SECTION 1
HISTORY OF WATER RIGHTS

Early appropriative rights for lands now part of Rancho Murieta were involved with the Cosumnes Irrigation Association, including the Fruitridge Investment Co. These rights, under Licenses 537, 2629, and 6238, covered primarily what are no the agriculturally lands in the southwest portion of the District, the lands submerged under Clementia Reservoir, and areas around the Murieta Parkway gate, the Rancho Murieta Training Center and Murieta Village.

Early license forms used by the State included a "priority of right" clause that confirmed the date of the right, the amount of water to which the right was entitled, and the purposes of use. This "priority date" is based on the filing date of the application with the State Water Resources Control Board. Early dates and holders were:

License No.	Priority Date	License Date	License Holder
537	25 May 20	10 May 26	Josephine D. Granlees
2629	12 Apr. 21	21 Feb. 44	Cosumnes Irrigation Assoc.
6238	18 Nov. 54	11 Apr. 61	Arthur J. and Josephine D. Granlees

These licenses are the only early ones that allowed diversion from the Cosumnes River.

Other, early licenses for Rancho Murieta lands are tabulated below. None of these licenses involved diversion from the Cosumnes River.

License No.	Priority Date	License Date	License Holder
6239	18 Nov. 54	11 Apr. 61	A.J. and J.D. Granlees – Lake Jean
8013	29 Nov. 61	1 Jan. 62	George W. Artz, Hal L. Ellis
9925	7 Oct. 66	6 Apr. 67	Guadalupe Reservoir
7744	6 Jun. 60	6 Apr. 66	Artz & Ellis – Original Calero

All water rights are assignable to other holders, and all of the above licenses have been reassigned several times, with final assignment to the Rancho Murieta Community Services District in January 1988.

The issuance of a Water Right License is the confirmation of the amount and extent of use under the permitted application. A permit is issued to the applicant when it has been determined by the State Board that sufficient unappropriated water exists to meet the amount requested in the application. Issuance of a permit allows the applicant to construct the project and develop the use.

Rancho Murieta has four water right permits, 16762, 16763, 16764 and 16765 (Applications 23416, 23417, 23418, and 23919) that comprise the major sources of water for municipal, industrial, and recreational uses in Rancho Murieta. They were filed by the Pension Trust Fund, and established a priority date of 19 December 1969. The last three permits (16763, 16764, and 16765) were granted 17 September 1975. These did not

involve diversion from the river. The first (16762), which is the major diversion permit, was granted 5 August 1980. A suit filed the Omochumne-Hartnell Water District produced revisions in the originally filed application (23416) delaying its approval. The State Water Resources Control Board Order WR79-13 resulting from this suit also affected Licenses 537, 2629, and 6238, in terms of diversion rates, places of use and purposes of use. (See section 3 for details.)

The four major permits (16762, 16763, 16764, 16765) were originally assigned to Rancho Murieta Properties, Inc., and were reassigned to Rancho Murieta Community Services District as part of the Acquisition and Services Agreement of Improvement District No. 1, as of 14 January 1988.

The net result of all of the above is that Rancho Murieta Community Services District now is the “assigned holder” of all appropriative water rights supplying all water inside the boundaries of Rancho Murieta.

The essential features of the licenses or permits that enable exercise of these rights are discussed in Section 3, following; and copies of all licenses/permits are attached as Appendix A.

Appropriative rights that enable diversion at Granlees Dam and transport through the District via the Cosumnes Irrigation Association ditch, for use outside the District, are not included. Riparian rights, since they are not a “licenses right” are also not included.

SECTION 2
WATER RIGHTS

Riparian Rights

- Is the property right that attaches to the smallest parcel in the chain of title that still remains in contact with stream channel?
- Attach only the natural flow of the stream.
- Use is common and equal with all other riparians on that stream.
- No license or permit required.
- Must report usage every three years.
- Each riparian may:

    Take all the water he needs for:

    - Domestic use
    - Watering of domestic animals

Even if these two uses exhaust the stream. These two uses have priority over all others, e.g., irrigation.

Divert a reasonable amount, in relation to other users, for other beneficial uses, including irrigation. He may not exhaust the stream for such uses, nor does he have a right to a specific quantity of water.

Each riparian may not:

- Divert to storage during wet season for use in dry seasons. (He may hold water in temporary, regulatory storage.)
- Use riparian water on non-riparian land.
- Sell the water for use on non-riparian land.

Riparian rights are superior to appropriative rights, unless patented after the appropriative rights.

Riparian rights may be impaired be prescription (upstream user takes water for 5 or more years).

Who has riparian rights at or near Rancho Murieta?

1. Anderson Ranch – north of Cosumnes River
    - Inside and outside CSD boundaries
    - Can be served through CIS ditch.
2. Jay Schneider (and other south of river users)
    - All outside CSD boundaries
    - Van Vleck Ranch north of Rancho Murieta
3. RMCSD – as holder of rights for RMPI, RMA, etc.
4. All downstream users
    - Omochumne-Hartnell Water District
    - Bill Hutchison
    - John Bozich

Appropriative Rights

- Are inferior to riparian rights
- Are rights to:
  - A specific quantity of water) Water Code
  - For a specified purpose) Section 1381
  - For a specified period each year
  - On a specified area or place of use.
- Are lost by five years of non-use
- Can be changed:
  - Point of diversion
  - Place of use
  - Kind of use
  - Only by the SWRCB, and if the change does not affect other users of the water involved.

Who, in and near Rancho Murieta, has appropriative rights?

1. RMCSD, as holder of rights previously held by RPI, and CIA, inside CSD.
2. CIA – for lands outside of CSD.

Prescriptive Rights

May occur when upstream user makes use of the water from a stream, adverse to the downstream users, for five or more years, without complaint or legal action being taken by downstream users. Prescriptive rights may be lost if downstream users are successful in filing cease and desist actions.

Commonly Used Units

1 cubic foot (cf) = 7.48 U.S. gallons
1 acre foot (AF) = 43,560 cf – 325,872 gallons
1 cubic foot per second (cfs) = 449 gallons per minute (gpm)

SECTION 3
PERMITS AND LICENSES

Currently, appropriative water rights at Rancho Murieta are exercised through six licenses and three permits, all issued by the State Water Resources Control Board and assigned to the Rancho Murieta Community Services District. The essential features of these licenses/permits are tabulated and discussed in this section, particularly for those that involve diversion from the Cosumnes River. An "Operations Manual for Diversion from the Cosumnes River" detailing criteria for diversions and operating procedures to be used are attached as Appendix B.

Copies of all permits/licenses are also attached as Appendix A.

Application 23416, Permit 16762

A. Source

1. Cosumnes River, primarily at Granlees Dam, but also at other diversion points known as Bass Lake Pump, Old Bridge Pump (north bank), and the Rock Crusher Pump (south bank).
2. Unnamed streams, as surface runoff. The Permit, paragraph 30, requires that "Permittee shall make all reasonable effort to collect local runoff to the extent local runoff is available in lieu of diverting water from the Cosumnes River". This particularly applies to filling Clementia Reservoir, which drains an approximate 1,100 acre watershed.

B. Transport

1. At Granlees Dam

   Water is diverted at the north end of the north dam into a forebay housing a suction manifold with 13 screens, thence into a wet well accommodating five vertical, multistage turbine pumps. Two pumps are driver by 125 HP electrical motors and are each rated at 6 cubic feet per second (2700 gallons per minutes). Three pumps, driven by 500 HP motors, are each rated at 15 cfs (5834 gpm). The suction header, screens, electrical supply, and the discharge piping will permit (maximum) operation of the three 500 HP units simultaneously.

   Water is transported to storage via either a 21 inch diameter pipeline to Clementia Reservoir or via a 33 inch diameter pipeline to Calero Reservoir, with a take-off into Chesbro Reservoir. Flow rate is indicated and recorded on a round chart, 7 day recorder in the control room, and totalized on an integrating counter.
2. Bass Lake River Pump

   Water is pumped from the Cosumnes River at a deep hole near the South Course No. 9 green via an 8" pipeline directly into Bass Lake. This pump is currently (October 1990) a pedestal mounted, single suction centrifugal, which must be removed during periods of high river flow.

Flow capacity is approximately 530 gallons per minute (1.24 cfs), depending upon the suction lift as affected by river levels. A totalizing meter records total water pumped.

This pump may also be used for diversion, under Permit 10144, Application 16142, for summer irrigation of non-riparian golf course lands.

3. Old Bridge Pump
Water can be pumped from the Cosumnes River at a location just upstream of the "Yellow Bridge" on the north side of the river. This pump installation is on a steel frame removable during high river flows. The pump discharges through a permanent filter station directly into the North Course irrigation system. Pump capacity is approximately 538 gpm (1.2 cfs). A totalizing meter records total water pumped.

4. Rock Plant Pump
Water can also be diverted from the Cosumnes River at a location on the south side of the river, about 100 yards above the Yellow Bridge. This pump is mounted on a floating steel frame removable during high river flows. The pump, of approximately 500 gpm capacity, now supplies only the RMTC training area, through a booster pump located between South Course No. 1 fairway and No. 18 green.

C. Uses and Place(s) of Use
Uses for water diverted under this permit are specified only as "municipal, industrial, and recreational over the entire 3,600 acres and irrigation of 500 acres net within the gross area of the 3,600 acres". The 500 acre irrigation portion of the permit has always been considered to be for golf course and public parks.

D. Conditions of the Permit
The original permit December 1969, as amended September 1982, contains 30 separate conditions. Those that will most affect RMCSD installations and operations are discussed below, by Permit paragraph numbers.

- Period of all diversions: (5) – November 1 of each year to May 31 of the succeeding year. Diversions are not permitted outside of this season to offset evaporation and seepage, or for any other purpose.
- Amounts permitted to be diverted:
  - 5.(a) Six (6) cubic feet per second direct diversion (directly to the water treatment plant).
  - (b) Four thousand and fifty (4,050) acre feet to storage.
    - A. 3900 acre feet per annum from the Cosumnes River to be stored as follows:
      - (1) 1250 afa in Chesbro Reservoir
      - (2) 2610 afa in Calero Reservoir
      - (3) 850 afa in Clementia Reservoir
      - (4) 40 afa in (South Course) Fairway 10 Lake

    Total diverted and store under (2), (3), and (4) above shall not exceed 2650 acre feet.
    - B. 50 afa from surface runoff into Chesbro Reservoir.

C. 100 afa from surface runoff into Calero Reservoir.

Total amount to be taken from the source (Cosumnes River) may not exceed 6368 acre feet per water year of October 1 to September 30.

Rates of Diversion Permitted

5. (c) The maximum rate of diversion from the Cosumnes River to off-stream storage shall not exceed 46 cfs. (Plus the 6 cfs direct diversion).

