Final Urban Water Management Plan for the City and County of San Francisco Public Utilities Commission

SFPUC

WATER

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WATER & POWER

CLEAN WATER

Prepared by
the City and County of
San Francisco Public Utilities Commission

February 2001

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City and County of San Francisco Public Utilities Commission 2000 Urban Water Management Plan Contact Sheet

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The Water supplier is: **San Francisco Public Utilities Commission**

The Water supplier is a: **Wholesale and retail supplier**

Utility services provided by the water supplier include: **Surface Water, Groundwater, Recycled Water**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Public Participation

Law[1]

> 10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published ... After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

Public Participation

The San Francisco Public Utilities Commission (SFPUC) has actively encouraged community participation in its urban water management planning efforts. Public hearings were held on the 1985, 1990, 1995 and 2000 Urban Water Management plans and public participation has been conducted for its groundwater and recycled water master plans as well as throughout the development of the SFPUC system-wide Water Supply Master Plan. In preparing the recycled water master plan and groundwater master plan, San Francisco held extensive public meetings and published and distributed several newsletters. San Francisco also prepared an Environmental Impact Report evaluating both the recycled water and groundwater master plans. For this update of the Urban Water Management Plan (the Plan), a public hearing was held on December 12 and a notice of the hearing was advertised as specified in California Government Code 6066. A copy of the draft Plan update has been made available at the San Francisco Main Public Library. In addition, a message was included in the November retail water bill notifying retail customers of the availability of the draft Plan update for public review. A copy of the draft Plan update was also sent to all wholesale customers.

Plan Adoption

The SFPUC prepared this update of its Urban Water Management Plan during fall 2000. The updated plan was presented to the San Francisco Public Utilities Commission for adoption in December 2000 and submitted to the California Department of Water Resources within 30 days of Commission approval. Appendix B presents a copy of the signed Resolution of Plan Adoption. This Plan update includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Urban Water Management Planning).

Agency Coordination

Law

> 10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

Coordination Within the City

The SFPUC coordinated the development of this plan with the Water Department, the City and County of San Francisco Department of Public Works, Department of Public Health, the San Francisco Fire

[1] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

Department, Building Department and the Recreation and Parks Department particularly regarding San Francisco's proposed recycled water program and groundwater management plan. In addition, a copy of the draft Urban Water Management Plan update was provided to each department for review.

Interagency Coordination

Development of urban water management planning has involved the participation of the Bay Area Water Users Association (BAWUA) (representing the 29 wholesale agencies served by the SFPUC). BAWUA was instrumental in the preparation of the Water Supply Master Plan, a contributing document to the Urban Water Management Plan. In addition, BAWUA has been working together with the SFPUC and other city departments to create a water shortage contingency plan that will meet the needs of the entire system. As mentioned previously, a copy of the draft Urban Water Management Plan update has been provided to all wholesale customers and staff at BAWUA for their comment.

Supplier Service Area

Law[2]

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Introduction

Many factors affect the amount of water used by an urban society. These factors can include climate, the economic and demographic makeup of the population, the nature of industry and commerce in the area and the conservation ethic of the populace, be it learned or coerced. This chapter provides a description of San Francisco's service area, climate and demographic features.

Service Area

The SFPUC provides water to both retail and wholesale water customers. A population of over 2.4 million people within the counties of San Francisco, San Mateo, Santa Clara, Alameda and Tuolumne rely entirely or in part on the water supplied by the SFPUC.

The SFPUC's retail water customers include the residents, services and institutions within the corporate boundaries of the City and County of San Francisco who are served by the Water Department. In addition to these customers, retail water service is also provided to numerous other industrial, governmental and individual users in the Bay Area and Sierra Nevada foothills. These entities include the United States Navy, Town of Sunol, San Francisco International Airport, and Lawrence Livermore Laboratory.[3]

The wholesale water customers of the SFPUC are comprised of twenty-nine entities which are served water under terms of the *Settlement Agreement and Master Water Sales Contract* together with individual water supply contracts. Since 1970, the SFPUC has supplied approximately 65 percent of the total wholesale water customer demand. Some of the wholesale water customers are entirely reliant on the SFPUC for their water supply. Table 1 lists the SFPUC's wholesale water customers.

Climate

The City of San Francisco has a Mediterranean climate. Summers are cool and winters are mild with infrequent rainfall. Temperatures in the San Francisco area average 58 degrees Fahrenheit annually ranging from the mid-40s in winter to the mid-70s in late summer. Strong onshore flow of wind in summer keeps the air cool generating fog through September. The warmest temperatures generally occur in September and October. Rainfall in the San Francisco area averages 20.2 inches per year and is confined to the "wet" season from late October to early May. Except for occasional light drizzles from thick marine stratus clouds, summers are nearly completely dry.

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[2] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

[3] For the purposes of water accounting, customers who receive water directly from the Hetch Hetchy Water Project (i.e. Groveland Community Services District) are accounted for as part of SFPUC retail (see Table 7).

The wholesale customers experience a climate similar to San Francisco, except for the southern and inland regions that tend to experience warmer temperatures in the summer months with less incidence of fog.

Table 1
City and County of San Francisco
Wholesale Water Customers

Alameda County	
- Alameda County Water District	- City of Hayward
Santa Clara County	
- City of Milpitas	- City of Santa Clara
- City of Mountain View	- City of Sunnyvale
- City of Palo Alto	- Purissima Hills County Water District
- City of San Jose	- Stanford University
San Mateo County	
- City of Brisbane Water Department	- Coastside County Water District
- City of Burlingame	- Cordilleras Mutual Water Company
- City of Daly City	- East Palo Alto County Water District
- Town of Hillsborough	- Estero Municipal Improvement District
- City of Menlo Park	- Guadalupe Valley Municipal Improvement District
- City of Millbrae	- Los Trancos County Water District
- City of Redwood City	- North Coast County Water District
- City of San Bruno	
- Mid-Peninsula Water District	- Skyline County Water District
- California Water Service Company	- Westborough County Water District

Demographic and Economic Trends

The water demand projections presented in this report are partially related to population and business trends forecast by the Association of Bay Area Governments (ABAG). ABAG's projections are used in combination with an analysis of the characteristics of water use in the San Francisco retail service area.

ABAG provides an important service to the San Francisco Bay Area with its periodic projection of regional economic and demographic conditions. Considerable effort is required when making these types of projections on a regional and subregional basis. ABAG collects land use development plans, policies and regulations affecting land use from local governments including city, county and service districts. These data are compared and reconciled in order to provide a consistent database for projections on a subregional and regional basis. These data become the basis for employment and demographic projections.

ABAG computes its employment and demographic projections using sophisticated models which have been developed for the nine-county area that comprises the San Francisco Bay Area. Employment models, for example, take into consideration interactions between neighboring counties or among economically related business sectors when determining employment projections on a subregional basis. The final step of ABAG's process consists of lengthy local participation and review. ABAG repeats this process and publishes its results on a biannual basis.

The San Francisco retail water demand has been forecast utilizing the most recent ABAG projection of Bay Area economic and demographic conditions. The ABAG report titled *Projections 2000, Forecasts for the San Francisco Bay Area to the Year 2020* represents the expected or most likely growth outlook for the Bay Area.

General observations and findings reached by ABAG regarding regional area economic trends include:

- *The Bay Area's economy is transforming from a regional economy based on high-tech manufacturing jobs to a much more broadly based economy that will see growth in an array of job sectors*
- *San Francisco will gain the most new jobs over the next two decades followed closely by San Jose*

Regarding demographic trends, ABAG highlighted the following findings:

- *... the population of the City and County of San Francisco is now estimated to be 799,000. ... is expected to peak in 2010 at 818,800 and begin to decline by 2015 with an expected population of 808,800 in 2020.*
- *Much of San Francisco's housing unit potential, ... is derived from the expected redevelopment of commercial and industrial land.*

The following provides demographic estimates and projections for the SFPUC's retail sector. A brief discussion of population estimates and projections for the SFPUC's wholesale customers is also included. This information is used as the basis for a detailed analysis of the SFPUC's retail water use provided later in this document.

Demographic and Economic Trends

Population. In 1995, San Francisco reached its highest population, 751,700, since the 1950 Census when it was recorded as 775,400. The current population of San Francisco is estimated to be 799,00 and projected to increase to 818,800 by the year 2010. This increase amounts to an annual growth rate of approximately 0.24 percent for the next 10 years. Thereafter, the population within San Francisco is forecast to decline to 808,800 by 2020 as a result of the aging of the populace and a continuing decline in average household size.

Households, Household Population, and Household Size. San Francisco projects water use within its residential sectors using factors such as household population (all persons living in individual housing units, not including persons who reside in places such as nursing homes, military facilities or rooming houses), households (occupied dwelling units) and household size (the household population divided by the number of households). These factors are important when projecting water use which is based on end-use of water within households.

A summary of population and housing trends for the 1990 through 2020 historical and forecast period is shown in Table 2.

