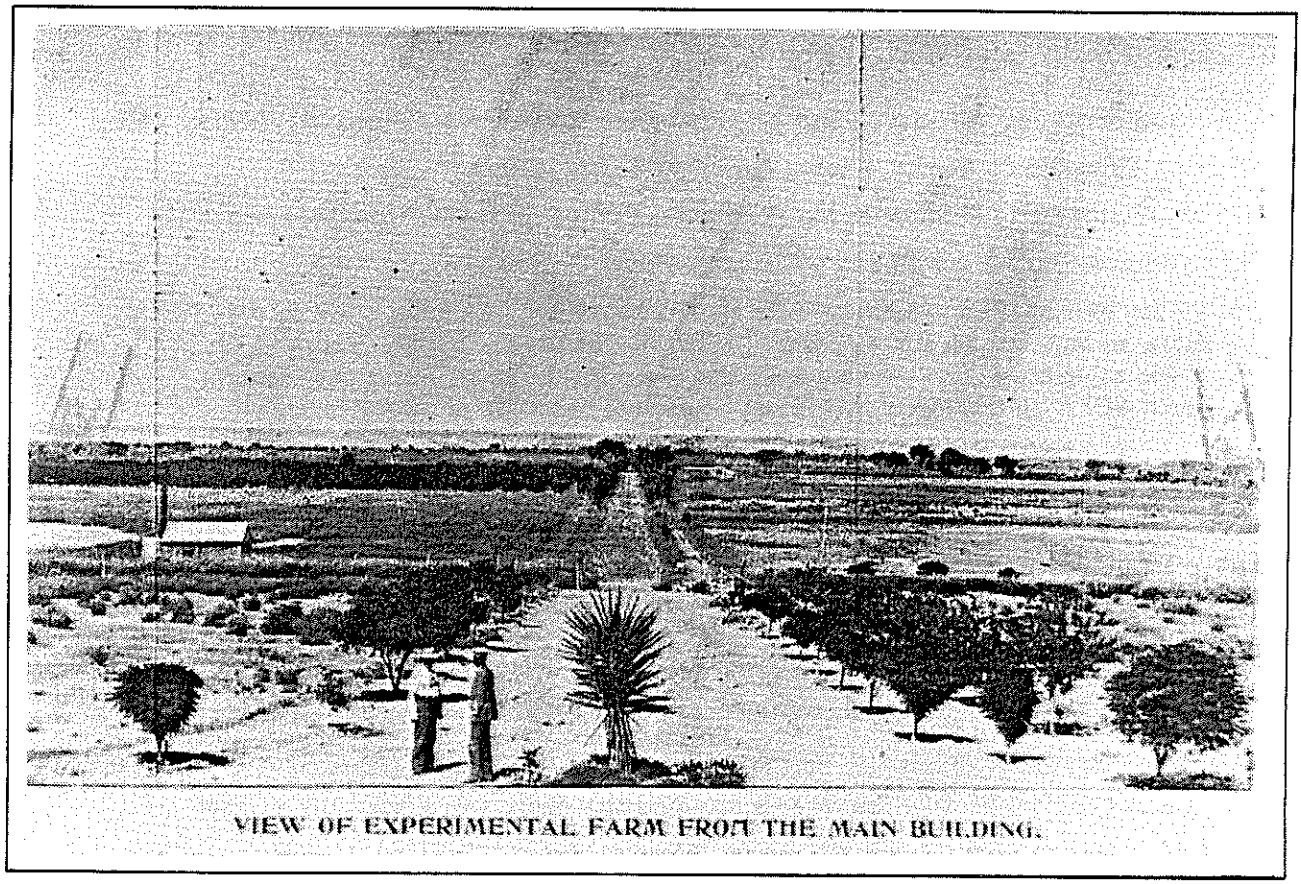
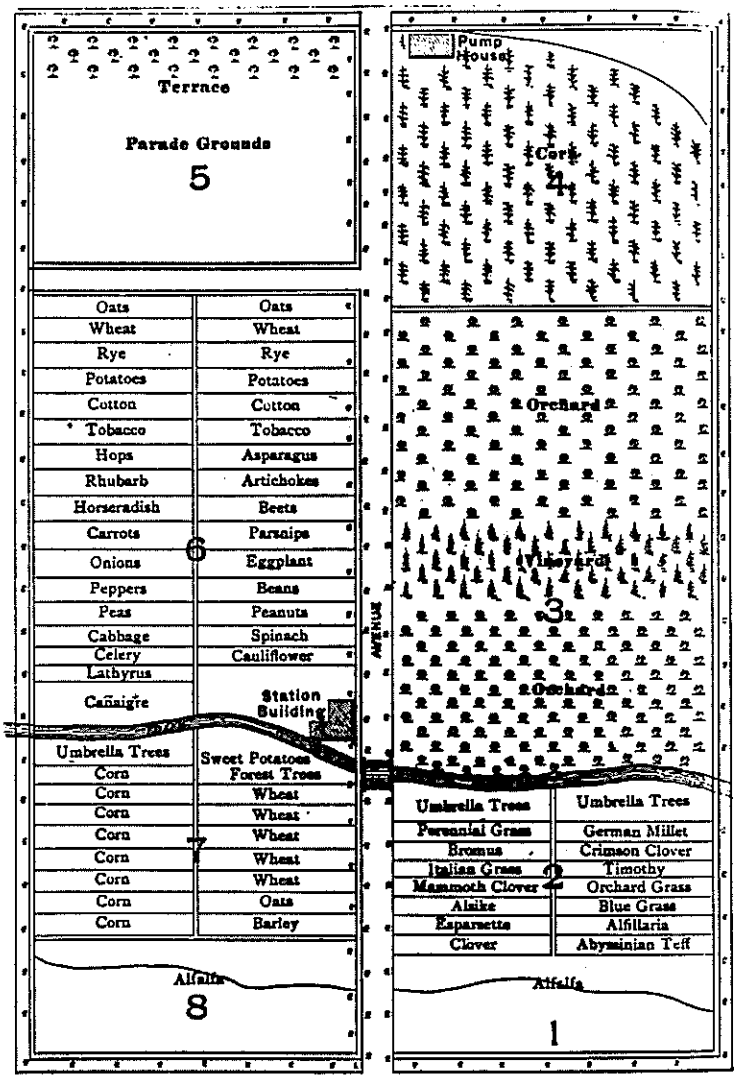


Figure 6. View of the Experiment Station farm looking west from McFie Hall, the university's first administration building. The Pulsomenter Pumping Plant is visible on the left. Circa 1895. Courtesy Hobson-Huntsinger University Archives, New Mexico State University.



PLAN OF
EXPERIMENTAL FARM.

Figure 7. Plan of the Experiment Station farm with the Pulsometer Pumping Plant and the Seed House (Experiment Station Building). Circa 1895. Courtesy Hobson-Huntsinger University Archives, New Mexico State University.

Pulsometer Pumping Plant

The college wanted a pumping plant for three reasons. First, it would supply the campus with another source of irrigation water in case the Rio Grande went dry. Second, the plant would make it possible to determine irrigation costs. The third reason was to see how campus vegetation would respond to irrigation.[17]

The specifications for the pumping plant stated that it was to consist of a No. 6 pulsometer pump (No. 8 pump was ultimately installed.), a 25 HP boiler, six 4-in. gang wells, each well to be from 26 ft. to 36 ft. deep.[18] The college had problems with this system from the beginning. First, the Pulsometer Pump was lost in route from New York City to Las Cruces. Records show that although the pump was shipped on July 31, 1891, it had not arrived by September. The Pulsometer Co. looked into the situation and found that the ship transporting the pump "is now in dry dock at Newport, News, [Rhode Island] and what cargo the pirate left in their hole is to be returned to New York." As of September 11, 1891, the pump had not been found.[19]

By January 1892, the pump arrived and had been installed, but it did not work correctly. The college hired W.E. Price of the Santa Fe Railroad to determine the problem with the system. Price concluded that various parts of the pulsometer had not been finished properly, causing the system to fail. He overhauled the pump and reground its valves to fit properly.[20] Professor Blount, who had been given responsibility for managing the pumping plant, was directed in June 1892, to make "improvements" on the pulsometer.[21] The Pulsometer Plant appears to have been replaced by Irrigation Department Well No. 1 in 1902.

Failure of Pulsometer System Results in Need for New Irrigation System

By 1892, the college water system consisted of: 1) the pulsometer plant, which provided ground water for irrigation purposes, 2) the windmill and water tower located behind McFie Hall, which provided domestic drinking water, and 3) perhaps an earlier windmill well located on the Experiment Station farm. This water system failed to meet the needs of the college and the Experiment Station.

Samuel P. McCrea, the college's second president (figure 8), discussed campus water needs in the 1895 Annual Report of the New Mexico College of Agriculture and Mechanic Arts. One of the college's pressing needs was a satisfactory water supply. "This has already been too long delayed; and money which should have been expended in securing a proper supply of water for the Experiment Station has been spent in efforts to secure a partial water supply for the Las Vegas Experiment farm..." [22]

Figure 8. Smauel P. McCrea, NMSU President 1894-1896.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

McCrea wrote that the lack of an adequate water supply hindered the college and Experiment Station's ability to carry out its responsibilities. Several times during the year important work in the Chemical Department had to be summarily suspended for lack of water. No water was available for either the Laboratory of Botany or the Laboratory of Zoology and Physiology. The amount of water furnished by the Experiment Station windmill always proved insufficient and uncertain. The water in use was increasingly alkaline, unsatisfactory for station work, as well as for almost any other purpose.[23]

McCrea set forth a plan he believed would solve the college's water problem. He urged the sinking of a large well far enough west on the farm to secure good water. He also suggested building a storage reservoir on the hill back of the college, connecting the reservoir with the well and college buildings by a pipeline, and erecting a pumping plant of sufficient capacity to furnish the necessary amount of water. "Many of the interests both of the College and Station will be greatly aided by this improvement which cannot much longer be delayed."[24]

The report points out a number of specific reasons for acquiring a better water system, and outlined the benefits of such a system.

> Not only must the laboratories be supplied with water, but water must be had for drinking by a better method than the crude one now in use [Old College Windmill Well]. Quite an amount of water will be needed in the shops and of better quality than that now used, as the boiler of the shop engine, which is badly corroded after only 3 1/2 years service, plainly shows [Water for the boiler was probably supplied by the College Shops Well]. The rate of insurance, now very high on both Station and College property, should be materially reduced when sufficient water under proper pressure to serve as fire protection is supplied. The Pulsometer plant, which has proven unsatisfactory as a means of irrigating the Campus and the farm, must be replaced by a plant which will supply the water needed for beautifying the Campus, and for irrigating the farm, especially the orchard, during the time the ditch is dry in the late summer. I believe it will prove more satisfactory in every way for the water facilities to be combined in a single system, and therefore urge that plan.

McCrea estimated that it would cost at least $6,000 to build such a system. Because the college had no funds to do this, he asked for an appropriation from the legislature.[25]

College Shops Well

Prior to 1898 there was a 4-in. well, 120 ft., deep located at the college's machine shop, also called the mechanical building. This would be in the general area of present day Thomas-Brown Hall (table 1). The well was later pulled back to 75 ft. because saline water was found at 120 ft.[26] It appears the well was associated with a boiler located in the machine shop.[27] The 1908 Sanborn map describes the well as "Well & Rumsey deep well pump to pump to new reservoir." This would be the 78,000 gal. reservoir 30 ft. high

by 15 ft. deep, 1,800 ft. east of old Hadley Hall. This well appears to still be in use in 1908, but no record exists of its use after 1908.[28]

College Windmill Well, New

In 1896 the College Windmill Well, New was drilled behind McFie Hall, 30 ft. south of the Old College Windmill Well on the eastern end of the present day Horseshoe (figure 9, table 1). Apparently, water from this 4-in. well (75 ft. deep) was used for domestic purposes.[29] With the construction of the Mesa Pumping Plant in 1908 the college no longer needed the windmill well, and by May 1909, both the windmill well and its water tank were taken down.[30]

Problems with the Water System Continue

President McCrea's 1896 annual report shows that no significant progress was made during the year to improve the water system, even with the drilling of a new windmill well.[31]

Cornelius T. Jordan succeeded McCrea as college president in 1896 (figure 10). By 1898 the school still lacked a satisfactory water system although the demand for water had increased with the construction of the science hall and the girls' dormitory. Jordan wrote that the inadequate water system had a negative impact on the college's ability to carry out its mission as a land grant institution.

> The College needs an adequate water supply for purposes of irrigation and without this it is almost impossible to do a great variety of work of great importance to the people of this Territory and of the whole arid region.[32]

College Farm, New Windmill Well

The first reference to the "College farm, new windmill well" is July 1899 (figure 11). This well was 20 ft. deep.[33] Willis T. Lee makes references to an "Agricultural College, windmill well" existing in December 1901.[34] It is probable these two wells are one and the same, and that the well replaced or supplemented an earlier windmill well located at the Experiment Station. The 1902 Sanborn map shows a water tank and well located in the northwest corner of the Experiment Station corral. The 1908, 1913 and 1921 Sanborn maps show two water tanks and a windmill in the same location.[35] By the 1927 map, the water tanks and windmill are gone.[36] The college catalog for the years 1909, 1910 and 1911 discussed the Experiment Station farm, and referred to the fact that "Windmills and tanks supply the necessary water for stock."[37] It appears that the College farm, new windmill well and the Agricultural College windmill well are one and the same, and were located in the northwest corner of the Experiment Station corral (table 1). The well provided water for the Experiment Station stock from the turn of the century until the

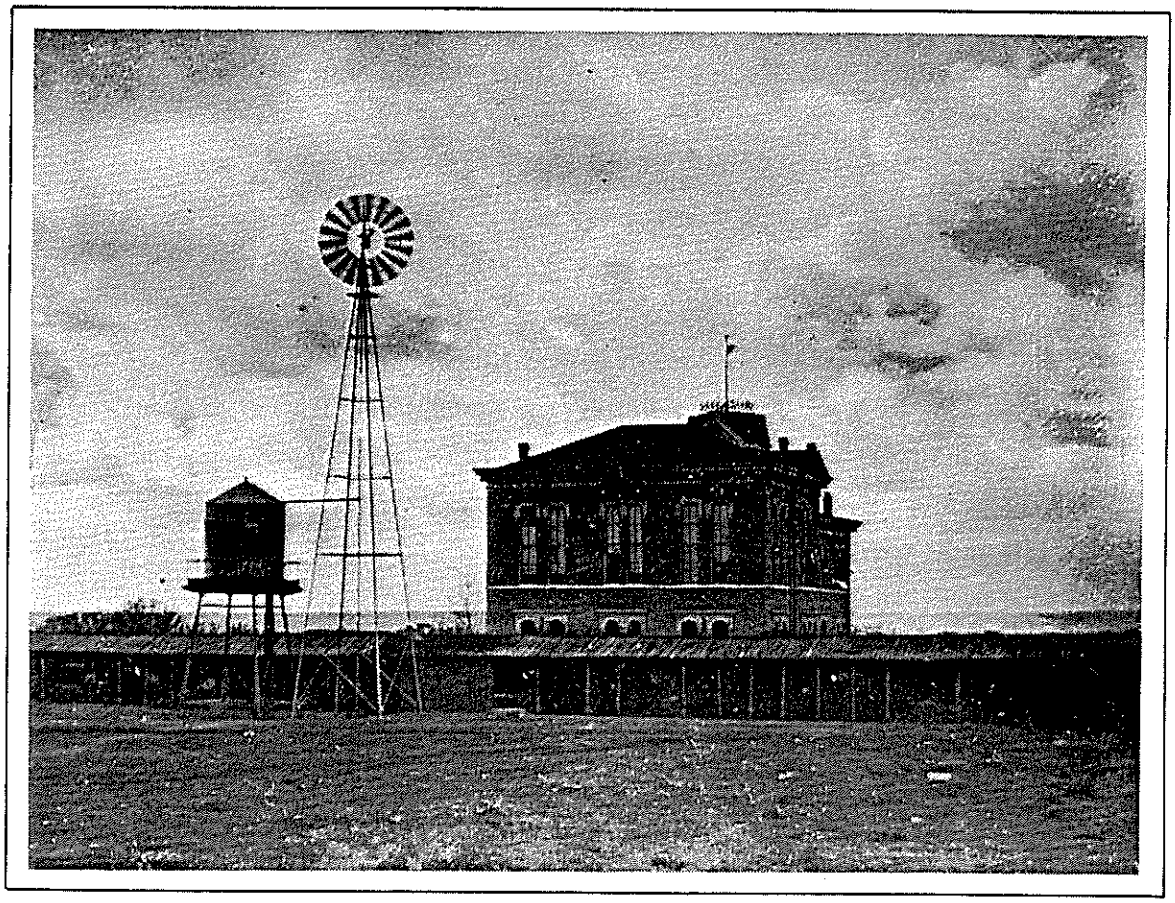


Figure 9. College Windmill Well, New, behind McFie Hall, looking west. Circa 1896.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University.

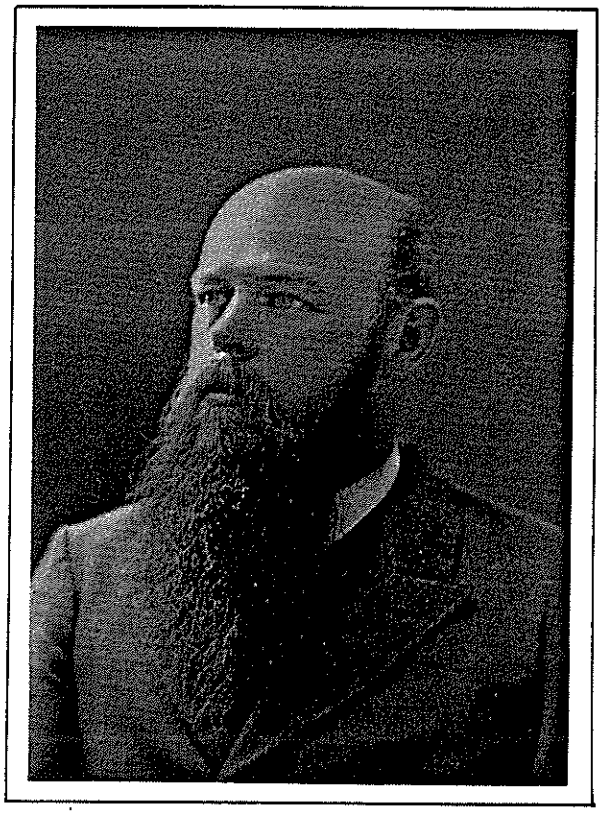


Figure 10. Cornelius T. Jordan, NMSU President 1896-1899.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

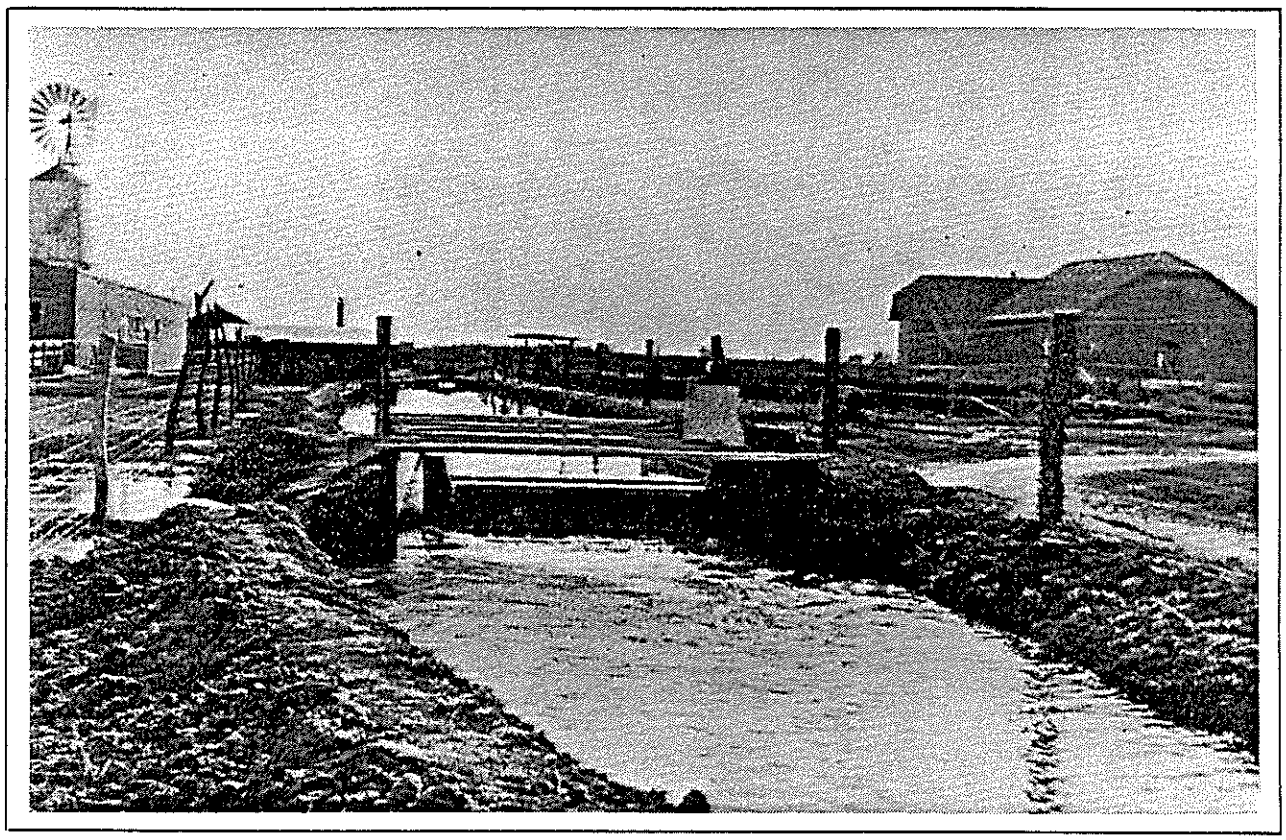


Figure 11.- At left is the College Farm, New Windmill Well and water tank. Seed House is on the right. Circa 1902.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

1920s. The records do not state why this well was taken out of service. The new windmill at the Experiment Station did not provide alternative irrigation water or improve the college's domestic water supply.

The water system did not improve under the Jordan administration. Writing in the Annual Report of 1900, Jordan's successor Frederic W. Sanders (figure 12) mentioned the continual need for an improved water system.

> We need a better water supply, and we shall also need more land for our stock. The Station farm nominally consists of about 270 acres, but only about 75 acres can be irrigated from the Rio Grande, and the expense of irrigating the upland has hitherto prevented any use of it for station purposes other than as a site for our station building [McFie Hall], which is supplied with water by a well and windmill. As soon as practicable, I would recommend that an appropriation from the territory be asked for, to enable us to improve our farm. Only $750.00 of the United States funds can be used for this purpose in any one year, and all of this is needed next year to complete our corral.[38]

Lack of an Alternative Source of Irrigation Water Harms Corps

Lack of an alternative source of irrigation water proved detrimental to the college and Experiment Station in 1900. The summer and fall of 1900 were exceptionally dry, with practically no water in the Rio Grande for irrigation from June 17 to November 28. Nearly all crops suffered because of this water shortage.[39]

The following year there was plenty of water in the Rio Grande, but the college could not get the water to the fields.

> The late summer and fall of 1901 were very drouthy because the diverting dam in the river at the head of the main acequia washed out about August 1. . . . The main acequia was left dry the remainder of the cropping season, although, during all this time, water was running to waste in the river.

The drought damaged the late cutting of the alfalfa and the fall and early winter planting of grain. The spring of 1902 was also dry, hurting the Experiment Station crops. The second cutting of alfalfa was light and the wheat yield was well below average.[40]

A New Irrigation System is Developed

In 1901 the Experiment Station began research into the development of ground water irrigation. The closing of the Experiment Station's sub-stations made money available for this research. The Territorial Legislature ordered that sub-stations in Aztec and Las Vegas be closed on May 1, 1901.[41] The 13th annual report of the Experiment Station reported that "The discontinuance of the sub-stations and the concentration of the whole energy at the main Station has tended to strengthen the work and make it more effective." One of the areas that was strengthened and became a principal line of investigation was "Pumping for Irrigation."[42]

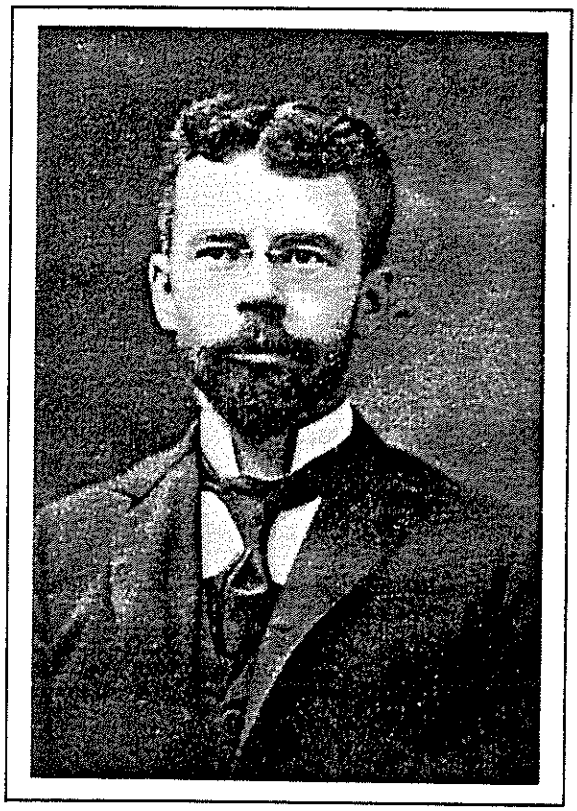


Figure 12. Frederic W. Sanders, NMSU President 1899-1901. Courtesy Hobson-Huntsinger University Archives, New Mexico State University.

The Experiment Station considered research on pumping plants for irrigation to be "the most important investigation undertaken by this Station since its organization." The station believed this research would help both the farms of the Mesilla Valley, and the entire state.

> While the work is at present only in its beginning, it seems to offer not only a practical, economical method of supplementing the water supply for the present crop producing areas, but it also bids fair to bring large areas of fertile land into cultivation in the Rio Grande Valley, and numerous other valleys of the Territory where water for irrigation is scarce.[43]

Francis Lester, one of the first researchers at Experiment Station to study ground water development, announced this project to the public in December 1901.