18. Certain terms and conditions, aimed at protection and preservation of fish life, are also imposed:
    A. No water shall be diverted when the flow (at USGS gaging station "Cosumnes River at Michigan Bar") is less than 70 cfs.
    B. Only up to 6 cfs shall be diverted when the flow is between 70 and 174 cfs.
    C. Only those flows in excess of 175 cfs shall be diverted at all other times. (The 46 cfs maximum diversion rate to storage may not be exceeded).

Provisions are made for diversion in "dry years", as follows:

If the total amount that could have been diverted under 18 A, B, C above is less than the following amounts, diversion of flows in excess of 70 cfs may be made. Diversion shall not exceed 46 cfs.

	Period	Amount Diverted to Date
(1)	Feb. 1	Less than 400 acre feet
(2)	Mar. 1	Less than 2000 acre feet
(3)	Apr. 1	Less than 4400 acre feet

Once a "dry year" diversion rate has been started, it must continue at that rate until total permitted diversion to storage is completed. Only reversion to the direct diversion rate (6 cfs) is then permitted.

Stream Flow to Highway 99

21. No water may be diverted, even during the November 1 – June 1 period, unless "there is continuous visible surface flow in the bed of the Cosumnes River' from Granlees Dam "to the gaging station at Highway 99 known as Cosumnes River at McConnell". This gaging station, as of 10/90, was not in operating condition, nor has it ever been equipped with remote (radio) transmitted readout equipment.

Measuring and Metering Requirements

22. Measuring devices, acceptable to the State Water Resources Control Board, to measure accurately the quantity of water diverted from the Cosumnes River, must be installed and maintained.

28. Suitable metering and recording devices shall be installed, operated, and maintained in good working order by RMCD, as follows:

A. Location: Granlees Dam pumps discharge pipe line. Device: Strip or circular chart recorder, showing rates and times of diversion.

B. CIA canal headworks

Continuous stage recorder, with stage-flow calibrations made annually.

C. All other diversion points, including:
   1. Bass Lake Pump
   2. Old Bridge Pump
   3. Rock Plant Pump

D. CIA canal, downsteam of Laguna Joaquin

E. At any other point where water is withdrawn from storage (except to South Lake 10 and the Water Treatment Plant).

F. Totalizing meters are considered adequate for installations C 1, 2, 3, and D, E above.

G. Levels at Calero, Chesbro and Clementia must be measured at least monthly, for reporting to the SWRCB upon request.

Waste Water Utilization

Permit paragraph 24 required that waste discharge plans be established with the State Regional Water Quality Control Board. The use of treated waste water for irrigation purposes is required by paragraph 26 of the permit.

E. Types of Water Covered by Permit

This permit (16762) is Rancho Murieta's only permit for diversion of water for treatment into potable, domestic uses; termed "municipal" as "purpose of use," paragraph 3. The permit also specifies "industrial" as a purpose of use, which can be presumed to be as either raw or treated water. The purpose of "recreational and irrigation" would seem to be raw water uses only.

F. Operating Procedures

To comply fully with permit conditions,, at least the following will have to be done:

1. Diversion period of November 1 to May 31, only, per Permit paragraph 5.
2. Installation; operation and record keeping; and maintenance, including periodic calibration of measuring and metering equipment in at least the following locations, in compliance with Permit paragraphs 22, 28, 29;
   a. Pumped diversions at:
      (1) Granlees Dam
      (2) Bass Lake Pump
      (3) Old Bridge Pump
      (4) Rock Plant Pump
      (5) Water treatment Plant output
      (6) Pressurized raw water irrigation system (south of Highway 16).
   b. Gravity, open ditch flows at:
      (1) CIA ditch headworks

(2) CIA ditch, downstream of Laguna Joaquin, near lone Pine Drive under crossing.

c. Cosumnes River flows at:
   (1) Michigan Bar gaging station
   (2) McConnell gaging station

d. Reservoir levels at:
   (1) Clementia Reservoir
   (2) Chesbro Reservoir
   (3) Calero Reservoir

3. Operation of Granlees Dam diversion pumps in strict compliance with Permit paragraphs 5, 18, and 21, particularly with relation to flows at the Michigan Bar gaging station.

Application 23417, Permit 16763

A. Source: surface runoff
B. Transport: natural drainage
C. Use: recreation, stock watering
D. Permit conditions:
   (1) Dates: November 1 – May 31
   (2) AFA: 130
E. Raw water only, for annual replenishment of Laguna Joaquin
F. No operations by RMCSD required, except for regular recording of lake levels.

Application 23419, Permit 16764

A. Source: surface runoff
B. Transport: natural drainage
C Use: recreation, stock watering
D. Permit conditions:
   (1) Dates: November 1 – May 31
   (2) AFA: 1240
E. Raw water only, for annual replenishing of Clementia Reservoir.
F. No operations by RMCSD required, except for regular recording of reservoir levels.

License 537, Application 1838

A. Source: Cosumnes River, at Granlees dam
B. Transport: CIA ditch, to Laguna Joaquin, pumped to irrigated areas.
C. Use: Irrigation; for 22.5 total acres; primarily common areas around Laguna Joaquin, the Murieta Parkway gate the Rancho Murieta Training Center, and in Murieta Village.
D. Permit conditions:
   (1) Dates: 3/25 – 9/1 each year
   (2) AFA: none specified.
   (3) Diversion rate: 0.28 cfs = 126 gpm = 181,000 gpd; as restricted by SWRCB Order WR79-13.
E. Raw water only.
F. Operations by RMCSD
   (1) Diversion, at Granlees Dam, into CIA ditch.

(2) Correct operation of gates and valves to transport water to Laguna Joaquin.
  (a) CIA ditch headworks
  (b) CIA ditch dump gates: at Yellow Bridge
  (c) CIA ditch valves, at :
    - East of Country Store
    - Laguna Joaquin outlet return to CIA ditch.

(3) Regular recordings of:
  - CIA ditch headworks flow
  - Laguna Joaquin levels
  - Totalizing meters of pumped irrigation.
  - CIA ditch flow downstream from Laguna Joaquin.

License 2629, Application 2296

A. Source: Cosumnes River at Granlees Dam
B. Transport: CIA ditch.
C. Use: Irrigation of 471 acres only, on agricultural lands within the District, per order WR79-13.
D. Permit conditions:
  (1) Dates: 3/1 – 7/10 each year.
  (2) AFA: None specified.
  (3) Rate: 12.5 cfs = 24.75 AF/day = 3267 AF 3/1-7/10.
E. Raw water only.
F. Operations by RMCSD.
  (1) Operation of gates and valves
    (a) CIA ditch headworks
    (b) Dump gates, at Yellow Bridge
    (c) Valves at:
      East of Country Store
      Outlet of Laguna Joaquin
    (d) Gates, on irrigated lands.
  (2) Regular recordings of:
    - CIA ditch headworks flow
    - Laguna Joaquin pumped into irrigation, as recorded by RMA and reported to RMCSD.
    - CIA ditch flow downstream of Laguna Joaquin, after arena recorder.

License 6238, Application 16142

A. Sources: Cosumnes River, at Bass Lake pump; and natural drainage into Bass Lake.
B. Transport: Via pipeline from Bass Lake river pump to Bass Lake.
C. Use: Non-riparian golf course irrigation, per WR79-13.

D. Conditions:
  (1) Dates: pumped diversion = 5/1-10/31 yearly.
    Surface runoff = 10/1-5/1 yearly.
  (2) AFA – surface runoff – 45 AFA.
    Pumped – none specified

(3) Rate: 1.24 cfs – 557 gpm = 107,136 cfd.

E. Raw water only.

F. RMCSD Operations

(1) Bass Lake River Pump

- Annual installation and removal
- Daily operations, stop/start, suction adjustment.
- Regular recording of totalizing meter.

License 6239, Application 16143

A. Source: Unnamed gully.

B. Transport: Surface runoff

C. Use: Recreation, Lake Jean

D. Permit Conditions:

(1) Dates: 10/1-5/1

(2) AFA: 20

(3) Diversion: Not applicable.

E. Raw water only.

F. Operations by RMCSD: None required.

License 8013 and 9925, Applications 20057 and 22603

A. Source: Unnamed gully.

B. Transport: Surface runoff.

C. Use: Recreation, Lake Guadalupe.

D. Permit Conditions:

(1) Dates: 11/15 – 4/15

(2) AFA: 8 (8103) plus 5 (9925)

(3) Diversion: N/A

E. Raw water only.

F. RMCSD operations: none required.

License 7744, Application 19477

A. Source: Crevis Creek, unnamed gullies.

B. Transport: Surface runoff.

C. Use: Recreation, original Lake Calero.

D. Permit Conditions:

(1) Dates: 11/1-5/15

(2) AFA: 49.26

(3) Diversion: N/A

E. Raw water only.

F. RMCSD Operations: Record reservoir levels only.

SECTION 4
DOMESTIC WATER
PLANTS-EQUIPMENT-OPERATIONS

General

The major source of Rancho Murieta's domestic water supply is the Cosumnes River, with a small part fro local surface runoff. Appropriative water rights assigned to RMCSD allow diversion only in winter months, when river flows are expected to be high enough to satisfy permit requirements, and in quantities adequate to replace annual consumption. Maximum diversion, under Permit 16762, for both direct use and storage is 6, 368 acre feet.

Water collected or diverted is stored in three lakes within the District: Clementia, Chesbro, and Calero. These have a total usable capacity of approximately 4, 174 acre feet. This quantity was based on usages projected at the time of structuring the overall plans for all of Rancho Murieta , and supposes to be adequate to supply the built-out community through two seasons.

Water is withdrawn from the lakes and processed into potable water suitable for all domestic and industrial uses. Treatment, storage and distribution are done on a daily demand basis. Current (1990) usage patterns reflect the extensive use for dwelling unit irrigation, with peak usage in summer months several times the winter or average daily consumption.

The treated water is distributed throughout the District in mains arranged and sized for fire protection. Two gravity storage tanks and one hydro-pneumatic system provide good pressures and adequate fire reserves. Hydrants are an integral part of every area installation, and every service is metered, usually on an individual customer basis.

Plant and Equipment

A. Diversion

The Granlees dam and pump station is equipped with two each, 125 HP pumps and three each 500 HP pumps. Maximum flow capacities into the storage lakes are 6 cfs (2,693 pgm) for each 125 HP and 15 cfs (6,732 gpm) for the 500 HP units. Suction screens, approximately 3/8" mesh, are located in the diversion forebay. Electrical power facilities are sized to permit (maximum) operation of the three, 500 HP units, but, because of hydraulic incompatibilities, 125 HP units and 500 HP units may not be operated simultaneously. Electrical controls are interlocked to achieve this limitation. Flow rate leaving the pump station is indicated and recorded, the amount diverted is recorded on a totalizing counter.

A. Surface Runoff

Only Lake Clementia has a significant watershed, of about 1100 acres. All runoff channels into this lake are now natural , no dams, paved channels, etc. are involved.