Table 2
San Francisco County Demographic Trends

Demographics	1990	1995	2000	2005	2010	2015	2020
Population	723,959	751,700	799,000	815,600	818,800	812,900	808,800
Household Population	699,330	728,700	776,200	792,700	795,800	789,800	785,600
Households	305,584	309,620	315,550	321,710	326,130	329,080	331,470
Persons Per Household	2.29	2.35	2.46	2.46	2.44	2.40	2.37
Single-family Units	105,521	106,722	108,255	109,816	110,789	111,212	111,459
Multi-family Units	200,063	204,708	207,295	211,894	215,361	217,868	220,011

Industrial and Commercial Businesses. The recession of the early 1990s significantly impacted the number of employed in San Francisco. While the number of jobs increased during the 1980s, between 1990 and 1993 ABAG estimates that San Francisco lost approximately 39,000 jobs. By 1995, the city had not yet recovered to pre-recession employment levels. However, Year 2000 estimates indicate a surge above pre-recession employment levels. The historical and projected number of people employed in San Francisco has been developed by ABAG, and is shown in Table 3. The values have been delineated by job sectors as classified by Standard Industrial Classification (SIC) code.

The majority of the job growth between now and the year 2020 is anticipated in the services sector. The jobs include hotel services, health services and business services.

Table 3
San Francisco County Number of Jobs in Industrial and Commercial Businesses

Job Sector Category	1990	1995	2000	2005	2010	2015	2020
Agriculture Services and Mining	2,300	2,220	2,300	2,310	2,280	2,230	2,180
Construction	16,350	15,810	19,750	20,990	21,600	22,400	23,130
Manufacturing	39,790	40,440	41,800	44,130	44,860	45,790	46,580
Transportation and Public Utilities	40,290	39,840	44,180	45,920	47,850	48,950	49,380
Wholesale Trade	30,560	24,020	25,150	27,550	27,730	28,160	28,770
Retail Trade	80,120	75,860	81,310	83,370	84,760	86,890	88,600
Finance, Insurance and Real Estate	75,400	71,350	75,820	78,550	79,980	81,730	82,960
Services	229,470	231,190	277,710	296,230	316,200	335,820	347,010
Government	64,900	58,570	60,840	61,560	62,080	62,730	63,050
Total	579,180	559,300	628,860	660,610	687,350	714,700	731,660

Wholesale Population Estimates and Projections

Table 4 provides estimates and projections for the population of counties served in part by San Francisco's wholesale water customers. Although the SFPUC does not solely provide water to the counties included in the table, examining growth projections for these counties is useful in anticipating growth trends within the SFPUC's service area. As the table indicates, growth in the three counties is expected to occur over the next twenty years.

Table 4
Populations Served in Part by Wholesale Water Customers

	1990	1995	2000	2005	2010	2015	2020
San Mateo County	649,623	687,500	737,100	767,100	779,700	795,700	809,800
Santa Clara County	1,497,577	1,599,100	1,755,300	1,854,000	1,919,000	1,970,600	2,016,700
Alameda County	1,276,702	1,345,900	1,462,700	1,573,200	1,615,900	1,641,700	1,671,700
Total	3,423,902	3,632,500	3,955,100	4,194,300	4,314,600	4,408,000	4,498,200

Past Drought, Water Demand and Conservation Information

The local region experienced a prolonged drought from 1987 through 1992. During this time, the SFPUC met its retail customer needs through water purchases, conservation and voluntary rationing, followed by mandatory rationing. Wholesale customers also reduced their demand through conservation and rationing. As a result of the drought-induced conservation programs, the SFPUC's retail and wholesale per capita water use has remained below pre-drought use.

Water Sources (Supply)

Law[4]

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments [to 20 years or as far as data is available.]

Water Supply Sources

This section describes the various sources of water supply available to meet the water demands of San Francisco. San Francisco normally supplies almost all of its water deliveries from a combination of local Bay Area supplies and diversions from the Tuolumne River through the Hetch Hetchy Water and Power Project (Hetch Hetchy). A portion of San Francisco's water is supplied by groundwater. Table 5 provides a breakdown of current and projected water supply sources over the next 20 years.

Development Of The Hetch Hetchy System.

The present SFPUC water supply system evolved through the development of two separate water systems: the Spring Valley Water Company and Hetch Hetchy. The Spring Valley Water Company was established in 1858, developing a spring and several creeks into a local water system. It expanded over the years with the construction of Pilarcitos, San Andreas and Upper and Lower Crystal Springs Dams on the Peninsula, and later with the development of the Pleasanton Well Field, the Sunol Filtration Galleries and the Calaveras Dam in Southern Alameda County.

Very early during San Francisco's development it was recognized that the local water resources would be inadequate to support a burgeoning metropolis and plans for importing water from the Sierra Nevada were born. In the late 1800s, the City decided to develop its own water supply system and culminated in the planning, financing and construction of Hetch Hetchy. Because many of the Hetch Hetchy facilities were to be located within Yosemite National Park, Congressional approval of the project was required. That approval was granted by the Raker Act of 1913.

The construction of Hetch Hetchy began in earnest in 1914, and after almost 20 years of construction, and the acquisition of the Spring Valley Water Company by San Francisco, Sierra Nevada water began flowing into the local distribution system. Through the operation of the two systems, the SFPUC has been able to provide the residents of the City and its neighboring communities with an unfailing supply of pure, potable water from secure sources.

Since the 1930s, the major additions to the SFPUC's water system have included the raising of O'Shaughnessy Dam and the development of Lake Lloyd; the construction of additional pipelines across the San Joaquin Valley; and the local construction of San Antonio Reservoir in Alameda County and the Bay Division Pipelines 2, 3 and 4. Other local projects included Crystal Springs Pipeline No. 3; Sunol Valley and San Andreas Filtration Plants; and the Crystal Springs Bypass Tunnel and Balancing Reservoir. The major facilities of the SFPUC water system are depicted in Figure 1.

[4] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

Local Watershed Production

Prior to the development of Hetch Hetchy, the SFPUC served water demands with a combination of local Bay Area watershed runoff and groundwater. Local watershed runoff continues to provide a significant portion of the SFPUC's water supply during normal years (about 18 percent on average), but represents a very small portion of deliveries during periods of drought (approximately 6 percent during the 1987-92 drought).

On the San Francisco Peninsula, the SFPUC utilizes Crystal Springs Reservoir, San Andreas Reservoir and Pilarcitos Reservoir to capture local watershed runoff. In the Alameda Creek watershed, the SFPUC has constructed the Calaveras Reservoir and San Antonio Reservoir. In addition to using these facilities to capture runoff, San Andreas, San Antonio and Calaveras Reservoirs also provide storage for Hetch Hetchy diversions, and serve as an emergency water supply in the event of an interruption to Hetch Hetchy diversions.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff. The water demands that are not met with local runoff require the importation of water from Hetch Hetchy.

Local area water production is dependent on precipitation and the ability of the SFPUC to regulate watershed runoff. Based upon yearly runoff, the utilization of water from the local watersheds has varied from negligible to approximately 104 mgd.

Groundwater

For the most part, groundwater aquifers within San Francisco are rated as inadequate by the United States Geologic Survey (USGS). There is essentially no groundwater available in the eastern half of the City and some development potential in the western half.

In the eastern half of San Francisco, the great majority of aquifers are less than 100 feet thick and nearly all are less than 200 feet thick. These aquifers consist predominately of low permeability, dune sand, bay mud and clay. Besides constraints on groundwater development in this area from thin aquifers and low permeability, extensive groundwater contamination from nitrates and other constituents has been detected. Currently, some isolated use of groundwater by individual users occurs in the eastern portion of San Francisco for such non-potable purposes as laundry supply.

The western half of San Francisco has generally more favorable groundwater available. Some areas exist where groundwater use has occurred historically. The primary areas of use are in the Golden Gate Park Area, the Sunset District, and the Lake Merced Area. These areas all have some areas where aquifer thickness is greater than 300 feet. Groundwater within these areas is typically used for such non-potable purposes as park irrigation, zoo supply, and golf course landscaping. This groundwater use has averaged slightly less than 2 mgd.

Recycled Water (Reclamation)

San Francisco's experience with reclamation dates back to the early 1900s when the Golden Gate Park Area was transformed from 1,070 acres of "great sand waste" to a garden spot through the application of raw sewage and groundwater. In 1932, the Recreation and Park Commission constructed the McQueen Treatment Plant to provide secondary treatment, using an activated sludge process. This plant produced reclaimed water that was used to irrigate Golden Gate Park, fill its lakes, brooks and spillways, and recharge groundwater.
The McQueen Plant met State health requirements for the production of reclaimed water until new regulations were proposed in 1978. The advanced primary plant was shut down in 1981 when it failed to meet new health standards for irrigation use.