> There is a rapidly growing interest in the question of irrigation from wells, and the best methods to be used. . . . It is too often the case that a crop is partially or altogether lost at a critical time when the water supply from rivers run short. At such a time an independent water supply drawn from wells should be the means of saving a valuable crop.[44]

The project involved three stages. The first stage was drilling a well and constructing a pumping plant on the station farm. The second stage involved testing various types of pumps to determine their efficiency and economic value to irrigation. The final stage was determining the cost of irrigating fields with well water.[45]

By December 1901 work had begun on the pumping plant's first well, located approximately 150 ft. east of the Seed House (figures 13 and 14, table 1).[46] The well was completed and operational by 1902. It was 48 ft. deep, and consisted of an open well dug to water level, at the bottom of which was sunk a 6-in. pipe, 21 1/2 ft. long, with a 12 ft. strainer, located in water-bearing gravel stratum.[47] Water from this well was used to supplement irrigation water from the Rio Grande, as well as providing information on the use of ground water for irrigation purposes. This well also was used to test various types of pumps.[48] In 1902 the well's capacity was 800 gallons per minute (gpm.)[49]

The 6-in. well was also known as Irrigation Department Well No. 1. However, the well became filled with sand and was replaced by Irrigation Department Well No. 2. There is no reference to this 6-in. well after 1906 in the Experiment Station's annual reports, but there are references to a 12-in. well, Irrigation Department Well No. 2.[50]

The Low Lift Pumping Plant

By 1904 an additional 12-in. well had been drilled to a depth of 48 ft. "in the neighborhood of the 6-inch well."[51] This well would be about 40 ft. west of the 6-in. well, and was known as Irrigation Department Well No. 2, as well as the Low Lift Pumping Plant (figure 15, table 1).[52] At the time it was completed in 1904 its primary

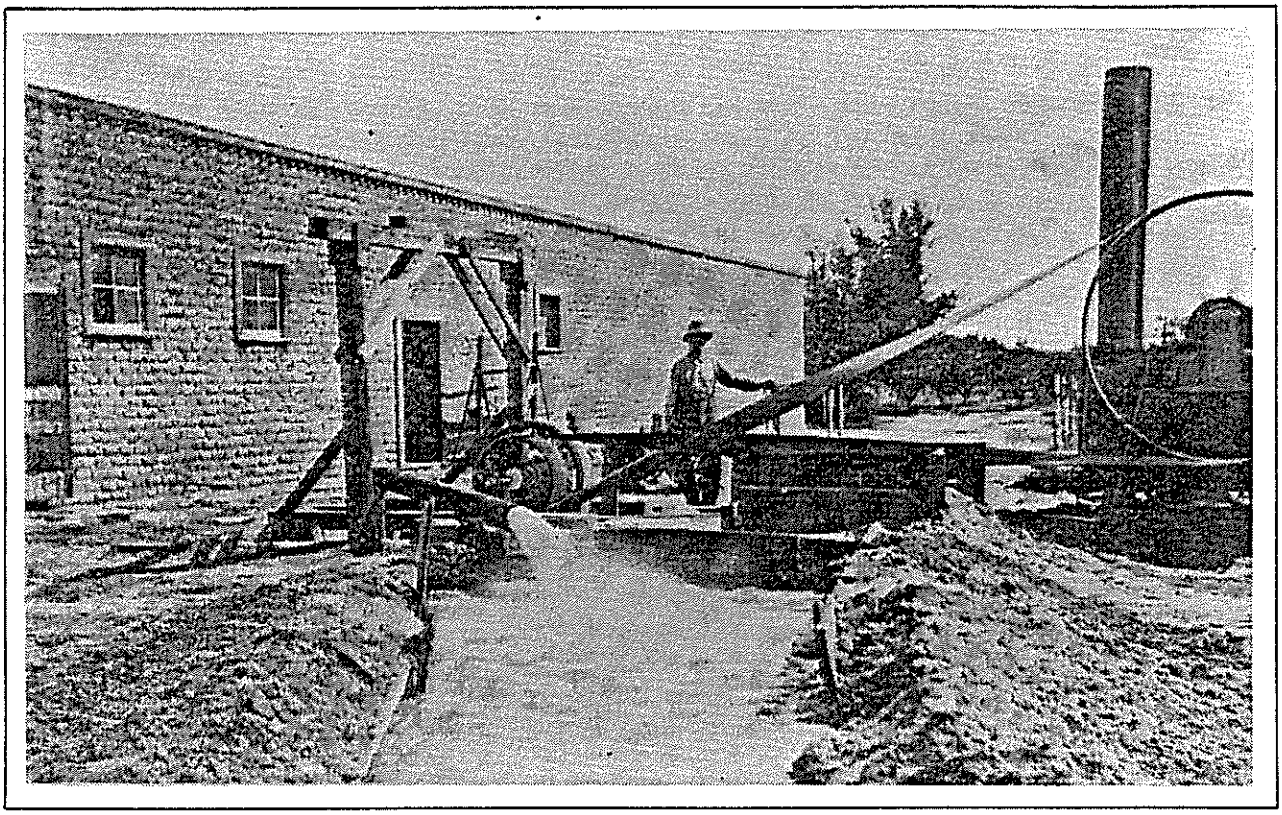


Figure 13. Irrigation Department Well No. 1. Circa 1902.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

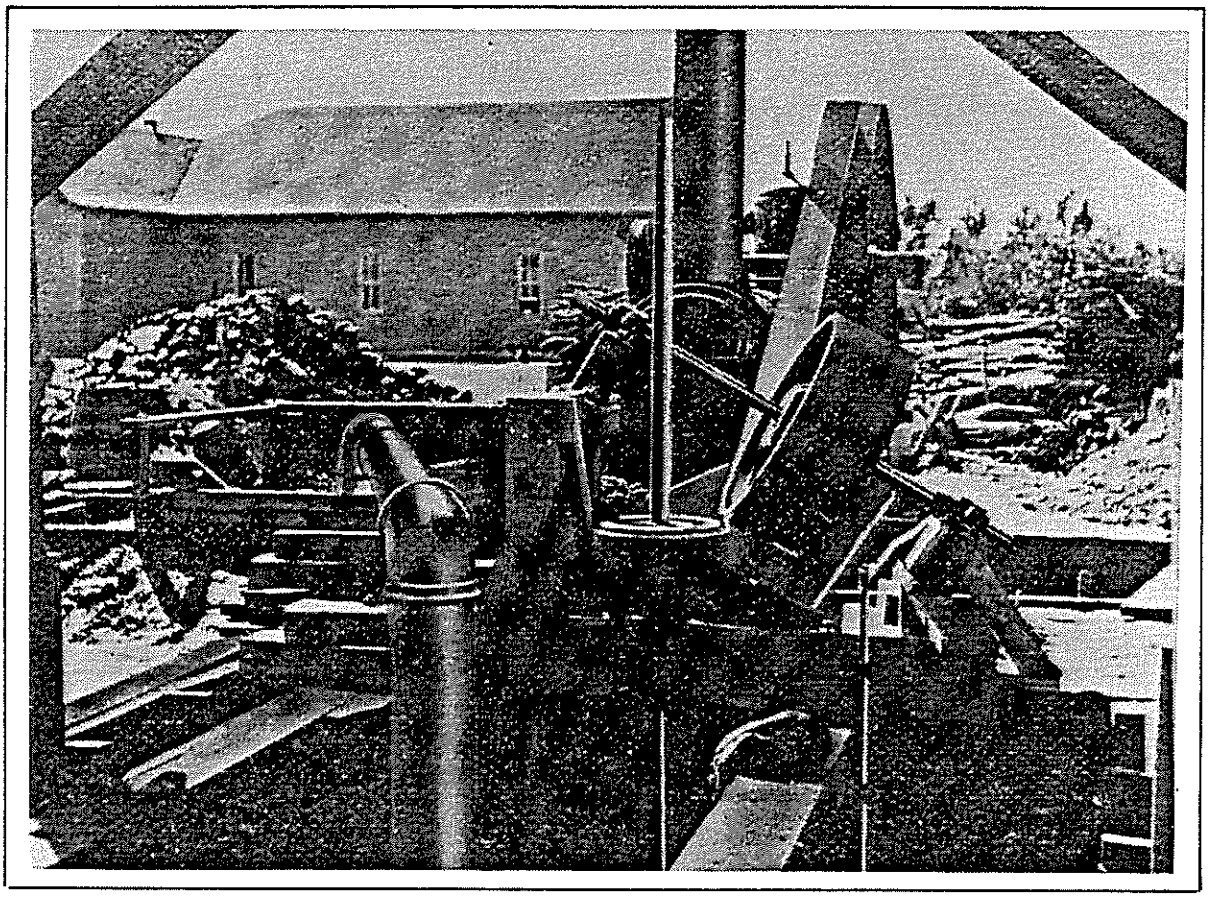


Figure 14. Irrigation Department Well No. 1 with Seed House in the background. Circa 1902.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

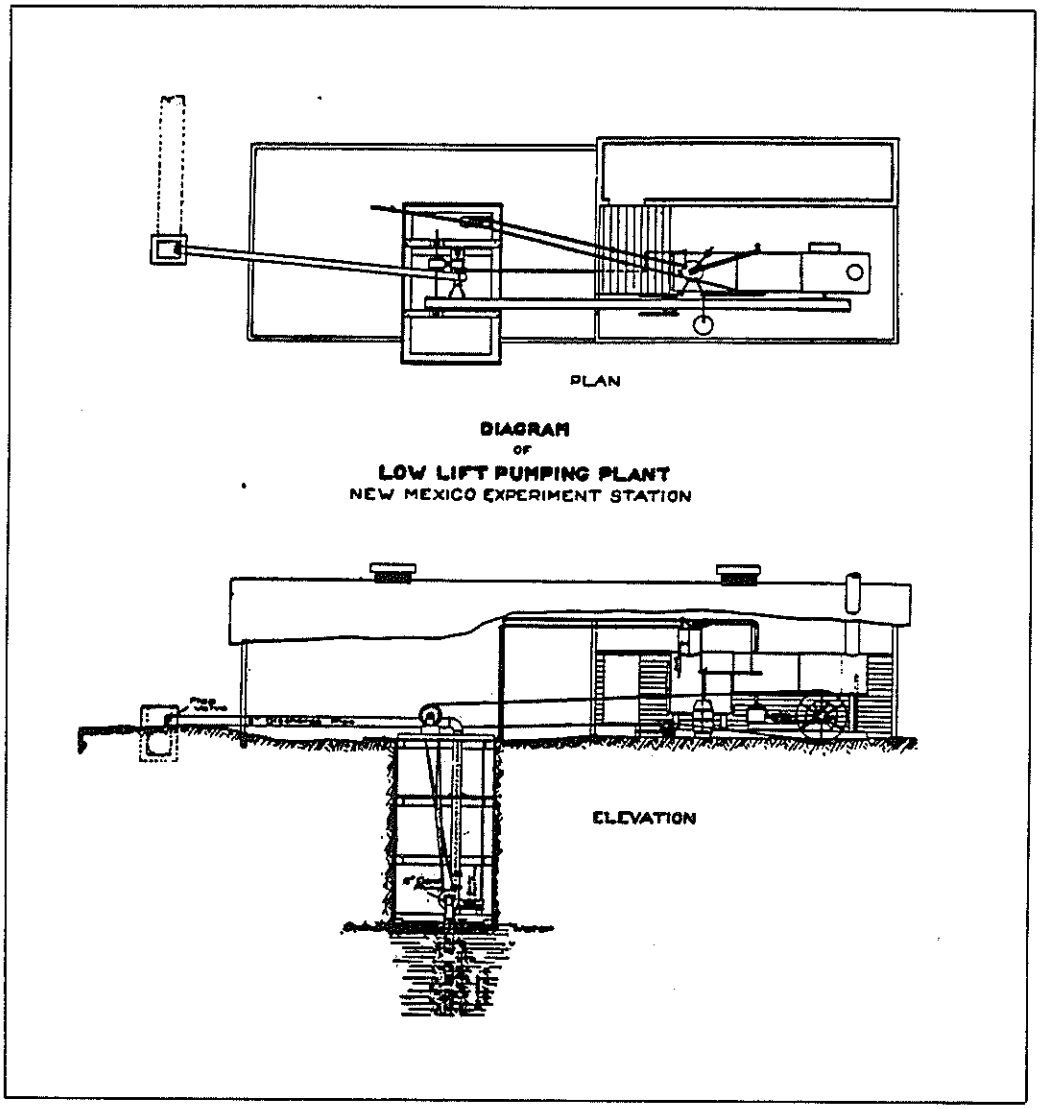


Figure 15. Low Lift Pumping Plant built 1904.
Courtesy Agricultural Experiment Station.

purpose was to serve "as an auxiliary to the gravity water supply of the station farm."[53] In 1909 the plant was described as "consisting of a centrifugal pump connected to a twelve inch well and operated by a steam engine. The pump which is a 6 in. horizontal 'American' centrifugal is located at the bottom of a pit about 16 ft. deep and only about 18 in. above standing water."[54] The pit was further described as being 8 ft. by 9 ft. wide and 16 ft. deep.[55] It was reported in 1905 that the combined capacity of this well and the 6-in. well was 1,800 gpm.[56] By 1935 the well had filled with sand and was replaced by Irrigation Department Well No. 3 (NMSU Well No. 7).[57]

In May 1909, the college's Nineteenth Annual Catalog described the well as "a 12-inch well, centrifugal pump, and a steam plant furnishing water for irrigation at the rate of 1,000 gallons per minute when it is necessary."[58] The Experiment Station annual report for 1909-1910 mentions that centrifugal pumps were being tested at the "Farm well." It appears this plant was later known as the Model Irrigation Pumping Plant, or the Model Pumping Plant.[59]

This new pumping plant did not relieve the problems associated with the domestic water system. The boys' dormitory, known as the Klondyke, suffered as a result of this system. "... water pressure became so feeble that 'Klondyke' had been deprived of water for twenty-four to thirty-six-hours at a time."[60]

Benefits of the New Pumping Plant

The benefits of an alternative source of irrigation water were seen in the spring of 1904 when the Rio Grande was dry. The station was able to use well water from its pumping plant, thus saving its crops, which otherwise would have been lost. The Rio Grande was dry from March 30 for four months when water for irrigation was most needed. This discouraging condition caused the Experiment Station to abandon all experiments involving the use of river water. However, the Experiment Station took advantage of the droughty conditions to extend experiments in pumping for irrigation. The fields, which under the original plan of the experiments were to have received river water, were irrigated with well water. This change in plans increased the area covered by the experiments in pumping, and thereby rendered the results more reliable.[61]

According to Experiment Station Press Bulletin No. 93, this period saw water use become an important aspect of the station's work. "The New Mexico Experiment Station is making the study of irrigation problems its chief line of work."[62]

Horticultural Well No. 1

In the summer of 1905 an irrigation well, Horticultural Well No. 1, was drilled on the Horticulture Farm. The well was located about 2 ft. from Horticulture Well No. 3 (table

1). This 12-in. well was located in a concrete lined pit, 16 ft. deep. The depth of the well was 62 ft. A vertical centrifugal pump discharged about 1,000 gpm. However the well filled with sand and was replaced by another irrigation well, Horticultural Well No. 2.[63]

The date Horticulture Well No. 2 was drilled is unknown. In later years the well was known as LRG 1858 and LRG 33 obs. The well was 42 ft. deep, with either a 14-in. casing or a 16-in. casing.[64] The records are not clear on this point. Well No. 2 was located about 75 ft. west of Horticulture Well No. 1 (table 1). The maximum discharge of the well was about 250 gpm with a vertical centrifugal pump. Because of the small amount of water pumped from the well, it was seldom used. It was replaced in 1935 by Horticultural Well No. 3.[65]

Notes

1.Experiment Station Agricultural College of New Mexico, Bulletin No. 1, (Las Cruces: Experiment Station Agricultural College of New Mexico, 1890), no page number.

2.Experiment Station Agricultural College of New Mexico, Bulletin No. 2, (Las Cruces: Experiment Station Agricultural College of New Mexico, 1890), no page number.

3.New Mexico College of Agriculture and Mechanic Arts hereafter referred to as NMCAMA, Annual Report of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1895), pp. 9-10.

4.Arthur Goss, Principles of Water Analysis as Applied to New Mexico Waters, Agricultural Experiment Station Bulletin No. 34 (Las Cruces: NMCAMA, 1900), p.78.

5.Willis T. Lee, Water Resources of the Rio Grande Valley in New Mexico and Their Development, Water-Supply and Irrigation Paper No. 188 (Washington: Department of the Interior United States Geological Survey, 1907), pp. 41-42.

6.Goss, Principles of Water Analysis, pp. 78-79; and Lee, Water Resources, p. 53.

7.Ibid.

8.Hiram Hadley to John R. McFie, 21 October 1890, Hiram Hadley Papers "Letterbook October 1890 - February 1893," box 3/3, Rio Grande Historical Collection hereafter referred to as RGHC, New Mexico State University Archives hereafter referred to as NMSU Archives, Las Cruces.

9.Goss, Principles of Water Analysis, p. 82.

10.Lee, Water Resources, p. 53.

11.Goss, Principles of Water Analysis, pp. 82-83; and Lee, Water Resources, p. 53.

12.Hadley to McFie, 21 October 1890, Hiram Hadley Papers "Letterbook October 1890 - February 1893."

13.Hiram Hadley to Pulsometer Co., 6 October 1890, Hiram Hadley Papers "Letterbook October 1890 - February 1893."

14.NMCAMA, Fourth Annual Catalogue of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1894), pp.65-66, 69-70.

15.NMCAMA, "Minutes of the Board of Regents, 1889-1893," meeting of 7 April 1891, RGHC, NMSU Archives, Las Cruces.

16.Hadley to McFie, 21 October 1890, Hiram Hadley Papers "Letterbook October 1890 - February 1893"; and NMCAMA, "Minutes of the Board of Regents, 1889-1893," meeting of 8 June 1891.

17.NMCAMA, Second and Third Annual Reports (Combined) of the Regents of the New Mexico College of Agriculture and Mechanic Arts 1891-92 (Las Cruces: NMCAMA, 1892), pp. 5-6; and "Specifications," n.d., Hiram Hadley Papers "Letterbook October 1890 -

February 1893," p. 158.

18."Specifications," n.d., Hiram Hadley Papers "Letterbook October 1890 - February 1893," p. 157.

19.Pulsometer Co. to Hiram Hadley, 11 September 1891, Hiram Hadley Papers, Box 1/3, RGHC, NMSU Archives, Las Cruces.

20.Hiram Hadley to Pulsometer Co., 25 January 1892, Hiram Hadley Papers, "Letterbook October 1890 - February 1893"; and W.E. Price to Hiram Hadley, 23 January 1892, Hiram Hadley Papers, Box 1/3, RGHC, NMSU Archives, Las Cruces.

21.NMCAMA, "Minutes of the Board of Regents, 1889 - 1893," meetings of 21 December 1891, and 23 June 1892.

22.NMCAMA, Annual Report 1895, p. 9.

23.Ibid., pp. 9-10.

24.Ibid., p. 10.

25.Ibid.

26.Lee, Water Resources, p. 41; and Goss, Principles of Water Analysis, p.82; and R.F. Hare and S.R. Mitchell, Composition of Some New Mexico Waters, Agriculture Experiment Station Bulletin No. 83 (Las Cruces: NMCAMA, 1912), p 24.

27.Sanborn Map: Las Cruces 1902, (New York: Sanborn Map Company, 1902), sheet 5; Sanborn Map: Las Cruces 1908, (New York: Sanborn Map Company, 1909), sheets 5-6.

28.Sanborn Map: Las Cruces 1908, sheets 5-6.

29.Lee, Water Resources, p. 41; and Goss, Principles of Water Analysis, p. 82.

30.NMCAMA, College Record: Nineteenth Annual Catalog, (Las Cruces: NMCAMA, 1909), p. 18.

31.NMCAMA, Annual Report of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1896), p. 5.

32.NMCAMA, Annual Reports of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1898), p. 48.

33.Goss, Principles of Water Analysis, p. 78.

34.Lee, Water Resources, p. 53.

35. Sanborn Map: Las Cruces 1902, sheet 5; and Sanborn Map: Las Cruces 1908, sheets 5-6; and Sanborn Map: Las Cruces 1913, (New York: Sanborn Map Company, 1913), sheet 11; and Sanborn Map: Las Cruces 1921 (New York: Sanborn Map Company, 1921), sheet 11.

36.Sanborn Map: Las Cruces 1927 (New York: Sanborn Map Company, 1927), sheet 14.

37.NMCAMA, College Record Nineteenth Annual Catalog, 1909, p. 20; and NMCAMA, College Record: Twentieth Annual Catalog (Las Cruces: NMCAMA, 1910), pp. 20-21; and NMCAMA, College Record: Twenty-First Annual Catalog (Las Cruces: NMCAMA 1911), p. 23.

38.NMCAMA, Annual Reports of the New Mexico College of Agriculture and Mechanic Arts and Agricultural Experiment Station comprising reports for 1898 - 1899, reports for 1899 - 1900 (Las Cruces: NMCAMA, 1900) p. 62.

39.NMCAMA, Annual Reports of New Mexico College of Agriculture and Mechanic Arts and Agricultural Experiment Station (Las Cruces: NMCAMA, 1902), p. 27.

40.NMCAMA, Thirteenth Annual Report of the New Mexico College of Agriculture and Mechanic Arts Agricultural Experiment Station (Las Cruces: NMCAMA, 1902), p. 25.

41.NMCAMA, Twelfth Annual Report of the New Mexico College of Agriculture and Mechanic Arts Agricultural Experiment Station (Las Cruces: NMCAMA, 1901), p. 22.

42.NMCAMA, Thirteenth Annual Report 1902, p. 7.

43.Ibid., p. 12.

44.Francis E. Lester, Irrigation From Wells, Agricultural Experiment Station Press Bulletin No. 53 (Las Cruces: NMCAMA, 1901).

45.NMCAMA, Thirteenth Annual Report 1902, p. 25.

46.Sanborn Map: Las Cruces 1902, sheet 5; and NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1935), p.56.

47.John J. Vernon and Francis E. Lester, Pumping For Irrigation From Wells, Agricultural Experiment Station Bulletin No. 45 (Las Cruces: NMCAMA, 1903), pp. 18-19.

48.J.J. Vernon, The Development of Water From the Underflow by Pumping, Agricultural Experiment Station Press Bulletin No. 66 (Las Cruces: NMCAMA, 1902); and J.J. Vernon, Pumping for Irrigation, Agricultural Experiment Station Press Bulletin No. 68 (Las Cruces: NMCAMA, 1902); and J.J. Vernon, Development of the Underflow: The Experiment Station Well, Agricultural Experiment Station Press Bulletin No. 75 (Las Cruces: NMCAMA, 1903); and J.J. Vernon, Development of the Underflow: Pump Test, Agricultural Experiment Station Press Bulletin No. 77 (Las Cruces: NMCAMA, 1903); and J.D. Tinsley, Irrigation Problems, Agricultural Experiment Station Press Bulletin No. 93 (Las Cruces: NMCAMA, 1904).

49.Vernon, Press Bulletin No. 66.

50.C.S. Conover, Ground-Water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico, Geological Survey Water Supply Paper 1230 (Washington: Department of the Interior United States Geological Survey, 1954), p. 104; and NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station (Las Cruces: NMCAMA, 1935), p. 54.

51.Charles S. Slichter, Observations of the Ground Waters of Rio Grande Valley, Water Supply and Irrigation Paper No. 141 (Washington: Department of the Interior United States Geological Survey, 1905), p. 22.

52.NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, 1935, p. 56.

53.B.P. Fleming and J. B. Stoneking, Tests of Pumping Plants in New Mexico, 1908-1909, Agricultural Experiment Station Bulletin No. 73 (Las Cruces: NMCAMA, 1909), p. 37.

54.Fleming and Stoneking, Tests of Pumping Plants in New Mexico, p. 37.

55.Slichter, Ground Waters of the Rio Grande Valley, p. 66.

56.Ibid., p. 67.

57.Conover, Ground-Water Conditions, p. 104.

58.NMCAMA, College Record: Nineteenth Annual Catalog, 1909, p. 20.

59.NMCAMA, Twenty-First Annual Report Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1911), p. 29; and NMCAMA, Twenty-Second Annual Report Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1912), p. 40.

60.Simon F. Kropp, That All May Learn (Las Cruces: New Mexico State University hereafter referred to as NMSU, 1972), p. 88.

61.NMCAMA, Fifteenth Annual Report of the New Mexico College of Agriculture and Mechanic Arts Agricultural Experiment Station (Las Cruces: NMCAMA, 1904), p. 24.

62.J. D. Tinsley, Press Bulletin No. 93.

63.Conover, Ground-Water Conditions, p. 104; and NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, 1935, p. 54.

64."Declaration of Owner of Underground Water Right" for LRG 1858, 29 November 1982, Records of the Physical Plant Department Lockwood files, NMSU, Las Cruces; and "Field Check Report" for LRG 1859, LRG 1858 and LRG 1856, 29 June 1983, Records of the Physical Plant Department Lockwood files, NMSU Las Cruces, p. 2.

65.Conover, Ground-Water Conditions, p. 104; and NMCAMA, Forty-Sixth Annual Report, 1935, p. 54.

CHAPTER TWO
1908 - 1945

Introduction

The years between 1908 and 1945 marked a time of growth for the college. It needed additional water to meet the demands of an increasing student body, a growing Experiment Station, and an expanding residential community adjacent to the college.

The college's growth spurred development of its water system. In 1908 the college had 321 students, and eight major buildings including dormitories, classrooms, and administrative offices.[1] At the end of this period, 1,145 students were enrolled, and the number of major buildings on the campus had increased to 22.[2] Without water this growth would have been impossible because water was needed for student use in both dormitories and classrooms. The faculty and staff needed water in order to conduct research. At the beginning of the period, one well, shared with the Experiment Station, took care of the college's domestic water needs. By 1930, the college needed an additional domestic water well, and by the end of the 1930s had added another domestic water well to the system.

Mesa Pumping Plant

The Mesa Pumping Plant was built in 1908 on the mesa east of the campus, west of present day Milton Hall (table 1). The plant provided the college, the Experiment Station, and the college community (the residential area north of University Ave.) with domestic and irrigation water.