B. Transport

A 33” diameter pipeline conveys water from the Granlees Pump Station to Lake Calero, the highest altitude storage lake, with a 20” diameter takeoff into Lake Chesbro, the intermediate altitude reservoir. A separate 21” diameter pipeline runs from the pump station to Lake Clementia, whose maximum level is below the treatment plant inlet.

A 30” diameter pump/siphon line enables transfer of stored water from Lake Calero into Lake Chesbro, from which the treatment plant is normally supplied. A pump station, with two each 60 HP pumps of 2,250 gpm total capacity, permit feeding the treatment plant from Lake Clementia.

Storage (Raw Water)

The current (1990) capacities of the reservoirs, (not including flashboards) are:

Capacities Acre Feet

Lake	Total	Usable
Calero	2,622.5	3,322.5
Chesbro	1,444	994
Clementia	907	857
Totals	4,673.5	4,173.5

A system of flashboards has been devised that permits adding approximately two feet of elevation to these three lakes, for a volume increase of about 500 acre feet. This super-elevation storage provides for water lost each year by evaporation, seepage, etc.

The levels of all three lakes are set by earth-fill dams, whose operations and maintenance, etc., are under the jurisdiction of the State Board of Dam Safety. All dams have leakage detection equipment and emergency drain gates that are periodically monitored and their operability verified.

All three reservoirs are used for recreation; Calero and Chesbro for non-body contact uses only. Swimming is permitted in Clementia only. Gasoline-powered boat motors are not permitted in any of the lakes, minimizing the input of organics. Clementia reservoir is not planned to be used, in years when full replenishment of one season’s consumption is possible by diversion from the river. Clementia water, used as feed to the treatment plant, would require extensive changes in plant operations, primarily because of typically higher solids concentrations.

Treatment

A. Process Overview

The bulk of the source of water that diverted from the river is of relatively high quality requiring little treatment to render it potable. The Cosumnes watershed is largely rural, with very little potential pollution from industrial sources. Diversion only

during winter, high-flow periods assures that essentially “snow-melt” water is diverted and stored with suspended solids and bacteria as the only major pollutants.

The relatively long-term storage, up to almost two years, also serves to improve the quality of water eventually entering the treatment plant, primarily by settling of suspended solids. Mechanical aeration is also used in Lake Chesbro to help convert the small amount of soluble iron and manganese into easily-removable forms.

Typical analyses of water entering the treatment plant from Chesbro Reservoir are:

Parameter	Units	Range of Values
Acidity/Alkalinity	pH	7.2
Total solids	NTU	0.5
Hardness	Mg/L	4.0
Bacteria	MPN	> 2.2

B. Plant Equipment and Operations

1. Facilities and Capacities

a. Treatment Units

Original plans for Rancho Murieta called for four, 2 Mgd units to be built and put on line as the number of equivalent dwelling units served increased. As of fall 1990, two units are in place, the original unit of 1.5 Mgd, the newer unit of 2.0 Mgd capacity.

b. Common Facilities. These include:

1. Liquid chemicals storage for alum, zinc orthophosphate, and chlorine. Handling and storage facilities enable accepting truck/trailer quantities.
2. Sludge disposal. Sludge drainage/drying beds are now in place for full future total capacity.
3. Standby power. An engine-generator was installed with the second treatment unit, with capacity to handle all operations of one of these units, including pumps that deliver finished water to the storage tanks and distribution system.
4. Laboratory. A laboratory was completed, along with construction of the second treatment unit, with capabilities for handling all normal laboratory work for all four future total units. Inlet and outlet turbidity and outlet chlorine residual are measured continuously for each plant unit.
   Other parameters, e.g., bacteria, are measured on samples taken at regular intervals. Periodic analyses are also made and reported as required by the State Department of Health Services.
5. Controls and electrical switchgear. All the controls, indicators, recorders and electrical switchgear for the existing (1990) two plant unites are located in one room for convenient operation by only one operator. Controls can be set so either or both of the existing units can be started or stopped automatically. This

mode of control is now based upon the level of water in the finished water storage tank serving all areas of the District.

c. Metering, Screening

Flow into each unit, from Lake Chesbro, is metered and controlled at a rate set by the operator to replenish daily consumption. A self-cleaning drum screen removes all solids, e.g. fresh-water clams, down to 3/8" mesh size.

d. Chemical Feeds

A central chemical feed room now serves both plant units with makeup tanks and mixers and chemical metering pumps for feeding solutions of alum, polymer, lime and potassium permanganate. Isolated rooms, off the central room, contain equipment for blending and feeding zinc orthophosphate, and for feeding carbon. Another separate, common feed room contains equipment for mixing chlorine gas with water and metering those solutions.

The incoming water from the storage lakes does not now require use of the lime feeder for pH control, the potassium permanganate feeder for iron/manganese control or the carbon feeder for organics control.

e. Rapid Mix

The chemical feed solutions are added into the screened influent water stream in a rapid mix chamber, containing a high—energy turbine mixer. Thorough mixing of the chemicals into the influent water is accomplished to start flocculation of suspended solids.

f. Flocculation

The action of alum and polymer to form settleable flocs requires longer, less turbulent reaction time. The stream from the rapid mix enters (two or three) larger chambers equipped with slow speed, low-energy mixers, where the final floc is formed.

g. Sedimentation

The floc/water stream then enters sedimentation chambers (two in each plant) where the floc slowly settles to the bottom of the basin. Settled flow is swept, counter-current to the liquid flow, back to the inlet end and over a submerged dam into a sludge well. The clarified liquid overflows at the outlet and over surface weirs.

h. Filtration

Final solids removal following sedimentation is effected by rapid sand gravity filters. These filters in both present (1990) plant units are manufactured by Environmental Elements, Inc., and are known in the industry as "traveling bridge" filters, for their backwash equipment design and operations. The total area for each filter is approximately 700 sq. ft. Filter media depths are nine inches (Plant 1) and twenty-four inches (Plant 2). The total area in each unit is divided into eighty-one "cells", each approximately 8" in width, and in length equal to the bed width, approximately 12'6". Normal filtration takes place through every cell over the entire filter area.

Backwash, to remove the solids retained on the surface and in the depth of the filter media bed, is performed one cell at a time, allowing normal filtration to continue over the rest of the total filter area. Backwash equipment consists of a “traveling bridge” spanning the width of the filter bed that can be positioned over each cell of the total filter length. When so positioned, the cell under drain port to the filtered water outlet header is sealed to the discharge of a bridge-mounted pump that forces filtered water back up through the filter media, dislodging the accumulated solids.

A second bridge-mounted pump takes suction from a hood suspended from the bridge that seals off the upper edges of the cell dividers and end walls. The backwash water, containing the solids washed out of the filter bed, is discharged by this second pump into a trough that conducts the dirty backwash water into a sludge well.

The frequency of the above-described backwash operation, the time over each cell, etc., is operator-controlled. Pressure drop through the filter, i.e., the head of liquid above the filter, is the most significant parameter setting backwash cycle occurrences.

i. Chlorination

Final treatment of the clear filtered water is reaction with chlorine to reduce the bacteria count to potable levels. A solution of gaseous chlorine in water is injected into the exit clear well of the filter, ahead of a long-path chlorine contact chamber.

Dosage of chlorine is set to produce residual levels in the storage tanks high enough so that by the time the water has passed through the distribution system, residual levels meet standards of less than 0.3 ppm established by the State Department of Health Services.

j. Sludge Disposal

Sludge from the flocculation chambers, sedimentation basin and the filter backwash is accumulated and further settled in a sludge well. This heavy sludge is periodically pumped to open beds for further de-watering and natural drying. Dried sludge is disposed of in licensed sanitary landfills.

k. Standards and Qualifications

Plant operators must be trained and certified by the State Department of Health Services. At least one Grade III Operator is required. Lower grade Operators (Grade II) or Operators in training may also be employed in plant operations under the supervision of the Grade III Operator, or under general supervision of the Water Superintendent who must be certified at Grade III or higher.

The State Department of Health Services sets the standards for potable, domestic water that must be produced in plant operations, as measured in samples taken at customer’s use points. Results of analyses of samples from use locations and plant samples are

periodically reported to the Department of Health Services. Parameters and levels are:

(1) At customer use point

Parameter	Units	Levels
Residual Cl_2	ppm	0.3 min. to 1.0 max.
Bacteria	MPN	less than 2.2 max
Solids	NTU	0.5 max., Plant 1
		0.1 max., Plant 2

l. Corrosion Protection

Zinc Orthophosphate is metered into the plant finished water, to reduce corrosion of metal fittings, valves, tanks, etc., and to minimize solution of cement from the asbestos-cement mains used in most of the original construction throughout Rancho Murieta.

m. Detailed Plant Operating Practices

Detailed operating procedures have been written for both water treatment plant units, by a professional consulting engineer specialist. These include detailed equipment descriptions, startup and shutdown procedures, normal operations, and alarm responses. These detailed procedures are primarily for use by Plant Operators. A copy is appended as Appendix C.

Distribution

A. Storage

Treated water is pumped from the treatment plant to three storage tanks which supply water by gravity to most of Rancho Murieta. Tanks are sized to meet maximum daily demands, primarily summer irrigation usage and reserves for fire protection. One 1.2 million gallon tank (Reservoir No. 1) located off Rio Oso Street, serves most of Rancho Murieta north of State Highway 16 and areas south of Highway 16 north of the river, including Murieta Village and the commercial-industrial areas. A 0.2 million tank (Lookout Reservoir), located above Murieta Plaza, provides a fire reserve for these areas south of Highway 16.

A hydro-pneumatic system with two 125 HP pumps, taking suction from Reservoir No. 1, provides adequate pressure to the residential areas above Reservoir No. 1 levels. A standby engine-generator enables operation of the pumps for this system in the event of SMUD power outages.

A third tank, to be constructed in 1991, will be located on a hill east of the eastern District boundary, and will also provide gravity pressures to the entire District system. This tank is sized (3 Mg) to assist in supplying peak daily usage demands and reserves for fire protection.

B. Distribution

Water mains are sized primarily to meet fire flow requirements. Loops are provided in residential and commercial areas to insure supply from more than one direction. Hydrants are installed in all areas, as located by the American River Fire Protection District.

C. Metering

Every customer's usage is metered with totalizing, positive displacement meters, mostly on an individual use point basis. Some users, e.g. Murieta Plaza, the Country Club Lodge, Murieta Equestrian Center, use "master" meters feeding multiple points.

Hydrant flows for fire flows, mains flushing, etc., are not metered. Customers needing bulk water, e.g. in tank trucks, are loaned a hydrant-attachable meter to produce billing information.

SECTION 4A
WASTEWATER COLLECTION, TREATMENT & DISPOSAL

General

Collection and treatment of wastewater, and re-use of the treated product, with a zero discharge to the Cosumnes River watershed, was an integral part of the planning of Rancho Murieta. The first Planned Development document, Ordinance Z-69-62, dated 23 July 1969, required (Section 11-B) that no effluent be discharged into the river".