Additional efforts to expand the use of available secondary effluent quality reclaimed water began in 1989, when San Francisco built a secondary effluent truck loading station to distribute reclaimed water for soil compaction and dust control. In 1991, San Francisco passed *Ordinance 175-91*[5] which requires that water used for dust control, consolidation of backfill or other nonessential construction purposes must be either groundwater or reclaimed water. The truck loading station has since been expanded and currently distributes reclaimed water to contractors, and for sewer maintenance and other wash down operations. San Francisco also uses secondary effluent for wastewater treatment plant process water. Current use of recycled water for these purposes is less than 1 mgd.

Tuolumne River Supply

Water developed by Hetch Hetchy represents the majority of the water supply available to San Francisco. During drought, the water received from Hetch Hetchy can amount to over 93 percent of the total water delivered. On average, Hetch Hetchy provides over 80 percent of the water delivered by the SFPUC.

The amount of water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

On an annual basis, reservoir storage is used to conserve the water and power resources associated with Hetch Hetchy. The annual cycle of operation regulates runoff so that hydroelectric power generation can be enhanced. More importantly though, reservoir storage provides the SFPUC with year-to-year water supply carry-over capability. During dry years the SFPUC has a very small share of Tuolumne River runoff available and the local Bay Area watersheds produce very little water. Reservoir storage is critical to the SFPUC during drought cycles since it enables the SFPUC to carry-over water supply from wet years to dry years.

Table 5
Current and Projected Retail Supplies (Non-drought Periods)

Water Supply Source	2000	2005	2010	2015	2020
SFPUC System	**Equal at Least to Projected Retail Demand**				
	90 mgd	91 mgd	91 mgd	92 mgd	92mgd
Recycled water	*	*	5 mgd	5 mgd	5 mgd
Groundwater[6]	2 mgd	2 mgd	4 mgd	4 mgd	4 mgd

* less than 1 mgd

[5] San Francisco Public Works Code, Article 21, Sections 1100-1107

[6] Groundwater supplies non-potable water to Golden Gate Park, Lake Merced Area, and Sunset District for park irrigation, zoo supply, and golf course irrigation.

Reliability Planning

Law[7]

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.

10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (c) Provide data for each of the following:
(1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.

Reliability

The SFPUC's water supply system reliability is expressed in terms of the system's ability to deliver water during droughts. Reliability is defined by the amount and frequency of water delivery reductions (deficiencies) required to balance customer demands with available supplies in droughts. The SFPUC plans its water deliveries anticipating that a drought worse than the worst drought yet experienced may occur. This section discusses both system-wide deficiencies and anticipated retail deficiencies that the City of San Francisco may experience.

The SFPUC's Hetch Hetchy supply has experienced periodic, short-term outages as a result of water quality events. Due to the fact that Hetch Hetchy water is not filtered, it is subject to strict water quality standards set by the state Department of Health Services. As a result of weather events, turbidity levels can exceed standards requiring the Hetch Hetchy supply to be diverted to local storage, in the case of short-term events, or shut off, in longer-term events, until levels drop to within standards. During these periods, the SFPUC's entire supply comes from the Sunol Valley Water Treatment Plant and the Harry Tracy Water Treatment Plant, both of which are supplied by local reservoirs.

Frequency and Magnitude of Supply Deficiencies

The total amount of water the SFPUC has available to deliver to retail and wholesale customers during a defined period of time is dependent on several factors which generally reduce to a comparison of 1) the amount of water that is available to San Francisco from natural runoff and reservoir storage and 2) the amount of that water that must be released from the SFPUC's system for commitments to purposes other

[7] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

than customer deliveries (e.g., releases below Hetch Hetchy reservoirs to meet Raker Act and fishery purposes).

The 1987-92 drought profoundly highlighted the deficit between the SFPUC's water supplies and its demands. Other than the 1976-77 drought, drought sequences in the past did not seriously affect the ability of San Francisco to sustain full deliveries to its customers. Based on the 1987-92-drought experience, the SFPUC assumes its "firm" capability to be the amount the system can be expected to deliver during historically experienced drought periods. In estimating this firm capability, the SFPUC assumes the potential recurrence of a drought such as occurred during 1987-92, plus an additional 18 months of limited water availability.

At current delivery levels, the SFPUC system can be expected to experience up to a 20 percent shortage 10 to 15 percent of the time, during multiple-year drought sequences. Therefore, the SFPUC is faced with the necessity to develop a long-term strategy to accommodate or rectify the potential of future water shortages throughout its wholesale and retail operations.

Plans to Assure a Reliable Water Supply

As an established major water supplier for the Bay Area region, the SFPUC has a responsibility to secure and manage its existing system supplies and plan for future needs, as well as securing its own retail supply. Given the existing circumstance that the SFPUC's water supplies are less than current system demands and that demand growth is anticipated, the SFPUC and its customers must accept the challenge of an increasing gap between supplies and demands. The SFPUC has prepared a Water Supply Master Plan to address system supply reliability issues. The Plan provides a water resource strategy that includes demand management; development of additional supplies; and facility improvements. As an extension of the Water Supply Master Plan, the SFPUC is currently exploring the possibility of increasing storage capacity at Calaveras Reservoir as a tool for improving supply reliability and potentially contributing to a Bay Area regional solution for meeting water quality objectives.

In relation to San Francisco's own retail supply reliability, the SFPUC adopted a resolution in 1999 to achieve 100 percent supply reliability within the City and County of San Francisco. To achieve this goal, the City is developing an Integrated Water Resources Plan (IWRP) that identifies reliable water supply sources and an action strategy that will achieve reliability goals in a cost-effective, environmentally sound manner. The IRWP identifies a source mix of recycled water, groundwater, and additional water purchases. Although, not considered a "resource," conservation measures are considered an important source for additional water supplies and are included as part of the resource mix in the IWRP. The source options considered in the IRWP are described below.

Groundwater Development

In 1989 and 1991, San Francisco's Board of Supervisors passed two resolutions, *Resolution 389-89 and Resolution 612-91,* that recommended the expanded use of groundwater and the development of comprehensive, regional programs for additional wastewater reclamation, groundwater usage and conjunctive use within the City's service area. Following these resolutions was passage of the *Ordinances 390-91 and 391-91*[8] which among other things required the SFPUC to develop a groundwater master plan.

In response to these ordinances, the SFPUC completed a *Groundwater Master Plan* in July 1996 that summarizes its plans to evaluate, manage and develop its groundwater resources and to integrate the potable and non-potable use of groundwater for the benefit of its customers. An Environmental Impact Report was prepared and certified in August 1997.

[8] San Francisco Public Works Code, Article 22, Section 1200-1210.

Approximately 2 mgd of San Francisco's average daily water demand is supplied by groundwater for non-potable uses. Most of this groundwater is produced and used by the San Francisco Recreation and Parks Department and the San Francisco Zoo.

There are seven significant groundwater basins that underlie the City of San Francisco. The groundwater master plan identifies three principal groundwater management strategies that can be implemented to provide groundwater as a reliable supply source. These are: increased groundwater production, sump pumpage, and conjunctive use/groundwater banking. Increased groundwater production and conjunctive use/groundwater banking are considered the most reliable supply sources. Sump pumpage, a method in which water is pumped to provide drainage around building foundations, has been considered a potential source for non-potable water. In the past it was considered potentially practical to retrofit buildings with separate piping systems so that sump pumpage could be used for non-potable uses such as toilets and cooling towers. However, under recent pilot projects poor water quality (particularly high iron content) has reduced the likelihood of it being considered a reliable source, primarily due to the fact that it would not be cost-effective to improve the water quality.

Increased Groundwater Production. The groundwater master plan identifies a potential for generating up to an additional 4 mgd from the Westside Basin in the western portion of the city. This amount is equivalent to that which currently flows to the Pacific Ocean, however, it is still unknown to what extent this outflow can be captured without inducing seawater intrusion. To address this issue, the groundwater master plan recommends initial pumping levels from proposed new wells, with simultaneously installed monitoring wells providing information on saltwater intrusion which can be used to refine pumping levels. Thus, avoiding the potential for inducing seawater intrusion.

Conjunctive Use/Groundwater Banking. The Westside Basin also has the potential to provide conjunctive use/groundwater banking. San Francisco is currently exploring the feasibility of such a program in cooperation with the cities of Daly City and Millbrae and the California Water Company, the other users of the Basin.

Recycled Water

The *San Francisco Recycled Water Master Plan (RWMP,* July 1996) describes the potential for developing recycled water in the City. The plan describes a three-phase program for delivering up to 10.3 mgd of recycled water for non-potable use. An Environmental Impact Report was prepared and certified in August 1997 evaluating the potential impacts of the RWMP. San Francisco is currently contemplating revisions to the RWMP. Consistent with these revisions, San Francisco has submitted water recycling construction program questionnaire responses for placement on a project priority list to the State Water Resources Control Board for a portion of phase 1 and phase 3 as described in the RWMP. The City intends to begin implementation of a portion of Phase I to provide supplemental supply. The City is also contemplating implementation of a golf course irrigation demonstration project and submitted a questionnaire response seeking project funding. Currently, San Francisco uses secondary-treated wastewater for wastewater treatment process water, soil compaction and dust control, as well as some washdown operations and sewer maintenance. Recycled water is discussed in further detail in the Water Recycling section of this document.