The Mesa Pumping Plant was the first pumping plant built in the Mesilla Valley on the mesa lands east of the Rio Grande.[3] The Experiment Station had about 10 acres of experimental fields, called plats, located east and south of old Hadley Hall (figure 16). The purpose of the mesa plats was to test the feasibility of growing crops on the mesa lands east of the Rio Grande, and to determine the amount of water need to grow crops in this soil. The experimental use of the mesa plats continued for about 15 years.[4] Burton P. Fleming, irrigation engineer for the Experiment Station, wrote in 1908 that "the main activities of this department during the present fiscal year have necessarily been in connection with the irrigation project financed under the Adams law."[5]

Money for drilling and developing the Mesa Pumping Plant came from funds made available for agricultural research by the 1906 Adams Act. Money from the Adams Act covered only the expenses of original research or experiments bearing directly on the agricultural industry.[6]

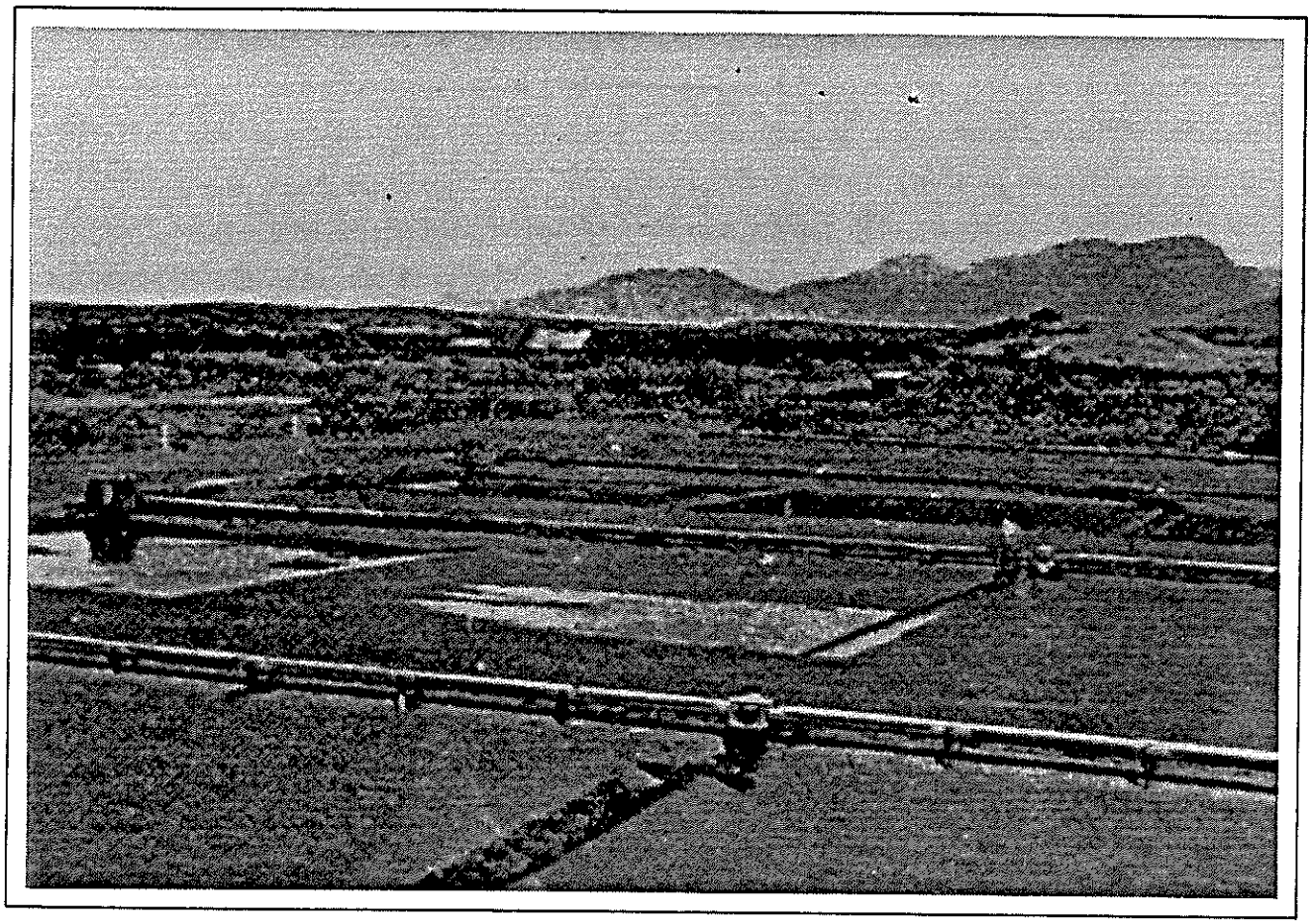


Figure 16. Mesa Plats, looking east toward the Organ Mountains. The building in the middle of the photograph is the Mesa Pumping Plant where present day Milton Hall stands. Courtesy Agricultural Experiment Station.

In addition to providing the Experiment Station with irrigation water, the Mesa Pumping Plant furnished the college with its first reliable source of domestic water. If it had not been for the research needs of the Experiment Station, it may have been a number of years before the college could have afforded to drill an adequate domestic water well. This pumping plant also made it possible for the college to sell water to those homes located in the vicinity of the college, but not within the Las Cruces city limits.

Because domestic water was available from the Mesa Pumping Plant, the "College windmill well, new" and a water tank located in front of old Hadley Hall were removed some time before May 1909. College officials expected the new pumping plant to furnish the institution with an "abundance of water for all the needs of the college buildings and for irrigation on the level of the campus."[7] The Mesa Pumping Plant served the needs of the college until the late 1940s. By that time, water taken from the well was considered "relatively poor" in comparison to newer domestic water wells located in the Building and Grounds Corral, now the parking lot north of the university's central heating and cooling plant on the corner of Frenger St. and Sweet Ave. In its final years of operation, the well was used primarily to fill the swimming pool (figure 17).[8] In 1949 its Gould Triplex pump was pulled, and the well was taken out of service. A brief note written at the time the well was taken out of service stated that "This was the only source of water supply for the domestic water system for about 40 years." [9]

At the time of its construction the Mesa Pumping Plant consisted of a cement lined pit, 70 ft. deep. At "the bottom of this pit a 12-inch casing was sunk to a depth of 31 ft. into strata consisting largely of very fine sand but covered by a stratum of fine gravel to a depth of about 12 ft. below water level." The well had two pumps, one was a Gould Triplex deep well pump used for fire protection and the domestic water supply. A second centrifugal pump was used for irrigation (figure 18).[10] In addition to the Mesa Pumping Plant, a reservoir was built north and just west of the plant. The reservoir was about 50 ft. higher than any other campus building, which provided the campus with enough water pressure for fire fighting.[11] The capacity of this reservoir was 78,000 gal.[12]

Model Pumping Plant

Construction on the Model Pumping Plant began during 1910-1911 at the Experiment Station farm about 110 ft. east of the Seed House (table 1).[13] This is the same location where the 1904 Low Lift Pumping Plant was built. The Model Pumping Plant first appeared on the 1913 Sanborn Fire Insurance map.[14]

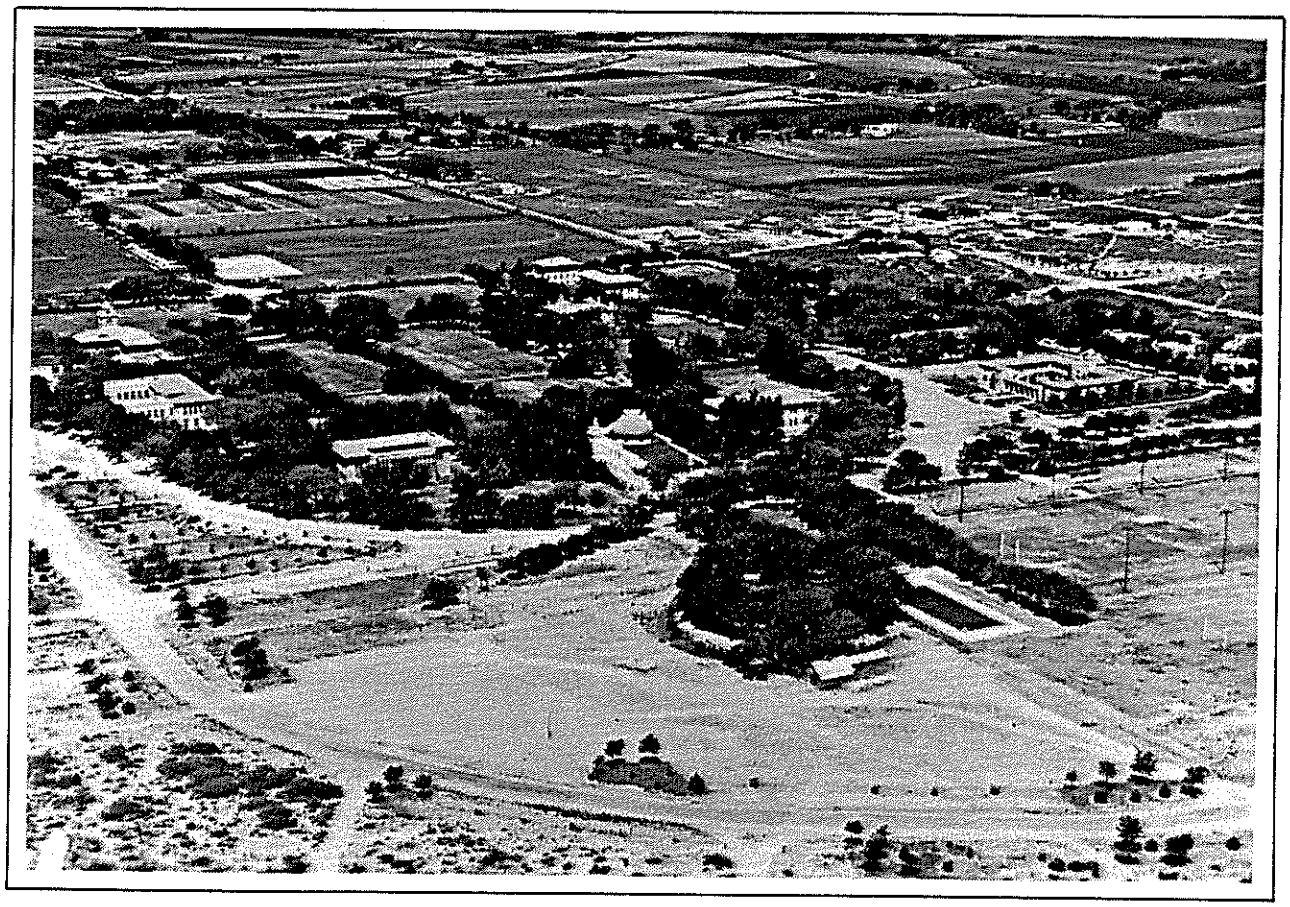


Figure 17. Campus swimming pool with the Mesa Pumping Plant to the left of the swimming pool. Circa 1940.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University.

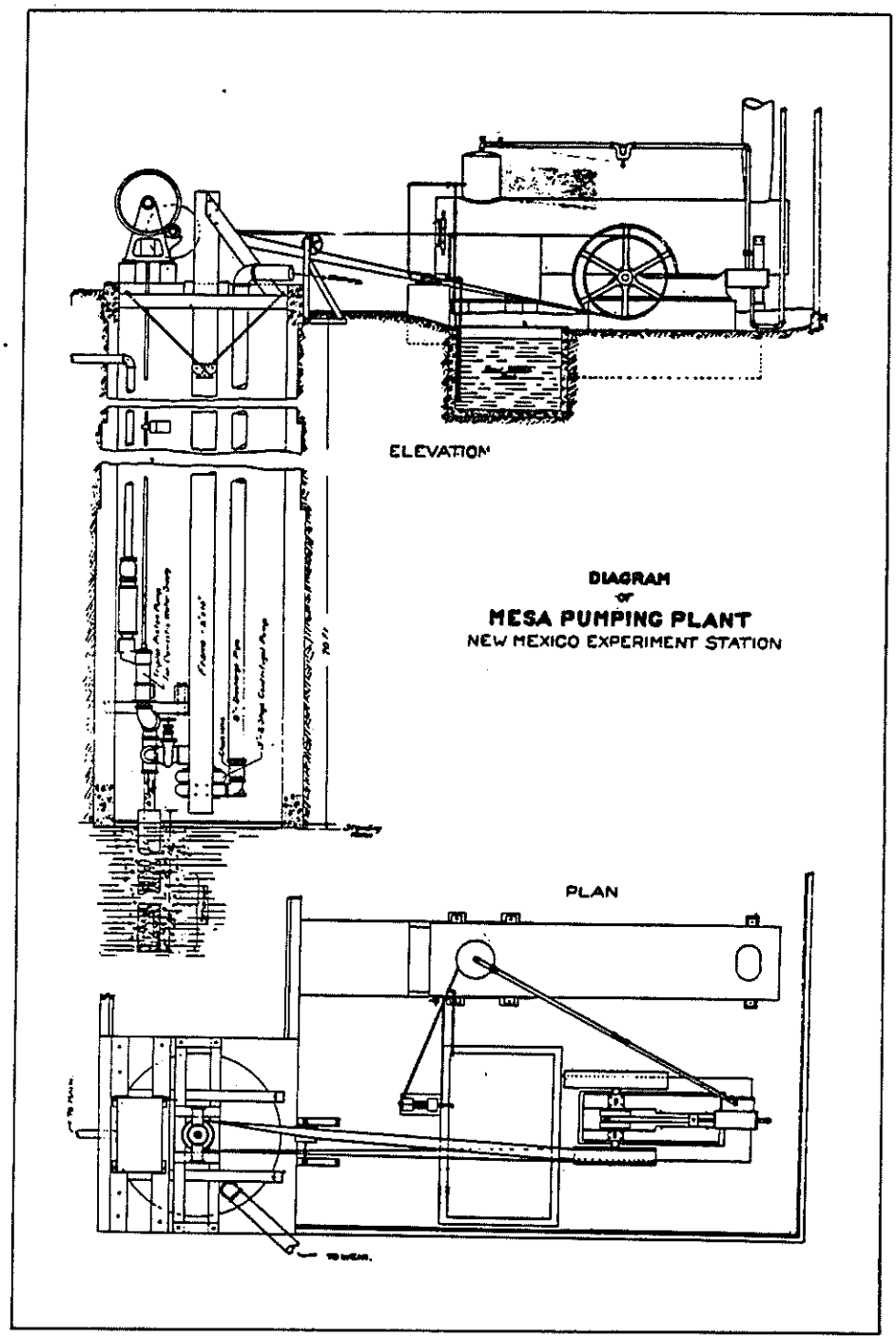


Figure 18. Diagram of the Mesa Pumping Plant built in 1908. Courtesy Agricultural Experiment Station.

The Model Pumping Plant comprised a building enclosing a dug pit with a well and pump located at the bottom of the pit. Pipes from the pump led to the farm water tank, the irrigation ditch and a calibration tank used for the Submerged Orifice project (figure 19). The tank, which was made of concrete, measured 45 ft. x 50 ft. and was 4 1/2 ft. deep (figure 20).[15] This tank first appeared on the 1913 Sanborn Fire Insurance map as a reservoir. Subsequent maps continued to show this reservoir. However, after the 1934/48 update, the reservoir is not shown.[16] The specific size of this well, its capacity, and when it was taken out of service is unknown, unless this well is the same as Irrigation Department Well No. 2, which is believed to have been drilled about 1915. Irrigation Department Well No. 2 was a 12-in. well, dug 43 ft. deep. It was located in a pit and discharged about 1,400 gpm.[17] The description of this well is also similar to the 1904 12-in. well of the Low Lift Pumping Plant, which was 48 ft. deep and also located in a dug pit. According to the 46th Annual Report of the Agricultural Experiment Station, Irrigation Department Well No. 2 was 40 ft. west of Irrigation Department Well No. 1, which was 150 ft. east of the Seed House. Irrigation Department Well No. 2 was in the same approximate location as the Low Lift Pumping Plant and the Model Pumping Plant.[18]

In all probability, the 12-in. well of the Low Lift Pumping Plant and the well of the Model Pumping Plant and Irrigation Department Well No. 2 are the same well. It is doubtful that three separate pits large enough to hold a pump would have been dug in the area between the Seed House and the Experiment Station corral, about 160 ft. east of the Seed House.[19] It is possible that the same pit was used to hold three different wells. The author believes from the available documentation that these three wells are the same. Over time, improvements were made on the well and the building housing it. Other authors might have recorded these improvements as the development of a new well. Irrigation Department Well No. 2 filled with sand, and was replaced by Irrigation Department Well No. 3, drilled in June 1935.[20]

Irrigation Pumping Plant

In 1917, college President Austin D. Crile informed the Board of Regents that the college needed a new pumping plant for irrigating the campus. This pumping plant would boost water from a reservoir filled by gravity from the Las Cruces canal.[21] This pumping plant did not have a well connected to it. The regents approved $15,000 to build such a plant and irrigation distribution system.[22] By May 1918, the pumping plant and new irrigation system were in place. It appears that the major reason for constructing this system was not for agricultural purposes, but to provide water for the grass, shrubs and trees of the college campus. The new pumping plant would make it possible to

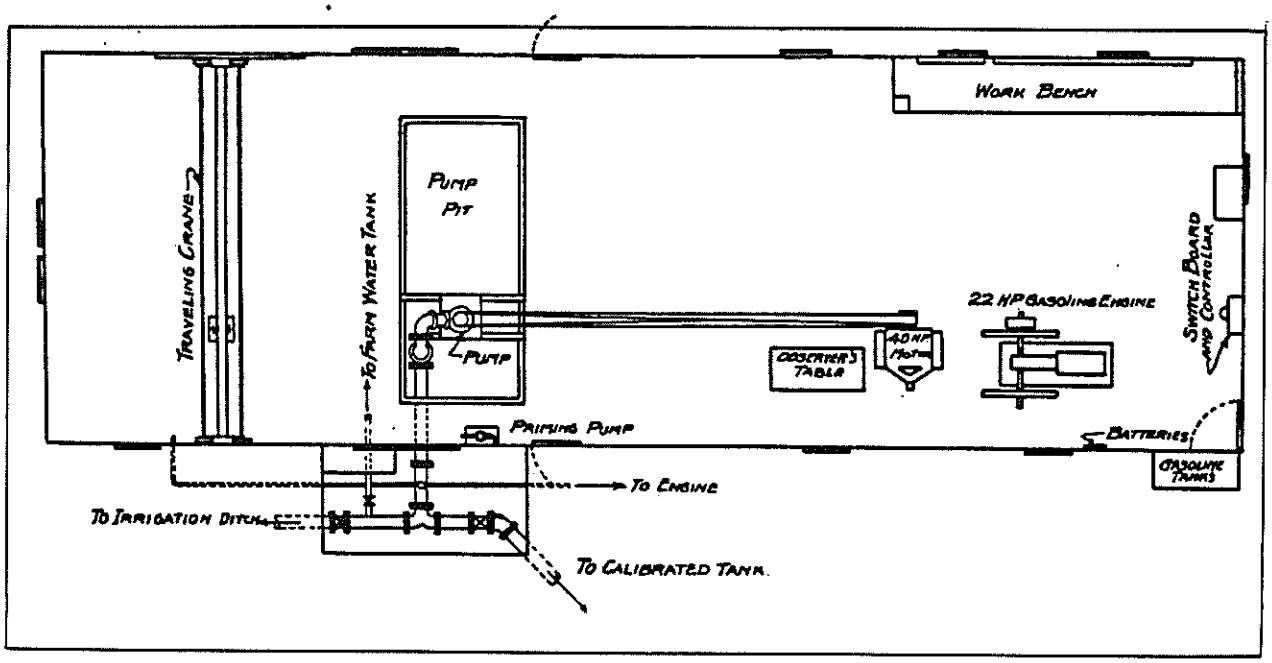


Figure 19. Diagram of Model Pumping Plant. Circa 1915.
Courtesy Agricultural Experiment Station.

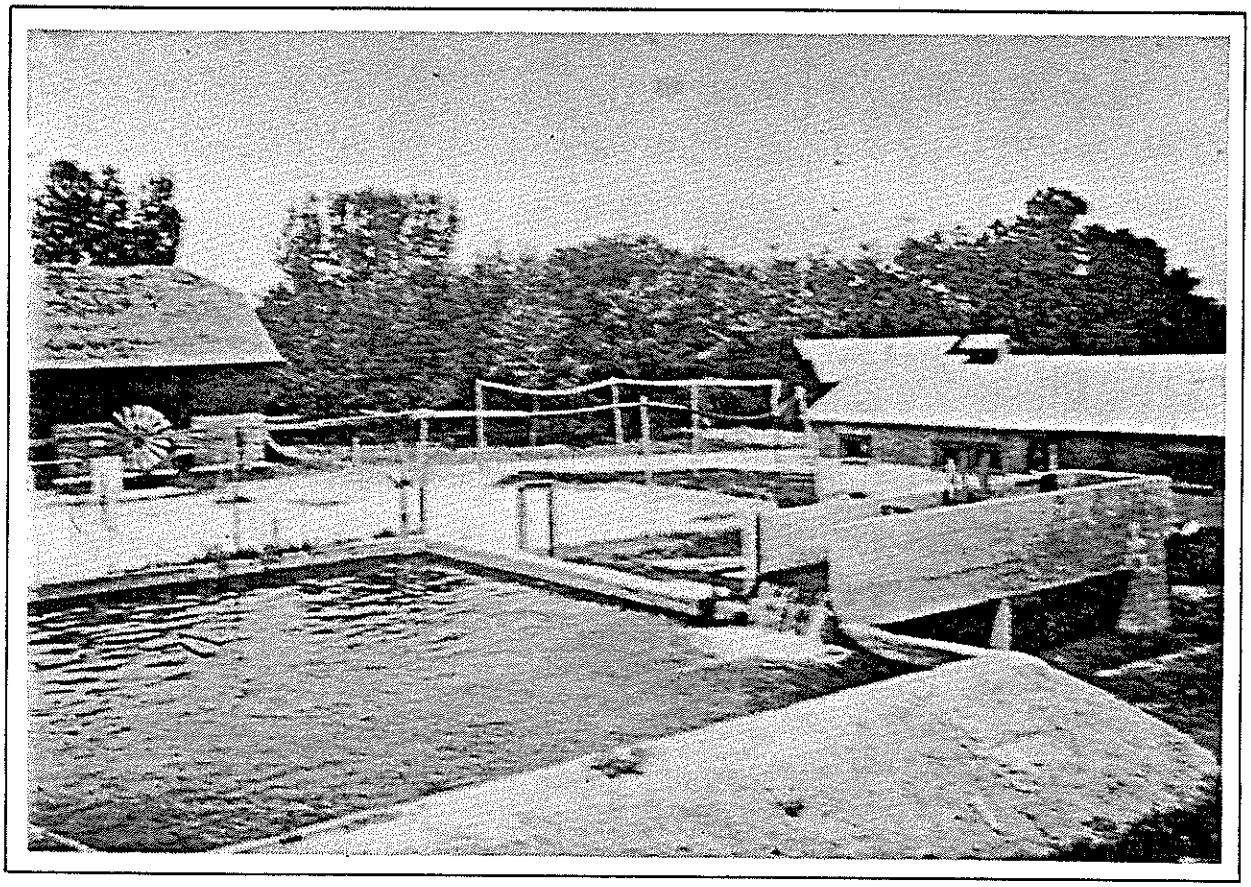


Figure 20. Model Pumping Plant and calibration tank. Circa 1915.
Courtesy Agricultural Experiment Station.

"further beautify the grounds."[23] This pumping plant and accompanying earthen reservoir were located on the southwest corner of Espina St. and College Dr., an area considered to be the base of the mesa. This would be the same location as the old Pulsometer Pumping Plant. This reservoir held about 50,000 gal. of water. What is left of this reservoir is today known as the "Aggie Pond."[24]

It is unclear why, but during the year 1920-1921, the pump at the Mesa Pumping Plant broke down. In order to provide water for the crops of the mesa plats, "arrangements were then made to deliver water from the Las Cruces Canal by way of a pump, which had been installed near the base of the mesa and which was used to furnish water to irrigate the College Campus." Unfortunately this pump and distribution system also broke down. The failure of water to reach the mesa plats seriously hurt that year's irrigation research.[25] This pump failure may have been a contributing factor in the drilling of NMSU Well No. 1A in the early 1930s.

College Ranch

In 1926, the college came into possession of the College Ranch property. According to C.S. Conover, author of Ground-Water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico, four wells with known drilling dates were already existed on the property (table 1). The Selden well, which may have been drilled about 1900, was a 6-in., 284-ft. deep well that provided water for livestock. The Cleofos well might also have been drilled in 1900. This well was about 16 ft. deep with a 60-in. diameter. Water from this well was also used for livestock. A third well, the Headquarters well, was drilled by Jim Sewell, probably in 1905. This 6-in., 373-ft. deep well provided water for both domestic and livestock use. This well was replaced by a the new Headquarters well drilled in 1970.[26] A fourth well may have been drilled in 1909, which Conover calls the Litton well. The Litton well was an 18-ft. deep windmill well. Conover did not report the size of the casing.[27] The Litton well, which was equipped with a windmill, may be the same well as the present day Lytten well on the College Ranch. This well is equipped with a windmill. The Lytten well is reported to have a 6-in. casing and be 12 ft. deep.[28] Both wells are in the same location and have similar names, leading the author to conclude these are the same well.

Conover, in Ground Water - Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico, lists the wells of the College Ranch as of 1947. Two wells have no stated drilling date, but were probably drilled before 1926. If they had been drilled after the college established the ranch, someone more than likely would have

remembered when they were drilled. They are the Mayfield well, 6 in. in diameter and 369 ft. deep, and the Wagner well about 60 in. in diameter and 16 ft. deep (table 1).[29]

Swimming Pool

In April 1929 the Board of Regents approved the construction of a swimming pool for the college. The pool's location was east of old Hadley Hall and just north and west of the Mesa Pumping Plant. This would be the area in front of present day Guthrie Hall on the International Mall. Water for the pool was pumped directly from the Mesa Pumping Plant, thus avoiding the campus domestic water system. The pool was constructed so that when it was drained, the water could flow into the campus irrigation system.[30] In later years, the swimming pool, which had a capacity of 200,000 gal., was considered as a reservoir to be used in case of fire.[31]

Experiment Station's Water Use Influences Development

The Experiment Station's use of water for research was a major influence on the college's development of ground water during the first half the 20th century. This work began in 1901 with the pumping plant constructed by the Seed House, and continued with the Mesa Pumping Plant, the Model Pumping Plant and wells on various other college properties such as the Agronomy Farm (latter known as the Horse Farm). The Experiment Station, besides determining how much ground water was needed to irrigate different varieties of crops, tested the efficiency of an assortment of pumps. Numerous Experiment Station bulletins published during this period dealt with pumping plants, the effect of irrigation water on crops, and the drainage of irrigation water from fields.[32] In addition to these uses of water, water also was needed for livestock and laboratory research.