The major appropriative water right, Permit 16762, that permits diversion from the River for domestic water uses, also requires treatment and re-use of the wastewater under zero discharge conditions. Conditions 24, 25, and 26 of this permit are the pertinent paragraphs, the last (26) requiring that treated wastewater be used for irrigation in lieu of water from other sources.

The current version of the discharge permit, designated Order No. 90-124, was transmitted to the District 4 May 1990, and rescinded and superseded the most current previous Order 86-161. A complete copy of the current order, 90-124, is attached as Appendix B.

Order No. 90-124 contains an information sheet describing Rancho Murieta; a list of 18 general findings; the compliance order listing 19 provisions, specifications and prohibitions; plus a required monitoring and reporting program. Those of the above of special significance to Rancho Murieta CSD operations include (listed by Order 90-124 designations):

A. Findings

9. The order is consistent with the Water Quality Control Plan for the Sacramento-San Joaquin Delta basin.
10. Sacramento County has approved a Negative Declaration in accordance with CEQA and State Guidelines, and:
11. The RWQCB concurs that there are no significant impacts.
13. The SWRCB water rights permits (16762) requires use of wastewater for irrigation purposes in lieu of water from other sources when the flow of influent wastewater reaches 424 AFA.
16c. The wastewater does not need to be managed as a hazardous waste.
    a. Discharge Prohibitions
        1. The direct discharge of wastes to surface waters or surface water drainage courses is prohibited.
        2. The by-pass or overflow of untreated or partially treated waste is prohibited.
        3. The use of reclaimed wastewater for purposes other than irrigation is prohibited.

B. Discharge Specifications

2. The discharge shall not cause degradation of any water supply.
3. Reclaimed wastewater treated in accordance with Section 60313(b), Article 4, Division 4, Title 22, CCR may be discharged in the following designated areas: a) the north golf course; b) the south golf course; c) the treatment plant equalization reservoirs; d) the proposed Rancho Murieta Homeowner's

Association Corporation yard; and e) the proposed community park.

9. Reclaimed wastewater conveyance lines shall be clearly marked as such.
10. Reclaimed wastewater operations shall be well managed to minimize erosion and runoff.

C. Provisions

2. The Discharger shall comply with the attached Monitoring and Reporting Program No. 90-124. (Monitoring and reporting requirements are outlined later in this chapter). II. Collection:

a. Systems and Equipment

All wastewater generated from every home, business, etc. in the District is collected, the large majority through a separate sanitary sewerage system; with the very minor exception of three restrooms on the golf courses and the Rancho Murieta Association shops. At these sites, wastewater is accumulated in underground holding tanks, and is periodically pumped and hauled to the wastewater treatment plant. No surface water drainage is admitted into the sanitary sewerage system. A completely separate system of storm drains and channels conveys all surface waters to the Cosumnes River watershed, with no mixing with the sanitary sewerage at any time, including surface "flooding" conditions.

b. Transport

The topography of Rancho Murieta and the planned land uses do not permit simple gravity flow of wastewater from the sources; i.e. homes, businesses; to the wastewater treatment plant. Wastewater pumping (lift) stations are required for present (1990) development and more will be required as other, additional areas are developed. Current lift station systems are:

1. "Main Lift", located just north of the Fire Station on Murieta Drive, handles wastewater from all sources north and west of the river, including all current residential development north of Highway 16, Murieta Plaza, Rancho Murieta Training Center, Murieta Village, Murieta Airport, and Murieta Equestrian Center. Four satellite lift stations; located: a- at the west end of Cantova Way, b-at the intersection of Cantova Way and Murieta Drive, c- at Alameda Drive near the tennis courts, and d- on Camino del Lago near the "Street of Dreams" homes; are also part of this "Main Lift" system.

   This "Main Lift" has an emergency engine/generator to provide electrical power for continued operation in case of Sacramento Municipal Utility District power outages. The four smaller satellite lift stations have emergency power connections capable of being supplied by a portable engine/generator set, part of Rancho Murieta Community Services District's standby equipment.

   This "Main Lift" was designed and built with provisions for installation of additional equipment; e.g. communitors and

pumps; to handle all planned future development north and west of the river, including the commercial acreage north of the airport, east of Murieta Drive.

Wastewater from this "Main Lift" is pumped through a force main easterly along Highway 16, crossing the river on the "Yellow Bridge" to the wastewater treatment plant south of State Highway 16.

2. Rancho Murieta South
A single pumping station, with separate equipment for sanitary sewerage and for storm water, has been constructed near the third tee of the South Golf Course as part of the initial development of residential areas south of the river, north of Highway 16. Surface water is pumped over the levee directly into the Cosumnes River channel. Wastewater is pumped, via a force main, to the wastewater treatment plant across State Highway 16.

This station also has an engine/generator to enable operation during SMUD power outages.

Complete residential development of Rancho Murieta South may require additional satellite lift stations as part of the wastewater collection and transport system.

Treatment

A. Process Overview

The total wastewater treatment sequence takes place in two distinctly separate phases:

1. Winter, collection, phase. Wastewater is given primary and secondary treatment only, at the rate it is generated; and stored in two ponds located south of State Highway 16, east of the plant buildings. The equipment, ponds, etc. involved are sized to handle the total wastewater flows from all of Rancho Murieta on a completely built-out basis. Maximum flow rates in the order of 1.5 Mgd are expected, and approximately 825 acre-feet (236 Mg) of storage is available in the two ponds.

2. Summer, disposal, phase. Stored wastewater is given tertiary treatment and supplied to (currently) the golf courses for irrigation. The plant equipment for these operations was installed in two, identical arrays, each capable of processing up to 1.5 Mgd in a 24 hour/day operation.

B. Collection (Phase 1) Treatment Operations

1. Primary treatment, which is essentially only solids size reduction, is done by communitors in the "Main Lift" and Murieta South pumping stations. Odor generation and grease agglomeration at "Main lift" are controlled by metered additions of selectively engineered bacteria.

2. Secondary treatment is done in four facultative digestion ponds at the west end of the wastewater treatment plant site. Aerobic digestion conditions, maintained by use of floating, powered agitator/aerators operated on timed cycles, produces further breakup of solids to a size/condition where most solids tend to remain in suspension. Piping arrangements in these ponds permit bypassing, draining, and removal of settled solids while maintaining secondary treatment operations.

3. Digested effluent from these facultative ponds is piped to the two storage ponds, and held through the non-irrigation season. Some additional digestion and solids settling takes place in these ponds during the storage season.

C. Disposal (Phase 2) Treatment

1. Plant equipment. Parts of the tertiary treatment equipment are sized to handle the entire plant, including:
   a. Chemical storage for H2SO4 liquid NaOH, liquid alum and polymer, and liquid chlorine.
   b. Transfer/feed pumps (tertiary lift station).
   c. Chlorine contact chamber.
   d. Sludge dewatering and disposal beds.
   e. Auxiliaries, such as compressed air, pressurized process (reclaimed) water.
   f. Process control laboratory.

Other plant equipment, built in two halves, each array handling only half the maximum flow, include:

   g. Dissolved air flotation units.
   h. Gravity sand filters.
   i. Chemical feed pumps and metering devices.
   j. Motor and other electrical controls.

2. Plant operations.
   a. Influent: Wastewater that has received primary and secondary treatment is pumped from the non-irrigation season storage ponds. A variable submersion depth suction device (the "Eagle") permits drawing off influent at levels selected to minimize variations in; e.g. solids content.

      Chemicals, NaOH, or H2SO4, and C12; are metered into the influent stream at the tertiary lift pumps; and alum and polymer are fed at the inlet to each dissolved air flotation unit. Quantities are based on influent analyses and previous operating experience in 44 producing the desired plant effluent. Parameters measured include Ph, total alkalinity, solids (turbidity), biological oxygen demand, bacteria, and residual C12.

   b. Dissolved air flotation. This stage processes the influent stream into three streams: (a) heavy, rapid-settling solids; (2) light, floatable solids; and (3) fine, still-suspended solids. The unit is an upright cylindrical vessel approximately 20 feet diameter by 12 feet high.

Influent is fed at mid-height on one side; effluent (stream 3) is discharged over a weir on the opposite side. A recirculating stream of approximately 350 gpm is taken off the effluent, pressurized to 60-70 psig, and injected with high pressure air. This air-saturated stream is then injected back into the body of the unit through an orifice. The resultant pressure drop causes the dissolved air to come out of solution as a very high number of extremely fine air bubbles. The lighter "floatable- solids (stream 2) unite with the bubbles and rise to the liquid surface. Rotating skimmers move these solids over a radial weir into the sludge disposal system.

The heavy solids (stream 1) settle to the slightly conical bottom of the unit, and are swept to a center discharge pipe by rotating rakes. This sludge is also periodically, automatically discharged to the sludge disposal system.

The clarified liquid (stream 3) rises through exit ports at about mid-height upward into a circumferential header at the top, and over a weir into the discharge line to the next processing unit, the sand filter. Additional chemicals; usually alum, polymer, and chlorine; can be added between the dissolved air flotation unit and the sand filter.

c. Filtration. This stage affects the final solids removal from the clarified stream from the DAF units. The equipment units are "gravity, rapid-sand" filters, with an approximately 12" deep bed of graded Monterey Sand as the filter media. Each unit has three, 100 square foot chambers, operated independently by automatic controls designed to produce the desired effluent with minimum downtime. Four operating modes are used:

1) Normal-filtration-mode. Liquid (DAF effluent) passes through the filter media, through the under drain piping and valves, and exits via a header to the next processing stage, chlorination.
2) Air sludge agitation ("Air Mix*'). The rising pressure drop across the sand filter media is sensed and turns on air-sparging headers located immediately above the upper sand surface. This air sparging disrupts the blanket of solids that accumulates at the sand upper surface, reduces the pressure drop, and extends the sand bed filter life. This air agitation then continues, with normal filtration and discharge of filtered liquid to the next stage.
3) Filter media agitation (Pulse Mix*). The rising level of liquid above the sand bed eventually contacts a sensor that triggers an air-agitation cycle of the filter media. The filtrate discharge valve is closed, and backwash filtrate is pumped back into the under drain, forcing trapped air upward through the sand media. This pulse of air dislodges much of the solids

**Trademark of filter manufacturer*

accumulated in the depth of the sand media to above the media upper surface, and lowers the influent level above the media. This "Pulse Mix" is repeated, automatically, for a selected number of cycles or until the pressure drop increases to start the final, backwash cycle.

4) Backwash (Hydro-Scour*). The filter media is backwashed when the pressure drop across the media reaches the maximum permitted by the design. The influent, with solids Trademark of filter manufacturer. suspended by the "Air Mix" sparging, is first drained off into a mud well, while normal filtration continues. Then, normal filtrate discharge is stopped; and filtrate is pumped back upward through the filter bed, thoroughly backwashing the accumulated solids out into the mud well. This backwashed liquid is returned to the facultative digestion ponds. At the conclusion of this backwash cycle, the normal filtration cycle (1) above, is resumed.