Water Purchases

In addition to more fully developing its existing water supplies, San Francisco is considering options that incorporate water purchases as a supplemental supply. These options may or may not require new or modified facilities to implement.

Water Availability Comparison

The current and future supplies available for retail deliveries through the year 2020 are shown in Table 5. The future supply projections assume non-drought hydrologic conditions for the Hetch Hetchy and local reservoirs systems.

Normal, Single Dry-year and Three-year Minimum Water Supply

Assuming a normal water condition occurs for the ensuing year, no deficiency in water deliveries would be anticipated. The SFPUC system water deliveries are anticipated to be approximately 260 mgd (approximately 291,000 acre-feet), all of which could be met.
The SFPUC plans its water deliveries anticipating that a drought worse than the 1987 through 1992 drought may occur. As a result, the SFPUC system operations are designed for providing sufficient carry-over water in SFPUC reservoirs after six years of drought. This design would enable the SFPUC to continue delivering water, although at significantly reduced levels, during and after such a drought.

The SFPUC currently operates under a plan that anticipates three stages of response to water supply shortages, ranging from voluntary customer actions to enforced rationing, the third stage envisioned to occur only during a drought period worse than previously experienced. At current demand levels the SFPUC system can expect shortages of at least 10 to 25 percent in dry years.

The 1987-92 drought period includes one-year and three-year sequences that are among the worst hydrologic periods projected for the SFPUC system. If within the next year a single dry (critical) year occurs, the SFPUC system deliveries could be reduced by 10 percent as a precaution to continued drought. If within the next three years a critical thee-year sequence recurred, the SFPUC system deliveries could be reduced by 10 to 20 percent. Table 6 illustrates the SFPUC system water availability for the next three years under differing assumptions of hydrologic conditions.

Table 6
SFPUC System Water Availability

		Multiple Dry Water Years		
Average/ Normal Water Year	**Single Dry Water Year**	**Year 1 2001**	**Year 2 2002**	**Year 3 2003**
291,000 100% of Normal	262,000 90% of Normal	262,000 90% of Normal	233,000 80% of Normal	233,000 80 % of Normal
Unit of Measure: Acre-feet/Year				

Transfer or Exchange Opportunities

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Water Transfers

The Water Supply Master Plan provides a discussion of the opportunities for the SFPUC to purchase water for its wholesale and retail operations. The discussion includes purchasing additional Tuolumne River

water and water from willing sellers located geographically south of the Delta who possess water rights or contractual entitlements to water diverted from the Delta. In addition, the Plan identifies potential opportunities of water purchases from willing sellers upstream of the Delta along the Sacramento, Feather, Yuba, American, San Joaquin Rivers and their tributaries. In preparation of the Integrated Water Resources Plan, San Francisco has identified opportunities for acquiring additional water from willing wholesale customers within the SFPUC system for its retail operations.

Water Use Provisions

Law[9]

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.

(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

Past, Current and Projected Water Use

This section primarily focuses on the projection of the SFPUC's retail water demands. These demands are based on the recent ABAG information and a detailed analysis of the SFPUC's retail water use characteristics, including the effect of conservation measures. A brief discussion is also included concerning the projection of the wholesale water demand that affects SFPUC's water system operation.

Water Use Characteristics

Water use within San Francisco is currently less than the level of water use experienced in the 1940s. Many factors have contributed to this reduction in water use including significant changes to the mix of industrial and commercial businesses and its associated water demand, and the general characteristics of water use by San Francisco water customers. In particular, the droughts of 1976-77 and 1987-92, and the conservation programs either voluntarily embraced by residents and businesses or mandated by San Francisco, have apparently affected water demands.

Total water use by SFPUC retail customers is estimated to be currently 90 million gallons per day (mgd). Approximately 53 percent of this total is delivered to San Francisco residential customers. Non-residential water use accounts for approximately 38 percent of the demand with unaccounted water amounting to approximately 9 percent (Figure 2).

Not only has the absolute consumption of water declined in San Francisco, but so has the per capita use of water. Figure 3 shows the historical record of retail water deliveries by San Francisco for the 1965 through 2000 period in terms of both total deliveries and gross per capita consumption (gallons per capita-day, gpcd).

[9] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

While the gross per capita consumption is not a true measure of the water used by an individual (since it includes water use by all categories of customers, e.g., industrial, commercial and losses), it does provide insight when comparing water use among regions. The current gross per capita consumption rate of water by San Francisco retail water customers is 112 gpcd.

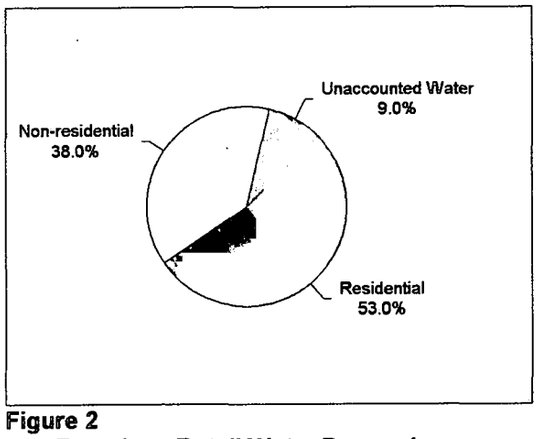
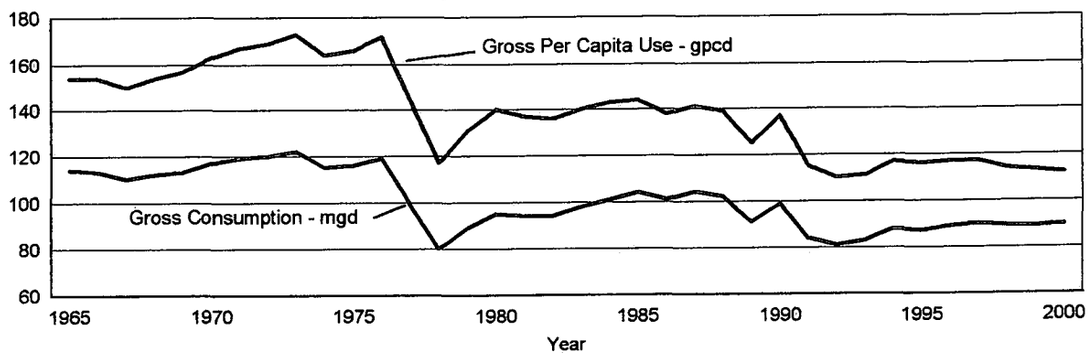


Figure 2
San Francisco Retail Water Demands

Residential Water Use. Single-family units comprise approximately 34 percent of the total households in San Francisco, and use approximately 40 percent of the total water delivered to the residential sector. The remainder of residential water use (60 percent) occurs from multi-family units such as apartments.

Combined, the single-family and multi-family residential sectors have a current per capita consumption rate of 61 gpcd. Due to the climate of San Francisco and the density of housing, water use within the residential sector is almost entirely for indoor water needs. For multi-family units, the average sector-wide outside water use is negligible. For single-family residential units, on average, outside water use is less than ten percent of their total use.

Figure 3
Historical San Francisco Water Consumption



Non-residential Water Use. Non-residential water use accounts for approximately 38 percent of San Francisco's retail water demands. This category of water use includes all sectors of water users not designated as residential and includes manufacturing, transportation, trade, finance, and government employment sectors, and the large services sector. Figure 4 illustrates the current distribution of jobs among the various employment categories within San Francisco.

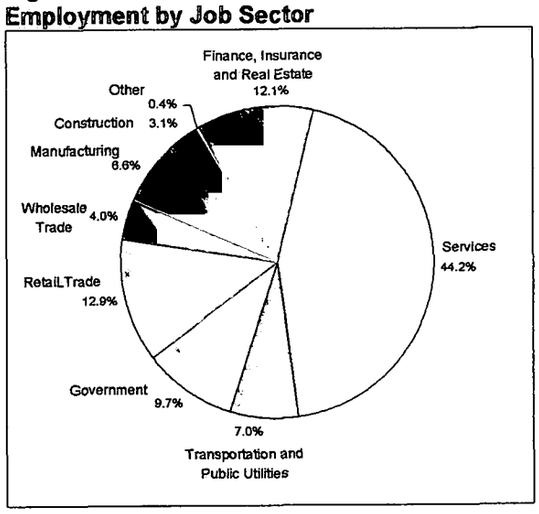
Average employee-use rates (gallons per employee-day, GED) have been estimated for the various employment categories. These values range from approximately 19 GED for the very small construction employment category to approximately 65 GED for the manufacturing employment category.

Projected Water Demands

The SFPUC uses disaggregated water use forecast models to project its retail water demands. San Francisco's water demand is segregated into three distinct categories of water use: non-residential (representing industrial and commercial business water uses); multi-family residential (representing water use within multiple family dwellings such as townhouses and apartments); and single-family residential

(representing water use within single-family dwellings). The remainder of San Francisco's water demands such as unaccounted water and minor uses such as docks and shipping are forecast by trend analysis.