College Sells Ground Water to Off-campus Residents

Another major influence of the college's development and use of ground water was the sale of water to off-campus residents, mainly those living north of University Ave., and known as the college community. With the construction of the Mesa Pumping Plant, the college had enough water to sell to these people as a public service. These sales began sometime after 1908, but before 1929. The minutes of the Board of Regents are missing for the period 1893 to 1913. The minutes of April 29-30, 1929, contain the first mention of this subject, but it is clear from the minutes that the sale of water had been going on for a number of years.[33] The college would not have had enough domestic water to sell off campus until the construction of the Mesa Pumping Plant in 1908.

Eventually, the college community came to depend upon the college to provide it with water service, primarily because it was outside the Las Cruces city limits. In making future water plans the college had to take into consideration the college community's use

of water. During the 1940s and 1950s, the college tried to discontinue selling water to the college community and turn this responsibility over to the city. However, the college did not accomplish this until the 1960s.

The minutes of the April 29-20, 1929, Board of Regents meeting dealt with the regulations governing the sale of ground water to off-campus residents. While the Board of Regents had previously issued regulations governing the sale of water to off-campus residents, these regulations had been lost. They were first issued when water began to be sold to off-campus residents. The regulations established at this meeting remained relatively the same, with a few minor additions, over the next 30 years.[34]

> The President [Harry L. Kent], at the request of the Custodian of Buildings and Grounds [Charles E. Strickland], reported that users of water from the College water system, living near the campus, were, in some instances, refusing to pay for repairs on the lines installed on land not belonging to the College and, therefore, not the property of the College. The Custodian of Buildings and Grounds reports that he is unable to find [the] copy of the old order or agreement issued by the Regents at the time when those lines were installed. The Custodian further reports that this agreement entered into a number of years ago provided that since the College is not and cannot be a public utilities, it cannot install water mains on property not belonging to the institution and that under the old agreement, water users were required to install their own water lines and to keep them in repair or to cease using College water. The Custodian of Buildings and Grounds recommended, and the President of the College endorsed, the recommendation that the Regents of the College approve a new set of regulations submitted by the Custodian of Buildings and Grounds and declare them to be in force and effect from and after this meeting of the Board. The following recommendations were then read, discussed and approved as amended:
>
> 1. The College is not a public utility and will not be held responsible as such and is not governed by the laws governing public utilities. This service is given merely as an accommodation or service to the College community and not as a commercial business, and the College will, in no way, be held responsible as a public utility or commercial business.
>
> 2. The College will not build, operate or maintain any water mains or lines outside of the boundaries of College property except when it is to serve College purposes and not then until after a written contract for right of way has been secured from the property owners or their agents upon whose property lines are to be built, after securing an order from the County Commissioners, granting a right of way in public roads.
>
> 3. The College will not permit any private lines to be laid on College property or taps made to College lines except as a temporary arrangement or in emergency cases, and only then upon written agreement, and when such work is approved and supervised by College authorities. The expense of such lines, extensions or connections must be borne by the party putting in same. Any such lines so laid on College property must be removed from College property at any time the College should so request owner to do so. While such lines

remain on College property, they must be kept in good repair and free from leaks.

4. The College will build a line or lines of sufficient size and capacity to the boundary lines of its property whenever request is made by a sufficient number of water users to justify the building of such lines, this depending entirely upon the length and size of lines required. The decision as to when and where such lines are justified is left entirely to the College authorities to decide.

5. The water users will build and maintain all lines tapped on to the College system and extending outside of College property. These lines are to be built of first class materials. The user must first make a written application to the proper College authority for permission to tap on College system. This application must be accompanied by a diagram showing proposed water line in detail; showing locality of line, size of line, depth beneath surface, amount of water to be supplied through line, stating kind and grade of material to be used. The tapping of College lines will be made only by College authorities or directly under their supervision. Water will not be turned on to any line until it has been inspected and approved by College authorities. The College reserves the right to, at any or all times, inspect any or all private lines through which service is rendered, and if found to be leaking or unsatisfactory in any way, will at once discontinue service through same. If such lines be partnerships lines, service may be discontinued from any one or all being served through same until such repair or changes are made as will meet with the College authorities approval. The College reserves the right to make proper emergency repairs on private lines through which water is being served as is necessary to preserve its water supply. The expense of such repairs is to be paid by water users using water through such lines. This expense will be pro rated among the different users, if said line is a partnership line. Service will be discontinued to any one or all of said users refusing to pay promptly their pro rate of this repair expense.

6. The College will not be responsible for damages done by water from lines outside or its property boundaries.

7. In case of shortage of water from any reason whatsoever, the College reserves the right to place a restriction on this service and, if found necessary to preserve the College water supply, this service will be discontinued temporarily or permanently as decided by the College authorities. The College will refuse service or discontinue service to any user or applicant that may be deemed as undesirable for such reasons as non-payment of water bills; misuse of water; neglect of water main; undesirable citizen; refusal to comply with these regulations.

8. The College will furnish and install a water meter of proper size and capacity to meter all water to water users, such meters to remain the property of the College, with right to remove when service is discontinued. Water user must provide a suitable place at the point where water line enters his property for meter to be installed and allow a College representative or employee to enter premises at any time necessary to read meter or make change or repairs on same.

9. Rate charged for water will be a minimum charge of one dollar and fifty cents ($1.50) per month or any part of a month, to each water user, allowing six thousand gallons of water for this minimum charge. All consumption of water over this minimum of six thousand gallons will be charged for at the rate of fifteen cents per one thousand gallons. There will be a charge of one dollar for turning on service and a charge of one dollar for cutting off service when ordered cut off or on by water user. Water will not be turned on at any property until all previous water charges have been paid. Water may be metered to user on a flat rate of one dollar and fifty cents ($1.50) per month, used as desired by College. The College will not in any case be held responsible for the quality or purity of the water delivered through their mains.

10. Each separate house or residence or family living in a house with another family, will be considered as a water user and provision for separate metering must be made at each. Each house or residence takes a separate charge regardless of owner or occupant.[35]

The Tenure of Charles E. Strickland Influences Domestic Supply

During the 20th century Charles E. Strickland had the single most important influence of any individual on the development of the college's domestic water system, because it was his responsibility (figure 21). Born in 1886, Strickland began working for the college in 1910 as supervisor of buildings and grounds. In 1910, the college campus consisted of five acres with seven buildings. When Strickland retired in July 1956, after 46 years of service, the college had 52 permanent buildings on a 108-acre campus. His staff grew from four full-time employees, with a few student workers in 1910, to 30 full-time employees, with 20 student workers in 1956. At the time of his retirement in July 1956 he had served under ten of the college's 15 presidents.[36]

Strickland served as superintendent of Buildings and Grounds, although his job title varied through the years. This position is now called director of the Physical Plant Department. One of his responsibilities was managing the college's domestic and irrigation water systems. He had a major influence on the location of wells, choice of drillers, type of wells drilled, and the material used in these wells such as casings, screens, and pumps. Strickland considered having a dependable water system of great importance. This concern is evident in the numerous letters and memos he wrote to members of the administration. Upon his retirement, Strickland listed among his achievements "the development of soft-water wells; the terrace method of irrigation; the building of the present athletic field; and the setting out of trees, plants and shrubbery that made the New Mexico A&M campus a show place for many years."[37]

NMSU Well No. 1A

By June 1930 the administration believed the college needed a more reliable domestic water system. At this time, the college received its domestic water supply from one

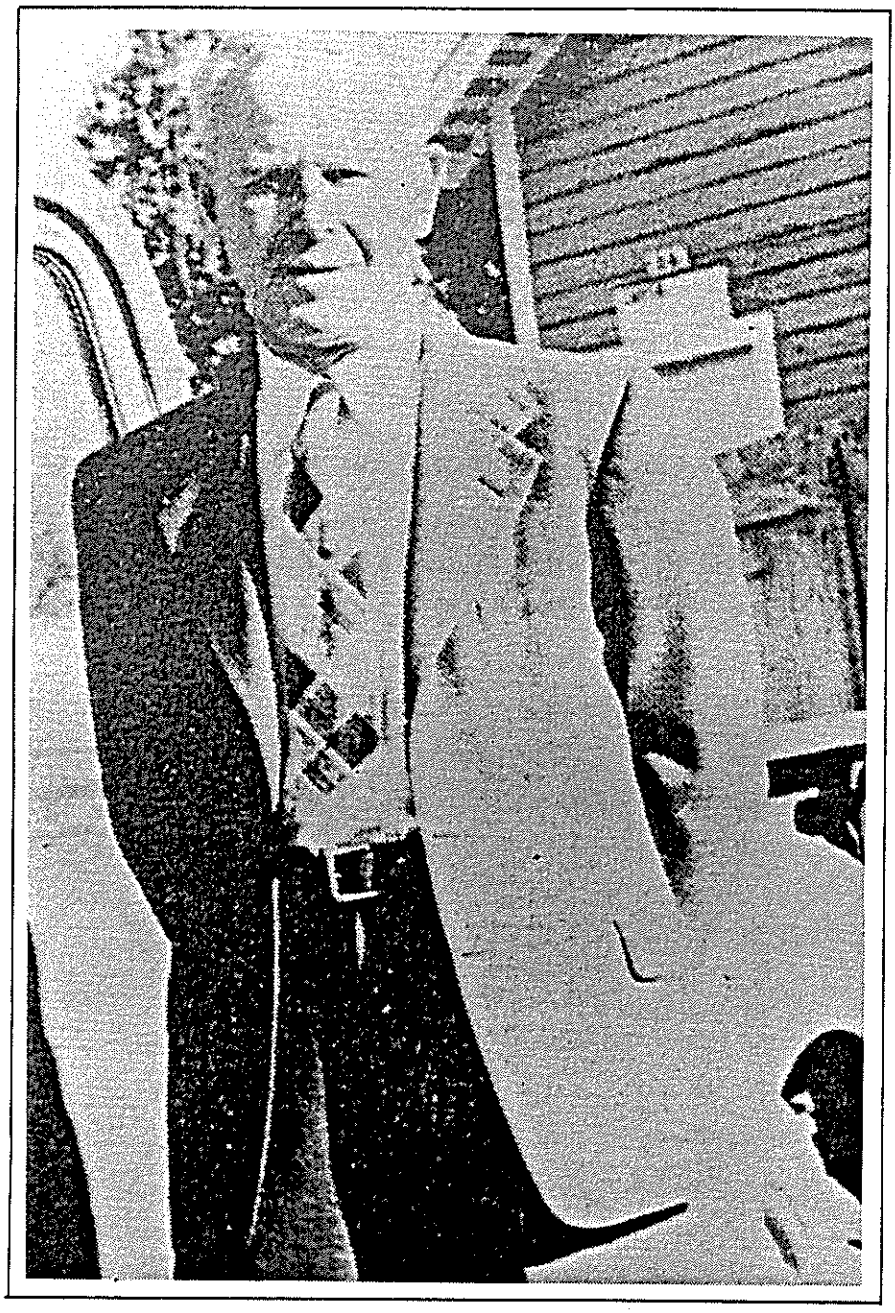


Figure 21. Charles E. Strickland, superintendent, Building and Grounds Department, 1910-1956.
Courtesy Physical Plant Department.

source, the well at the Mesa Pumping Plant. This situation was discussed at the June 23, 1930 Board of Regents meeting by Strickland and college President Kent.

> For 21 years the institution had depended upon a single well and pump [Mesa Pumping Plant] for its entire water supply. That no other well is now available in the event of the present pump or well failing. They further reported that the consumption of water is now approximately 80,000 gallons per day and that the storage tank holds only approximately 40,000 gallons. Under the present circumstances if the pump failed the entire institution including all of the workers, students, and livestock and some 20 homes adjoining the College would be without water in less than twelve hours after the pump failed. The President and the Custodian informed the members of the committee that in their judgement this situation is one which ought not longer to exist and that safety and reasonable plans for the future demanded that steps be taken to provide for the installation of an auxiliary pump so that if one well failed the other could be used as a supplementary source of water supply.

Based on that reasoning, the regents authorized the development of a new domestic water well for the college.[38]

The new well was located in the northwest corner of the old Building and Grounds Corral (table 1). The exact drilling date is unknown, although available documents show it was some time between 1930 and 1932. By 1932 NMSU Well No. 1A was functioning and records show it was tested that year. This well has been known as "NMAC Domestic Well 2" and "Well #1, Domestic water Well."[39]

This well consisted of a concrete lined pit 8 ft. x 13 ft. wide and 32 ft. deep. From the bottom of the pit a 4 in. well was drilled to a depth of 228 ft. A Triplex pump was installed at the bottom of the pit at the original water table.[40] In a report prepared by the military in 1943, the average capacity of four domestic water wells on the campus, including NMSU Well No. 1A was 300 gpm.[41] It was reported that in 1946 the well pumped 100 gpm.[42] As of 1952, the well pumped 86 gpm when pumping to the surface, and 80 gpm when pumping into the domestic water system.[43]

NMSU Well No. 1A was taken out of service in 1947 when it was disconnected from the campus water system, although the well still had a pump attached to it in December, 1950.[44] Tests run on this well in 1952 and 1953 indicated that it was still usable.[45] Sometime after 1953 the opening to the well was sealed with concrete, and the well was buried.[46]

College Ranch

In 1930 A.& M. Camp Well or Camp Well #1 was drilled at the College Ranch by Dutch Chandler and Jim Sewell (table 1). The 6 in., 373 ft. deep well has been used to water livestock.[47] In 1980, it was reported that the Civil Conservation Corp (CCC) drilled this well around 1934. This information appears to be erroneous. In September

1936, Fred N. Ares of the U.S. Forest Service wrote that a well was "bored by the CCC Camp last winter near the west boundary of the Jornada Experiment Range." Ares went on to write that in "recent years" New Mexico State College had drilled three wells, the latest being "one last winter on their ranch which adjoins us on the west."[48] This would have been the Oaks well drilled in January 1936. The two other wells would be the Buckle Bar well drilled in 1935 and the A.& M. Camp well drilled in 1930, which were the only wells drilled by the college on the ranch during the 1930s.[49] This letter indicates that there was a well drilled by the CCC around 1934, however, the camp well had already been drilled a few years before.

Campus Water System: 1930s

It is unclear why, but in 1932 some of the residents of Mesilla Park requested permission to buy domestic water from the college. The Board of Regents approved the building of a pipeline to the western edge of the college, and allowed the residents of Mesilla Park to tie into the campus domestic water system at that point.[50]

From 1933 to 1938, the college's domestic water system consisted of two wells, two pumps, and two storage tanks with a total storage capacity of 280,000 gal., as well as water mains, valves, meters, and fire plugs. An average of 110,000 gal. of water per day were used in college buildings, laboratories, barns, corals, and 68 homes in the college [51]

The campus irrigation system during this period irrigated 47 acres of the college campus. This system had one pumping plant, two reservoirs, one sump, and about five miles of 12-in. concrete and steel irrigation mains with valves. The pumping plant did not produce its own water, but boosted water from a sump which was filled by gravity from the main canal into the irrigations system. The plant had a capacity of about 1,800 gpm, and the pump was powered by electricity. The reservoir storage capacity was approximately five acre-feet. The system of applying water to the campus was "terrace, slope and furrough irrigation." It required an average of 48 hours to irrigate the campus.[52]

New Experiment Station Pumping Plants

The drilling of two new irrigation wells, Horticultural Well No. 3 and Irrigation Department Well No. 3, took place in 1935 (figures 22,23, and 24). The driller for both wells was R.D. Sidey. The 46th Annual Report of the Agricultural Experiment Station describes the reason for drilling these new wells.

> Owing to the anticipated shortage of irrigation water for the Mesilla Valley for the 1935 growing season, the College and Experiment Station considered it advisable to install two pumping plants to provide water in case of emergency. . . . The drouth situation had decreased the supply of irrigation water in the

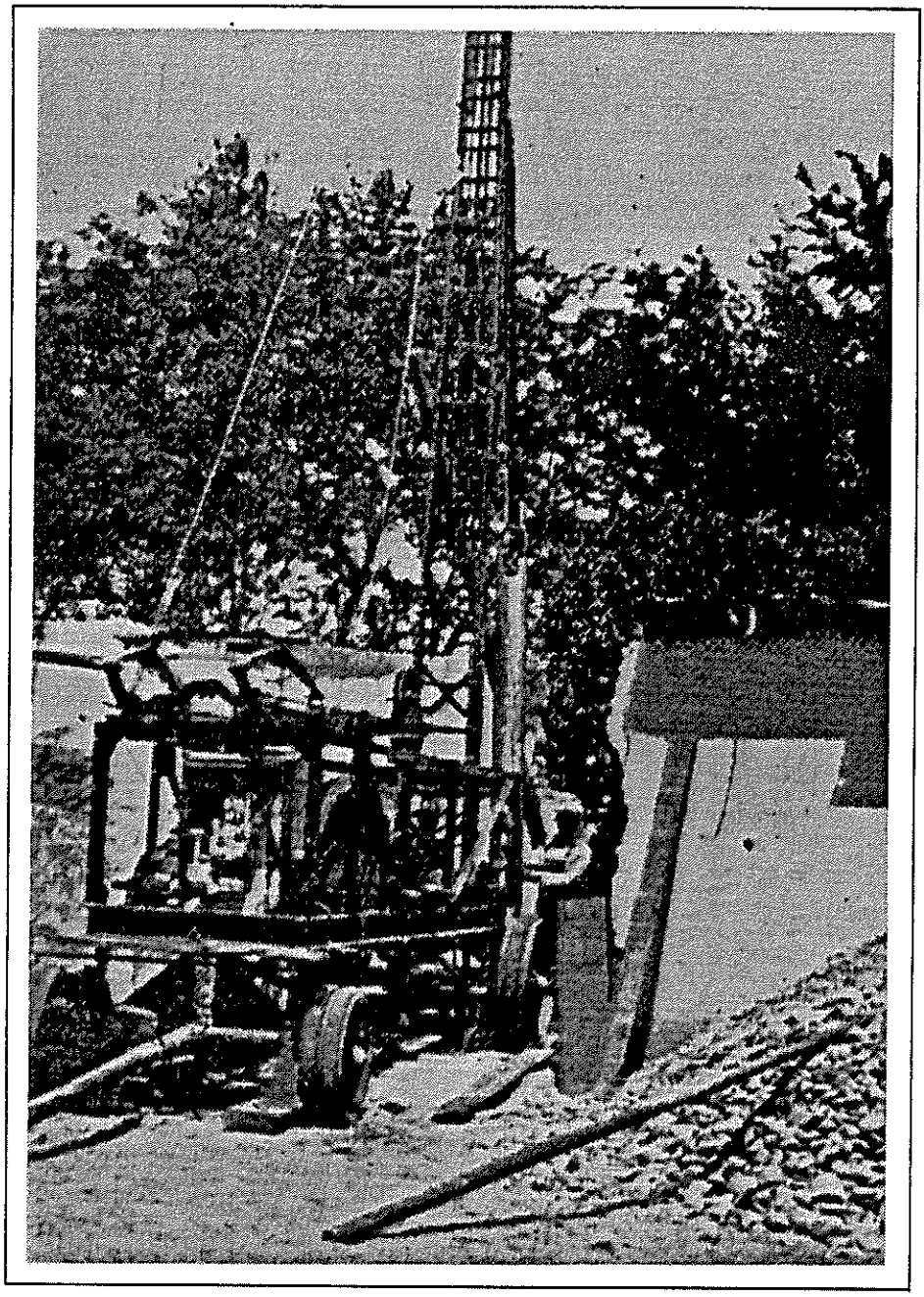


Figure 22. Rig used in the drilling of Horticulture Well No. 3 and NMSU Well No. 7 in 1935.
Courtesy Agricultural Experiment Station.

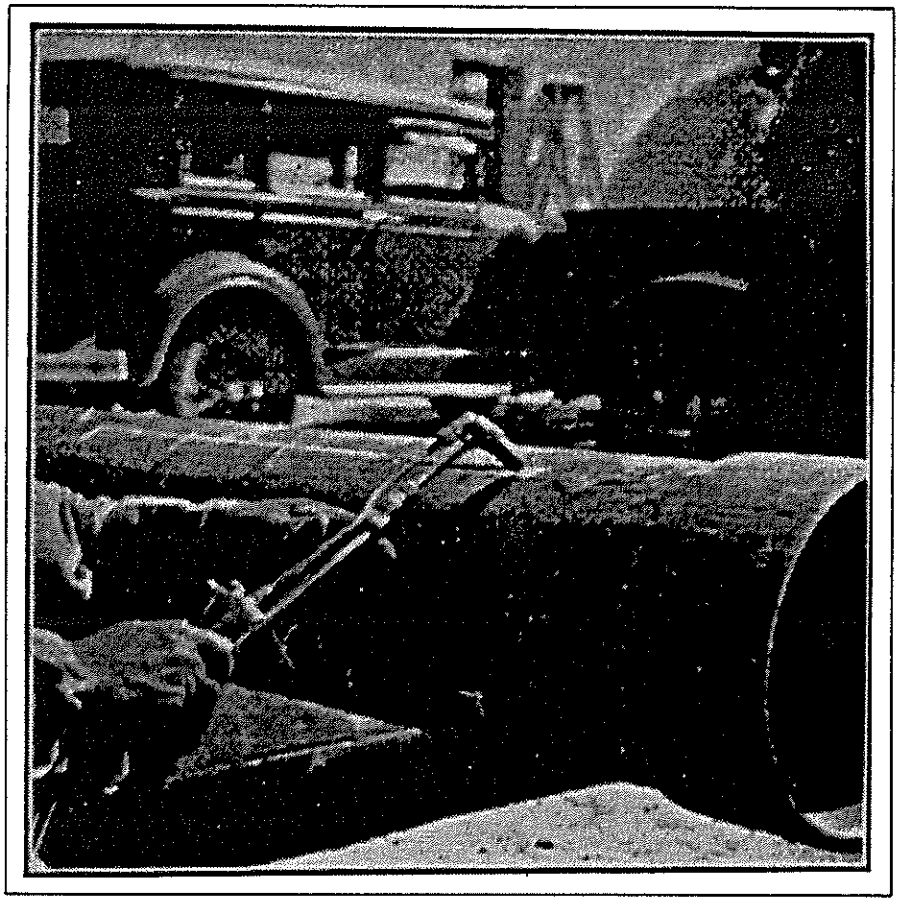


Figure 23. Torch cutting the casing in Horticulture Well No. 3, 1935. Courtesy Agricultural Experiment Station.

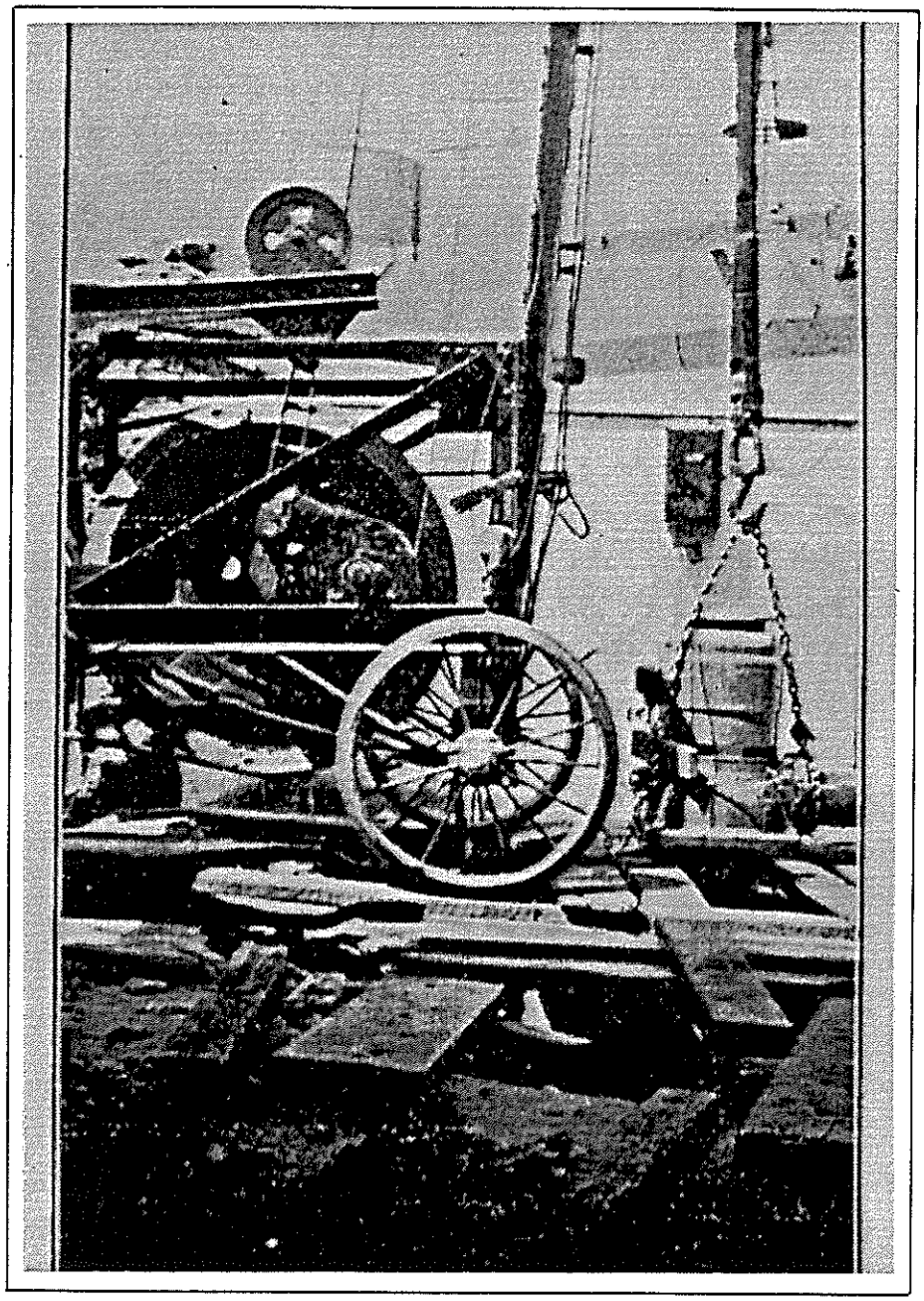


Figure 24. Pump being installed on NMSU Well No. 7 in 1935. Courtesy Agricultural Experiment Station.

