ENGINEER'S REPORT

WHITE OAKS MUTUAL WATER COMPANY, INC.

REV. APRIL, 1995

The *White Oaks Mutual Water Company* was formed to serve the White Oaks Estates Subdivision Additions One, Two & Three and portions of the Oak Park Subdivision, in Shasta County. The following report has been prepared in order to furnish all relevant information pertaining to the water system, including recent improvements to the Third Addition of the White Oak Estates Subdivision.

1. AREA TO BE SERVED

1.1 Initial Design

The *White Oaks Mutual Water Company* originally was proposed to provide service to developments existing and proposed in portions of Sections 8, 9, 16 and 17, T29N, R4W, Shasta County and more specifically, Lots 52 through 71 of the Oak Park Subdivision and the greater portion of the White Oaks Ranch being developed as the White Oaks Estates 1st, 2nd & 3rd Additions. This is a potential of 116 lots to be served by the *White Oak Mutual Water Company.*

The system presently serves 76 lots. Improvements made to13 additional lots by the developer, are ready to be added. Future extensions are designed to serve 27 more lots.

1.2 Present Design

The present design is shown on the attached *White Oaks Mutual Water Company* Water Facilities Plan. This design is based on the 116 lots proposed at present to be served by the system. At present the *White Oaks Mutual Water Company* is serving Lots 52 to 71 of the Oak Park Subdivision, and the 43 lots of the First and Second Addition to the White Oak Estates within the initial 63 lots. In the Third Addition to the White Oaks Estates, 13 lots: 7, 8, 14, 15, 16,17, 37, 38, 39, 40, 41 & 42 are also being served by the *White Oaks Mutual Water Company.* All off-site improvements have been completed on 13 additional lots of the Third Addition (1-6A, 6B, 9, 10, 11, 12, 13 and 18). Note that a property line adjustment (PLA No. 27-92) has been done between lots 6 & 7 of the Third Addition, and a Parcel Map (30 PM-46) created an additional lot labled 6B on the *White Oaks Mutual Water Company* Water Facilities Plan, by the developer. These completed improvements include all water mains, fire hydrants and water services. Future services will be installed to the other lots of the Third Addition to White Oaks Estates as the phases of the development are completed. The total acres within the service area at system buildout will be 439 acres.

Improvements have also been made for an additional lot being created by a Parcel Map redivision of lot Nos. 10,11 &14 in the Third Addition, to create one additional lot for the owner of lot 14 in the 3rd Addition.

A Water Facilities Plan is attached for the area to be served by the *White Oaks Mutual Water Company*, showing phased development, and showing lots to be served, recorded on subdivision maps and parcel maps, and showing all pertinent information as to source location, main sizing, valving, fire hydrants and appurtenances.

2. DESCRIPTION OF THE WATER SYSTEM

The system is comprised of 6, 8 and 10 inch Class 160 and 200 P.V.C. water mains, served by two deep well sites, one with a 60 H.P. variable speed lineshaft turbine pump, and the second well with a 60 H.P., 1800 rpm lineshaft turbine pump. Both well sites have hydropneumatic tanks.

Water main materials and installation specifications for the system are attached. Service crossings of class 200 P.V.C. pipe are one inch diameter for single services, 1 1/2" diameter for larger lots and two inch for double water services. All service connections to the meter stop are one inch diameter polyethylene or 1 1/2" diameter Sch 40 P.V.C. pipe.

2.1 Water Mains Initially Installed

The pipe quantities of the initial system serving the 1st, 2nd & 3rd Addition to the White Oaks Estates Subdivision and a portion of the Oak Park Estates Subdivision, previous to March of 1992 were as shown in the table at right:

Length of Main (Linear Feet)	Size of Main (Inches Dia.)
450	10
6,600	8
6,000	6
550	4

These water lines served lots 52 through 71 of the Oak Park Estates Subdivision and the 1st & 2nd Addition to the White Oak Estates Subdivision as well as lots 7, 8, 14, 15, 16, 17, 19, 37, 38, 39, 40, 41 & 42 (13 lots) of the Third Addition to the White Oak Estates Subdivision. These presently have service connections.