Figure 4
Employment by Job Sector



Non-residential water use is estimated using relationships between employment within San Francisco and employee-use of water. These relationships are segregated by type of business or service enterprise based on SIC groups. The determination of appropriate employee-use rates within San Francisco's model included significant review of industry literature.

Two separate use models estimate multi-family and single-family residential water use. These models rely on a delineation of household end-use of water, such as the number and volume of toilet flushes, duration of showering, and the size and frequency of use of washing machines and dishwashers. Data from residential end-use monitoring studies were applied in each of the residential water use models.

The models have been verified with water delivery records for historical periods, including periods of time when water demands were affected by drought induced rationing programs. Water use projections through the year 2020 were developed using these models, and incorporated assumptions for market penetration of long-term conservation programs implemented by the SFPUC and the effects of legislative building requirements regarding water-saving plumbing fixtures.

Projected Demands. Projected water use by the SFPUC's retail customers has been estimated using San Francisco's water use models. These models have incorporated economic and demographic forecast data developed by ABAG that includes the projection of population, housing units and employment in San Francisco.

Also incorporated into the forecast models is the anticipated change in water use within the residential and non-residential sectors due to conservation programs implemented within the SFPUC. These programs are consistent with the *Memorandum of Understanding Regarding Urban Water Conservation in California*, which San Francisco signed in 1991. This document committed San Francisco to the evaluation and implementation of numerous long-term conservation measures which are referred to as Best Management Practices (BMPs).

Results of the water demand forecasts show that the SFPUC's retail water demand will only slightly increase by the year 2020 (Table 7). Demands are projected to increase from approximately 90 mgd (2000) to approximately 92 mgd by the year 2020.

The projected increase in retail water demands is due to estimated growth in business and industry activity with a commensurate increase in water use. The increase in water use within these sectors is forecast to be partially offset by decreases in water use within the residential sectors.

The forecasted water demands of both the single-family and multi-family residential sectors are projected to be less than current demands. This circumstance occurs as a result of projections that 1) population density within housing units will decline in the future, and 2) market penetration of conservation measures within the residential sectors will increase as time progresses. In tandem, these two factors will lead to less water use by a slowly increasing population.

Table 7
Projected Water Demands (mgd)

Entity	Year				
	Current	2005	2010	2015	2020
In-City Customers					
Single-family Residential	18.8	18.9	18.7	18.3	18.0
Multi-family Residential	28.8	28.8	28.6	28.0	27.6
Non-residential	27.8	29.1	30.2	31.3	32.0
Other	0.2	0.2	0.2	0.2	0.2
Sub-Total	75.6	77.0	77.7	77.8	77.8
Unaccounted Water	8.3	8.0	8.0	8.0	8.0
Total	83.9	85.0	85.7	85.8	85.8
Other Retail Customers and HHWP Customers					
Suburban Retail Customers	4.9	4.8	4.8	4.8	4.8
Groveland Community Services District	0.4	0.4	0.4	0.4	.4
Lawrence Livermore Laboratory	0.6	0.6	0.6	0.6	.6
Sub-Total	5.9	5.8	5.8	5.8	5.8
Total SFPUC Water System Retail Demand	89.8	90.8	91.5	91.6	91.6
Other Water Uses					
Sunol Area/Castlewood	1	1	1	1	1
Golden Gate Park	1	1	1	1	1
Lake Merced Area	1	1	1	1	1
Presidio	1	1	1	1	1

Wholesale Water Demands

The SFPUC provides water to twenty-nine entities that comprise the wholesale water customers. These entities receive almost two-thirds of the total water delivered by the SFPUC.

Although the SFPUC does not specifically perform water demand forecasting of the wholesale water demand, coordination and exchange of information occurs between the SFPUC and the wholesale water customers. This coordination normally occurs through the San Francisco Bay Area Water Users Association (BAWUA).

The most recent projection of water demands for the wholesale water customers originates from information gathered for the development of the recently completed SFPUC Water Supply Master Plan. The Water Supply Master Plan was prepared jointly by the SFPUC and its wholesale customers to describe the SFPUC's water supply needs and to present a plan of action for future challenges. That information and certain other sources of information form the basis for projecting the wholesale water demands included in this report.

Methodology Used to Project Wholesale Water Demands

The water demand projections for the wholesale water customers are, for the most part, a compilation of the projections made by the individual customers. Most of the customers are currently developing projections for inclusion to their respective 2000 Urban Water Management Plans.

The water demand projection approach used for the Water Supply Master Plan involved each customer estimating its future year 2030 water requirements. The guidelines to the approach requested that demands reflect the growth planned for within the agency's sphere of influence, and that the projections reflect the land uses and densities allowable under the General Plan(s) of relevant jurisdictions. The second step of the approach required the agency to estimate the amount of SFPUC water purchase which would occur from that agency in consideration of the agency's other water supply sources and opportunities.

The Water Supply Master Plan focused on projections of water supply requirements for the year 2030 time horizon with additional consideration given to water demands projected for the year 2050. To develop information for nearer-term increments through the year 2020, the 1998-99 annual report produced by BAWUA, which provides future water supply requirement information for the SFPUC's wholesale customers, was utilized.

Water Demands

The total water demands of the wholesale water customers are shown in Table 8. The data shows that for the year 2020, water demands of the wholesale water customers (regardless of water source) will increase to approximately 311 mgd. Other water supplies available and developed by the wholesale customers show an increase of 13.2 mgd. As shown in Table 8, the purchase of SFPUC water by the wholesale customers is projected to increase from approximately 171 mgd to over 200 mgd by the year 2020.

Table 8
SFPUC Wholesale Customer Water Demands (mgd)

	Current	2005	2010	2015	2020
Wholesale Customer SFPUC Demand	171.3	183.7	191.7	196.9	200.9
Other Supplies	97.1	100.7	104.4	107.2	110.3
Total Wholesale Customer Demand	268.4	284.4	296.1	304.1	311.2

Water Supplies Other Than the SFPUC Water Supply

The wholesale water customers rely on SFPUC and to some extent other supplemental sources of water supply to meet water demands. These additional sources include groundwater, local surface water, the Santa Clara Valley Water District (Santa Clara) and the State Water Project. In a few cases, reclaimed water is also an additional source of water supply. Although two-thirds of the wholesale water customers are entirely dependent on the SFPUC for water, the other one-third of the customers are able to obtain some portion of their water from other sources. Several entities are projecting an increased reliance on supplies other than the SFPUC to hold their SFPUC demands constant, or in some instances reduce their demands of SFPUC supplies.

The supply projections made by the wholesale water customers may not always account for the variability in water supply hydrology associated with each source. They also may not incorporate all the potential impacts of recent or pending regulatory decisions such as the State Water Resources Control Board 1995 Water Quality Control Plan for the Bay-Delta estuary, which may significantly impact the availability of water from the State Water Project and the federal Central Valley Project. In addition to these factors, plans for increasing groundwater production, local surface water use, and reclaimed water use are at various stages of development and evaluation. Therefore, their projected supply benefits may be realized at different

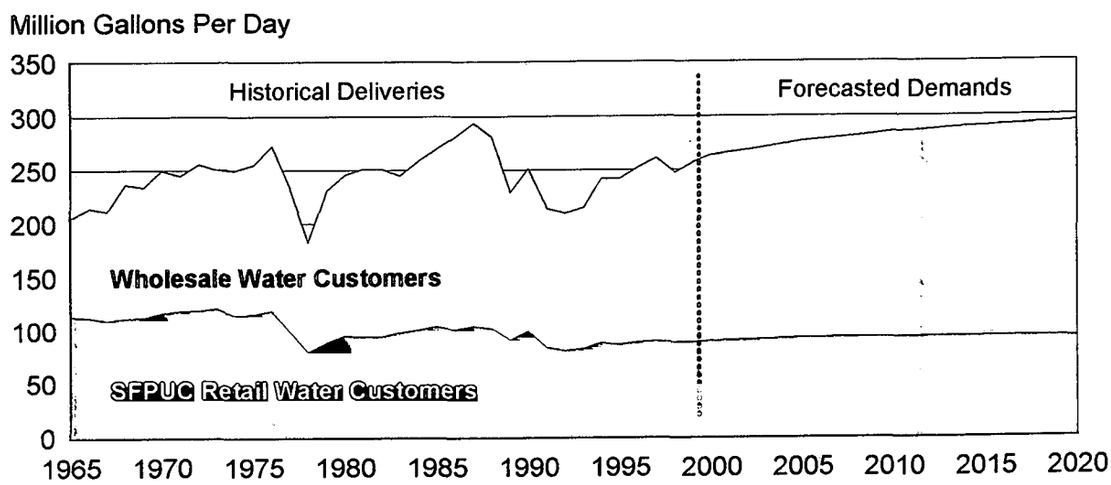
times and different yields than currently planned and/or projected. In the event any of these circumstances occur the wholesale customer water demands on the SFPUC could be higher than projected.