Elephant Butte Reservoir to such a extent by the spring of 1935 that district officials believed that there would be insufficient water for crop production for that year.[53]

Horticultural Well No. 3 was drilled in May 1935 on the Experiment Station's Horticultural Farm (table 1). Horticulture Well No. 3 replaced Horticultural Well No. 2. Well No. 3 was located 2 ft. from Horticultural Well No. 1 in the same pit. Well No. 3 had a 12-in. casing and was originally drilled to 71 ft. In 1935, the well was reported to have produced 1100 gpm. By November 1946, Well No. 3 had gradually filled with sand and produced only 250 gpm.[54] Horticultural Well No. 4 appears to have replaced Well No. 3 by November 1947.[55]

Irrigation Department Well No. 3 replaced Irrigation Department Well No. 2, which had filled with sand. The location of Irrigation Department Well No. 3 is 35 ft. north of Irrigation Department Wells Nos. 1 and 2 by the Seed House (table 1). The three wells form a triangle. Well No. 3 had a 16-in. casing and was drilled to a depth of 50 ft. In 1935, the well discharged, 1,625 gpm, and in 1946, 1,270 gpm.[56] This well is still in use.

In 1935, the Board of Regents approved the installation of a centrifugal pump in the Mesa Pumping Plant. The pump was to provide supplemental water for irrigation purposes. It would also be possible to gather additional information on the cost of pump irrigation.[57] A centrifugal pump was originally installed in the Mesa Pumping Plant when it was first constructed. It appears that the removal of this earlier pump took place some time before 1935. The new pump may have been installed in 1935 when the college was expecting less water to be available from the Rio Grande because of drought.[58]

College Ranch

Drilling of the Buckle Bar well was completed in 1935. The 4-in., 18 ft. deep well was used for watering livestock. The Oaks well was completed in 1936 (table 1). This was a 6-in. well, 320 ft. deep. The exact use of this well is not recorded, although it appears that it was intended to provide water for livestock. By the 1980s this well was no longer in use.[59]

Campus Water System: 1937

In June 1937, about 50 acres of campus grounds were irrigated. Water was provided by a large pumping plant, which was located at the foot of the mesa on the southwest corner of Espina St. and College Dr.[60]

In 1937 the Experiment Station had three irrigated experimental farms, the Experiment Station Farm, the Horticulture Farm and the Agronomy Farm. The Experiment Station Farm consisted of about 185 acres, which adjoined the campus. Irrigation water from the Rio Grande and Irrigation Well No. 3 provided the farm with water. The 45-acre

Horticulture Farm was approximately 1/4 mile northwest of Mesilla Park. It was irrigated from the Rio Grande and Horticultural Well No. 3. The 65-acre Agronomy Farm was located 1/2 mile west of Mesilla Park. Its source of irrigation water is unknown before the drilling of a well in 1947.[61]

NMSU Well No. 2A

An additional domestic water well was added to the water system in 1941.[62] NMSU Well No. 2A was also known as NMCA Domestic Well 3 and was drilled by Dickinson Brothers.[63]

NMSU Well No. 2A is located in the northeast corner of the Buildings and Ground Corral (table 1). The well consisted of a 10 ft. x 15 ft. pit, 35 ft. deep. An 8-in. casing extended approximately 200 ft. down to a 6-in. casing which extended approximately another 200 ft. to the bottom of the well.[64] In 1946, the well was pumping 100 gpm, and by 1952 the capacity of the well was 137 gpm.[65]

The exact date at which this well was taken out of service is unknown, though it may have been taken out of service at about the same time as NMSU Well No. 1A. In 1950 it was reported that this well, like NMSU Well No. 1A, was disconnected from the campus water system. Again like well No. 1A, test reports from 1952 and 1953 show that the well was usable, and that it still had a pump.[66]

Off-campus Water Services

In 1939, the Board of Regents discontinued access to the college's domestic water system by Mesilla Park residents. This action was taken because some area residents took water without paying for it.[67] During the year, more than 8,518,200 gal. of water were sold to off-campus residents bringing in $2,135.73 in revenue.[68]

By 1940, the college was criticized for being in the water business, a charge denied by college Comptroller R.W. Boney in a December 1940 letter to water users.

> The College has been furnishing water to residents near the campus for many years and at various times we have been criticized for being in the water business. About a year ago the Board directed the President of the College to meet with the City Council of Las Cruces and see if they would not run lines to serve those now being serviced by the College. There was insufficient business to justify such a large investment by the city of Las Cruces, and until such time as the City or some other agency may service your residence, the College will continue to do so.[69]

As a result of World War II, the college increased the amount of water receiving the minimum charge during the spring and summer months. This regulation was made for the duration of the war, with the hope that additional water allowed for at the minimum charge would assist water users in producing a Victory Garden. "The minimum charge of

$2.00 per month will entitle each user to 6,000 gallons of water per month for the months of October, November, December, January, February, and March, and 12,000 gallons per month for the months of April, May, June, July, August, and September."[70] The rate was in effect until June 1, 1949.[71]

During 1945, the college sold more than 13,863,266 gal. of water to the college community. The sale brought in $2,680.09 in revenue.[72]

Agronomy Farm

It appears that water from well LRG-1857, located on the Agronomy Farm was first put to beneficial use in 1942 (table 1). As of 1982, the well had a 4 in. casing and was 80 ft. deep, with a capacity of 15 gpm. Water from the well was used for domestic and livestock uses.[73]

Campus Water System: World War II

In 1943 the War Department described the campus' water system as having four wells for domestic use, varying in depth from 50 ft. to 438 ft. with an average capacity of 300 gpm. These wells would have been the Mesa Pumping Plant, NMSU Well No. 1A and NMSU Well No. 2A. The fourth well is unknown. There is no known record of a fourth domestic well. In the author's opinion the fourth well was an irrigation well mistakenly identified as a domestic well. No additional wells were drilled until 1946. Water storage consisted of one 80,000 gal. tank and another 200,000 gal. earthen tank, which was used mainly for irrigation. The college's water system was not chlorinated in 1943.[74]

Notes

1.NMCAMA, College Record: Eighteenth Annual Catalog (Las Cruces: NMCAMA, 1908), p. 149; and Sanborn Map: Las Cruces 1908, sheet 5.

2.R.J. Prohaska, "Report of Facilities of New Mexico College of Agriculture and Mechanic Arts Las Cruces; New Mexico," (Albuquerque: War Department U.S. Engineer Office Albuquerque District, April 24, 1943), plate 3; and "New Mexico State University - Fall Semester Comparisons - Main Campus," 1941, Registrar Office, NMSU, Las Cruces.

3.Fleming and Stoneking, Tests of Pumping Plants in New Mexico, pp. 31-32.

4."Another Old Landmark Gone," 29 October 1949, Physical Plant Department Records hereafter referred to as PPD, Collection A 73-37, Box 2/5, Rio Grande Historical Collection hereafter referred to RGHC, New Mexico State University Archives hereafter referred to as NMSU,Archives, Las Cruces.

5.NMCAMA, Nineteenth Annual Report of the New Mexico College of Agriculture and Mechanic Arts Agricultural Experiment Station (Las Cruces: NMCAMA, 1908), p. 46.

6.Alfred Charles True, A History of Agricultural Education in the United States 1785-1925 (New York: Arno Press & The New York Times, 1969), p. 233.

7.NMCAMA, College Record: Nineteenth Annual Catalog, 1909, p. 18.

8.Conover, Ground-Water Conditions, p. 105.

9."Another Old Landmark Gone," 29 October 1949.

10.Fleming and Stoneking, Tests of Pumping Plants in New Mexico, pp. 31-32.

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20.NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, p.56; and Conover, Ground-Water Conditions, p. 104.

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24.Carl Madsen to D.G. Mulligan, 23 May 1950, PPD, Collection A 73-37, Box 3/5, RGHC, NMSU Archives, Las Cruces; and Sanborn Map: Las Cruces 1927, sheet 14.

25.NMCAMA, Thirty-Second Annual Report Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts (Las Cruces: NMCAMA, 1921), p. 23.

26.Conover, Ground-Water Conditions, pp. 182-183.

27.C.S. Conover, "Well Schedules Dona Ana County, Rincon Valley," Litton well, Files of Bob Meyers, United States Geological Survey, Las Cruces.

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40.Ibid.

41.Prohaska, "Report of Facilities of New Mexico College of Agriculture and Mechanic Arts Las Cruces; New Mexico," p. 9.

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44.Well #1 in R.C. Steele, "Report of a Sanitary Survey of State College Domestic Water Works System," n.d. (Santa Fe: State of New Mexico Department of Public Health), PPD, Collection A 73-37, Box 5/5, RGHC, NMSU Archives, Las Cruces.

45."Memorandum On Wells - Well #1, Domestic Water Well," 20 February 1952.

46.Interview with James Field, Las Cruces, New Mexico, 22 October 1987.

47.Conover, Ground-Water Conditions, pp. 180-181.

48.Fred N. Ares to Kirk Bryan, 2 September 1936, Files of Bob Meyers, United States Geological Survey, Las Cruces.

49.Conover, Ground-Water Conditions, pp. 180-183.

50.NMSU Regents, Minutes 1913-1933, meeting of 23-24 May 1932.

51.Strickland, "Building and Grounds Department," p.2-3.

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53.NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, p. 53.

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55.Conover, Ground-Water Conditions, pp. 176-177.

56.NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, pp. 56-58; and Conover, Ground-Water Conditions, pp. 104, 174-175.

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58.NMCAMA, Forty-Sixth Annual Report Agricultural Experiment Station, p. 53.

59.Conover, Ground-Water Conditions, pp. 182-183.

60.NMCAMA, College Record Forty-Seventh Annual Catalog Issue 1936-1937 (Las Cruces: NMCAMA, 1937), p. 22.

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63.Conover, Ground-Water Conditions, p. 174-175

64.C.S. Conover notes "Mesilla Valley Well Schedule Dona Ana County, NM," #3 Dom., Files of Bob Meyers, United States Geological Survey, Las Cruces; and Memorandum 18 February 1941; and "Memorandum On Wells - Well #2, Domestic Water Well," 20 February 1952, James Field personal papers.

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66.NMSU Well No. 2A is referred to as Well #3 in Steele, "Report of a Sanitary Survey of State College Domestic Water Works System," n.d.; and "Memorandum On Wells - Well #2, Domestic Water Well," 20 February 1952; and James Field, "The History and Technical Conditions of New Mexico State University's Domestic and Irrigation Wells," draft, 22 March 1982, James Field personal papers, p. 8.

67.NMSU Regents, Minutes 1933-1950, meeting of 28 July 1939.

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69.R.W. Boney to Water Users, 2 December 1940, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

70.Charles E. Strickland to Water Users, 3 February 1943, PPD, Collection A 75-34, Box 2/2, RGHC, NMSU Archives, Las Cruces.

71."College Domestic Water Regulations," 1 February 1943, amendment 14, PPD, Collection A 75-34, Box 2/2, RGHC, NMSU Archives, Las Cruces.

72.Strickland and Branson to McClernon, 25 January 1947.

73."Declaration of Owner of Underground Water Rights," for LRG 1857, 29 November 1982, Records of the Physical Plant Department Lockwood files, NMSU, Las Cruces.

74.Prohaska, "Report of Facilities of New Mexico College of Agriculture and Mechanic Arts Las Cruces; New Mexico," p. 9.

CHAPTER THREE
1946 - 1960

Introduction

The dominant influence upon the college water system during the post-war years were the efforts taken to secure additional sources of domestic and irrigation water. There were two major reasons why this increase was needed. First, the end of World War II saw an influx of new students attending the college, thus increasing the demand for domestic water. Second, throughout much of this period the Mesilla Valley suffered from drought and a diminished flow of the Rio Grande, resulting in less water available for irrigation. Steps taken to increase the amount of water needed to meet the needs of the college included drilling additional wells, connecting the college water system with the city of Las Cruces water system for emergency use, and an abortive attempt to discontinue providing water to the college community.

The end of World War II and the inception of the G.I. Bill resulted in a large increase in the college's enrollment. The enrollment for the fall semester of 1945 was 307 students. However, by the fall of 1946, enrollment jumped to 1,515 and by fall 1947, enrollment had risen to 1,697 students. By May 1948 the number of buildings on campus had grown to 40.[1]

18-in. Irrigation Well

By 1948, the student population had reached such a size that the demand for water strained the domestic water system. The college, anticipating the demand, had begun drilling new wells in 1946.[2] In June of that year, a requisition was submitted for drilling a new domestic water well.[3]

The location of one of these wells was on the south side of the Building and Grounds Corral, the present day parking lot north of the university's central heating and cooling plant on the corner of Frenger St. and Sweet Ave. (table 1). Although the new well was originally meant to be a 10-in. domestic well, when drilling was completed it ended up being an 18-in. irrigation well 100 ft. deep.[4] Charles E. Strickland, superintendent of the Building and Grounds Department explained the reason for the increased well size.

> This irrigation well was started with the intention of drilling a domestic water well as called for on our Requisition #378 on June 18, 1946. In drilling this, well, when we reached the depth of 50', which is 20' below the surface water table, we struck an exceptionally good strate of course sand, rock and gravel and continued in this formation to a depth of 75' at which point we struck clay and sand. This formation and condition was ideal for an irrigation well but the water was not of a quality to permit it to be used for a domestic water well.

So we are moving the location of our domestic water well and developing this well as an irrigation well.[5]

Drilling of the 18-in. well by Dickinson Brothers was completed by December 1946, but development did not begin until 1948 because the college was unable to acquire a pump at that time.[6] Because of problems that arose during development in 1948, the well was abandoned and replaced by a 22-in. irrigation well. The well was having trouble producing a steady flow of water, and was pumping sand and gravel.[7]

NMSU Well No. 1

The drilling of another well, this one domestic, was completed by February 1947. The driller was Frank Dickinson.[8] This well can be found in the southwest corner of the old Building and Grounds Corral (table 1). When originally drilled the well was 14-in. wide and 300 ft. deep. Like the 18-in. irrigation well, development did not begin until 1948 because of the unavailability of a pump.[9] During rehabilitation of NMSU Well No. 1 in 1964, a 10-in. casing was placed inside the 14-in. casing and the depth of the well was increased 87 ft.[10] The capacity of NMSU Well No. 1 after development in 1949 was approximately 500 gpm, but by 1952 the capacity decreased to 301 gpm. After rehabilitation in 1964, the capacity had increased to 975 gpm.[11] NMSU Well No. 1 is still in use. In 1947 it was known as "Domestic Water Well # 5", but by 1952 the well was known as "Well #3, Domestic Water Well."[12]

Campus Domestic Water Service

In November 1946, President Milton (figure 25) "notified the water users of the college community that the college would not be able to furnish them with domestic water after July 1, 1947."[13] During 1946, the college community used more than 13,964,065 gal. of water.[14] The residents of the college community petitioned the city of Las Cruces requesting that the city provide them with domestic water service. On January 6, 1947, the city of Las Cruces agreed to provide domestic water to the college community as soon as enough pipe could be purchased to run a line from Las Cruces to the college. The city, however, was confronted with finding enough pipe to run from the southern edge of Las Cruces to the college. Las Cruces City Manager Pat McClernon, writing to Charles Strickland in 1947, pointed out this difficulty.

> An order for sufficient pipe, for this job, was placed several months ago and as soon as the material arrives I will advise you in the matter; however, deliveries on material is exceedingly slow and we cannot guarantee any specific delivery date.[15]

Because of this delay, and the fact the water users could not find an alternative source of domestic water, the college community requested that the college continue to

Figure 25. Hugh M. Milton II, NMSU President 1935-1947.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

provide them with domestic water until the city of Las Cruces could provide them with this service.[16] The Board of Regents agreed to continue to provide domestic water to the college community until January 1, 1948, at which time it was hoped that Las Cruces would have completed extending its water lines to the college.[17] New Mexico College of Agriculture and Mechanic Arts President John R. Nichols (figure 26) reported to the Board of Regents in January 1948 that "the City of Las Cruces is now at work on an extension of their domestic water lines to include the State college community and that when this is completed the City proposes to connect with the main college line, so that in case of fire or other emergency the two water systems may supplement each other."[18] The college did not discontinue its domestic water service to the college community on January 1, 1948. Throughout the 1950s and into the early 1960s the college continued to sell water to the residents living in the vicinity of the campus.

New Irrigation Wells

In 1947, the college drilled two new agricultural irrigation wells. In November of that year drilling was completed on Horticultural Well No. 4 on the college's Horticulture Farm by the driller Layne Texas (table 1). The well replaced Horticulture Well No. 3 which had filled with sand. The 14-in. casing of Horticulture Well No. 4 went to a depth of 95 ft. The well produced 695 gpm of water in November 1947. According to Conover, the well was about 120 ft. from Horticulture Well No. 3.[19] The well is now known as LRG 1856. Some time after 1947 the well was rehabilitated, and a 4-in. casing was placed in side of the original 14-in. casing. By 1982 the well was only producing 40 gpm, and provided water for a greenhouse, irrigation and domestic use.[20]

A new well was also drilled by Layne Texas at the college's Agronomy Farm in 1947 (table 1). The well had a 14-in. casing and was 70 ft. deep. At the time the well produced 1,100 gpm of water.[21] It appears that either additional work was done on this well in 1953, or a new well was drilled in the same general location. In 1965, a "Declaration of Owner of Underground Water Right" was filed by NMSU for well LRG-34. Drilling of the well was completed by Valley Drilling Co. in February 1953. The well was 94 1/2 ft. deep, with a 16-in. casing. The well produced about 800 gpm. According to the declaration, water from the well was first put to beneficial use in 1946. Because it is not feasible for a well to be put to beneficial use before it is drilled, a reasonable conclusion is that the 1953 well and the 1947 well are the same, that the well was rehabilitated in 1953 during the drought period, and that the 1946 date is an estimate rather than an exact date.[22] This well is no longer owned by the university. It is located in a section of land that was sold to the Las Cruces Public Schools.[23]

Figure 26. John R. Nichols, NMSU President 1947-1949.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University Library.

College Water System: 1948

In 1948, Conover described the college water system as obtaining "its water supply from two wells drilled at the college above the level of the valley floor [NMSU Wells No. 1A and 2A]. Another well is used for emergencies and for filling the swimming pool [Mesa Pumping Plant]. A new well for domestic use, drilled in 1947, is not at present equipped with a pump [NMSU Well No. 1]."[24]

Campus Faces Water Shortage

In 1948 the college and Experiment Station were faced with a shortage of domestic and irrigation water. The shortage of irrigation water was a result of a lack of enough irrigation water from the Rio Grande.[25] The shortage of domestic water was caused by a greater demand placed on the domestic system by the increased number of students attending the college.

In March, Charles Strickland wrote President Nichols explaining how this problem developed, and the steps taken to deal with the problem.

> We have a serious emergency facing us at this time in the way of a water shortage for the college campus, both in our domestic water supply and our irrigation water supply.
>
> First, our campus irrigation water supply has been cut off causing the emergency by our not being able to secure water from the irrigation district for our campus of 108 acres of irrigated land. In previous years we have bought this water as excess water on our irrigated farm lands and brought it in open ditch from the irrigation canal to a sump at the foot of the campus and from there pumped it up on the campus through a steel and concrete pipe system to an average elevation of 75' where it is distributed and used.
>
> The campus is not a part of the Elephant Butte Irrigation Project and has no water right, but is mesa land adjacent thereto.
>
> Our domestic water supply emergency has been caused by our abnormal increase in use of water caused from our increased student body; also, by our numerous building programs for housing and for caring for this student body.[26]

Strickland pointed out that these problems were anticipated in 1946, and several actions had been taken. Two new wells were drilled, one for irrigation and the other for domestic use. The irrigation well was 18-in. in diameter and 100 ft. deep. The domestic water well was 14-in. in diameter and 300 ft. deep. However, pumps for the wells were not available until 1948 when the Building and Grounds Department began installing them and developing the wells.[27]

Conover reported that beginning in 1946, a number of people in the Mesilla and Rincon valleys expected an irrigation water shortage by 1948. In order to deal with this anticipated shortage, numerous irrigation wells were drilled in both valleys.

Unfortunately, after these wells were drilled, pumps were not available for some of them.[28]

In May 1948 John C. Overpeck, Agronomy Department head, wrote to Harry R. Varney, dean of the Agriculture College, as well as director of both the Experiment Station and Agricultural Extension Service, about the shortage of irrigation water for the college and experiment station. There would be no irrigation water "delivered in excess of the allotment in effect for the 1948 season." Overpeck added:

> The chief difficulty with our irrigation set up on this college farm is that at least 50 acres and probably nearer 75 acres on the campus and 20 acres at the U.S. Field Station draw their water supply from that allotted to the college farm. In other words, while the college farm consists of 179 acres the water allotted to these 179 acres must irrigate an additional 75 to 100 acres of land....However; it definitely seems to me that the situation hinges entirely on the campus problem and if we are going to get by, the Building and Grounds Department simply must make other arrangements for irrigating. I know that they have purchased a new pump for one of the new wells on the campus but it has never been installed and no move has been made to use the present pump down near the corral. It is my firm opinion that something must be done about this very promptly and certainly the Building and Grounds Department should not expect, under such circumstances, to use the water allotted to the valley land, and if they do, various crops of the Agronomy, Irrigation, Animal Husbandry, Dairy Husbandry, and Poultry Husbandry are certain to suffer from lack of water before the end of the season.

Overpeck concluded by saying that the Agronomy and Horticulture farms would be able "to get along with the present allotment since pumps are now available on those farms, but it is most obvious to me that the college farm can not get along with its allotment with an additional 75 acres or so added, and something had better be done very soon."[29]

Albert S. Curry, associate director of the Agricultural Experiment Station, wrote Varney the following day about his concern over the shortage of irrigation water.

> I would like to emphasize the seriousness of Mr. Overpeck's May 18 letter regarding the irrigation water for the institution.
>
> As you know a shortage of water may result in crop failure. This in turn results in loss of time in obtaining the desired experimental data, in loss of funds covering salaries and maintenance and in loss of revenue in some cases....Because of the seriousness of this situation it seems to me that future deliveries must be discontinued to the campus and that reciprocative measures should be applied to replace to the valley lands the water used this year to date on the campus.[30]

In June, the Board of Regents discussed the possibility of constructing "an additional domestic water tank on the hill beside the present two tanks." This location would be in the vicinity of present day Corbett Center.[31] During 1948, the increased demand for

water was caused by the growth of the college. That year approximently 2,500 students were registered, with 1,400 living on campus.[32]

22-in. Irrigation Well

A new 22-in. irrigation well was drilled in 1948 to replace the 18-in. irrigation well drilled in 1946. The 18-in. well failed to pump a sufficient amount of water, and observers thought not enough water was getting through the casing.[33] The location of the 22-in. well was "on the south side of the corral directly south of Building and Utilities shop and office building (table 1)." As of 1988, this building was still standing. Frank Dickinson was the driller of the well.[34]

By 1952 the 22-in. well had reached a depth of 80 ft. with a 35 ft. strainer. It was reported that "this well has never been used. It is in the process of being developed and has been pumped approximately 50 hours with air and 100 hours with turbine pump." In 1953 it was reported that the "well is at present covered over and has not been used for approximately a year." The approximate capacity of the well was 250 gpm.[35] Because there is no record of this well after 1953, it appears that it was abandoned and replaced by a new irrigation well, NMSU Well No. 5.

College and Las Cruces to Join Water Systems

The Board of Regents agreed on March 18, 1949, to enter into an agreement with the city of Las Cruces to connect both water systems so that in case of an emergency water would be available. It was pointed out that if this 6-in. line were established, it would be possible to eliminate the pump and pump house at Milton Hall, which was being used to fill the swimming pool. "Authority was granted to enter into an agreement with the City of Las Cruces for emergency exchange of water..." by the Regents.[36] It was not until April 1950 that the two water systems were connected.

The agreement was intended for emergencies and neither the college nor the city would "depend on the other for their permanent supply of water and each will maintain and enlarge their present water systems as necessary."[37]

By April 1950, work was finished on connecting the college and city water lines.[38] The city of Las Cruces extended a 6-in. water main south along Mesa Dr. (Solano) to the city limits, and the college extended a 6-in. water main north along Mesa Dr. to the same point. The two systems were connected at this junction, with a metering device installed and connections made for booster pump installation by which the water received from one system to the other could be metered. As of April 1950, without the aid of a booster pump, the city could deliver 277 gpm into the college system. The college could pump 353 gpm into the city's system.[39]

College Water System: 1949

As of June 1, 1949, the summer rate for water was changed from a minimum charge of $2.00 for the first 12,000 gal. of water to the pre-war price of $2.00 for 6,000 gal.[40]

In October 1949, the Board of Regents directed that the Mesa Pumping Plant be removed. This well had been in operation since 1908, and for most of its history provided the college with domestic and irrigation water. In the last few years before 1949 it was used only to fill the swimming pool. The regents also directed that the earthen irrigation reservoir, just east of old Hadley Hall, be filled in and a new one built.[41] This directive was similar to the recommendations of Strickland in a letter to Acting President John W. Branson in September 1949 on the same subject.[42] It appears that during this same time the college began making plans for a new sewage treatment plant, which was constructed in 1951.