2.2 Water Mains Added With the Second Well

Water mains and service connections have been added to provide service to lots 1 - 6A & 7, 9 - 13 & 18 (13 lots) of the Second Phase in the Third Addition to the White Oak Estates Subdivision development (17 MAPS-1) and Parcel Map 30 PM-46. One additional service connection has been added for one more lot, being created by the redivision of lots #10, 11 &14, (Parcel Map No. 59-91), recorded at Book 31 of Parcel Maps, Page 32. There will be a total of 14 additional lots with service connections.

Length of Main (Linear Feet)	Size of Main (Inches Dia.)
350	10
2,400	8
600	6

A second well was added to the system in 1992. The following pipe quantities and sizes were added to the water system at this time:

2.3 Total With Added Water Mains

With these water mains added to the water system, the quantities of water mains listed, will be in service in the *White Oaks Mutual Water Company*:

Length of Main (Linear Feet)	Size of Main (Inches Dia.)
800	10
9,000	8
6,600	6
550	4

2.4 Water Mains at System Buildout

The pipe quantities after system buildout, which will serve the Oak Park Estates Subdivision lots 52 through 71 and the White Oaks Estates Subdivision First, Second and Third Addition, are as shown in the table at right:

Length of Main (Linear Feet)	Size of Main (Inches Dia.)
800	10
9,000	8
11,100	6
550	4

3. CONSTRUCTION DATES AND CONDITION OF SYSTEM EQUIPMENT

3.1 Initial Installations

The *White Oaks Mutual Water Company* was formed in 1981 to serve the 1st & 2nd Addition to the White Oak Estates Subdivision and lots 52 to 71 of the Oak Park Subdivision. The system for the White Oaks Mutual Water Co. originally include two 30 H.P. submersible well pumps installed in a 14 inch steel cased well 310 feet in depth, pump control panel, a 6,000 gallon hydropneumatic tank, 6, 8 and 10 inch water mains and valves, fire hydrants and water services. These were installed in the summer and fall of 1979.

3.2 Subsequent Installation

During the summers of 1980 & 1981, 6, 8, and 10 inch Class 160 P.V.C. pipe and valves were extended to the Third Addition of the White Oaks Estates Subdivision. Service connections and fire hydrants were installed in the summer and fall of 1984 to serve the 13 lots of the first phase of the Third Addition. These were all installed by and at the expense of the developer under standards established for the *White Oaks Mutual Water Co.*

The extensions made to the original installation are in excellent condition.

3.3 Recent Installations & Replacements

The second phase to the Third Addition of White Oaks Estates Subdivision includes lots 1-6A & 6B, 9-13 & 18. Service connections were installed for the second phase in the spring of 1991, anticipating the PLA and Parcel Map involving lot 6 & 7, as well as a Parcel Map involving lots 10, 11 &14.

Since the lots in the Third Addition are larger parcel (2 acre minimum) double services have been installed to some of the larger lots, to provide sufficient flows for domestic as well as for irrigation usage for lots which are not able to use irrigation water from the A.C.I.D. canal.

An additional well was drilled with a 12 inch steel casing set to a 400 foot depth. A 60 H.P. line shaft turbine pump has been installed in this well, and a 10,000 gallon hydropneumatic tank was located at this new well site (Well #2). This provides an additional water source to the system. These additions are shown on the Water Facilities Plan for the *White Oak Mutual Water Company*. 8 inch class 200 P.V.C. water mains were installed to connect the new well source to the existing system. An 8 inch class 200 P.V.C. water main was also installed to provide a loop to the existing water main along Granola Way.

The two 30 H.P. submersible well pumps at Well #1 have been replaced with one 60 H.P. variable speed, lineshaft turbine pump.