Variability of Wholesale Customer Demands

The water demands and supplemental sources of supply projected for the wholesale water customers are continually adjusting due to changing economic and demographic conditions within the service areas. Although conservation has been incorporated into the water use projections, the effects of certain programs upon water usage are still uncertain.

The historical delivery of water and the projected demand of water to the wholesale water customers from the SFPUC is shown in Figure 5. Figure 5 also depicts the demand for water by the wholesale water customers in combination with demands from all other SFPUC customers.

Figure 5
Total San Francisco Water Demands



Supply and Demand Comparison Provisions

Law[10]

> 10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

Supply and Demand Comparison

Table 9 compares current, and projected SFPUC system water supply and demand. It indicates that during normal precipitation years, the SFPUC has adequate supplies to meet its projected retail and wholesale water demands.

Table 9
Projected SFPUC System Supply and Demand Comparison
Normal Years (Non-drought Years)

	Current	2005	2010	2015	2020
System Supply Totals	> 261	> 274	> 283	> 288	>292
System Demand Totals	261	274	283	288	292
Difference	0	0	0	0	0
Units of Measure: mgd					

As the SFPUC water demands increase in the future, absent actions to increase the SFPUC system water supplies, the SFPUC customers will be subjected to an increasing risk of water delivery shortage. A single dry-year (critical) condition following a normal-year could cause the imposition of system-wide water shortages. Table 10 illustrates the level of first dry-year water delivery shortage that could occur with the projected 5-year increments of water demands.

Table 10
Projected SFPUC System Supply and Demand Comparison
Single Dry-year

	Current	2005	2010	2015	2020
System Demand Totals	261	274	283	288	292
System Supply Total	235 90% of Demand	233 85% of Demand	241 85% of. Demand	245 85% of Demand	249 85% of Demand
Difference	26	41	42	43	43
Units of Measure: mgd					

Multiple-year drought sequences could subject the SFPUC customers to greater levels of shortage. Table 11 illustrates the level of water delivery shortages that would be anticipated if a three-year dry hydrologic condition occurred.

[10] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

Table 11
Projected SFPUC System Supply and Demand Comparison
Multiple Dry-years

	Multiple Dry Water Years		
	Year 1	Year 2	Year 3
Current System Demand	261 mgd	261 mgd	261 mgd
System Supply Total	235 mgd 90% of Demand	209 mgd 80% of Demand	209 mgd 80% of Demand
Year 2005 System Demand	274 mgd	274 mgd	274 mgd
System Supply Total	233 mgd 85% of Demand	206 mgd 75% of Demand	206 mgd 75% of Demand
Year 2010 System Demand	283 mgd	283 mgd	283 mgd
System Supply Total	240 mgd 85% of Demand	212 mgd 75% of Demand	212 mgd 75% of Demand
Year 2015 System Demand	288 mgd	288 mgd	288 mgd
System Supply Total	245 mgd 85% of Demand	202 mgd 70% of Demand	202 mgd 70% of Demand
Year 2020 System Demand	292 mgd	292 mgd	292 mgd
System Supply Total	248 mgd 85% of Demand	204 mgd 70% of Demand	204 mgd 70% of Demand

As described in Table 5 previously, and illustrated in Table 9 above, during non-critical years neither the SFPUC retail nor wholesale customers are anticipated to be curtailed in their SFPUC deliveries within the reporting period. However, as illustrated in Table 10 and Table 11, during single dry-year or multiple dry-year events the SFPUC system supply available to the SFPUC retail customers, as well as wholesale customers, may be limited.

The illustrations shown above depict anticipated SFPUC shortages on a system-wide basis. Historically, system-wide shortages have been applied to SFPUC wholesale and retail customers based on the circumstances occurring at the time. During the 1987-92 drought, procedures included considerations of anticipated impacts upon the system's end-user use of water. These considerations lead to a differing amount of delivery reduction to each SFPUC wholesale customer and to the individual retail customers. The SFPUC and its wholesale customers have been negotiating an Interim Water Shortage Allocation Plan (IWSAP) that provides a fair and reasonable method for allocating water between the SFPUC and its wholesale customers during times of system-wide shortages up to 20 percent due to drought. The SFPUC adopted the IWSAP on October 24, 2000 and it is currently before the governing body of each wholesale customer for adoption. The IWSAP cannot be implemented without unanimous approval of the SFPUC and all 29 wholesale customers. In the meantime, assuming a continuation of a form of previously used procedures, and the current level of water delivery, the SFPUC retail customers can translate a 10 percent system-shortage into a 6 percent shortage to retail deliveries, collectively. A system-shortage of 15 percent can be translated into a 9 percent shortage to retail deliveries, and a 20 percent system-shortage can be translated into a 13 percent shortage to retail deliveries. A similar relationship between system-wide shortages and anticipated resultant retail shortages exists for higher levels of system-wide shortages.

For a single dry-year event, Table 12 illustrates the comparison between SFPUC retail demands and supplies for the reporting period.

Table 12
Projected SFPUC Retail Supply and Demand Comparison
Single Dry-year

	Current	2005	2010	2015	2020
Retail Demand	90 mgd	91 mgd	91 mgd	92 mgd	92 mgd
SFPUC System Supply	85 mgd	87 mgd	90 mgd	91 mgd	92 mgd
Potential Groundwater[11]			2 mgd	2 mgd	2 mgd
Potential Recycled Water			5 mgd	5 mgd	5 mgd
Deficit	5 mgd	5 mgd	0	0	0
Units of Measure: mgd					

For 3-year multiple dry-year sequences Table 13 illustrates the comparison between SFPUC retail demands and supplies for the reporting period.

Table 13
Projected SFPUC Retail Supply and Demand Comparison
Multiple Dry-years

	Multiple Dry Water Years		
	Year 1	Year 2	Year 3
Current Retail Demand	90 mgd	90 mgd	90 mgd
SFPUC System Supply	85 mgd	78 mgd	78 mgd
Groundwater	0 mgd	0 mgd	0 mgd
Recycled Water			
Deficit	5 mgd	12 mgd	12 mgd
Year 2005 Retail Demand	91 mgd	91 mgd	91 mgd
SFPUC System Supply	86 mgd	79 mgd	79 mgd
Potential Groundwater	0 mgd	0 mgd	0 mgd
Potential Recycled Water			
Deficit	5 mgd	12 mgd	12 mgd
Year 2010 Retail Demand	92 mgd	92 mgd	92 mgd
SFPUC System Supply	89 mgd	82 mgd	82 mgd
Potential Groundwater	2 mgd	2 mgd	2 mgd
Potential Recycled Water	5 mgd	5 mgd	5 mgd
Deficit	0 mgd	3 mgd	3 mgd
Year 2015 Retail Demand	92 mgd	92 mgd	92 mgd
SFPUC System Supply	91 mgd	80 mgd	80 mgd
Potential Groundwater	2 mgd	2 mgd	2 mgd
Potential Recycled Water	5 mgd	5 mgd	5 mgd
Deficit	0 mgd	5 mgd	5 mgd
Year 2020 Retail Demand	92 mgd	92 mgd	92 mgd
SFPUC System Supply	92 mgd	81 mgd	81 mgd
Potential Groundwater	2 mgd	2 mgd	2 mgd
Potential Recycled Water	5 mgd	5 mgd	5 mgd
Deficit	0 mgd	4 mgd	4 mgd

[11] Current groundwater use does not offset potable supply and the water demand supplied by groundwater is not considered in the retail demand. Thus, the approximately 2 mgd of groundwater currently used for Golden Gate Park, Lake Merced Area, and Sunset Area is not included in this table.

Water Demand Management Measures

Law[12]

> 10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following: (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:.....

Introduction

San Francisco and its customers have a proven record of commitment to, and implementation of demand-side management programs. As demonstrated through its first conservation efforts begun in 1928 with the inauguration of the high bills inspections to its recent receipt of the award for "Best Conservation Program-Large Utility" by the California Municipal Utilities Association (March 2000).

San Francisco has experienced a substantial decrease in water use as a result of conservation programs. The first substantial decrease came following the 1976-77 drought in which gross per capita water use prior to and subsequent to the 1976-77 drought decreased nearly 20 percent.[13] And despite growth in San Francisco since 1976, water demands have remained less than pre-drought levels.

A second substantial decrease in water use within San Francisco occurred as a result of the 1987-92 drought when a new level of conservation activities resulted in further water use savings. It is anticipated that through the continuation of these programs per capita water use will continue to decrease into the future. Current gross per capita water use within San Francisco is 112 gallons per capita per day (gpcd) with residential water use calculated to be approximately 61 gpcd.

The following provides a discussion of San Francisco's conservation activities, referred to as demand-side management and its distribution efficiency program which further reduces San Francisco's water use.

Distribution Efficiency

The difference between the amount of water produced or purchased by an agency and the amount recorded as sold at customers' meters is referred to as unaccounted water. Some amount of loss in distribution is unavoidable due to necessary, but unmetered uses such as fire fighting, main flushing, and storage facility cleaning. A portion of a system's losses can be controlled.