Strickland stated, probably in 1949, that the maximum water consumption per day was reported to be 216,000 gal., and the minimum daily consumption was 37,000 gal. He placed the average consumption of water per day at 131,721 gal.[43]

College Water System: 1950

In April, 1950, Strickland described the college water system as having three domestic water wells (NMSU Well No. 1A, NMSU Well No. 2A and NMSU Well No. 1). With the three wells there was a "total well and pump capacity for our domestic water system of 577 gallons per minute or a well capacity of 1004 gallons." The domestic storage capacity consisted of 280,000 gal., "being 200,000 gallons in our steel stand pipe and 80,000 gals. in concrete tank." The average daily consumption was approximately 210,000 gal. Strickland sums up his report by writing, "As a whole our domestic water system is in excellent condition as far as water supply is concerned. Our storage and distribution system needs to be enlarged."[44]

The college began buying water from the city of Las Cruces soon after the two systems were connected. In May 1950, the college bought 1,159,200 gal. of water; in August, 1,352,400 gal.; and in September, 1,159,200 gal.[45] One of the uses for this water was filling the swimming pool. One pool filling required 193,200 gal. of water.[46]

R.C. Steel, associate engineer, Division of Sanitary Engineering and Sanitation, reported in December 1950 that the college had three domestic water wells, but that only one was actually pumping water into the domestic water system (NMSU Well No.1). According to Steel, "The college system delivers from 15,000 to 175,000 g.p.d. which is required to serve all of the campus buildings, which are not metered, and 128 which are metered." Besides providing water to residents living in the vicinity of the campus, the

college provided the Tortugas school with water. One major problem with the college's water system was lack of chlorination. Steel concluded his report by commenting on the college's plan to drill a new domestic well.[47]

Drought Affects College

Throughout most of the 1950s there was a shortage of irrigation water in the Mesilla Valley. "From 1951 to 1957 a severe drought caused a shortage of surface irrigation water. During this period several hundred wells were drilled, and ground-water was developed for irrigation purposes."[48] This drought directly affected the college.

The immediate impact of this drought was recorded in the document "Irrigation Situation, 1951." This document shows the differences between the amounts of irrigation water available in 1950 and that available in 1951.

> On the main College Farm, besides the 174 acres noted above, we are now irrigating at least 70 acres on the campus and at least 20 acres at the U.S. Cotton Field Station. As the picture appears at present we will in 1951 have 174 acre feet of water from the canal where last year we used 734 acre-feet. The only source of irrigation for all land west of the Las Cruces lateral is the canal water. This is also true for the U.S. Field Station. . . . It is estimated for the main farm that to supply 560 excess acre feet would require 3360 hours of operation, or 140 days of 24 hours each. It is further estimated that under continuous operation it would require 27 days to complete one irrigation of the entire 264 acres.[49]

In 1950, the Horticulture Farm used 140 acre-feet of water. The Agronomy Farm used 214 acre-feet of water during the same period. "The Agronomy and Horticulture farms with the aid of their present pumps can probably take care of their needs."[50]

In January 1951, the Board of Regents discussed the "problems facing the institution in securing irrigation water for the campus during the coming season." The regents directed President Branson "to do what seems to be necessary to get irrigation water for the campus."[51]

On January 30, 1951, the college sent letters to individuals living in the vicinity of the college who received irrigation water from the college informing them that the college would not be able to provide them with irrigation water for the coming year.

> Regarding irrigation water for this year. Due to the shortage of water we find that we will not be able to supply you with any irrigation water this year.
>
> We are indeed sorry of this condition, but since it is so serious that we are cutting out the irrigation on part of the campus and some of our fields we do not feel that we can supply private users.[52]

By 1951, John C. Overpeck of the Agronomy Department appears to have been placed in charge of the distribution of irrigation water on the campus and experiment station.

Overpeck refers to himself as "Water Master" and established regulations for irrigation during 1951.[53]

It appears from a memo dated June 1, 1951, that the city of Las Cruces was also being affected by the drought.

> The College will supply the City with any surplus water we may have. The method of supplying this water to the system is as follows.
>
> When College has surplus water they well notify the City Office at what time the College will open its valves at the campus to the city main, and will notify the City when the valves will be closed and we will cease serving water through the main.[54]

In December 1951 the college's new sewage treatment plant became operational. The plant replaced a system consisting of a septic tank and a series of lagoons.[55]

NMSU Well No. 5

In response to the regent's directive of January 29, 1951, the college began making preparations for the drilling of a new irrigation well. This well was to help fill the void in surface irrigation water resulting from the drought. On February 23, 1951, a Requisition For Purchase #205 was issued for the drilling of a new irrigation well.[56]

Drilling of NMSU Well No. 5 by George E. McKenzie was completed in 1951. The new 20-in., 240-ft. deep irrigation well was located "at foot of Campus," which would have been east of the present day Agriculture Building on Espina St. (table 1).[57] The well provided water for irrigating the campus and experiment station.[58] It appears that this well replaced the sump located on the corner of Espina St. and College Dr. NMSU Well No. 5 was capped in 1985 and the water rights to this well were transferred to NMSU Well No. 14, with 3 acre feet per year being temporarily transferred to NMSU Wells No. 12 and No. 13.[59]

By 1952, Overpeck, head of the Irrigation Service Department, was responsible for irrigation wells and the canal irrigation system on campus. In reference to NMSU Well No. 5, Overpeck wrote in 1952 that the well should be placed under control of the Irrigation Service Department instead of the Building and Utilities Department (formally the Building and Grounds Department).

> It was the consensus of opinion that the present system of operation of the pump near the seed house in 1951 was quite satisfactory and that it might be desirable to include this new well [NMSU Well No. 5] in the general Irrigation Service set-up and consider the two wells and the regular canal irrigation system as one integral unit.[60]

In February 1952, the Buildings and Utilities Department turned over responsibility for NMSU Well No. 5 to the Irrigation Service Department.[61]

LRG-33

It seems that a new irrigation well was drilled on the Horticulture Farm in 1951 (table 1). This well was known by the two different identification numbers of LRG-1859 and LRG-33. George E. McKenzie, driller of NMSU Well No. 5, was also the driller of this new horticultural well. The well had a 16-in. casing, and was drilled to a depth of 124 ft. The well's original flow was 1,273 gpm, the flow in 1964 was 1,100 gpm.[62] It appears LRG-33 was drilled near Horticulture Well No. 3, which has caused it to be mistaken for Well No. 3, or possibly Horticulture Well No. 3 was rehabilitated in 1951. In that case, Well No. 3 and LRG-33 are the same wells. LRG-33 was abandoned and capped in 1984 because its casing had deteriorated and the well had lost efficiency and production capacity. This failure led to a change in the location of the well. The new LRG-33 was located about 100 ft. north of old LRG-33 (table 1).[63]

NMSU Well No. 3

In 1952, NMSU Well No. 3 was drilled on the hill over looking the campus, the area south of present day Garcia Residence Hall and west of the ponding area by Alumni Residence Hall (table 1). This well appears to have been originally a 12-in. well 665 ft. deep. However, because sand was entering the casing, 590 ft. of 8-in. casing was placed inside the well in 1963. It is reported that the well produced 425 gpm before the 8-in. casing was added. After the new casing was added, the well was never a good water producer. The well, which had been drilled by Dickinson Brothers, was taken out of service in 1972.[64]

In February 1952 the college had approximately 1,250 students registered, with 850 of these living on campus. It was unclear how many persons lived in the temporary family housing units.[65]

NMSU Well No. 2

The drilling of NMSU Well No. 2 was completed in June 1953 by Frank Dickinson. The location of the well was in southeast corner of the old Building and Grounds Corral (figure 27, table 1). This well was described in June 1953, as being 485 ft. deep with a combination of 16- 12- and 8-in. casings.[66]

This well was drilled to contribute to the campus' domestic water system. When drilling began the well was known as Domestic Water Well #4, but by the time of its completion it was known as Domestic Water Well #6.[67]

The well was in use until 1964 when NMSU Well No. 1 was rehabilitated. However, the well never produced good water, had a bad odor, and pumped sand. It is reported the

Figure 27. University well locations circa 1953. (1) NMSU Well No. 3, (2) NMSU Well No. 1A, (3) NMSU Well No. 2A, (4) NMSU Well No. 1, (5) NMSU Well No. 2, (6) NMSU Well No. 5. Courtesy Hobson-Huntsinger University ARchives, New Mexico State University Library.

well pumped 350 gpm using a Byron Jackson deep well turbine pump. Since 1964, the wellhas been "used as an observation well and for static water conditions near Well #1."[68]

NMSU Well No. 6

Planning for the drilling and development of NMSU Well No. 6 began in April 1955. This well, also known as the Maestas Well, is located at Wells St. and Espina St. near the Dona Ana Branch Campus (table 1), and was originally intended to be a domestic water well.[69] Although drilling began in 1956 and was completed in 1957 by Frank Dickinson. It appears the pump was not installed until 1959.[70]

This well seems to have been used as an irrigation well instead of a domestic water well. It is reported to have pumped 1,067 gpm in may 1965.[71] The well appears to have been taken out of service sometime before 1981. The available records are unclear regarding the size and depth of the well. Records from the 1950s describe this well as having a 10-in. casing.[72] Later documents show the well as having a 16-in. casing and a 18-in. casing, and being 150 ft. deep.[73]

The Water Needs of an Agricultural College

In 1956 a list was prepared showing the various areas in which water was needed at an agricultural college. This list is obviously based on the needs of the New Mexico College of Agriculture and Mechanic Arts.

> Listed below are places over and above the usual academic program and laboratories where an Agricultural College must furnish utilities--in this case, WATER:
>
> Horticultural Greenhouses- irrigation and humidity
> Soils Laboratories- separation and cleaning
> Seed Testing Laboratory- cleaning and humidity
> Dairy barns- animal use, cleaning, milk cooling, refrigeration towers and live steam
> Beef cattle barns and pastures- animal use and cleaning
> Sheep barns and pastures- animal use and cleaning
> Swine barns and pastures- animal use, cleaning, and cooling
> Poultry brooders and runs- drinking, cleaning, egg washing, egg hatching humidity
> Meats Laboratory- cleaning and live steam
> Wool Laboratory- wool scouring and live steam
> Poultry Pathology Laboratory- medicinal cleaning
> Cotton Gin- humidity and fire protection
> Hay and feed barns- fire protection
> Feed and Fertilizer Control Laboratory- analysis and cleaning
> Animal Nutrition Laboratory- analysis and cleaning
> Animal pastures and feed- irrigation and silage preparation
> Agronomy field plots- irrigation
> Home Economics- food preparation, cooking and cleaning
> Agricultural Engineering- water measuring devices
> Extension Service- human consumption, dark rooms, and restrooms
> Dairy Manufacturing Laboratory- cleaning, analysis, and live steam

> Water, for the above uses, must be delivered long distances from minute quantities to fire protection quantities. It is used in every form from ice to live steam. It's source must be dependable.[74]

College Wants Out of the Domestic Water Business

In May 1958, the Board of Regents raised the water rate charged to the college community to the same rate the city of Las Cruces charges its customers. This action was taken so that the college would not be criticized for competing with the city of Las Cruces, whose rates were double that of the college. Because of this rate change, the college would then have a yearly income from water sales of $11,000 in comparison to the $7,000 it was then making. The regents wanted the college to "strive toward getting out of the water business as soon as practicable."[75]

City of Las Cruces Wants to Drill a Well on the Campus

In 1958, the city of Las Cruces wanted to drill a well on college property approximately 500 ft. from one of the college's wells, which would appear to be NMSU Well No. 7. The college denied the request because it believed this city well might lower the water table in the area and increase the hardness of the water.[76]

In 1959, Las Cruces requested to drill at a site in the vicinity of the Poultry Farm. The college rejected this request for the same reason it denied the 1958 request. The college did recommend a site on its property, which was sufficiently far away from any of its wells. This site was "west of the Truck-by-pass, east of Casad Lane, south of Mountain Avenue [University Ave.], and north of the last house on Casad Lane."[77]

Notes

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2.Charles E. Strickland to John R. Nichols, 3 March 1948, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

3."Requisition For Purchase," Reg. No. 378, 18 June 1946, Records of the Physical Plant Department main office, NMSU, Las Cruces.

4."Requisition For Purchase," Reg. No. 378, 18 June 1946; and Strickland to Nichols, 3 March 1948.

5."Requisition For Purchase," Req. No. 736, 27 November 1946, Records of the Physical Plant Department main office, NMSU, Las Cruces.

6.Strickland to Nichols, 3 March 1948; and "Memorandum," 21 March 1949, Records of the Physical Plant Department main office, NMSU, Las Cruces.

7."Memorandum - Irrigation Well at Building and Grounds Department," 23 July 1948, Records of the Physical Plant Department main office, NMSU, Las Cruces; and "Irrigation Water Well," n.d., Records of the Physical Plant Department main office, NMSU, Las Cruces; and "Requisition For Purchase," Req. No. 672, 5 August 1948, Records of the Physical Plant Department main office, NMSU, Las Cruces.

8."Payment For Purchases and Services Other Than Personal," to Frank Dickinson, 25 February 1947, Records of the Physical Plant Department main office, NMSU, Las Cruces.

9.Charles E. Strickland, "Memorandum," 28 February 1947, Records of the Physical Plant Department main office, NMSU, Las Cruces; and Strickland to Nichols, 3 March 1948; and "Memorandum," 21 March 1949.

10.Field, "History and Technical Conditions," p. 1.

11."Well No. 5, Domestic Water Well," n.d., Records of the Physical Plant Department main office, NMSU, Las Cruces, and "Memorandum On Wells - Well #3, Domestic Water Well," 20 February 1952, James Field personal papers; and Field, "History and Technical Conditions," p. 1.

12.Strickland, "Memorandum," 28 February 1947; and "Memorandum On Wells - Well #3, Domestic Water Well," 20 February 1952.

13.J.W. Branson and Charles E. Strickland to Hugh Milton, 7 May 1947, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

14.Strickland and Branson to McClernon, 25 January 1947.

15.Pat McClernon to Charles E. Strickland, 21 March 1947, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

16.Branson and Strickland to Hugh Milton, 7 May 1947.

17.NMSU Regents, Minutes 1933-1950, meeting of 10 May 1947.

18.NMSU Regents, Minutes 1933-1950, meeting of 7 January 1947.

19.Conover, Ground-Water Conditions, pp. 176-177.

20."Declaration of Owner of Underground Water Rights," for LRG 1856, 29 November 1982, Records of the Physical Plant Department Lockwood files, NMSU, Las Cruces.

21.Conover, Ground-Water Conditions, pp. 176-177.

22."Declaration of Owner of Underground Water Right," for LRG 34, 5 January 1965, State of New Mexico, State Engineer Office, Las Cruces.

23.Hand written note, 3 March 1983, on a letter, L.T. Putnam to New Mexico State University, 5 May 1965, State of New Mexico, State Engineer Office, Las Cruces.

24.Conover, Ground-Water Conditions, p. 106.

25.Ibid., pp. 2, 107.

26.Strickland to Nichols, 3 March 1948.

27.Ibid.

28.Conover, Ground-Water Conditions, p. 107.

29.J.C. Overpeck to H.R. Varney, 18 May 1948, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

30.Albert S. Curry to H.R. Varney, 19 May 1948, PPD, Collection A 73-37, Box 1/5, RGHC, NMSU Archives, Las Cruces.

31.NMSU Regents, Minutes 1933-1950, meeting of 7 June 1948.

32.Robert P. Lowe, "Report on Survey of Sewage Treatment Plant at New Mexico College of Agriculture and Mechanic Arts," n.d. (Santa Fe: State of New Mexico Department of Public Health), PPD, Collection A 73-37, Box 5/5, RGHC, NMSU Archives, Las Cruces.

33."Memorandum Irrigation Well at Building and Grounds Department," 23 July 1948; and "Irrigation Water Well," n.d..

34."Memorandum on Wells - Well #4, Irrigation Well," 20, 1952, Records of the Physical Plant Department main office, NMSU, Las Cruces.

35.Ibid.

36.NMSU Regents, Minutes 1933-1950, meeting of 18 March 1949.

37.Charles E. Strickland to John R. Nichols, 17 March 1949, PPD, Collection A 73-37, Box 2/5, RGHC, NMSU Archives, Las Cruces.

38.Charles E. Strickland to J.W. Branson, 14 April 1950, PPD, Collection A 73-37, Box 3/5, RGHC, NMSU Archives, Las Cruces; and Steele, "Report of a Sanitary Survey of State College Domestic Water Works System."

39.Strickland to Branson, 14 April 1950.

40."College Domestic Water Regulations," 1 February 1943, amendment 14.

41.NMSU Regents, Minutes 1933-1950, meeting of 17 October 1949.

42.Charles E. Strickland to J.W. Branson, 21 September 1949, PPD, Collection A 73-37, Box 2/5, RGHC, NMSU Archives, Las Cruces.

43."Sewerage System Questionnaire," n.d., PPD, Collection A 73-37, Box 2/5, RGHC, NMSU Archives, Las Cruces.

44.Strickland to Branson, 14 April 1950.

45.Charles E. Strickland to Henry Gaines, 26 May 1950, PPD, Collection A 73-37, Box 3/5, RGHC, NMSU Archives, Las Cruces; and Charles E. Strickland to Henry Gaines, 25 August 1950, PPD, Collection A 73-37, Box 3/5, RGHC, NMSU Archives, Las Cruces; and Charles E. Strickland to Henry Gaines, 30 September 1950, PPD, Collection A 73-37, Box 3/5, RGHC, NMSU Archives, Las Cruces.

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47.Steele, "Report of a Sanitary Survey of State College Domestic Water Works System."

48.Gary Lee Richardson, "Water Table Investigation in the Mesilla Valley" (Master Thesis: New Mexico State University, 1971), p. 4.

49."Irrigation Situation, 1951," n.d., Records of the Physical Plant Department main office, NMSU, Las Cruces.

50.Ibid.

51.NMSU Regents, "Minutes of the Board of Regents, June 5, 1950 to March 1, 1968," hereafter referred to as Minutes 1950-1968, meeting of 29 January 1951 (Las Cruces: NMSU).

52.Charles E. Strickland to Dan W. Williams, 30 January 1951, PPD, Collection A 73-37, Box 4/5, RGHC, NMSU Archives, Las Cruces.

53.J.C. Overpeck, "Memorandum Concerning Irrigation, 1951," 6 March 1951, PPD, Collection A 73-37, Box 4/5, RGHC, NMSU Archives, Las Cruces; and J.C. Overpeck, "Memorandum No. 2 Concerning Irrigation, 1951," n.d., PPD, Collection A 73-37, Box 4/5, RGHC, NMSU Archives, Las Cruces.

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63.T.J. Valverde to J.B. Nixon, 9 January 1984, State of New Mexico State Engineer Office, Las Cruces.

64.Field, "History and Technical Conditions," p. 8.

65.Lowe, "Report on Survey of Sewage Treatment Plant at New Mexico College of Agriculture and Mechanic Arts."

66.Hand written note concerning NMSU Well #2, 9 June 1953, Records of the Physical Plant Department main office, NMSU, Las Cruces.

67."Memorandum," 10 April 1953, Records of the Physical Plant Department main office, NMSU, Las Cruces; and Charles E. Strickland to Business Office State College, 26 June 1953, PPD, Collection A 75-34 RGHC, NMSU Archives, Las Cruces; and James Field, 20 December 1963, Records of the Physical Plant Department main office, NMSU, Las Cruces.

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71."NMSU Groundwater Well Field Data," n.d., Records of the Physical Plant Department main office, NMSU, Las Cruces, p. 1.

72."Requisition For Purchase," Req. No. 16792, 13 December 1956, Records of the Physical Plant Department main office, NMSU, Las Cruces.

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CHAPTER FOUR
1960 - 1987

Introduction

The major influence upon the expansion of the university water system during the decades of the 1960s, 1970s, and 1980s was the continual growth and development of NMSU. In the fall of 1960, 3,315 students were enrolled at NMSU.[1] By the fall of 1987, enrollment had grown to 14,003 students, an increase of 322.4 percent.[2]

The earliest yearly record of both domestic and irrigation usage on the campus was during fiscal year 1966-1967 when 462,555,000 gal. of domestic and irrigation water were pumped.[3] In 1987 approximately 749,457,300 gal. of water were pumped for domestic and irrigation usage, an increase of 75 percent over 20 years.[4] To keep up with the ever increasing demand for water, the university had to continually look for new sources. If new sources of water had not been found, future growth of the university would have been limited.

During the past three decades, the capacity of the university's water system was strained to the point of failure, in that demand almost surpassed capacity. Several times during this period the water system actually reached capacity. If a well had failed during those times, there would not have been enough water to keep the university functioning. However, through the efforts of the Physical Plant Department, as described in this chapter, the water system was able to keep one step ahead of demand.

The goal of the Physical Plant in administrating the university water system was to have enough wells on line so that if a well failed, enough extra water would be available to meet the demand. Because this policy required the water system to have a capacity greater than demand, new wells were constantly being drilled to replace older wells, which for various reasons could no longer be used.

Although the Physical Plant labored to find reliable sources of water, it was never able to make the system as secure as it wanted, primarily because it took the Physical Plant about two years to bring a well on line after it informed the university administration of the need for a new well. On several occasions, a new well began to function just when an older well deteriorated to the point where it could no longer be used, which put the campus water system back in the same situation where demand equaled capacity. At most, the water system would only be secure for a short time before the Physical Plant would have to start making arrangements to drill another well.

Additional contributing factors that influenced the development of the campus water system included a water shortage in the mid-1960s, water conservation, and efforts to improve water quality.

University Domestic Water System: Early 1960s

In the early 1960s, the university domestic water system consisted of three wells, No. 1, No. 2, and No. 3. Wells No. 1 and No. 2 produced approximately 325 gpm. However, they also pumped sand. In addition, Well No. 2 "produced free sulphur gas which made it obnoxious and was used only when necessary." NMSU Well No. 3 had a capacity of 400 gpm, and was called a "sander" because it pumped an inordinate amount of sand into the water system. The university had a total installed capacity of 1050 gpm.[5] In addition to the domestic wells, NMSU operated three irrigation wells, NMSU wells No. 5, No. 6, and No. 7.

NMSU Well No. 4

In December 1961, the Butte Pump Company finished drilling NMSU Well No. 4 on the university golf course (table 1). The well became operational in 1962. The well with a 12-in. casing was 607 ft. deep. Well No. 4 was initially intended to provided irrigation water for the golf course at the rate of a 1,000 gpm, but the original capacity was only 650 gpm. The well was connected to the university's domestic water system.[6]

In February 1965, Fred Day, director of the Physical Plant (figure 28), reported that the water was "hot and extremely hard causing some scaling problems at Alumni Ave. dorm."[7] Because of the well's poor water quality, by 1967 it was used only to irrigate the golf course. However, the well was still connected to the domestic water system in case of an emergency.[8]

It appears that the major use of NMSU Well No. 4 for irrigation ended in 1970 when the domestic system began supplying irrigation water to the golf course.[9] NMSU Well No. 4 was finally taken out of service some time before January 1973 because its pump failed when corrosive water ate holes in the casing and pump. The university decided not to put any more money into repairing the well because the water was of such poor quality that the university would no longer use it to irrigate the golf course.[10]

The "New Mexico State University Campus Water Report: Annual Report 1 July 1972 - 1 July 1973" stated that NMSU Well No.4 "will be abandoned and no longer used for irrigation or domestic water. Pump will be removed and bore will be used as an observation well for static water table studies." The report stated that the water was "fair, tastes salty and is warm."[11] The annual water report for 1974-75 stated that the well had been abandoned.[12] But in 1982, NMSU Well No. 4 was still used as an

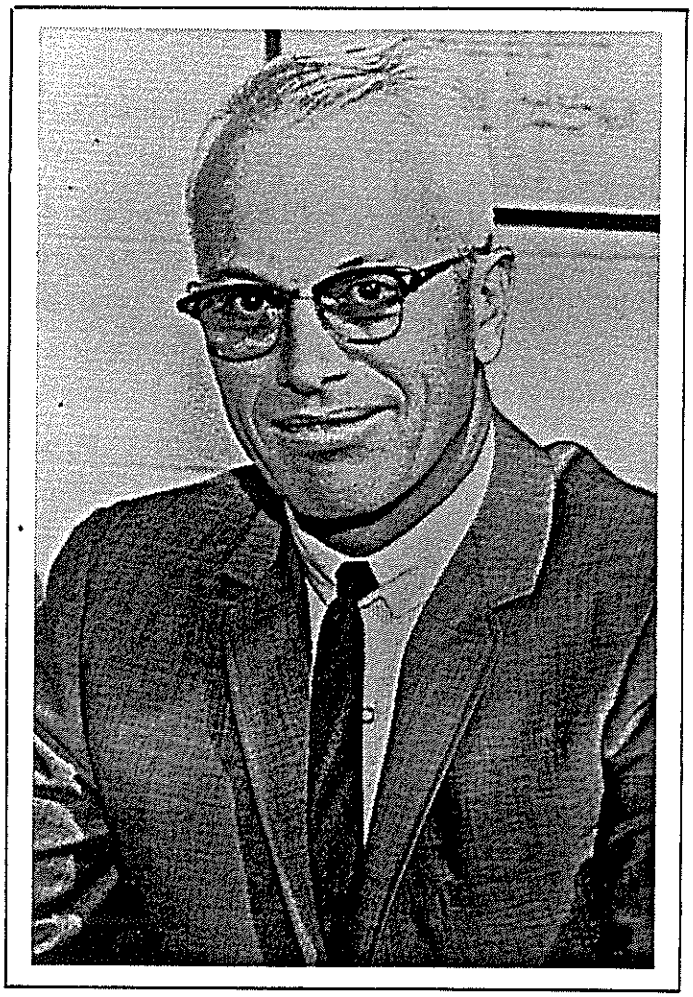

Figure 28. Fred Day, Director, Physical Plant Department 1956-1978. Courtesy Physical Plant Department.

observation well for static water level studies, and was also used in the geothermal project for waste water return.[13]

Water Shortage and Conservation

From 1963 to 1966 the Mesilla Valley suffered a shortage of surface irrigation water.[14] This shortage led the university to rehabilitate wells, such as NMSU Well No. 1 in 1964, drill new wells, such as NMSU Well No. 8, and emphasize water conservation.