These were all installed under specifications established by the engineer for the *White Oaks Mutual Water Co.*

The balance of the system shown as proposed on the *White Oaks Mutual Water Company* Water Facilities Plan will be completed at a later date by and at the expense of the developer.

4. SYSTEM HYDRAULICS

A 10,000 gallon hydropneumatic tank at Well #2 maintains the pressures at the primary source between 50 psi and 65 psi. The pressure at the 6,000 gallon hydropneumatic tank located at Well #1, varies between 42 psi and 57 psi, under static conditions. There are no storage facilities.

Analysis of the system piping reveals that 500 gpm can be delivered to the most remote point in the subdivision while simultaneously providing 557 gpm for domestic use, with a pressure drop of less than 25 psi. Residual pressures can be maintained above 20 psi at required fire flow quantities.

5. SOURCES OF SUPPLY

5.1 Original Well, (Well #1)

The source of supply has been from a 14 inch steel cased well 310 feet in depth at the original well site. The well and casing is in fair condition.

A well test was performed on this well in December of 1992, by Layne-Western Co. of Woodland. The static water level at the time was at 84 feet. Flow rates were varied from 525 to 1350 gpm. The pumping level changed from 104' at 525 gpm to 165.6' at 1350 gpm. From the sand test, it was determined that the well produces an excessive amount of sand only when the pump was started or when the flow rate was changed significantly. With the submersible pumps only operating for 3 to 4 minutes to charge the hydropneumatic tanks, the sand suspended from surging, would not clear up before the pump shut off. To overcome this characteristic of the well, a variable speed pump has been installed.

The 60 H.P. variable speed line shaft turbine pump recently installed in Well #1 was tested by P.G.& E. 5/4/94. With the pump operating at 1790 RPM (60 Hz), 797 GPM was pumped at a pressure of 50.7 PSI at the discharge, with the water level in the well at 118.5 ft (235.6 Ft TDH), and a plant efficiency of 73.5%.

5.2 New Well, (Well #2)

The second well was drilled during the summer of 1991. This well has a 12 inch casing and is drilled to a 400 foot depth. The well and casing is new and in excellent condition.

The results of the PG&E "Pump Test" performed 6/30/92 indicated an overall plant efficiency of 74.0 % for a discharge of 936 GPM at 60.5 PSI, with the water level in the well at 60.5 ft.

Chemical analyses was performed on water samples taken from the new well. The results of the analyses were submitted to the County of Shasta Environmental Health Department.

Water mains were installed from Well #2 to the existing water mains to provide a second water source for the *White Oaks Mutual Water Company.*

The *White Oaks Mutual Water Company* system design as presently installed and as proposed at system buildout complies with all requirements of a "Mutual Water System" as specified in Paragraphs 260.140.71.4 to 260.140.71.7 of the California Administative Code.

6. FLOW REQUIREMENTS

6.1 Requirements at System Completion

The area being served is rural residential with lot averages in excess of 1.0 acre. The flow requirement is:

Q = ncf, where:

Q is gallons per minute at 35 psi
n is the number of services
c is the gallon per minute demand per unit based on type of development
f is a diversity factor based on number of services

The flow requirements for the *White Oaks Mutual Water Company* water system are based on the above formula where **n** = 116, **c** = 8, **f** = 0.6, and **Q** = is in gallons per minute (gpm).

Q = (116) X (8) X (0.6) = 557 gpm

This can be exceeded with the combined flows of the 60 H.P. variable speed pump at Well #1 and the 60 H.P. lineshaft turbine pump at the Well #2.

The static pressure difference between the two well sites will be approximately 7.8 psi with the 2nd well site being at an elevation 18 feet lower than Well #1. The 60 H.P. pump at Well #2 will be the primary lead pump. The cut-in pressure will be set at 50 psi and the cut-out pressure at 65 psi.