   The filtered effluent, "reclaimed waste water", at this stage, now has a solids content, (turbidity), low enough to meet State standards for irrigation use. (See IV, Standards and Qualifications, following).

d) Chlorination. The effluent from the filters, essentially free of solids, must have the bacteria also reduced to essentially zero levels to meet State standards. This is done by injection into the filter effluent of a C12-in-water stream at the head of a long-path chlorine contact chamber. This reaction rate is rather slow, the chlorine contact chamber is designed for a retention time of four hours at full plant throughput. Feed rates of the C12-water solution are designed to produce a chlorine residual at the chlorine contact chamber exit of 2.0 to 5.0 ppm, and essentially a zero level after being stored in the equalization pond (3 below).

e) Sludge System.

1) Equipment and Operations. Sludge from the DAF units is transported via a gravity pipeline (sewer) to an array of sludge dewatering and drying beds located along the south boundary of the waste water treatment plant. These four beds are each of 5,600 square feet area, and each bed has individual, manually operated, inlet and outlet valves.

   Liquid remaining in the sludge feed drains out through the under- drains and is pumped back into the non-irrigation storage ponds. The remaining solids are allowed to naturally dry, and are periodically removed for disposal.
   Disposal can be made in sanitary landfills, as approved by the State Department of Health Services, or can be

used in agriculture as fertilizer, again as approved by the State DOHS.

3. Operating Procedures.
Detailed operating procedures have been written for both the secondary and tertiary operations, by a professional consulting engineer specialist. These include detailed equipment descriptions, startup and shutdown procedures, normal operations, and alarm responses. These detailed procedures are primarily for use by plant operators. A copy is attached as Appendix D.

4. Storage and Delivery.
The final, treated effluent is accumulated in a 6.0 mg equalization pond. Some, final, reduction in residual chlorine levels takes place, but no other processing.

Control of plant operating cycles is controlled from equalization pond levels. Delivery from the equalization ponds can currently (1990) be made only to the two existing golf course irrigation systems. Delivery is made to the south course irrigation system through a 12" gravity line to ponds between south course sixteenth green and seventeenth tee.

Delivery to the north course irrigation system is by three, vertical turbine pumps taking suction directly from the equalization pond. The treated water is piped through a 12" line to the north course westward along State Highway 16, across the "Yellow Bridge", and connects to the course irrigation system on No. 10 fairway. A surge control valve off the pump discharge line has been installed to minimize pipeline damage from rapid shutoff of irrigation flows.

Operations of these pumps, and the valve controlling the gravity line to the south course ponds are controlled by RMCSD at the request of golf course personnel. Typical golf course operating sequences, present and probably future, are discussed in the next section (Section 5).

Standards and Qualifications

A. Operator Qualifications
Plant operators must be certified as Wastewater Treatment Plant Operators by the State DOHS. At least one Grade III operator is required. Lower grade operators or operators in training may also be employed in plant operations under the Grade III operator; or under the general supervision of the Waste Water Superintendent who must be certified at Grade III or higher.

B. Effluent Standards
Standards for reclaimed wastewater are set by the State Regional Water Quality Control Board, and are part of the permit assigned to Rancho Murieta. Critical constituents and characteristics specified are:

Constituent or Characteristic	Units	Monthly Mean	Monthly Median	Maximum
Total Coliform Organisms	MPN 100 ml	--	2.2	23
Turbidity	NTU	2	---	5

These standards now apply to irrigation uses on both the North and South golf courses. Also, the golf courses greens keeper prefers that residual chlorine levels be held close to zero, to minimize damage to certain turf grasses.

C. Effluent Monitoring and Reporting

The Regional Water Quality Control Board requires (Monitoring and Reporting Programs 90-124) monitoring of plant operations, sampling and analyses of the effluent product, and periodic reporting to that board. The currently-prescribed program is:

MONITORING

Constituent	Units	Type Sample	Sample Frequency
Flow	Mgd	Continuous	
pH	pH Units	Grab	Weekly
Settleable Matter	ml/i	Grab	2X week
Coliform Organisms	MPN/100 ml	Grab	Daily
Residual Chlorine	mg/1	Grab	Daily
Turbidity	NTU	Continuous	

REPORTING

Reports must be submitted quarterly to the Regional Board. The Board also may request an annual summary report that summarizes data for the entire previous year, discusses any deviation from standards, and outlines corrective actions planned.

SECTION 5
RECLAIMED WASTE WATER USAGE

Mandated Requirements

A. Permits

The original Planned Development Ordinance approved for Rancho Murieta (Z-69-62) contained a requirement that no wastewater be discharged back into the Cosumnes River watershed.

The major appropriative water right, Permit 16762; under which water is diverted from the river for domestic use; requires treatment and re-use of wastewater, with zero discharge.

The wastewater permit issued to the District, Order No. 90-124, also requires treatment and re-use of wastewater, in lieu of diversion of water from the river. It also specifies places of use, including golf courses and public parks; and prohibits any discharge to surface water drainage courses.

B. Design Criteria

Early plans and designs for Rancho Murieta included concepts enabling compliance with the above permit conditions:

1. Collection and storage of all wastewater, at as-generated rates, the year around.
2. Primary and secondary treatment, at as-generated rates.
3. Tertiary treatment• and re-use during the irrigation-summer-season, at rates adequate to dispose of each year's total generation.
4. Primary disposal; i.e., irrigated; areas would be golf courses, public parks, and property owners corporation (maintenance) yards.

C. Plant Designs and Operations

1. Generation/Collection

The 5,189 residences, businesses, etc. authorized by the Planned Development Ordinance for Rancho Murieta converts, using industry-standard criteria, into 5,900 Equivalent Dwelling Units (EDU). The accepted industry criteria for wastewater generation is 200 gallons per day per EDU. Based on these accepted data, plant designs and operations must, at full build-out of Rancho Murieta, be based on:

Daily wastewater generation	= 1.18 million gallons per day (Mgd)
	= 3.62 acre feet (AF)
Annual total generation	= 430 Mg
	= 1322 AF

Plant designs and operations, to comply with design criteria B-1 and B-2 above, have been installed and set up for a 1.5 Mgd maximum.

2. Treatment (tertiary) and Disposal.
Disposal of treated wastewater is, per permits, by irrigation only, with no return to the river; which essentially limits the treatment/disposal operations to summer months only.

Plants have been designed, partially constructed, and are in operation to meet criteria 3 and 4 above, as follows:

Wastewater accumulation ponds, capacity	= 825 Acre feet (AF)
Tertiary treatment capacity (2 units, 1.5 Mgd each), max.	= 3.0 Mgd
Treated wastewater storage (equalization pond)	= 6.0 Mg = 18.4 AF

These capacities dictate a maximum collection phase of approximately 7 months, as limited by the capacity of the storage ponds. The tertiary treatment and disposal season is similarly limited to approximately 5 months minimum, as dictated by the treatment plant maximum capacity.

Current Plant and Operations

A. Golf Courses

1. North Course

a. Pumps and Controls

The North Course can now be supplied with treated wastewater directly from the wastewater treatment plant equalization (final product storage) pond. Three vertical, multistage turbine pumps take suction directly from the pond. Two of these are 100 HP units, each rated at 1,000 gpm at 175 psi; the third, is a 25 HP unit, rated at 250 gpm at 100 psi. A hydro-pneumatic tank and controls permit automatic, staged operation, depending upon demands of the North Course irrigation system. The total capacity is adequate to supply the entire course.

Operation of the pumps, controls, etc. is done entirely by RMCSD personnel through requests of golf course personnel.

b. Delivery System

The pumped water is carried through on 12" diameter line west and north from the wastewater treatment plant, crossing the river on the Yellow Bridge., A pressure reducing valve, located in an underground box just north of the Yellow Bridge, controls the pressure of the pumped stream entering the course irrigation piping system. Connection to the North Course piping is made in the 10th fairway, near the 10th hole pond.

c. Storage

Currently, no appreciable capacity for storage of treated wastewater exists in the North Course irrigation system. The wastewater treatment plant equalization pond (6.0 Mg) is now the only storage capable of being fed to the North Course.

Proposals have been made to convert Bass Lake into a multi-source reservoir for irrigation of the North Course, plus a possible future "third course". Sources would be: 1. directly from the river, by a pump setup similar to the existing "Bass Lake Pump"; 2. a pipeline, and probably pumps, from Clementia Reservoir; 3. a (new) pipeline from No. 10 fairway to Bass Lake.

d. Course Equipment and Operations

Currently (1990) the North Course is not using any reclaimed wastewater. Bass Lake has been supplied primarily by pumping from the river. A pump station, rebuilt in 1987, taking suction from Bass Lake, supplies the entire course system. Equipment is operated solely by course personnel.

2. South Course

a. Wastewater treatment plant to course system.

A 12" gravity line from the plant equalization pond crossing under SR 16 fills the course ponds at 16th green and 17th tee. A motorized valve in this line is controlled by level controls in pond #17.

b. Storage.

In addition to the wastewater treatment plant equalization pond, reclaimed wastewater can be transferred to, and stored in, the South Course lakes along the 10th and 11th fairways. Pump and pipeline capacity enables transfer to lakes 10-11 at about 450 gpm, (.648 Mgd).

c. Course system and operation.

Currently, virtually all the wastewater reclaimed has been used for irrigation on the South Course.

Pumps located at the 17th tee, taking suction from the 16-17 ponds, supply water for irrigation of the course, and for transfer to lake 10-11. Pumps located on lake 10-11 can also supply water for course irrigation. Operation of the pumps, etc. and sprinkler system is solely by golf course personnel.

Usage of reclaimed water during the 1990 irrigation season averaged 1.1 million gallons per day. Course sprinkling is generally done during early morning hours.

Future Disposal

A. Design Criteria Verification

Actual operating data, taken during recent years (1989-1990), from the 1300-1400 EDU now in place, show:

1. Average wastewater generation of 200 gallons per day per dwelling.
2. Golf course irrigation requirement of 1.1 Mgd. These actual operating data provide verification of the original criteria upon which the wastewater treatment plant facilities were designed and built.

B. Annual Operations

Because it is imperative to the life of the entire Rancho Murieta community that each year's generation of wastewater be disposed of, changes in annual operations will have to take place as the community builds out. These include:

1. Areas irrigated with reclaimed wastewater will have to increase beyond the South Golf Course, as used to date. The North Course would easily follow, since all facilities are already in place. Other areas, designated but not yet developed, would include the community park below Clementia dam, and/or the "third golf course", and the recreational area along Stonehouse Road.
2. Use of reclaimed wastewater will have to have an increasing priority over use of river water. This priority is required by both the appropriative water permits and wastewater permits. Close coordination with reclaimed wastewater users, e.g. golf course greens keeper, will be required, including accurate daily records of amounts of water used. Drought occurrences may also force priority use of reclaimed water.
3. Plans also may have to be made for additional or alternate disposal (irrigation) areas. Uses considered to date have included pasture acreage and non-food crops acreage, e.g. sod farms.