Throughout its history, NMSU stressed the importance of not wasting water or having it wasted by off-campus water users. Off-campus water users were responsible for maintaining and repairing their water lines that were not on university property. However, if a problem developed in these lines, a leak for example, and the owner did not repair it, the university would make the repairs and charge the owner. In a letter dated May 2, 1963, Day explained to a water user that because the university could not reach him to get a leak repaired, the Physical Plant repaired it. Day wrote that the leaking water on University Ave. was a "hazard on the road and a waste." Day added that "Our water situation is critical and we cannot allow any losses."[15]

The water shortage lead NMSU to look for ways of landscaping the campus that would conserve water. Water conservation was the topic of discussion at the March 6-7, 1964, Board of Regents meeting. "It is important that the campus appearance be improved; the landscaping is not in keeping with the fine buildings. Since water is a problem, suggestions were made for use of plants and rocks that would not require water--such as desert plants, gravel."[16]

In March 1965, an NMSU student wrote New Mexico governor Jack Campbell complaining about what he considered to be the university's waste of water. He was upset because water from the campus sprinkler system was spilling over onto sidewalks and running in the streets. Also, he complained about a leak from a water meter manhole that had gone unrepaired also causing water to run into the street. Governor Campbell forwarded the student's letter to NMSU President Roger Corbett (figure 29), asking him to look into the situation. Corbett, in turn, asked Physical Plant director Day to investigate the complaint and report back to him.[17]

Day responded, explaining why some water spilled over onto sidewalks, curbs, and into the street. The university had recently installed a new sprinkler system in the central part of the campus in order to make more efficient use of its water for lawn irrigation. At that time of the year (March), the soil was compacted, and in places it was bare due to the sprinkler installation. Under these conditions, water could not be absorbed into

Figure 29. Roger B. Corbett, NMSU President 1955-1970.
Courtesy Hobson-Huntsinger University Archives, New Mexico State University.

the ground, but instead would run off. Also because the system was new and under initial trial, the grounds men had not learned to adjust the sprinklers properly.

The gradients on a number of lawns on the campus were changed from flat grades for flood irrigation to a more pleasing slope for sprinkler irrigation. The Physical Plant also was trying to grow grass to the curb, with a 2 percent overall slope to the campus. This would necessarily cause water to spill over the curb if the grass was to get sufficient water. With the 2 percent slope, water moved rapidly to the lower part of the campus where it was collected and used in Miller Field (formerly an athletic field located on the northwest corner of Espina St. and College Ave.).

Another factor contributing to increased street runoff was the new domestic water distribution system installed in 1964, which included 43 new fire hydrants. The Physical Plant flushed the hydrants occasionally to keep the valves operable. Because the outlet was required to face the street, sometimes water flowed in the gutters.

On University Ave., where the manhole was leaking, the university faced the age-old problem of serving water to off-campus users through the user's own lines, and trying to get them to repair those lines. Day explained that responsibility for the problem had been shifted to the city as that area was now in the city limits.

Day ended his letter to Corbett by writing that: "We appreciate all the interest and help we can get from anyone to help us conserve water."[18]

Sale of Water to Off-campus Users Ended

It appears the water shortage caused the university to consider discontinuing the sale of water to off-campus users in 1964. Upon examination of the water service, the determination was made to continue selling water off-campus. In September 1964 Day wrote of the discussion.

> We have looked into our water department operations because of the possible shortage of water we were faced with before the well repairs were completed and due to the trouble with trying to get the water customers to repair their own lines. We deliver only to University Avenue and they own their own lines from there to their homes. There are 73 customers located from the Las Cruces lateral on the west to Jess Morgan's house on Jordan St. on the east. The furthest one to the north is about four blocks from University Avenue.
>
> In the six-month period of January to June 1964, we metered 8,705,393 gallons to these customers and collected $2,557.06. Our power cost, calculated at the highest possible rate, is $750.00. There is some cost in meter reading, repair and billing but there is no denying that it is a profitable operation.
>
> There are plenty of headaches in dealing with our customers but I haven't much basis to recommend that we discontinue the service as I had originally thought of doing.[19]

However, five months later, during the February 1965 Board of Regents meeting, the decision was finally made to end the sale of water to off-campus customers.

> Through the years there are certain private dwellings adjacent to the campus that have purchased water from the University, with the understanding that each consumer provide and maintain their own lines. The City of Las Cruces has recently brought this area under a paving district, and is requiring that all water pipes be copper. The City has offered to install such pipes for their customers. NMSU's agreement with the users is that we are not a utility company, not responsible for the quality of water service, and can discontinue the service by giving 30 days notice. MOTION was made and seconded that the water users be notified that service from NMSU will be discontinued.

Thus ended nearly 60 years of service to the residential communities adjacent to the university.[20]

Future Water Needs

In planning future water usage, the Physical Plant prepared in November 1965, a list of the university's water needs from 1966 to 1968, as well as listing problems facing the campus water system. The document noted that some irrigation was done with domestic water.

	Summer 1966
Irrigation needs:	Forty acres new P.E. area
	New slope between Breland & Garcia
	Student Health Center
	Physical Science Laboratory
	East slope practice field
Domestic needs:	Wells Street grass
	Slope on Espina west of AF ROTC
	Triangle by south Stadium Parking Lot
	Fraternity housing domestic and lawns
	Light load on Central Cooling
	Plant
	Fall 1966
Domestic needs:	200 married student houses and lawns
	Addition to Jett Hall
	Mathematics Building
	Spring 1967
Irrigation needs:	Teacher Education project
Domestic needs:	900-unit dormitory
	Heavy load Central Cooling Plant
	Teacher Education project
	Spring 1967
Irrigation needs:	Student Union & Activities Building

Domestic needs: Student Union & Activities
Increased capacity at Central Cooling Plant

Three problems faced the university water system in 1965, 1) a need for more domestic water, 2) domestic water pressure problems east of Locust St., and 3) a need for additional irrigation water and the elimination of the irrigation storage pond.[21]

Domestic Water System: 1966-1967

In February 1966, the campus water system consisted of six wells (Domestic wells: NMSU wells No.1, No.3, and No.4; Irrigation wells: NMSU wells No.5, No.6, and No.7. NMSU Well No.2 was taken out of service in 1965.). These wells served an estimated 6,800 people, including 500 residential units for married student housing, 8 dormitories, classrooms, administrative buildings, and the irrigation needs of the campus.[22] During fiscal year 1966-67, the university's four domestic wells (NMSU Well No. 8 had come on line in June 1967 to help meet the extra water demands of the drought) provided the university with 462,555,000 gal. of water.[23]

During the fall of 1966, the university considered purchasing water, sewage, and gas services from the city of Las Cruces.[24] The university acknowledged that its domestic water system had grown so large that it had to make a commitment either to be in the "water business," or let someone else handle the responsibility of providing the university with water. If NMSU wanted to continue operating its own domestic water system, it had to commit a greater amount of money to hire more people to keep it working and more importantly, it had to drill additional wells.[25]

An additional motivation for purchasing water from Las Cruces may have been the recent water shortage. The university's overall strategy in regard to its water system was securing reliable sources of water for present and future needs. Receiving water from the city of Las Cruces was one method of achieving this goal. However, the university decided it would be more convenient to continue administering its own water system, and made the commitment needed to run a large domestic water system.[26]

In 1967, the university published its first domestic water survey. James Field of the Mechanical Engineering Department (later of the Industrial Engineering Department) wrote the report in co-operation with the Physical Plant. Field's association with the university's water system began when he was a student in the late 1930s working for the old Building and Grounds Department. According to Field, he wrote the report because "water consumption has been increasing so rapidly on the campus I felt that a survey should be made over a years time so that the people concerned could get a better picture of the system and its problems."[27]

Throughout 1966-1967, the university was able to pump enough water to meet its domestic and irrigation requirements, but lacked an adequate water storage facility. Field wrote on the need for a better storage facility in the first annual water report.

> We have heavy demands, especially in the afternoons, we can see where we are suddenly faced with a storage problem rather than increased pumping capacity. At this time we could be in serious trouble without our new well #8, but we should look for better storage facilities for safety and economy. . . . The largest improvement at the present time to our water system would be a storage tank of no less than 2 million gallons. This would smooth out our pumping curves, allow steadier pumping and lessen control problems. Adequate storage would save in maintenance on pumps and systems piping and supervision would be much less.[28]

NMSU Well No. 8

As a result of the water shortage, and the removal of NMSU Well No. 2 from service, a new domestic well was drilled. Boyd & Sons Drilling Co. finished drilling NMSU Well No. 8 on September 9, 1966 (figure 30). The location of Well No. 8 was on the north side of the Physical Plant warehouse on Wells St. (table 1). Water from the well was first put to beneficial use on June 21, 1967. Originally the well had a 16-in. casing and was 630 ft. deep, with a pumping capacity of 1,400 gpm.[29]

According to the "New Mexico State University 1966-67 Annual Domestic Water Survey," the water quality of NMSU Well No. 8 was excellent, and the well was considered a "principal producer of domestic water."[30] Eventually however, water quality deteriorated, and the well produced less and less water. In March 1975, NMSU Well No. 8 was no longer considered a lead well. The Physical Plant decided to limit the use of the well to standby peak load periods and emergency use. A new well, NMSU Well No. 9, came on line in 1975, replacing Well No. 8 as the lead well because it had better water quality.[31]

The 1977 domestic water report stated that of the three current domestic water wells, NMSU Well No. 8 was the poorest in quality. "Use of Well #8 is avoided as much as possible due to its excessive hardness, which is well above the U.S. Public Health Department's guidelines for domestic water. Even without such guides, the use of such hard water is highly undesirable as it leads to rapid scale formation in pipes, particularly where heat transfer is involved." In 1977, the well was only used during the high demand months of May to August in order to supplement the other two domestic wells.[32]

A Water Analysis Report issued on January 12, 1978, determined that NMSU Well No. 8 was "fair for irrigation but will cause deposit and reduce pipe diameter." The report went on to state that water from the well, classified as satisfactory for livestock use, was unsatisfactory for domestic use.[33]

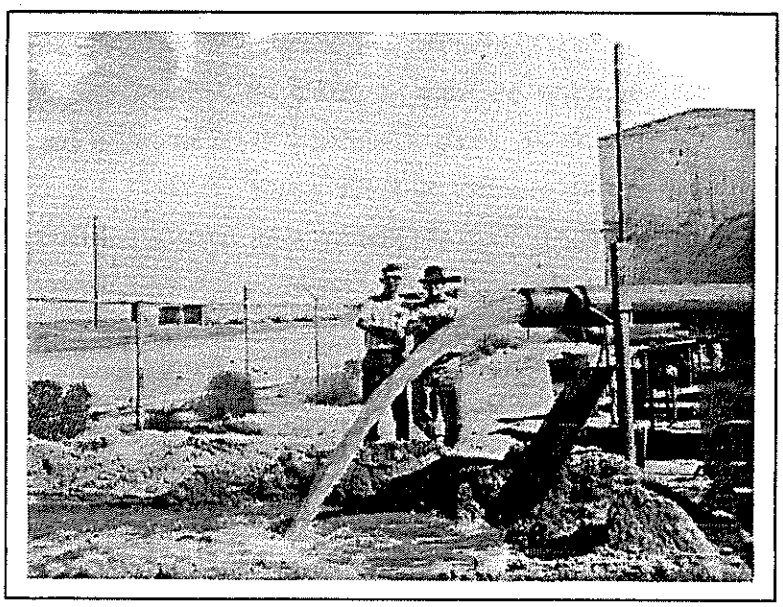

Figure 30. James Field (left) and Mr. Boyd of Boyd and Son Drilling, during the development of NMSU Well No. 8. Circa 1966. Courtesy Physical Plant Department.

In a July 13, 1978, memo to Vice President Kirkpatrick from M.F. Whalen (figure 31), Physical Plant director, Whalen discussed problems with NMSU Well No. 8, and its impact on the university water system.

> Well #8, the marginal well due to water quality, has begun to lose capacity and now will maintain a volume of only about 800 gpm. As a result we lose ground very rapidly during the day as lawn watering is done. We gain during the night but do not completely fill the tank again until the weekend. Further, when the tank drops below 13' we lose the prime on the golf course pump and water to the rodeo area. This prolonged hot spell and consequent heavy watering has definitely proven we have reached capacity, and beyond, on the present wells.[34]

Field wrote a memo to Physical Plant director Whalen on July 21, 1978, explaining that the capacity of Well No. 8 had fallen from 1,050 gpm to 800 gpm. The well was surging, but because of summer water demands, it was impossible to shut the well off for repairs. Field also expressed an urgent need for a new well.[35]

During the weekend of August 6-7, 1978, Well No. 8 failed and began surging, making it necessary to remove the well from service and make repairs. By September, the well was back in operation, but unfortunately the repairs did not improve the well's water quality. It was still only marginal, but capacity had increased to 825 gpm. Whalen wrote "Had the well gone dry two weeks earlier, we would have seriously curtailed irrigation. Thus the need for the new well becomes more obvious."[36]

In 1982, Field wrote that NMSU Well No. 8's water quality "was never too good for domestic use, and seemed to change over heavy pumping periods to light use in late winter. . . . The well has been plagued with problems since it was started on the line May 19, 1967. It is now being held for standby use as a irrigation well." Its pump was pulled in 1983.[37]

Domestic and Irrigation Water: 1968-1969

According to the 1968-1969 annual water report, enormous quantities of water for domestic and irrigation use were pumped from the university's wells each month. NMSU wells No. 1 and No. 8 were the principal producers of 300,099,000 gal. of domestic water. While Well No. 1 was the primary producer of domestic water, Well No. 8 augmented the water system when Well No. 1 could not keep up with demand. NMSU Well No. 5 was the principal producer of irrigation, pumping 495,500,000 gal. during the year.[38]

The Plant Science Research Center

In 1969, the university purchased 204 acres of land about eight miles south of Mesilla for use as the Plant Science Research Center (figure 2). As of 1988, seven wells were located at the research center. Water from these wells, along with water from the Rio Grande, were used to irrigate the various experimental crops grown at the center.

Figure 31. M.F. Whalen, Director, Physical Plant Department, 1978-1982. Courtesy Physical Plant Department.

Some of the research center's irrigation methods are also experimental in nature. When purchased by the university in 1969, the property had four existing wells, LRG-3926, LRG-3927, LRG-3929, and LRG-3929-s (table 1). It is unclear from the available documents when LRG-3926 and LRG-3927 were drilled and who the drillers were. In 1982, LRG-3926 had a 4-in. casing and was 50 ft. deep, and had a capacity of 30 gpm. Also in 1983, LRG-3927 was 200 ft. deep with a 4-in. casing, with a capacity of approximently 40 gpm.[39] The documents available for LRG-3929 and LRG-3929-s state that they were drilled in the 1950s, but the driller is unknown. Both wells had 18-in. casings, and were 100 ft. deep. In 1982 LRG-3929 had a capacity of 1,100 gpm. LRG 3929-s had an original capacity of 1,400 gpm, but by 1982 this had decreased to 1,200 gpm.[40]

In the early 1970s, three additional wells were drilled at the Plant Science Research Center (table 1). LRG-3929-s-3, drilled in 1971 by Johnson & Son, had a 8-in. casing and was 74 ft. deep, with an original capacity of 350 gpm. In 1972 Guffey & Sons Drilling finished drilling LRG-3929-s-2. The well was 200 ft. deep, with a 16-in. casing. The well had an original capacity of 2,000 gpm, but this had fallen to 1,800 gpm by 1983. Guffey completed LRG-3928 in 1973. The well had a 4-in. casing and was 200 ft. deep. Its original pumping capacity is unknown.[41]

University Water System: 1970-1974

As the 1970s began, NMSU continued to grow. Because of the growth, it was crucial that the university have a reliable water system that could meet the needs of the coming decade. During the first half the 1970s the campus had two domestic wells, NMSU wells No. 1 and No. 8, with Well No. 8 replacing Well No. 1 as the primary producer of domestic water.[42] Fiscal year 1969-1970 saw 322,778,000 gal. of domestic water pumped from wells No. 1 and No. 8.[43] The same wells pumped 504,751,600 gal. of water during 1973-1974.[44] This was an increase of 56.37 percent over five years. The same period saw enrollment rise form 7,608 to 9,675 students, a 27.16 percent increase.[45]

The use of domestic water during this period increased because the domestic system provided an increasingly greater share of water for campus irrigation. At the end of the 1960s, NMSU Well No. 5 produced 495,500,000 gal. of irrigation water.[46] By 1973, NMSU wells No. 3 and No. 5, which were the primary producers of irrigation water on the main campus, were only pumping 198,400,000 gal. of water.[47] The growing use of sprinklers for watering the campus lawns replaced the older flood irrigation method, which accounted for an increase in the amount of domestic water pumped. However, the overall amount of water used for irrigation decreased compared to the amounts under the older flood system, thus helping conserve water.

College Ranch: 1970

A new well named Headquarters, was drilled on the College Ranch in 1970 (table 1). The well, drilled by Schieffee Drilling Co., was 375 ft. deep with a 6-in. casing. This well seems to have replaced an earlier well also called Headquarters, drilled approximently in 1905 by Jim Sewell.[48]

Water Quality

In the 1970s, NMSU expanded its efforts to improve the quality of its domestic water. In 1972, U.S. Representative Harold Runnels (D-NM) wrote NMSU President Gerald Thomas expressing concern about the quality of the university's drinking water. Carl R. Hall, vice president-Administration, responded to Runnels' letter.

> The discoloration of the water supply on campus has been a sporadic problem, particularly in the periphery areas of the campus and particularly during the times of low use such as holidays and vacations. In November 1971 the University hired a sanitary engineering consultant who has established a testing schedule and who has tried several techniques to improve the situation. . . . In summary, the water is safe but not up to the standards we would prefer. We will continue to try new solutions until the water quality is satisfactory to all concerned.[49]

During fiscal year 1972-1973, an additional program was initiated to improve the quality of the campus' domestic water by regularly monitoring color and chlorine levels.[50]

Conservation

In a letter dated June 18, 1974, NMSU president Gerald Thomas expressed the university's desire to conserve water.

> Water conservation has become critical, not only on campus but in the entire State on New Mexico. I have asked for special studies of alternative approaches to landscaping in view of the need to conserve this vital resource. Preliminary reports indicate that with proper planning we can create the appearance of large amounts of vegetation with considerable water savings.[51]

Four Million Gallon Reservoir

A result of the 1960s water shortage was the call for new reservoir, first expressed in 1966.[52] In September 1971, the Board of Regents authorized the construction of a 4-million gal. steel reservoir.[53] By May 1972 the new reservoir was built and on line.[54] The new reservoir supplemented an existing 2-million gal. reservoir. This reservoir enabled the university to have greater confidence in its ability to meet its water needs.

The 1971-72 annual water report discussed the advantages of the new reservoir.

> The big difference and advantage to the water system over last summer is the addition of the 4-million gallon reservoir. Water consumption for this period is about the same as last summer except that a safe reserve is kept in storage. Should a power failure occur now we always have over 1,500,000 gallons in reserve. This allows time to shut down irrigation water, and normal operation

> of other critical equipment and experiments can be maintained. Last summer, a power failure would have been disastrous as our reserve was not over 10 or 15 minutes at the most.[55]

Additional benefits of the 4-million gal. reservoir included not running pumps during peak electrical load periods, which would result in a savings on the campus' electrical bills; and having longer pumping cycles, which would result in less line starts, thus increasing the life of the pump. "Under the old system, as many as four starts per hour was not uncommon on No. 1 well." Water pressure could be maintained resulting in safer fire protection in case of an emergency; Better water could be pumped to the golf course; The reservoir would also provide "adequate storage facilities for future planning."[56]

The 1972-1973 annual water report brought out further benefits of the new reservoir. "For instance when the Art barracks burned last spring, the system supplied three fire-engine pumpers and at their peak were putting out 1,500 GPM on the fire. Shortly after the fire was under control, the two water wells shut off with a full reservoir of water." Use of the reservoir as a water supply for firefighting led to a drop in the university's insurance rates.[57]

NMSU Well No. 9

During the late 1960s and early 1970s, the university had two wells producing domestic water, NMSU wells No. 1 and No. 8.[58] The university believed it was too risky to depend upon these wells, which were able only to meet its current needs. If either well had failed, the campus would not have had enough domestic water to meet its needs.

In June 1970, Field in a memo to Physical Plant Director Day, brought out the need for a new domestic water well.

> I have consulted with John Clark and Dr. John Hernandez of the Civil Engineering Department and made use of Clark and Viseman's text on water use and supply. They agree that our system is in grave danger should we lose a well. We use approximately one fifth the water the City of Las Cruces uses and they operate on 26 wells and a 12,000,000 gallons storage capacity.

Field concluded his memo.

> I feel that I cannot accept any responsibility for our water system should we have any failures. I also do not think that the Physical Plant Department should be held responsible for any such losses should they occur.
>
> Requests have been made for improvements that we felt were necessary for a modern, safe and efficient water system. Some of these have been as long as four years ago, especially water storage. I feel the responsibility now lies with those people who plan and develop the future of this University.[59]

Finances may have been the reason the university administration was slow in responding to the Physical Plant's requests. Drilling wells and building reservoirs were expensive undertakings. The administration may have wanted to make sure they had all the facts before investing money in such expensive projects.

In September 1972, the Board of Regents authorized the drilling of "a third water well in order to provide an adequate supply of water as the institution grows."[60]

In January 1973, a list was drawn up showing the reasons why the university needed to drill a new well, NMSU Well No. 9. The document was a demonstration of the university's efforts to plan for future water use.

1. To meet the demands for increased irrigation placed on domestic water system.
2. The addition of O'Donnell Hall, Physical Education Building, Stucky Hall, Arts and Science Building, which have been or soon will be on system.
3. The addition of the golf course on the domestic system.
4. Additional water will be needed for proposed addition to power plant and future expansions of buildings to this system.
5. To have a well for reserve in case of mechanical failure of one or both well at the same time. This factor is especially critical in the spring and summer seasons where maximum demands are placed on the system. Both wells now supplying water must pump 20 to 24 hours per day to meet the demands.
6. New Mexico State University had hoped to get all the campus irrigation on domestic water along with the new tank but before the tank was finished, the pump at the golf course failed due to the corrosive water eating holes in the pipe and pump. Rather than sink more money into repairs there - the water is of too poor a quality to use on the course - the course is supplied by the new tank. There is not now enough capacity to handle the campus irrigation also. The two pumps are presently operating about 85 percent of the available time and that is a very high use rate.[61]

In November 1973, a bid for the drilling of a new domestic well, NMSU Well No. 9, was accepted from Guffey & Sons Drilling. The location of the well was on Williams Ave. between Sweet Ave. and Standley Dr. (table 1). The 16-in. well was 525 ft. deep, and was on line by March.[62]

In addition to adding a new domestic well to the water system, the university also made plans to lay two, 10-in. water main loops to help with water distribution and

prepare for future campus growth. A new connection with the city of Las Cruces water system was also planned for emergency use. At the time, the university believed the present connection would not work very well in an emergency.[63]

When NMSU Well No. 9 first came on line in 1975, its water quality was considered excellent. Because Well No. 9 had better quality water than NMSU Well No. 8, it replaced Well No. 8 as lead well and principal producer of domestic water.[64] But by 1978, the water quality of Well No. 9 had deteriorated to the point that the well was classified as borderline satisfactory for domestic use.[65]

In March 1982, Well No. 9 was still considered a principal producer of domestic water. In late fall and winter, it alternated as lead well with Well No. 1.[66] Later in the year, NMSU Well No. 9 began "pumping a large quantity of sand into the domestic water system." Upon investigation "it was determined that the top 294 feet would have to be re-cased; the pump and column and shafting replaced."[67]

Owen Lockwood (Physical Plant engineer responsible for campus water wells after James Field retired) wrote on the need of having this well repaired.

> This well is one of three on campus which provide NMSU with domestic water, at this time. Due to the proximity of our normal hot summer, a time when the university's water consumption rapidly accelerates. it is imperative that we proceed as rapidly as possible with the repair measures.
>
> I believe that this repair work constitutes an emergency as the university's normal water consumption for the summer period exceeds that which can be provided by the normal operation of the remaining domestic wells.[68]

By June 1982, NMSU Well No. 9 was rehabilitated and back on line. A 14-in. casing was placed inside the original 16-in. casing to a depth of 300 ft. After rehabilitation, the well pumped 1,100 gpm.[69] Five years later, water quality had deteriorated to the point where engineering consultant Jesse Lunsford determined that water from Well No. 9 "is of poor quality and should be used only for emergencies." [70]

University Water System: 1975-1977

Three domestic wells were operating in the mid-1970s: NMSU Wells No. 1, No. 8, and No. 9. In 1975 these wells produced 499,576,000 gal. of water, serving a student population of 10,649.[71] By 1977, production had increased to 554,000,000 gal. while enrollment grew to 11,423 students.[72]

When NMSU Well No. 9 came on line it produced better quality water than NMSU Well No. 8, and thus was made the lead well. Beginning in March 1975, Well No. 8 was only used for standby load and emergencies. By 1975, two campus irrigation wells had been abandoned, No. 4 at the Golf Course, and No. 3 south of Garcia Residence Hall. An

irrigation pond located near well No. 3 was also abandoned. The abandoned wells were to be used as observation wells for static water table conditions.[73]

The quality of the NMSU's water continued to be an important responsibility of the Physical Plant during this period. "Water quality control which is under the guidance of Dr. Lunsford of the Civil Engineering Department continues and is a most valuable phase of Physical Plant's effort to keep water quality under control."[74]

During 1974-1975, water usage decreased 14.05 percent on the campus, the first time in eight years in which water use decreased. The decrease was the result of a higher amount of rainfall during the summer of 1974, which in turn meant less ground water was needed for irrigation.[75]

The only well producing irrigation water for campus use after the abandonment of wells No. 3, and No. 4, was NMSU Well No. 5. In 1975, NMSU Well No. 5 pumped an estimated 248,400,000 gal. of water between July and December. During 1976, No. 5 produced an estimated 319,616,000 gal. of water. Well No. 5 produced less water than in the past because the irrigation pond located near NMSU Well No. 3 on Locust St. was moved.[76]

Conservation: 1975

Water conservation continued to be important to the university during the mid-1970s. In July 1975, Day received a memo from Donald Cotter concerning different ways in which the university could conserve water.