When the average flow rate from the pump at Well #2 exceeds 400 gpm, the variable speed pump will start operating, maintaining a constant pressure of 55 psi at Well #1. The variable speed pump will supply the demand for the system at this pressure to 780 gpm. Above the capacity of the variable speed pump, the fixed speed pump will also operate to supply the demand of the system.

The sustained (average) flow rate requirement if no storage were available to provide for peak domestic demands and fire flows would be:

Q = 0.4 ncf or (0.4) X (116) X (8.0) X (0.6) = 223 gpm plus 500 gpm for fire protection flow, for a combined flow rate of 723 gpm.

6.2 Present Water Demand

The average monthly water usage from the period Dec. 13, 1990 to Nov. 10, 1994, for an average of 62 active services, was 432,785 Cu Ft (3.24 million gallons). The low demand period was Jan. 13 to Feb. 11, 1993, with a demand of 75,000 Cu Ft (0.56 million gallons) and the high demand period was Aug. 14 - Sept. 16, 1991, with 1,073,000 Cu Ft (8.03 million gallons) being used.

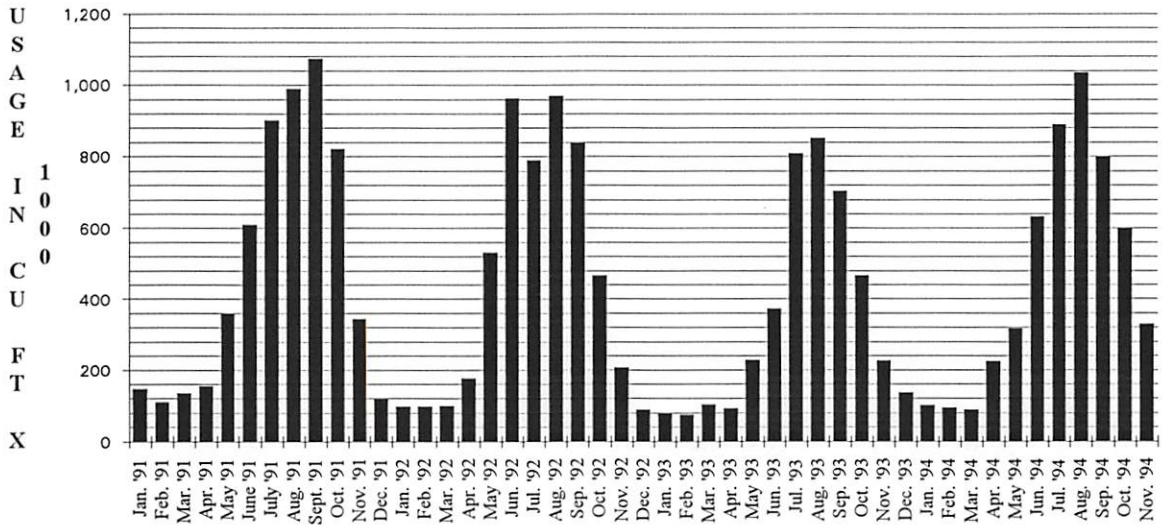
The monthly average flow rate for Jan. 1991 to Nov. 1994 is equivalent to 10.02 Cu Ft/min. (74.94 gpm) or 1.21 gpm per active service connections.

The average usage during the months of maximum usage was 170 gpm, or 3.0 gpm per service connection, for 57 active services.

The average household usage (exclusive of landscaping and irrigation water), can be estimated from the consumption during the period of Nov. 16, 1992 to April 14, 1992, the months of minimum usage. For the 60 active services during this period, the system usage was 15.26 gpm ~~per service~~ or 0.256 gpm per service.

As of December 1994, there were service connections to 67 residences and 1 residences under construction. In addition there are 9 vacant lots with service connections installed. 13 (thirteen) lots are ready to be added to the system for the second phase of the Third Addition and 30 PM-46.

WHITE OAKS MUTUAL WATER CO., MONTHLY WATER USAGE



The graph above indicates the monthly water demand from the well sites for the period of Dec. 13, 1990 to Nov. 10, 1994.