San Francisco has an aggressive program to minimize the loss of water within its distribution system. Measures include regular investments in replacement of old, leak-prone mains with new pipe, systematic leak detection programs and regular meter calibration and repair programs. The result of these activities is a reduced unaccounted water level within San Francisco –of approximately six to nine percent of total water production.[14]

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[12] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.
[13] San Francisco decreased its per capita use from 160 gallons per capita per day (gpcd) prior to the drought to 130 gpcd subsequent to the drought.
[14] The American Water Works Association industry standard for system losses is 10 percent.

Demand Management

The conservation ethic of San Francisco was demonstrated by the key role it played in negotiating and implementing the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) in 1991. Two years in the making, the MOU is a unique achievement in the field of water conservation.

As a result of the MOU, Best Management Practices (BMPs) were identified that all signatories agreed to implement. The BMPs describe actions and activities that encourage water conservation. The MOU recognizes the evolutionary nature of water conservation measures and makes provisions for the removal or addition of BMPs as the technical and economic reasonableness of measures are determined. The current BMPs are:

1. Interior And Exterior Water Audits And Incentive Programs For Single Family Residential And Multi-Family Residential Customers.
2. Residential Plumbing Retrofit
3. System Water Audits, Leak Detection And Repair.
4. Metering With Commodity Rates For All New Connections And Retrofit Of Existing Connections.
5. Large Landscape Conservation Programs And Incentives.
6. Horizontal Axis Washer Rebate Programs
7. Public Information
8. School Education Programs
9. Commercial, Industrial And Institutional Water Conservation
10. Wholesale Agency Assistance Programs
11. Conservation Pricing
12. Conservation Coordinator
13. Water Waste Prohibition
14. Residential ULFT Replacement Programs

The MOU also created the California Urban Water Conservation Council (CUWCC) which is charged with certain responsibilities and authorities, including but not limited to recommending study methodologies for BMPs, collecting and summarizing information on implementation of BMPs and making annual reports to the State Water Resources Control Board. San Francisco has been an active member of CUWCC.

Signatories of the MOU are required to submit bi-annual reports to CUWCC outlining progress toward implementing the BMP process. San Francisco's 2000 bi-annual report to CUWCC, which satisfies portions of the Urban Water Management Planning Act, is incorporated in this Urban Water Management Plan by reference.

A summary of San Francisco's progress with the BMPs follows.

BMP 1 -- Interior and Exterior Water Audits for Single Family and Multi-Family Customers

San Francisco has provided an incentive program since the 1920s to residential accounts, which promotes the identification and repair of leaks. The program involves offering water audits to single and multi-family

residences for the purpose of identifying leaks. In addition, bill adjustments are provided to customers who repair leaks that have resulted in high water bills. Since 1988, San Francisco has conducted water audits on 16,640 out of 108,000 (15 percent) single-family accounts and 12,352 out of 35,000 (34 percent) multi-family accounts.

San Francisco's program specifically targets the top 20 percent of water users in the multi-family residential sector. Customers on the list are notified by letter and offered a free water audit. These customers receive at least two letters encouraging participation.

The audits are conducted by San Francisco's Conservation Inspectors. During the audit, the inspector monitors the facility's meter, laundry area, water heater and plumbing fixtures. Depending on the size of the building, the inspector will then typically inspect 25-50 percent of all of the building's apartments or flats to identify additional leaks.

Multi-family accounts that purchase four or more toilets from the San Francisco Water Department[15] or that have purchased toilets two or more toilets through the rebate program also receive a conservation audit.

For each building, the inspector will create a checklist on needed repairs and give a copy of the checklist to the owner or manager. A formal written report is then returned to the owner or manager. At the request of the customer, the inspectors will mark the building's water shut-off valve with a plastic tag to improve its visibility in case of an emergency.

San Francisco offered this same service to the top 20 percent of its single-family sector water users in 1996 and 2000. During the audit, the inspector monitors the customer's meter, water heater, plumbing fixtures and outdoor irrigation. Shut-off valves are also tagged if requested.

BMP 2--Residential Plumbing Retrofit

Beginning with the adoption of *Ordinance 392-90*[16] in December 1990, San Francisco began efforts to require customers to install water-conserving devices. This ordinance changed San Francisco plumbing codes to require all new buildings (and all buildings in which the water drainage system is substantially altered modified or renovated) to retrofit toilets and urinals with fixtures using no more than 1.6 gallons per flush and 1 gallon per flush, respectively.

San Francisco followed the "new construction" ordinance with a series of additional ordinances, which address conservation within existing dwellings. In May and September 1991, San Francisco adopted *Ordinance 185-91* and *Ordinance 346-91*[17]. Collectively these ordinances require water conservation device retrofits within multi-family and single-family residential buildings upon sale, transfer of title, or major improvement to a dwelling.

Retrofit requirements include:

- *Installation of Showerheads with a capacity not exceeding 2.5 gallons per minute,*
- *Installation of aerators attached to sinks and basins where possible, and*
- *Installation of flush reducers, flow restrictors, volume reducers, or toilets with a capacity not exceeding 3.5 gallons per flush.*

According to the ordinance, all applicable fixtures within multi-family residential units were to be retrofitted within three years subsequent to the effective date of the ordinances (by the end of 1994).

[15] The San Francisco Water Department is a division of the SFPUC responsible for, among other things, implementing San Francisco's retail water conservation program.
[16] San Francisco Plumbing Code sections 905 and 1001.1
[17] San Francisco Housing Code, Chapter 12A, Section 12A01-12A14

Ordinance 359-91[18], passed in September 1991 required the same plumbing retrofit requirements for commercial buildings, including tourist hotels and motels. Compliance of this ordinance was also required by 1994.

To ensure compliance with these ordinances an inspection is required. A certificate of compliance is provided to the seller. Conservation Pricing, a BMP discussed below, also provides an incentive for complying with the "new construction" ordinance.

At this time, 91 percent of all subject property in San Francisco is retrofitted with the above devices. Approximately 98 percent of the municipal buildings in San Francisco have also been retrofitted. San Francisco's retail customers outside of city limits are also required to retrofit their plumbing fixtures.

BMP 3--System Water Audits, Leak Detection and Repair

Since the 1970s, San Francisco has implemented a system-wide leak inspection and repair program to reduce distribution system losses. This program has contributed to reduce unaccounted water previously described (six to nine percent).

Beginning in 1990, an innovative leak inspection program using advanced pitometer measurements and system zone analysis was instituted. Zones for inspection are selected for evaluation by factors including age of the water mains, results of previous measurements and the time since last evaluation.

San Francisco has stepped up its ability to identify leaks within its distribution system through use of sophisticated electronic equipment, which can detect leaks from above ground. The equipment is able to differentiate between different noises under the ground including water flowing out of a pressurized pipe. Approximately one-third of San Francisco's distribution mains are surveyed per year.

BMP 4 --Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All of San Francisco's retail customers have been metered since 1916, and are billed by volume. They are also billed for their sewer charges based on the amount of water that they use. Currently, the water rate is $1.26 per ccf and sewer charges are $1.86 per ccf for the first 3 ccf per dwelling unit per month and $4.83 per ccf for the remaining usage.

BMP 5--Large Landscape Conservation Programs and Incentives

San Francisco has a large landscape conservation program, which targets commercial, industrial, residential and governmental water users irrigating three acres or more. San Francisco requires separate meters on all irrigated park areas, median traffic strips, landscaped public areas, landscaped areas surrounding multi-residential and commercial developments, and industrial parks. Under current accounts, 3 percent of San Francisco's water use is for irrigation. To promote efficient water use in new and renovated landscaping, *Ordinance 92-91*[19] was passed in 1991. The ordinance applies to any new commercial, governmental or residential (two or more units) building on a lot exceeding 3,500 square feet with a landscaping area of more than 1,000 square feet. The ordinance requires that the Retail Conservation Administrator prior to having the meter approved for installation approve landscape, irrigation, and soil amendment plans.

The specific requirements of the ordinance include:

- *Total area devoted to turf grass; decorative water use and water intensive planting must be limited to 15% of the parcel area. The limitation does not apply to children's play areas, public recreation areas or other such areas.*

[18] San Francisco Building Code, Chapter 53B, Sections 53B01-53B15
[19] San Francisco Administrative Code, Chapter 63, 63-63.11

- *Strips of turf less than 8 feet wide are prohibited.*
- *Water intensive plants must be grouped together and must be irrigated on a separate cycle from turf grass.*
- *Slopes exceeding 10% adjacent to the hardscape cannot consist of turf grass.*
- *All large areas must have separately metered irrigation systems.*
- *Valves and circuits shall be separated based on water use and must be set to operate between 5 p.m. and 10 a.m.*
- *A soil analysis must be done on the soil used for the landscape. A report specifying how the soil deficiencies will be meet must accompany the application for the meter.*

Revised in September 2000, the ordinance further requires that any commercial meter application with a landscape of more than 1,000 square feet must also meet the same requirements.