> I was pleased to receive a copy of the memorandum from Mr. Field concerning water use during a test period from June 17 to June 23, 1975, in which slightly more that [than] 45 acre feet was used on campus during a seven day period. While it is difficult to determine which portion of the water used was supplied to the landscape, a number of studies of urban settings indicate that the water used during the summer exceeds all other uses, by several fold. This is particularly true when the water is not metered. The campus base use rate could be estimated in two ways. First, water used could be monitored during periods of heavy rainfall. Normally, then all of that consumed would have been for purposes other than campus landscape maintenance. Second, water use could be monitored during various periods of the year beginning in September when full campus activities begin through early May when they cease. Campus domestic use would predominate during the winter periods. That water used in excess of base campus use in the fall and the spring could be charged to the landscape.
>
> You recall our studies show that it is possible to save 45 to 50% of the water applied when thought is applied to balance the plant needs with irrigation applications. I think the solution to the problem lies in reducing the frequency in which water is applied on campus. Bob Reeves is working on this point now. Also, greenhouse research on turf water requirements show that hybrid bermuda

turf used less water than common bermuda and buffalo grass. Fescue is the greatest consumer - using 25-40% more than the other 3 species.[77]

Water System: 1977

By 1977, the university's domestic water system was supplying most of the water used for irrigating the campus and the University Golf Course. Fire hydrants were also connected to the domestic system. As the campus expanded, the majority of new irrigated areas received water from the domestic system. To use irrigation water in these new areas would have required installing duplicate water lines, one for domestic water and the other for irrigation. Older irrigated areas on the campus that had previously received irrigation water were connected to the domestic system. Another reason for this change was that the older irrigation system suffered from inadequate water pressure. When previously developed areas on the campus began receiving water from the domestic system, the form of irrigation changed from flood to sprinklers. This "resulted in a considerable reduction in total water used on these fields, but has shifted the requirements to the domestic system."[78]

In 1977, the domestic system consisted of three wells, NMSU wells No. 1, No. 8, No. 9, and a 4,000,000 gal. water tank at the Golf Course.[79] The wells operated in order of the quality of water produced. NMSU Well No. 1 had the best water quality and was the lead well. The well pumped more than half the total domestic water produced during 1977 and ran most of the time. NMSU Well No. 9 had the second best water quality and ran when well No.1 fell behind. Use of NMSU Well No. 8 was avoided as much possible because of the excessive hardness of its water, although the water hardness was well above the guidelines of the U.S. Department of Health for domestic water.[80]

Problems With The Water System

By 1977, the university's domestic water system had almost reached the point were demand surpassed capacity. Demands at the time required the use of NMSU Well No. 8, which should not have been in domestic use because of its poor water quality. At the time, it was possible that the university could have been forced by the EPA or another regulatory agency to remove Well No. 8 from the domestic system. If NMSU had been forced to remove Well No. 8 from the system, or the well had failed, the university would not have had enough water to meet its needs. Within a month during high use periods, the reserves would have been exhausted. In 1977, future demands expected to be placed upon the domestic water system involved a new stadium, practice fields, baseball facilities, and other new construction.[81]

The 1977 water report reflects the university's discomfort with the campus water situation.

> Murphy's Law dictates that things which can go wrong, will--and at the worst possible time. If a well were to fail, it would most likely do so when most heavily loaded--during the high-use months. Under such circumstances, even assuming a full storage tank at the time, which is highly unlikely, the University would run out of water in about two weeks to a month. If the tank happened to be empty, the University would be in trouble almost immediately.[82]

During peak summer months, water production was nearly 70 percent higher than the yearly average, and four times greater than the winter low. This peak requirement was troublesome in regard to capacity. In 1977, the water system could produce 6,800,000 gal. in a 24-hour period without running NMSU wells No. 1 and No. 9, but this would have completely drained the storage tank. Realistically, if a load much exceeding 2,000,000 gpd had been sustained for a few days, it would have been necessary to run NMSU Well No. 8. The wells produced such a load during most of the summer of 1977.[83]

The 1977 water report concluded by making a strong call for a new well.

> An adequate reliable water supply is too important to neglect. Further if the water system is allowed to deteriorate, the fire insurance rates will be adversely affected. Something must be done soon. There are two options open to the University for dealing with this problem. Water could be purchased from the City of Las Cruces for about $0.40 per thousand gallons, assuming the City would be willing to sell the University the necessary quantities. Or, NMSU can drill a new well. . . . It is strongly recommended that a new well be drilled as soon as possible. This should be a high priority item; it is something which cannot be ignored.[84]

A New Domestic Water Well is Needed

Throughout 1978 there were increasing calls for a new well. In June 1978, the Physical Plant drew up a list of facility needs for the campus. Item 1 on the list was "New domestic water well" and item 9, "Complete auxiliary water line to storage tank".[85]

In July 1978, M.F. Whalen, Physical Plant director wrote Vice President Kirkpatrick about the university's water needs. Whalen stressed the need for a new well, and a second water pipe going to the storage tank by the Golf Course.

> Well #8, the marginal well due to water quality, has begun to lose capacity and now will maintain a volume of only about 800 gpm. As a result we lose ground very rapidly during the day as lawn watering is done. We gain during the night but do not completely fill the tank again until the weekend. . . . This prolonged hot spell and the consequent heavy watering has definitely proven we have reached capacity, and beyond, on the present wells.
>
> Next year we will be adding the stadium lawn and landscaping, football practice fields, baseball fields, and a rather large area around the Educational Services Building. All will be watered on the potable system while the old stadium and

practice fields are on the irrigation well. No savings there! With our being slightly beyond capacity now, next year we will be in real trouble. I am advised the area on the west side of the campus, where the new well is to be sited, has a record of good quality water so the taste of our water in the summertime should be much better.

The increase demand also makes it all the more important we have the second pipe up the hill to the reservoir. The present velocity in the pipe is sufficient to cause a vibration that can be felt in the ground. Increase flows will no doubt aggravate the problem and a rupture could result in a prolonged water outage.

I realize this is a rather large outlay request, yet it is vital to the entire University that the two projects are completed this winter.[86]

Later in the month Field sent a memo to Whalen outlining problems with the water system, especially the need for a new well.

Water Well No. 8 (next to P.P.D. offices), which has been used as a standby, has fallen off considerably due to heavy pumping this summer. Its flow has decreased from 1,050 g.p.m. to 800 and has created a problem as the well surges and an artificial head has to be placed upon the pump to decrease the flow, to overcome surging. This is necessary as excessive surging such as we experienced can cavitate the pump quickly and also damage the electric system.

At the time, we cannot shut this well off for any kind of repairs. Our summer consumption of water is very high and the loss of #1, #9, or #8 well would create a very great problem with our system.

It is most urgent that we get a new well started soon. It will push P.P.D. to have this well in operation for the next summer season which begins around April when our consumption rises.[87]

However, two more years passed before a new well was drilled and operational.

During 1978, NMSU wells No. 1, No. 8, and No. 9 produced more than 560,131,700 gal. of water. Water production for June, July and August "equals 41.5% of total yearly production which should show enormous amounts of water used for irrigation."[88]

NMSU Well No. 10

R.L. Guffey received the contract to drill NMSU Well No. 10, with drilling completed by June 1979 (figure 32). The well's location was south of Espina St. at I-10 and the access road (table 1). NMSU Well No. 10 had a 16-in. casing and was 775 ft. deep. Water from Well No. 10 was first put to beneficial use in May 1980. The well was intended for domestic use. The original capacity of the well was 2,100 gpm, in 1982 the capacity was recorded as 2,000 gpm.[89]

On February 23, 1983, Well No. 10 failed because of a broken pump shaft.[90] During the period it took to repair the well, the university considered itself in an emergency

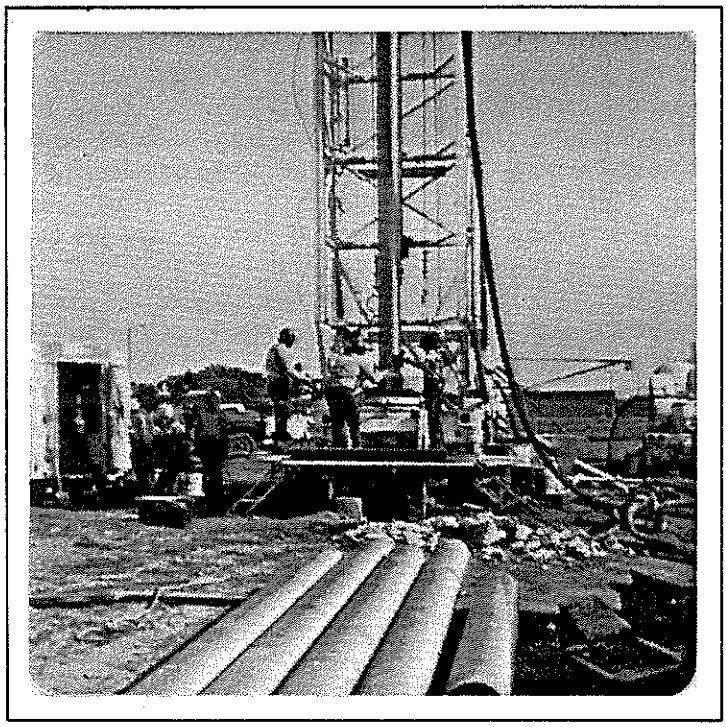

Figure 32. Setting screen for NMSU Well No. 10. Circa 1979. Courtesy James Field.

situation. "New Mexico State University is therefore in an emergency status for the repair of Well #10." The university had to depend on only two wells during this time, No. 1 and No. 9. These wells met the immediate needs of the university, but with water demands increasing during April, there was the possibility that demand would exceed the capacity of these wells.[91] It appears that by the end of March, the well had been repaired.[92]

In subsequent years, NMSU Well No. 10 suffered several pump failures. In February 1986, the motor on the pump burned out and was replaced.[93] On May 4, 1987, the pump failed on Well No. 10. Repairs were made and by May 7, the well was again pumping water.[94]

Geothermal Water Wells

Beginning in 1979, the university began developing geothermal water wells in order to test and evaluate the potential use of geothermal water (table 1). Geothermal water also provided the university with a growing alternative source of heating. Two wells were drilled in 1979, NMSU No. PG-1 and NMSU No. PG-2. In 1981, NMSU No. PG-3 was drilled. Injection Well LRG 520-Inj. was drilled in 1982, followed by the drilling of NMSU No. PG-4 in 1986.[95]

Agricultural Water Needs

In 1978 the Experiment Station prepared "Agricultural Research at New Mexico State University - History, Current Research and Future Goals." The document stressed water research as one of three broad areas for future agricultural research. The first area of research involved finding a "better use of water and natural resources." Research within this area would center on water conservation, trickle irrigation, the effect of chemicals on ground water, development of crops requiring less water, and desalinization of saline ground water.[96]

Horse Farm and College Ranch

The university's Horse Farm in Mesilla Park was the site of the drilling of a new irrigation well LRG-1860 in 1979 (table 1). The well had a 12-in. casing, 154 ft. deep, with an original capacity of 650 gpm.[97] At the College Ranch, Camp Well #2 was drilled in 1980 by Aqua Drilling to a depth of 450 ft with a 6-in. casing (figures 33 and 34, table 1).[98]

NMSU Well No.11

The drilling of NMSU Well No. 11 began in February 1980 with the well first being put to beneficial use that August.[99] The well was located on El Paseo Rd. south of College Dr. (figure 35, table 1). The purpose of Well No. 11 was to irrigate fields

Figure 33. Camp Well #1, College Ranch. Windmill provided power to pump.

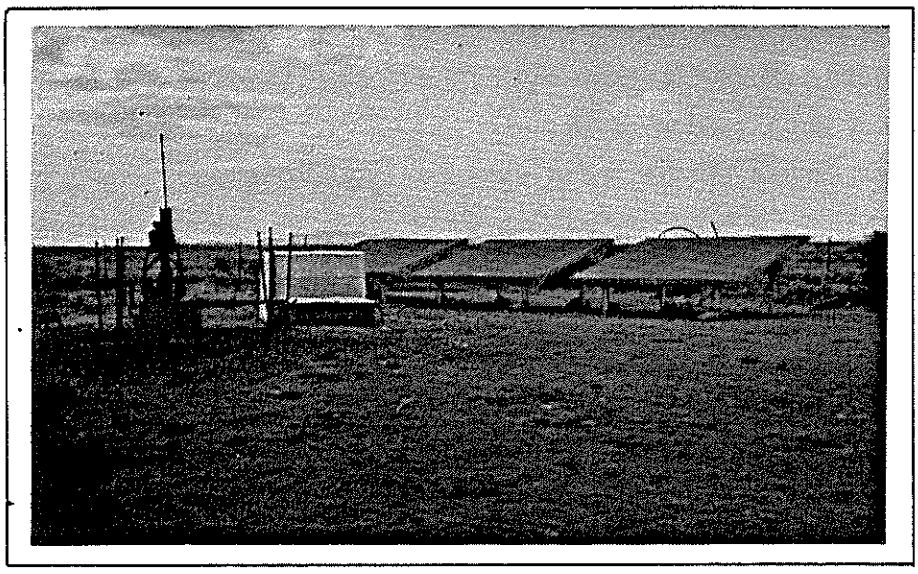

Figure 34. Using new technology, Camp Well #2, College Ranch, is powered from photovoltaic collector arrays, which provide electricity to run the pump.

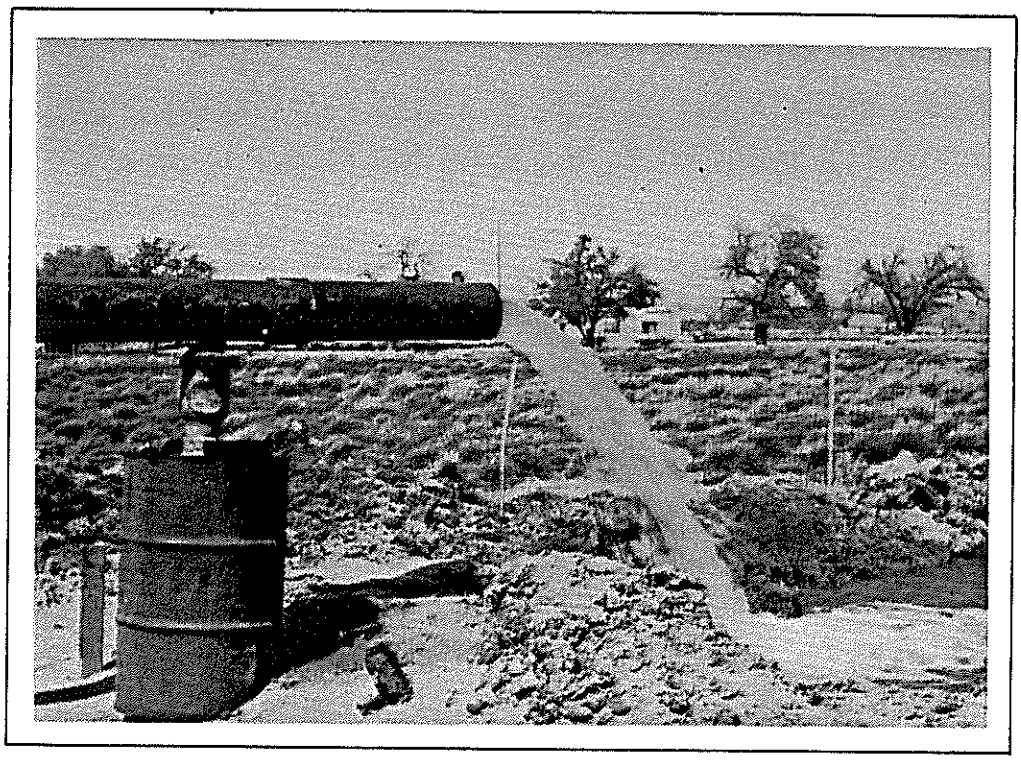

Figure 35. NMSU Well No. 11, 1980.
Courtesy James Field.

formerly irrigated by NMSU Well No. 5. These fields were cut off from Well No. 5 because of the construction of Knox Hall. The responsibility for managing NMSU Well No. 5 was then shifted to the Physical Plant where it was used for campus irrigation. NMSU Well No. 11 became the responsibility of the Animal & Ranch Sciences Department.[100] The driller of Well No. 11 was B.D. Lacy & Sons Drilling Co. Originally the well had a 16-in. casing, and was 150 ft. deep, with a capacity of 1,500 gpm.[101]

Historically, NMSU Well No. 11 never pumped the volume of water originally intended. The pump was designed with a capacity of 1,800 gpm, but the well never consistently pumped more than 600 gpm. In July 1983, the pump was pulled, and work was done on the well increasing production by only approximently 100 gpm. In late 1984, additional work was done on the well that increased capacity to 1,500 gpm. By February 1985, production had fallen to 1,200 gpm, and to 1,000 gpm in June 1986.[102]

By the summer of 1986, Well No. 11 was again causing problems. In July 1986, Bobby Rankin, department head of Animal and Range Sciences, wrote that he wanted to use campus domestic water to supplement the Agricultural Farm's irrigation system.

> Our well on El Paseo has not provided adequate water for our needs and is not currently piped to the pastures west of the irrigation canal. We plan to attempt to improve production from our well, but, based on past experience, we don't expect it to completely meet our needs. Since the cost of an additional well is prohibitive at the time, I believe use of the domestic system on a limited basis is a feasible alternative.[103]

The Physical Plant looked into the problems associated with NMSU Well No. 11 and determined that in the long run trying to improve the capacity of NMSU Well No. 11 would be useless because the well could never produce a sufficient quantity of water.[104]

In August 1986, Jesse Lunsford conducted tests on NMSU Well No. 11. He concluded his report by writing that "It's highly improbable that the economic value of this well for irrigation can equal the cost of operation maintenance and annual acidizing of the system." His recommendation was "to design the distribution system for well #14 to provide irrigation capabilities to replace use of well #11. Declare well #11 with the State Engineers office for future equivalent use at a new location."[105]

NMSU Well No. 12 and NMSU Well No. 13

Hargraves Drilling drilled two new wells in 1982, NMSU wells No. 12 and No. 13. These wells were located on the west side of Knox Hall (table 1). Temporary water rights for both of wells came from NMSU Well No. 5, with each well receiving 3 acre feet per year. The reason for drilling these wells was "To provide the Fish and Wildlife Department of N.M.S.U. with water (nonchlorinated, non-metallicin nature) to be used for research and experimentation projects on the N.M.S.U. main campus."[106] NMSU Well No.

12 had a 4-in. casing, drilled to a depth of 90 ft. NMSU Well No. 13 also had a 4-in. casing, but was 382 ft. deep.[107]

Agricultural Water Needs in the 1980s

As the 1980s began, the College of Agriculture and Home Economics and the Experiment Station recognized the important role water played in past research and educational efforts and emphasized its importance to future efforts. In 1981, the Experiment Stations considered research in the area of water to be of top priority for the coming decade. "Research on water has received top priority in the Agricultural Experiment Station since its inception - much has been learned, much remains to be discovered." The first area of research would be water conservation. This area of investigation planned to concentrate on drip or trickle irrigation, water retention, and measuring actual water used at various stages of plant growth. A second area of research would focus on producing plants with salt tolerance. Producing drought resistant alfalfa was to be a third area of research. The fourth area of research would concentrate on the economic aspects of using water.[108]

The Experiment Station believed New Mexico never "addressed the total research and development dimensions of its water problem. No state faces a more serious obstacle to economic growth." However, because of other responsibilities the Experiment Station was only able to allocate part of its funds for work in this area.[109]

The Experiment Station's five year research plan, beginning in 1981, called for Agricultural Engineering to work on providing information to help reduce the water required for irrigation.[110] In the Experiment Station's 1983-84 and 1984-85 budgets, it listed some of the significant contributions that the Experiment Station made in past decades. In the area of water, the Experiment Station through the efforts of the Agricultural Economics and Agricultural Business Department dealt "with water, cost and returns, marketing of farm products and socio-economic problems in rural areas, thus encouraging efficient production and profitable establishment of irrigation projects," and other agricultural economic enterprises. Through Agricultural Engineering, the Experiment Station pioneered the "consumptive use of water, including application and conservation. Recently, research concluded on conservation of energy through an innovative pump testing program."[111]

New Well at the Horticulture Farm

In 1984 a new well was drilled at the Horticulture Farm in Mesilla Park. This new well, called LRG-33, replaced the original LRG-33 drilled in the 1950s (table 1). The water rights of the original LRG-33 were transferred to the new well and the older well

was capped and abandoned.[112] The new well had a 16-in. casing to a depth of 152 ft. At the time of completion the well had a capacity of 1,050 gpm.[113]

Domestic Water System During the 1980s

In 1980, domestic wells No. 1, No. 9, and No. 10 served a population of 12,347 students with 543,121,400 gal. of water. During the same year, irrigation Well No. 5 produced 41,264,000 gal. of water.[114]

In 1982, Calvin Douglas Black (figure 36) became the current director of the Physical Plant, thus taking the overall lead in administering the university's water system.

The Environmental Improvement Division of the Health and Environment Department described NMSU's water system in a 1983 report. The system's maximum water production for a day was 2,912,000 million gal. The average daily production was 1,546,000 gpd. The report estimated that the water system served 12,000 people. It also estimated that there were 1,000 connections to the system. The water system had three wells: NMSU Well No. 1, capacity 800 gpm, NMSU Well No. 9, capacity 1,300 gpm; and NMSU Well No. 10, capacity 1,800 gpm. Storage capacity in 1983 consisted of "Reservoir No. 1," a 4-million gal. steel tank, built in 1971, and "Reservoir No. 2," a 400,000 gal. steel tank installed in 1978.[115] The domestic system produced 631,433,000 gal. of water, and two wells, NMSU wells No. 8 and No. 5, were taken out of service in 1983.[116]

NMSU Well No.14

Drilled in June 1985 by R.L. Guffey, NMSU Well No. 14 is an 18-in., 720 ft. deep well. NMSU Well No. 14 is located on College Dr. and El Paseo Rd., just east of the Seed House (figure 37, table 1). Water rights for this well were transferred from NMSU No. 5. In October 1986, the well discharged 2,350 gpm.[117]

By 1987, the student population had increased to 14,003. The primary domestic wells were NMSU wells No. 1 and No. 10, producing approximently 749,457,300 gal. of water.[118] The water quality of Well No. 9 had deteriorated to the point where it was no longer used on the domestic system.

Figure 36. Calvin Douglas Black, Dirctor, Physical Plant Department, 1982 to present.
Courtesy Physical Plant Department.

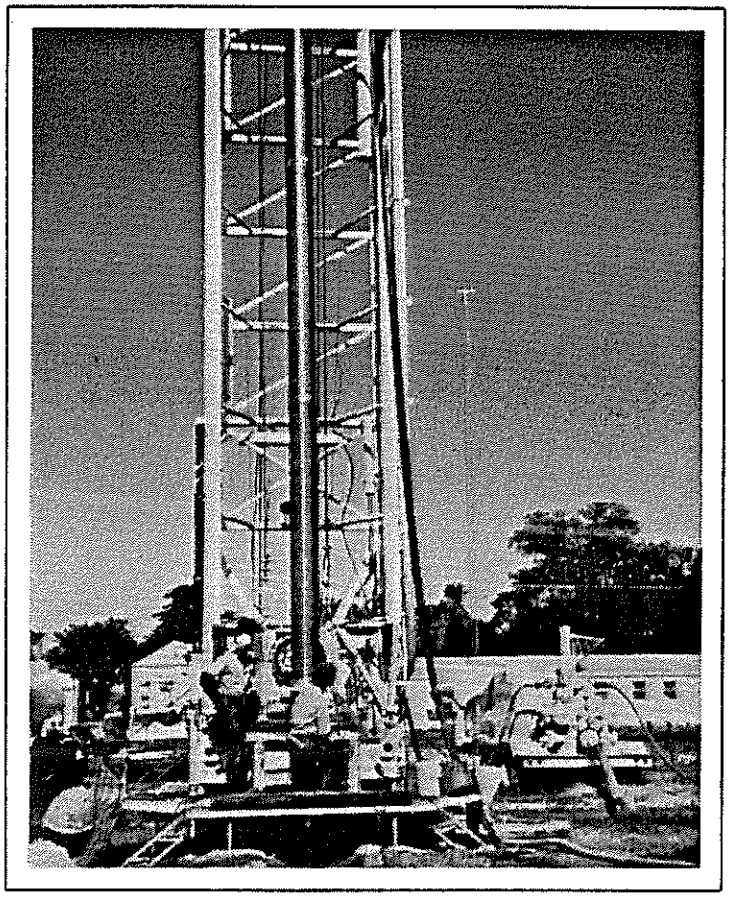

Figure 37. Setting Screen for NMSU Well No. 14, June 1985. Courtesy James Field.

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CONCLUSION

Throughout the university's first 20 years from 1888 to 1908, the lack of a reliable source of water impeded its growth. During this period, the campus water system failed to meet the demands required of it. Although university officials made repeated comments on the need for a better water system, a lack of funding prevented development of such a system. An adequate alternative source of irrigation water was not developed until the turn of the century, and problems with the domestic water system were not solved until 1908.

The years between 1908 and 1945 were a period of growth for NMSU. Ground water was required to meet the demands of an increasing student body, a growing Experiment Station, and an expanding residential community adjacent to the college. Ground water was crucial to NMSU, for without it, growth would have been impossible during this period. The demand for ground water and surface water inspired the university to enlarge and improve its water system.

The dominate influence upon the university water system during the years following World War II (1946 - 1960) were the efforts taken to secure additional sources of domestic and irrigation water. These steps were taken for two major reasons. First, the end of World War II saw an influx of new students attending NMSU, increasing the demand for domestic water. Second, throughout much of this period, the Mesilla Valley suffered from drought and a diminished flow of the Rio Grande, resulting in less water available for irrigation.

The continual growth and development of NMSU during the 1960s, 1970s and 1980s were made possible by the attempts of the Physical Plant to keep up with an ever increasing demand for more water. To keep up with this demand, NMSU continually looked for new sources of ground water. If it had not found new sources of water, further growth of the university would have been impaired. The availability of ground water was crucial to NMSU's growth during its first 100 years. Without ground water, it is unlikely the university would exist as it does today, an educational institution combining agriculture, engineering, and the humanities. Water was not the deciding factor in the establishment of NMSU, but it was a major influence on the direction of its development.

Drilling wells to bring ground water to the surface was critical to the university's survival. Historically NMSU officials have underestimated the projected growth of the university, and thus future water demands. There are a number of differing estimations

on how high enrollment will rise, and what future water demands will be. However, all seem to agree that the university will continue to grow.[1] As this growth continues into NMSU's second century, there will be an ever increasing demand for water, requiring the university to drill additional wells.

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