6.3 Maximum Water Demand

Peak demand was in the summer of 1991, during the period of July 15 to Sept. 16 (63 days). The total usage for 57 active service connections, was 2.06 million Cu Ft (15.43 million gallons) or about 4300 gallons per day per active service. Using a 2.5:1 ratio of maximum hour to average hour, it is estimated that peak hourly flow per active service will be about 7.46 gpm. At full buildout with 116 domestic services, and using the same usage as the present usage, would result in a maximum demand of 865 gpm, well under the system capacity of 1,700 gpm from the two existing wells.

7. FIRE FLOWS

Fire flows are required by the County of Shasta (Res. No. 92-44)"FIRE SAFETY

STANDARDS", effective April 1, 1992. For single-family residential lots larger than one acre in size, minimum flow requirements are 500 gpm in addition to the average daily demand.

The fire flow demand requirements are added to the average domestic water use, to determine the two hour demand flows from all sources, including available storage. The total average flow requirements plus fire flows, for the *White Oaks Mutual Water Company* water system will be about 662 gpm at buildout [(1.4 X 116) + 500].

The original well (Well #1) is capable of supplying in excess of 1,600 gpm, from well test performed in 1978. The 60 H.P. variable speed, verticle lineshaft turbine pump in this well will pump 780 gpm at 1790 rpm with a TDH of 250 Ft (55 psi tank pressure & 123 Ft pumping level).

The new well (Well #2) is capable of supplying in excess of 1,500 gpm. The 60 H.P. 1800 rpm, verticle lineshaft turbine pump will provide 936 gpm into a tank pressure of 60.5 psi.

The combined flows of 780 gpm from Well #1 and 936 gpm from the Well #2, will be about 1,700 gpm or about 1,538 gpm for fire flow based on an average domestic demand of 162 gpm for 116 domestic services.

8. MAINTENANCE, OPERATIONS AND RESERVES FOR REPLACEMENT

8.1 Maintenance and Operation Costs

Maintenance and operation costs include labor, supplies, electric power, loan payments, fees, taxes, water analyses and such other costs as may be needed for prudent management of the system.

Within the estimated budget, the only significant item that will vary with the number of active services, is power costs. Based on the present P.G.& E. Schedule A-1 rate of $0.15999 per kWh for the summer energy charge, the projected average usage and an overall plant efficiency of 74%, the annual cost for power will be $6,168 or about $95 per active service for this year. Other costs will be about $12,750 for the present system not including system replacement costs and will increase to about $17,500 at 80% buildout.

8.2 System Replacement Costs

The system components consist of two basic categories, sources and distribution lines.

The sources for the *White Oaks Mutual Water Company* water system are two wells with deep well turbine pumps in conjunction with two hydropneumatic tank.

The distribution system includes the water mains, valves, fitting, services and fire hydrants.

8.2.1. Replacement Costs For The Present System

Tabulated on the following page are the various system components, life expectancy, replacement cost and capital recovery, based on an inflation rate of 4%, and the return on invested money at 7%, for the presently constructed facilities.