SECTION 6
CIA DITCH

Rights, Permits, Operating Agreements

A. History

The Cosumnes Irrigation Association facilities, including the Granlees Dam(s) and the ditch westward were constructed in 1920-1921. Original participants were the Schneider, Bozich, and Granlees families. The Fruitridge Investment Co. also was involved, holding some of the early permits.

Currently, the Cosumnes Irrigation Association is owned one third by Rancho Murieta Community Services District, one third by Fred Anderson, and one third by his wife.

B. Riparian Rights CIA Ditch Usage

Use of the CIA ditch is not required for any riparian rights being exercised within the District. Uses outside the District, e.g. for stock watering and irrigation, involve diversion at Granlees Dam and transfer of water westward through the District to the eventual place of use.

C. Appropriative rights CIA Usage

The Granlees Dam and ditch facilities are involved in exercise of appropriative rights within the District, through two permits.

License 2629 (Applic. 2296) is for irrigation of 471 acres of agricultural lands lying inside the District. This permit allows a maximum diversion of 12.5 cfs, which is very close to maximum ditch flow capacity. No storage is allowed under this permit, nor is there an annual diversion total. Since these 471 acres lie in the southwestern portion of the District, almost the total length of the CIA ditch is used.

License 537 (Applic. 1838) is for irrigation of 22.5 total acres around the Rancho Murieta (North) gate house, at the Rancho Murieta Training Center and in Murieta Village. Water for this permit is carried through the CIA ditch into Laguna Joaquin for irrigation on lands north of SR 16, and on through the ditch to a diversion just west of the Lone Pine Road to supply the RMTC pressurized irrigation system. Murieta Village is not currently using water under this permit for common area irrigation.

D. Ditch Operating and Maintenance Agreements

All operations and normal maintenance of the ditch, and Granlees Dam, are performed by Rancho Murieta Community Services District. Costs for these operations and maintenance are shared in proportion to the current ownership per an agreement negotiated in 1988.

Costs of major repairs and rebuilding, e.g. repair of Granlees Dam spillways, have been distributed through special, one-time agreements.

Operating Equipment and Practices

A. Dam and ditch construction

1. Dams

The Granlees Dam(s) that impound the Cosumnes River and divert water into the Cosumnes Irrigation Association ditch were built in 1920-1921. The dams are located in the southeast corner of the District. A large rock island separates the river at that point, necessitating two dams.

The south dam has only a fish ladder and a stream bed level dump gate. The upstream side of the dam is filled with rock, sand, etc., burying the dump gate and rendering it unusable. The crest of the south dam is 2.4 inches higher than the north dam, so that no overflow takes place during much of the (current) year's flows.

The north dam also has a fish ladder and dump gate, the latter also unusable because of sediment buildup behind the dam, almost to the crest elevation. A forebay, constructed in 1983, connects to the north end of the north dam. This forebay houses the 13 suction screens of the wet well for the five pumps that divert the major portion of the annual water usage by Rancho Murieta.

A slide gate leading out of this forebay feeds the CIA ditch. A similar' gate enables return of diverted water back to the river. The fish ladder inlets are at elevations such that, during periods of minimum river flow, these ladders are still capable of being operated.

2. Ditch System Construction

a. Ditch

A major portion of the ditch was also constructed in the 1920-1921 period. It is understood that the "design capacity" of the ditch was originally intended to be in excess of 15 cfs (6,732 gpm). Most of the ditch is unlined, except for some concrete lining in broken rock areas in the vicinity of the Bass Lake pump location. Short culvert sections were recently installed in the Granlees Ranch area, and under the north pier of the yellow bridge. Piped sections are:

1. Gate box east of the Country Store to Laguna Joaquin.
2. Gate box east of the Country Store through an inverted siphon to a gate box west of the Fire Station.
3. Laguna Joaquin to the above (2) gate box.
4. Under the Murieta Equestrian Center, and to the north side of SR 16.

b. Gates

Gates are currently in place and operable at the following locations:

1. Out of the north dam forebay into the ditch.
2. Out of the ditch back to the river about 100 feet below the dam.
3. Out of the ditch back to the river at the Bass Lake pump.
4. Out of the ditch back to the river at the Yellow Bridge.

5. Out of the box east of the Country Store to feed Laguna Joaquin.
6. From Laguna Joaquin into the box west of the Fire Station.

All other gates, valves, and pump suction pipes that take water out of the ditch are located beyond the last ditch flow recorder near the Murieta Equestrian Center, and are operated by the users according to their permits.

c. Metering

Flow metering equipment is installed, according to permit requirements, as follows:

1. A stage (ditch level) recorder just downstream from the forebay headworks.
2. A stage recorder near the Murieta Equine Center, downstream of Laguna Joaquin.
3. Totalizing meters on the discharge of irrigation pumps taking suction out of Laguna Joaquin.
4. If water is returned to the river from the ditch, other meters also come into play:
   a. Bass Lake river pump totalizer.
   b. Yellow Bridge river pump totalizer.
   c. Rock Plant river pump totalizer.
      All of the above meters are read monthly by RMCSD personnel, and included in reports to the proper agencies.
   d. Ditch Performance
      Currently, approximately 400 of the water metered at the ditch headworks cannot be accounted for by metering at the Equine Center stage recorder and the irrigation pump meters out of Laguna Joaquin. Most of this loss is from leakage along the ditch between the headworks and the Yellow Bridge. Agreements are in place with current developers that the open ditch will be replaced by closed conduits whenever development of property along the ditch takes place.

SECTION 7
LAKE-TO-LAKE TRANSFERS

Operation of the water resources at Rancho Murieta requires transfer between lakes and ponds within the District boundaries, and involves raw water for both domestic and irrigation uses, and reclaimed waste water. The facilities in place to carry out these transfers, brief descriptions of operations required and agencies responsible for necessary operations follow.

Domestic Water End Use

Raw water pumped from the Cosumnes River during permitted diversion periods is, for domestic end use, stored in Lakes, Calero, Chesbro, and Clementia. Transfers involved are:

A. Calero to Chesbro

Calero is the highest elevation lake in the storage chain and is normally the first to be drawn down by transfer into Chesbro, the next highest lake and the feed lake to the Water Treatment Plant.

A pump/siphon system with a 30" diameter inter-lake pipe was installed as part of the construction of Lake Calero in 1982. This system enables rapid transfer to Lake Chesbro, manually as seen fit by operators based on Chesbro level. With this system, approximately 2,322.5 acre-feet maximum can be withdrawn from Calero.

Operations of the pump/siphon system are completely by Rancho Murieta Community Services District personnel. Total amounts transferred are recorded by a totalizing meter, and reservoir levels are periodically recorded.

B. Chesbro to Clementia

While currently not seen as a "normal" in domestic water operations, raw water can be transferred from Chesbro to Clementia.

Water is normally fed from Chesbro to the water treatment plant via a 36" gravity line. A 36" stub from this line enables filling of Clementia and for periodic flushing of this line to the water treatment plants.

All operations would be carried out by RMCSD personnel. No metering equipment, other than surface level gages, are installed.

Irrigation End Use - Raw Water

Raw water diverted from the river and surface water runoff and stored in Lakes Calero, Chesbro and Clementia, and South Lake 10/11 may, in part, be used for irrigation within the District. Transfers involved are:

A. Clementia to Laguna Joaquin

Water can be drained, by gravity, through a 24" pipe leading to a 10" pipe out of the lower, dam end of Clementia and fed via a valve stub into the CIA ditch. The ditch carries the water, by gravity, into Laguna Joaquin, which serves as a suction reservoir for pumps supplying irrigation to common areas, parkways, etc. of the Rancho Murieta (North) Association areas.

Operations of the diversion from Clementia, through the CIA ditch into Laguna Joaquin, are by RMCSD personnel. Operation of the irrigation pumps are by Rancho Murieta Association personnel. Totalizing meters are installed on the irrigation pump discharge lines, and are read and recorded by RMCSD personnel.

B. Clementia to South Lake 10/11

Water can be drained, by gravity, from Lake Clementia via the 24" line, into the 10" line and through a 12" under crossing of the river, into the upper end of the lakes along the tenth and eleventh fairways of the South Golf Course. The lower, larger portion of this lake serves as the major suction reservoir for the South Course irrigation pump stations located at the west end of the lake.

Operations out of Clementia into South Lake 10/11 are entirely by RMCSD. Totalizing meters on the discharge of the irrigation pumping station are read and recorded by RMCSD.

C. South Course Lake 10/11 to Golf Courses Ponds

Raw water is delivered from the Lake 10/11 pump station to the South Course Irrigation system through header mains along the course, and also to a pond located at No. 5 tee, and two ponds between No. 16 green and No. 17 tee. The latter two also serve as a suction reservoir for reclaimed waste water, discussed below.

Operation is entirely by golf course personnel, but metering, recording and reporting are done as described in (B) above.

D. Bass Lake to North Golf Course Ponds

Raw water is supplied from Bass Lake to the entire North Golf Course by a pump station on the west side of the lake.

Operation is entirely by golf course personnel. A totalizing flow meter at the pump station is read and recorded by RMCSD personnel.

Reclaimed waste water

A. Waste Water Treatment Plant to South Course Lakes 10/ll.

Reclaimed waste water can be delivered by gravity flow from the plant effluent pond (Equalization Pond) into the ponds at South Course No. 16 green and No. 17 tee. For reclaimed water, these ponds are a suction reservoir for pumps located at No. 17 tee, which can deliver water through the course header mains to the South Course Lakes 10/11, as well as directly to the course irrigation system and the pond at No. 5 tee.

Operations involved are handled exclusively by golf course personnel. Flow is metered and totalized in the gravity line from the Equalization Pond. Readings are made and recorded by RMCSD personnel.

B. Waste Water Treatment Plant to Bass Lake

Reclaimed waste water can be delivered, by the three pumps at the waste water treatment plant equalization pond, to the North Course header main for course irrigation. The existing header main is not capable of delivering reclaimed waste

water to Bass Lake. Full utilization of Bass Lake as a suction reservoir for both reclaimed and raw water will require a new pipeline from No. 10 fairway to Bass Lake.

Operation of the present arrangement is entirely by golf course personnel. The totalizing meter .on the discharge line from the Equalization Pond pumps is read and recorded by RMCSD personnel.

SECTION 8
METERING - RECORDING - REPORTING

Several of the permits and licenses held and operated by RMCSD, for both water and wastewater; contain requirements for installation, operation and maintenance of metering equipment. Most of these are for totalizing meters that operate whenever the pipeline has liquid flowing, and simply record the total quantity passing that meter. Rate-of-flow meters that record only the instantaneous flow, are required in a few locations. Careful reading of the permits will clearly identify the type of meter required for each flow requiring measurement.

Several of the permits and licenses also require that regular reports be made to the licensing or permitting agencies; e.g., the State Water Resources Control Board (SWRCB). The frequency of reporting is specified in the permit or license, the content and form of the report is usually agreed to between the permitting agency (state) and the reporting entity (RMCSD).