ANNUAL REPLACEMENT COST FOR PRESENT SYSTEM

COMPONENT	QUANTITY	UNIT COST	INITIAL COST	LIFE EXPECTANCY	ANNUAL REPLACEMENT COST
Well #1	1	$28,000.00	$28,000.00	20	$1,496.54
Well #2	1	$28,000.00	$28,000.00	40	$673.37
Well #1 Pump	1	$25,000.00	$25,000.00	30	$858.40
Well #2 Pump	1	$20,000.00	$20,000.00	30	$686.72
Well #1 Tank	1	$30,000.00	$30,000.00	30	$1,030.08
Well #2 Tank	1	$25,000.00	$25,000.00	50	$437.03
Well #1 Controls	1	$5,000.00	$5,000.00	30	$171.68
Well #2 Controls	1	$25,000.00	$25,000.00	30	$858.40
10" Pipe L.F.	800	$24.00	$19,200.00	50	$335.64
8" Pipe L.F.	9000	$22.00	$198,000.00	50	$3,461.31
6" Pipe L.F.	6600	$20.00	$132,000.00	50	$2,307.54
4" Pipe L.F.	550	$18.00	$9,900.00	50	$173.07
3/4" Meters	52	$60.00	$3,120.00	20	$166.76
1" Meters	12	$100.00	$1,200.00	20	$64.14
1-1/2" Meters	2	$260.00	$520.00	20	$27.79
TOTAL INITIAL COST			$549,940.00		
TOTAL ANNUAL REPLACEMENT COST (1994)					$12,748.47
ASSUMING NO HOOKUP FEES					
ANNUAL COST PER SERVICE				$196.13	
MONTHLY COST PER SERVICE				$16.34	

Approximately $12,721.74 annually should be placed into a replacement fund. If revenues from hookup fees do not cover the annual replacement costs, this could amount to $196.13 per active service connection for the present system, or $16.34 per month.

8.2.2 Replacement Costs At System Buildout

On the next page are the various system components, life expectancy, replacement cost and capital recovery, based on an annual inflation rate of 4% and the annual return on money invested at 7%, for the system after buildout.

REPLACEMENT COST AT SYSTEM BUILDOUT

COMPONENT	QUANTITY	UNIT COST	INITIAL COST	LIFE EXPECTANCY	ANNUAL REPLACEMENT COST
Well #1	1	$28,000.00	$28,000.00	20	$1,496.54
Well #2	1	$28,000.00	$28,000.00	40	$673.37
Well #1 Pump	1	$25,000.00	$25,000.00	30	$858.40
Well #2 Pump	1	$20,000.00	$20,000.00	30	$686.72
Well #1 Tank	1	$30,000.00	$30,000.00	30	$1,030.08
Well #2 Tank	1	$25,000.00	$25,000.00	50	$437.03
Well #1 Controls	1	$5,000.00	$5,000.00	30	$171.68
Well #2 Controls	1	$25,000.00	$25,000.00	30	$858.40
10" Pipe L.F.	800	$24.00	$19,200.00	50	$335.64
8" Pipe L.F.	9,000	$22.00	$198,000.00	50	$3,461.31
6" Pipe L.F.	11,100	$20.00	$222,000.00	50	$3,880.86
4" Pipe L.F.	550	$18.00	$9,900.00	50	$173.07
3/4" Meters	69	$60.00	$4,140.00	20	$221.27
1" Meters	50	$100.00	$5,000.00	20	$267.24
1-1/2" Meters	9	$260.00	$2,340.00	20	$125.07
TOTAL INITIAL COST			$646,580.00		
TOTAL ANNUAL REPLACEMENT COST					**$14,676.68**
ASSUMING NO HOOKUP FEES					
	ANNUAL COST PER SERVICE			$126.52	
	MONTHLY COST PER SERVICE			$10.54	

Upon buildout of 116 residences, the annual system replacement cost would be approximately $126.52 per service per year or $10.54 per month, if revenues from hookup fees were not available.

8.3 Annual Budget

An annual budget with 68 hookups has been prepared and is listed in the table on the following page.

The *White Oaks Mutual Water Company* is charging on the basis of water usage. The monthly service charge has been $21.50 since 1992, which covers the first 4,000 Cu Ft per month per lot. A charge of $1.50 per 1,000 Cu Ft per month has been charged for usage above the first 4000 Cu Ft. This has encouraged the conservation of water and limit the demand on the system. The excess usage revenues have been projected from last years usage.

Hookup fees for new service connections have been set at from $1400 for a 5/8" meter, to $2000 for a 1-1/2" meter. Hookup fees have been established to generate revenues for future replacements without significantly increasing user fees.