Both normal operations of water and wastewater facilities and preparation of required reports involve frequent recording of meter readings and for some meters, calculations from raw data. Usually, the frequency of such recordings is based upon needs for controlling plant operations, and periodic totalizing of such frequent recordings is used for reports to agencies.

A tabulation of the quantities to be metered, type of meter, recording and reporting frequency, and agency requiring the report is attached as part of this section, referenced to permit/license numbers. Samples of typical records and reports are included in Appendix E.

All meters are read at the end of each month; data is accumulated and forwarded annually to the Division of Water Rights as part of the annual report.

Application 23419 - Permit 16765 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 1838 - License 537 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 16142 - License 6238 Amount: N/A
Meter Make: Water Spec. Meter Type: Propeller
Meter Size: 8" Units: cu ft. Diversion

Application 19477 - License 7744 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 20057 - License 8013 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 23418 - Permit 16764 Amount: 130.0 Ac Ft
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Not built - as yet

Application 23416 - Permit 16762 Amount: 6.0 cfs/4,050.0 Ac Ft
Meter Make: Water Spec Meter Type: Propeller
Meter Size: 10" Units: cu ft Diversion

Application 23416 - Permit 16762 Amount: 6.0 cfs/4,050.0 Ac Ft
Meter Make: Sparling Meter Type: Electric
Meter Size: 33" Units: gallons Diversion

Application 23416 - Permit 16762 Amount: 6.0 cfs/4,050.0 Ac Ft
Meter Make: Sparling Meter Type: Electric
Meter Size: 21" Units: gallons Diversion

Application 23417 - Permit 16763 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 22603 - License 9925 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 16143 - License 6239 Amount: N/A
Meter Make: N/A Meter Type: N/A
Meter Size: N/A Units: N/A Storage only

Application 2296 - License 2629 Amount: 12.5 cfs
Meter Make: Stevens Meter Type: Float
Meter Size: N/A Units: Ft CIA Ditch Recorder

Application 2296 - License 2629 Amount: 12.5 cfs
Meter Make: Stevens Meter Type: Float
Meter Size: N/A Units: Ft CIA Ditch Recorder

APPENDIX B
OPERATIONS MANUAL FOR
DIVERSION FROM THE COSUMNES RIVER

CIA Ditch

A. Permitted Diversions

Certain permits/licenses held by the RMCSD allow diversion at Granlees Dam for use within the District. These, and their important limits, are: (Complete permits in Appendix A)

1. License 537

   Places of use: 22.5 acres total, around Laguna Joaquin, Murieta Parkway gate, the RMTC and Murieta Village.

   - Diversion period: 3/15 to 9/1 each year.
   - Diversion rate: 0.28 cfs (=126 gpm = 181,000 gpd = 685 AF per season).

2. License 2629
   - Place of use: 471 acres, agricultural lands within the District.
   - Diversion period: 3/1 to 7/10 each year. Diversion rate: 12.5 cfs (= 24.75 AF/day = 3267 AF per season).

Diversions are also made at Granlees Dam, for uses outside the District, including riparian and appropriative uses on agricultural lands west and south of the District.

B. Annual Operations

Certain equipment involved with CIA ditch operations must be installed and removed, and given annual preventative maintenance. These include:

1. Headworks and Equestrian Center stage recorders.
   - Install after spring floods.
   - Remove after river flows cease.
   - Perform maintenance while out of ditch.

2. Laguna Joaquin pump discharge meters.
   - Maintenance during non-irrigation season. Calibrations, some required by Permits, must also be performed, including:
   - Stage recorders (2), bimonthly for permit 16762, paragraph 28A.
   - Laguna Joaquin pump discharge meters, annually.

C. Seasonal Operations

Gates, valves, etc. in the CIA Ditch system are operated by RMCSD personnel. These are detailed in Section 6, CIA Ditch, Section II-2-a,b,c. Logs and records must be kept of all Ditch equipment, including:

- Daily: Status of all gates and valves.
- Status of stage recorders.
- Readings of pump discharge meter totalizers. Weekly:
- Readings of stage recorders totalizers.

Pumped Diversions

A. Permitted Diversions

Certain permits/licenses held by the District allow pumped diversions from the Cosumnes River. These, and their critical limits, are: (complete permits in Appendix A)

1. License 6238
   - Non-riparian golf course irrigation.
   - Dates: 5/1 to 10/31 yearly.
   - Rates: 1.24 cfs (557 gpm = 107,136 cfd = 443 AF per season).

2. Permit 16762

   Municipal, industrial and recreational uses, on all lands (3600 A) of the District, and irrigation of 500 A within the 3600 A.
   - Dates 11/1 each year to 5/31 next year. Permitted diversion volume: see text Section 3 and permit, Appendix A.
   - Permitted diversion rates: see text Section 3, permit Appendix A, and following below.

3. Riparian diversions
   - Permitted year around, river water levels permitting.
   - Letter agreement with SWRCB dated June 29, 1990, permits operation of the Bass Lake, Yellow Bridge, and Rock Plant pumps on alternate days, after 5/31 yearly.

B. Annual Operations

1. Equipment installation, removal, maintenance
   - The Bass Lake Pump, Yellow Bridge Pump, and Rock Plant Pump cannot be installed until after spring floods.
   - These same pumps must be removed at the end of the irrigation season or when flow ceases in the river.

2. Records and reporting
   - See text Section 8.

C. Diversion Restrictions

1. McConnell Gage - No diversions are allowed unless "there is a continuous visible surface flow in the bed of the Cosumnes River from the permittee's point of diversion to the gaging station at Highway 99 known as Cosumnes River at McConnell" (Ref. Permit 16762, paragraph 21).
   a. District operating procedures.
      (1) A District employee shall drive south on Highway 99 past the McConnell Gage and observe if flow is visible.
         (a) Three times a week, once flow starts at Granlees Dam.
         (b) Weekly during well -above-minimum- for diversion flows at Michigan Bar.
         (c) Daily during declining flows, near minimum for allowable

diversion.

b. Recording and reporting.
McConnell Gage observer(s) shall keep a daily log of date, hour, and presence or absence of visible flow. Such data shall be incorporated into the annual diversion report to the SWRCB.

2. "Normal Year" Diversions
Diversions may be made, in "Normal Years", only when adequate flow exists in the river, as measured at Michigan Bar gaging station (Permit 16762, paragraph 18E). A schedule of maximum permitted diversions, as related to river flows, is detailed in paragraph 18 of Permit 16762 (See Appendix A). A tabulation of these restrictions was spelled out by the SWRCB (Letter 25 January 1990 as follows:

Pump No.	HP	Max.Div. Rate cfs	Min. Mich. Bar flow to operate
1	125	6	76
1+2	2 @ 125	12	181
3	500	15	184
3+4	2 @ 500	30	199
3+4+5	3 @ 500	45	214

The relationships of the table above are also shown on the attached graph, titled:

NORMAL YEARS DIVERSIONS
Permitted Diversions at Granlees Dam
Nov 1 - May 31

a. District Operating Procedures

NORMAL YEARS DIVERSIONS
Maximum Permitted Pumped Diversions at Granlees Dam Nov. I - May 31

All diversions require Cosumnes River visible flow at McConnell Gage

45
m m
3- 500 HP
30
(0 N

	45	
	40	
	35	
0		
a) o	30	
c 0		u.,
L.	25 _	z 0
a)		a
>		w
v		>
	20	0
a)		0
Cl.		z
E	15	0
	_ 10	N

r-•

1 - 500 =

I - 500 HP 2- 125 HP
"IrrvAir I-125 HP , 1i II-125 HP

a
2- 500 HP
15
_/I2
60 70 80 90 100 120 140 160 180 200 220
Flow at Michigan Bar Gage - cfs
6/11/91

1. Determination of Flows at Michigan Bar.
A readout of the hourly flows at Michigan Bar is accessible via a telephone/modem link from a computer at SWRCB. RMCSD has, (6/91), installations and trained personnel for calling up this data as follows:

Personnel	Location
CSD Water Supt.	Plant and Home
CSD Accountant	Office and Home
Engineering Aide	Plant
Water Field Supv.	Plant

2. Pump Operation Criteria
   a. Flow zero to minimum.
   - Call up data for previous 16 hours at 0800 daily.
   - Call up data for previous 8 hours at 1600 daily.
   - No pump operation unless 24 hour data remains above minimum (76 cfs).

   b. Rising or stable flows.
   - Call up data for last 16 hours at 0800 daily.
   - No added pump unless last 12 hours data remains above next higher diversion rate.

   c. Falling flows.
   - Call up data for last 16 hours at 0800 daily.
   - Call up data for last 8 hours at 1600 daily.
   - Shut down pump(s) to next lower rate if 12 hour data trend so indicates.

   d. Off-hour operation.
   - No weekend pump operation, unless Normal Year total diversions are near "Dry Year° levels (see Dry Year below).
   - If weekend operation required, data call up for past 24 hours at 1600 Friday must show stable or rising flow.
   - Night pumping rate to be reduced if 12 hour data call up at 1600 hours shows Michigan Bar flow decreasing.

3. Pump Operating Procedures.
Checklists for start/stop of both the 125 HP and 500 HP pumps, for use by District operating personnel, are attached at the end of this appendix.

3. Dry Year Diversions
Provisions are made in Permit 16762, paragraph 18C, for accelerated diversions in "Dry Years", as follows:

Date	Maximum to Storage, AF
Feb 1	400
Mar 1	2,000
Apr 1	4,400
May 31	4,050

Pumped diversions to storage, up to 46 cfs are permitted (with 70 cfs minimum flow at Michigan Bar and visible flow at McConnell) if the total amount that could have been diverted by the date specified under "Normal Year" operation was less than the amounts tabulated above.

These relationships have also been put into graphical form, attached, titled:

DRY YEARS DIVERSIONS
Accelerated Diversions at Granlees Dam

a. District Operating Procedures

1. Reservoir levels - Calero, Chesbro, Clementia.
- Continue weekly readings.
- Increase reading frequency to daily in last weeks of January, February and March.
- Read daily during pump operations.

2. Michigan Bar Flows.
- Call up data 0800 daily for last 16 hours.
- <u>Diversion must not reduce flows over Granlees Dam to less than 70 cfs.</u>

3. Pump Operation Criteria.
- Once started, diversion to storage must continue, at maximum rate, until stored volume limit for that period is reached.
- Diversion for direct usage, 6 cfs max., may be continued after storage limit is reached.

4. Records and Reporting.
- Michigan Bar flow)) Record daily
- Pump operations)) Report annually Reservoir levels

4. <u>River Pumps</u>

a. Bass Lake Pump.

1. Permit restrictions.

a. Permit 16762
- Dates: 11/1 - 5/31
- Rate: Part of 6 cfs direct usage diversions.
- AFA: Part of total allowed diversion.

b. License 6238
- Dates: 5/31 - 10/1 yearly.
- Rate: 1.24 cfs max.
- AFA: No limit specified.

c. Riparian diversions.
Agreement with SWRCB dated 6/29/90 allows alternate

day operation.

2. Operating procedures.
   a. Installation after spring floods.
   b. Start/stop per RMCC request and/or Bass Lake levels.
   c. Remove after irrigation season.

b. Yellow Bridge and Rock Plant Pumps:
   1. Permit 16762 restrictions.
   - Dates: 11/1 - 5/31
   - Rates: Part of 6 cfs direct usage diversions.
   - AFA: Part of total allowed diversion.
   2. Operating procedures:
      a. Install after spring floods.
      b. Start/stop per RMCC and RMTC requests.
      c. Remove after river flow ceases.

c. Records and reporting.
- Read pump discharge flow meters daily.
- Report annually.

DRY YEAR DIVERSIONS
5
W
I--- 4

a
O
F--
W (I)3
o
< cn
®F-
H 2
U)
0
E-
LL 1
0


4400
Accelerated diversions permitted at Granlees Dam, if total amounts on vertical scale have not been diverted to storage under Normal Years operations, by the dates on the horizontal scale.
----Restrictions----
- 70 cfs minimum beyond Granlees Dam - Visible flow at McConnell - 46 cfs maximum diversion
2000
4050 4050
400
JAN FEB MAR APR MAY
DIVERSION YEAR

APPENDIX B-1
GRANLEES DAM DIVERSION PUMPS
Start/Stop Checklist

125 Horsepower (6 cfs) Pumps

Pre-start (Assumes that adequate flow has been determined to exist at Michigan Bar Gage).

A. Suction
   1. Forebay. Verify that forebay is at maximum level and inlet gate open.
   2. Purge system.
      a. Start purge system, verify that air pressure is rising in accumulator tank.
      b. When compressor stops, initiate a PURGE cycle.
      - Inspect the suction screens to see that they are free of debris.
      - Run additional PURGE cycles, if required, to clean the suction screens.

B. Discharge
   1. Storage reservoir selection.
      a. Operate valves at Granlees to discharge into either Clementia or Calero and Chesbro.
      b. If to Calero-Chesbro, open discharge gates at the reservoir selected.

C. Records.
   1. Read and record.
      a. Flow totalizer on either Clementia or Calero-Chesbro flow meters.
      b. Watt-hour meters.

Start and Run

A. Initiate pump start sequence, using HAND mode.

B. Start up checks.
   1. Verify that automatic shut-off valve (Clay valve) is opening).
   2. Check discharge pressure gage for typical operating pressure.
   3. Check suction well for adequate level.

C. Run.
   1. Re-check suction well level, run additional PURGE cycles, if required.
   2. Re-check discharge pressure gage.
   3. Check pump shaft packing gland.
   4. Check for pump smooth operation.

Stop

A. Initiate pump stop sequence, using OFF mode.

B. Shut-down checks.
   1. Verify closure of Clay valve and subsequently motor stop.

C. Shut-down operations.

1. Discharge.
    a. Shut valves to reservoir at Granlees.
    b. Shut gates at Calero or Chesbro.
2. Suction.

    If last pump in operation,
    a. Shut down Purge system.
    b. Adjust forebay gates, etc.

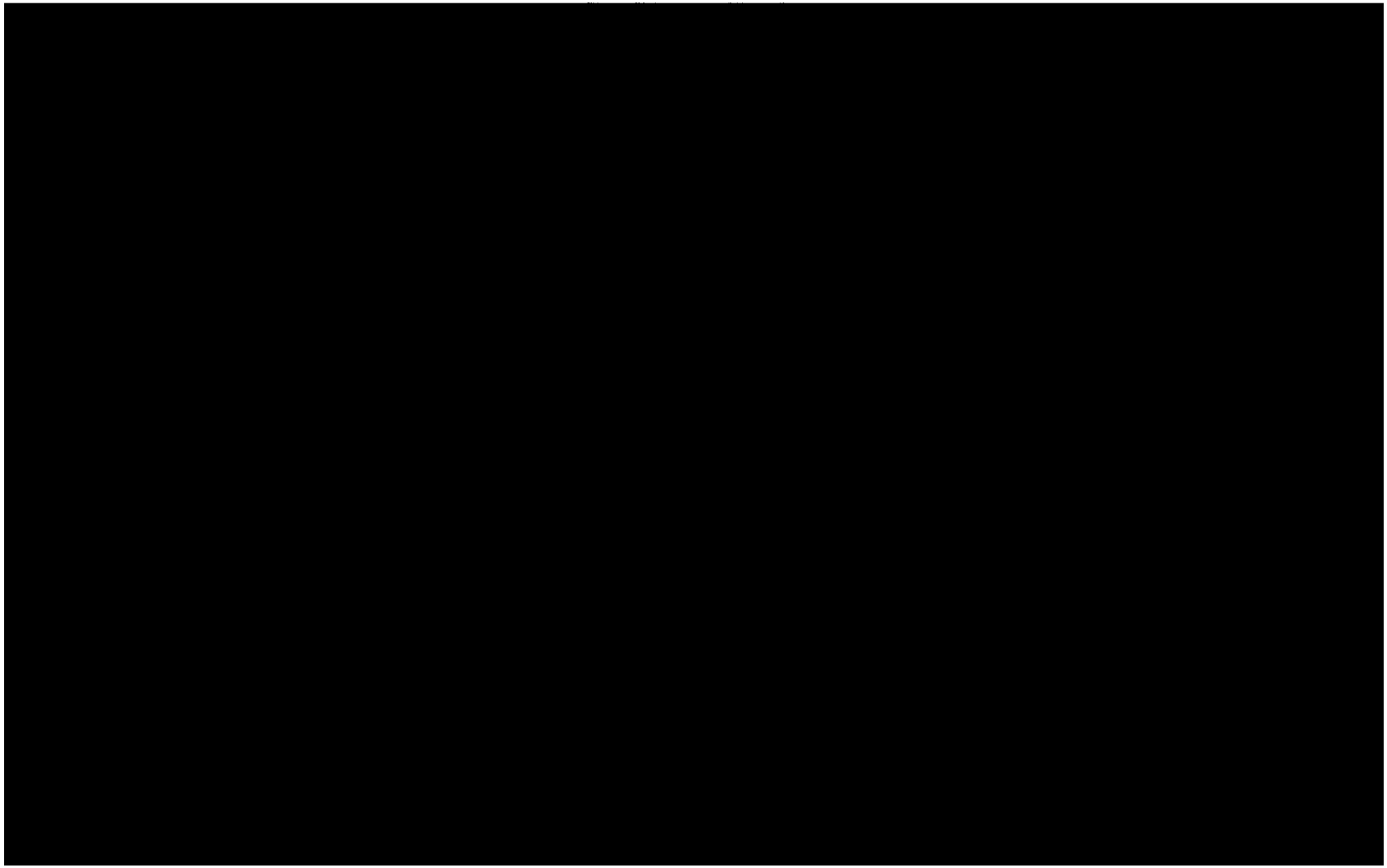
NORMAL YEARS DIVERSIONS
Maximum Permitted Pumped Diversions at Granlees Dam Nov. I - May 31

All diversions require Cosumnes River visible flow at McConnell Gage
45
a) a)
3- 500 HP
30

45	
40	
35 U a)	
30	
0	U) z
25 _ a)	0 U) w
	>
20	0-
a	0 z
15	0
_ Or	ti

lo _
r
•2- 500 HP 7—12-
- 500 HP
1~~5~1_
HP
l "PA;.,— 125 HP 2 Ar-e-0sa
15 _/12
60 70 80 90 100 120 140 160 180 200 220
How at Michigan Bar Gage - cfs
6/11/91
5


0
DRY YEAR DIVERSIONS
4400
Accelerated diversions permitted at Granlees Dam, if total amounts on vertical scale have not been diverted to storage under Normal Years operations, by the dates on the horizontal scale.
----Restrictions----
- 70 cfs minimum beyond Granlees Dam - Visible flow at McConnell
- 46 cfs maximum diversion
2000 400
JAN FEB MAR APR
DIVERSION YEAR
MAY
4050 4050



APPENDIX B-2
GRANLEES DAM DIVERSION PUMPS
Start/Stop Checklist

500 Horsepower (15 cfs) Pumps

Pre-start (Assumes that adequate flow has been determined to exist at Michigan Bar Gage).

A. Suction
   1. Forebay - Verify that inlet gates are open and forebay is at maximum level.
   2. Purge system.
      a. Start air purge system, or verify that air accumulator tank is at operating pressure.
      b. If this is "first pump" start, initiate a PURGE cycle.
      c. Inspect suction screens to ascertain they are free of debris. Run additional PURGE cycles, if required.

B. Discharge
   1. Reservoir selection.
      a. Open discharge gate at Calero or Chesbro.
      b. Open valves at Granlees to direct flow to Calero and Chesbro.
      c. Open manual pump discharge valve.

C. Motor Cooling System
   1. Open cooling water valve, at middle 500 HP pump beyond the pump discharge valve.
   2. Blow down strainers on cooling water line.

D. Records
   1. Read and record.
      a. Flow totalizer on Calero-Chesbro round chart flow meter.
      b. Watt-hour meters.
   2. Verify on round chart meter:
      a. Chart set to correct day and hour.
      b. Indicator pen inked, etc.

Start and Run

A. Initiate pump start sequence, using HAND mode.

B. Start-up checks
   1. Verify that automatic valve (Bailey valve) is opening.
   2. Check suction well for adequate level.
   3. Check discharge pressure gage for typical operating pressure.

C. Run

1. Re-check suction well level, run PURGE cycle, if required, to clean suction screens.
2. Re-check discharge pressure gage.
3. Check pump shaft packing gland.
4. Check for motor cooling water flow.
5. Check for smooth pump operation.

Stop

A. Initiate pump stop sequence, using OFF mode.

B. Shut down checks
   1. Verify closure of Bailey valve, and subsequent motor stop.

C. Shut down operations
   1. Discharge.
      a. Shut pump discharge valve.
      b. If last pump, shut Granlees valves to Calero-Chesbro.
      c. Shut discharge gate at Chesbro or Calero.
   2. Motor cooling.
      a. If last 500 HP pump in operation, shut pump motor cooling water valve.
   3. Suction.
      If last pump in operation:
      a. Shut down purge system.
      b. Adjust forebay gates, etc.

DRY YEAR DIVERSIONS
5 W
F-- 4
0
0
E--
W ~3
0
c Q
O ~2
(1)
0
LL_ i Q
0

4400
Accelerated diversions permitted at Granlees Dam, if total amounts on vertical scale have not been diverted to storage under Normal Years operations, by the dates on the horizontal scale.
----Restrictions----
- 70 cfs minimum beyond Granlees Dam - Visible flow at McConnell
- 46 cfs maximum diversion
2000 400
4050 4050
FEB MAR APR
DIVERSION YEAR
JAN

MAY