8.3.1 Annual Expenses

ANNUAL EXPENSES FOR THE PRESENT SYSTEM

1	OPERATIONS, BILLING & ACCOUNTING (BOOKKEEPING)	$1,500.00
2	BANK CHECKING SERVICE CHARGES	$100.00
3	MAINTENANCE (OUTSIDE LABOR)	$250.00
4	REPAIR/MAINTENANCE (PUMPS & WELLS)	$500.00
5	OPERATING PERMIT (ENVIRONMENTAL HEALTH)	$400.00
6	BACTERIOLOGICAL TESTING	$400.00
7	LAB ANALYSIS (WATER QUALITY FOR TWO SOURCES)	$1,000.00
8	OFFICE SUPPLIES & POSTAGE	$1,000.00
9	EQUIPMENT, TOOLS & SUPPLIES	$400.00
10	STATE CORPORATION FEES	$5.00
11	STATE INCOME TAX	$800.00
12	COUNTY PROPERTY TAX	$210.00
13	TAX PREPARATION FEE	$400.00
14	WATERMASTER	$300.00
15	METER READER	$600.00
16	REPLACEMENT COSTS	$12,748.47
17	LOAN PAYMENTS	$5,729.88
18	TOTAL OF VARIABLE COSTS (ELECTRIC & HOOKUPS)	$7,339.09
	TOTAL EXPENSES	**$33,682.43**

8.3.2 Annual Income

ANNUAL INCOME FOR THE PRESENT SYSTEM

1	WATER SERVICE CHARGES (BASE RATE)	$17,544.00
2	STANDBY CHARGES (VACANT LOTS)	$864.00
3	UNOCCUPIED RESIDENCES CHARGES	$0.00
4	CHARGES FOR USAGE ABOVE BASE	$4,800.12
5	REVENUE FROM HOOKUP FEES	$10,800.00
	TOTAL INCOME	**$34,008.12**

The water supply, distribution and fire protection of this mutual water system will adequately, dependably and safely meet the total requirements for all consumers under maximum consumption. The water system as designed meets the requirements of Title 10 of the State of California Administrative Code for mutual water companies.

John H. Sharrah, P.E.
Civil Engineer RCE 14359

Attachments:

- W/O Mutual Water Company Specifications, Rev. 6-92
- Water Usage , Dec. 13, '89 to Nov. 10, '94 from Well Sites, with Graph
- Total of Monthly Customer Meter Readings, Aug. '92 to Dec. '94, with Graph
- Domestic Water Supply Requirements Chart
- Shasta County Environmental Health Permit
- White Oaks Mutual Water Company, Inc.,Service Area Map, Rev. 5-94
- Item 19, Sales of Securities Pursuant to 25102(f)
- Lots to be Approved, in the White Oaks Estates Subdivision, 3rd Addition
- White Oaks Mutual Water Company, Inc.,Service Area Map, colored to indicate *Sales of Securities Pursuant to 25102(f)* (Orange) and *Lots to be Approved* (Pink & Dark Blue)

Well #1

- Water Sample Chemical, Mineral & Physical Analysis
- Water Well Driller's Report, Nos.57601 & 57619
- Floway Pump Performance Curves, DWG. NO. 93-32078-1, S/N 93-32078
- PG&E Pump Test Report, Plant I.D.: 56559, 5/04/94
- Well & Sand Test Report by Layne-Western Co., Inc. 12/92

Drawing for Well #1:

- Retrofit for a 60 H.P. Variable Speed Pump, 5/94

Well #2

- Water Sample Chemical, Mineral, Physical & Radiological Analysis
- Water Well Driller's Report, No.369578
- Floway Pump Performance Curves, DWG. NO. 91-33614-1, S/N 91-33614
- PG&E Pump Test Report, Plant I.D.: 56862, 06/30/92
- Well Test Report, 6/18/92

Drawings for Well #2:

- Well Site Plan View, Rev. 6/22/92
- 60 H.P. Turbine Pump, 7/30/92
- 10,000 Gallon Hydro-Pneumatic Tank, 1/15/92