The San Francisco Water Department ensures that the ordinance is complied with by reviewing an applicant's landscape and irrigation plans as well as the soil analysis and an applicant's plans for meeting any deficiencies identified in the soil analysis. If the plans do not meet the requirements of ordinance, the applicant is required to change the landscaping plans.

Irrigation surveys have been conducted for all of San Francisco's large irrigation accounts in order to establish a voluntary water budget account included on each water bill. The large irrigation accounts, are predominantly owned and operated by the National Park Service and the San Francisco Department of Recreation and Parks. Many of the large irrigation customers have several irrigation accounts, for example Golden Gate Park and McLaren Park. Initial surveys for all large irrigation accounts were conducted between 1992 and 1995. Follow-up surveys generally occur on a biennial cycle. In FY 98-99 and 99-00, the Conservation Inspectors completed 1,565 inspections on SFWD's 1,200 irrigation accounts. During the audit, the inspector surveys the irrigation system to identify inefficient water application and leaks in the system. San Francisco also offers yearly training seminars by local experts to these agencies' grounds keepers.

San Francisco has installed two California Irrigation Management Information System (CIMIS) weather stations. One of the sites is in San Francisco's largest residential neighborhood and the other is located on the east side of San Francisco. Weekly evapotransporation data is made available on a Web Page for the public to aid in irrigation scheduling.

The San Francisco Water Department also prints out an irrigation budget based on the account's landscape size and the ETo for all of its 1,200 irrigation accounts on their monthly meter bills. A bill message alerts the customer when they have exceeded their budget and indicates their water budget for the next billing period.

BMP 6--Horizontal Axis Washer Rebate Program

In 1999, the San Francisco Water Department began a $75 washer rebate program for its residential customers. Four hundred rebates were distributed during 1999. A second program was offered in October 2000. San Francisco has limited the washer rebate program to one rebate per property.

BMP 7--Public Information

San Francisco promotes water conservation through a variety of outreach efforts including brochures, public service announcements, radio spots, newspaper ads, bus interior posters, bill inserts, direct mailings, "attention-getters", presentations and bill messages.

San Francisco sponsors various activities to reach out to the public with the message of conservation. One example is San Francisco's mobile *Environmental Booth*. Designed to look like a small circus, the exhibit displays low-flow showerheads; retrofit devices for toilets, energy-efficient fixtures, and other water conservation and environmentally directed messages. The booth is taken to fairs throughout San Francisco and is staffed on a rotation basis by different San Francisco departments, including the Water Department.

The San Francisco Water Department also works with a local community group, the San Francisco League of Urban Gardeners (SLUG), to provide outreach to the community about water-efficient landscaping. With funds from San Francisco, SLUG created and maintains a water-efficient demonstration garden in one of the San Francisco's residential communities. San Francisco also works with SLUG to develop brochures and promotional materials on landscape topics such as irrigation maintenance, composting, mulching and water-efficient plants. In cooperation with SLUG, San Francisco has developed several brochures including the following recent releases: "Native Plants," "Maintaining Your Irrigation System," and "Fertile Soils."

San Francisco offers a yearly seminar to professional grounds staff and landscapers on a variety topics ranging from "Calculating Your Evapotranspiration Rate" to "Quick Repairs on Your Irrigation System" And has been an exhibitor at the annual San Francisco Landscape Garden Show.

In the fall of each year, San Francisco offers a presentation on an indoor water conservation topic for building engineers working within the City. Past topics have regarded conservation and cooling towers, water-saving dishwashers and water efficient laundry facilities. In the spring, San Francisco offers an outdoor water conservation seminar in for the City's park personnel and commercial landscape companies.

Each spring, the San Francisco also offers seminars for homeowners, at four different sites throughout the City, on how to install and repair water efficient toilets.

In addition to the brochures listed above, San Francisco has developed and maintains numerous other publications for public distribution, such as:

- *Installing Retrofit Devices*
- *Apartment Residents, If You Don't Think You're Paying for Water ...*
- *Cash In On the Water Savings*
- *Water Conservation Checklist (Provided in English, Spanish and Chinese)*
- *Low-Flow Watering Systems*
- *Compost: The Inside Story (Provided in English, Spanish and Chinese)*
- *Water-Wise Gardening Basics*
- *Water-Wise Plants (Provided in English, Spanish and Chinese)*
- *Water Conservation: A Ten-Step Approach for the Business User*
- *How to Read Your Meter*
- *Mulching Matters*
- *Maintaining an Irrigation System*
- *Save Up to 20% with a FREE Audit*

- *Installing a Water Efficient Toilet in English, Chinese, Spanish, Russian and Vietnamese*
- *Fixing a High Level Leak in Your Bathroom*
- *Composting*
- *Table Tent Series-Six Different Choices*
- *Low-Flow Water Systems*
- *Finally, It Pays to Be A Landlord*
- *Look Good to Your Boss*
- *Marking Your Shut-off Valve*
- *Toilet 101*
- *Water Conservation Guide*

San Francisco also developed a marketing campaign for its "Toilets for $10" program which includes distributing 100,000 door hangers; acquiring radio spots in Cantonese, Spanish, Japanese and English; printing newspaper ads in English, Spanish, Chinese, Russian and German; mounting interior bus shelter posters; distributing 200,000 direct mailers each year; providing bill inserts and doing presentations on radio talk shows in English, Spanish and Cantonese.

San Francisco has also created videos available for free rental on how to install toilets and lead-free faucets in English, Spanish and Cantonese.

San Francisco has also been reaching the public directly through its billing process. On each bill, the account's current average daily water use is shown in comparison to its water use during the same period of the previous year. This information is helpful for the public to recognize water use trends and possible instances of plumbing problems.

BMP 8--School Education Programs

San Francisco works with the San Francisco Unified School District's Environmental Education Program, offering presentations to teachers and approximately 12,000 students each year about water and other environmental issues. San Francisco also makes presentations to an additional 1,800 students each year on how San Francisco gets its water, the water cycle and careers within the Water Department. In addition, the San Francisco Water Department has created a two-piece map series of the Hetch Hetchy/Peninsula Water Supply System and San Francisco's Water Distribution System for teachers of upper elementary grades.

San Francisco has offered an environmental grant program in conjunction with the Clean Water Program for the last three years. The grant program is open to high school classes and student groups. Grants of up to $1,000 are given for projects exploring an aspect of water conservation or pollution prevention. An average of eighteen grants are given each year. Grantees are assigned a City-employee mentor to oversee and assist in their project work. During the ten-week grant period, the students prepare weekly reports for their mentor and receive feedback. At the end of the grant period, the grantees present the findings of their study at the Environment Summit, which is held during the week of Earth Day.

San Francisco also sponsors "Water Play Day" at the city's children museum, Randall Junior Museum in June. Geared towards pre-schoolers and students in early primary grades, twenty organizations present hands-on activities that allow students to learn about water.

For the last six years, San Francisco has sponsored a calendar contest for third, fourth, fifth and sixth graders. Following the California Water Awareness Month's theme, the contest encourages students to think about water conservation. The winning entries are created into a wall calendar.

BMP 9--Commercial, Industrial and Institutional Water Conservation

Similar to the single-family audit program, San Francisco has offered a commercial and industrial audit program to identify and repair leaks. Since 1989, San Francisco has conducted conservation audits on 12,873 commercial accounts. Since the program began commercial water use has decreased by seven to 10 percent.

San Francisco's municipal and industrial water use audit program includes the review of the following items when applicable: plumbing fixtures, cooling towers, meter(s), laundry facilities, kitchens, public and private restrooms and boilers. In 1998 and 2000 San Francisco targeted the top 20 percent of its commercial and industrial accounts to participate in the conservation audit program. These large commercial and industrial customers received both a letter and telephone call offering a free audit.

In 1999, the SFPUC worked with San Francisco's Department of the Environment to pass an ordinance, *Ordinance 148-99*[20], requiring all municipal buildings to replace their water-inefficient toilets with 1.6 gallons per flush toilets and showerheads with 1.5 gallons per minute showerheads. In July 1999, the San Francisco Board of Supervisors passed an ordinance requiring that all municipal buildings be in compliance with the requirements by June 6, 2005.

The ordinance also requires monitoring to ensure progress of the City departments on these two goals. San Francisco owns approximately 2,200 buildings that have 9,900 toilets and 11,000 showerheads. To gauge the progress of the ordinance, the Water Department conducted 271 inspections over the last year on City department instititutional accounts. Approximately 98 percent of all municipal buildings in San Francisco have been retrofitted with the required plumbing fixtures.

New Commercial and Industrial Water Use Review. Before receiving a certification of occupancy, all new commercial and industrial buildings must have an inspection by an inspector from the Department of Building Inspection that includes verification of water-efficient plumbing, recirculating cooling towers and other water efficient plumbing fixtures.

BMP 10—Wholesale Agency Assistance Programs

The SFPUC has established a wholesale water conservation coordinator position. The wholesale water conservation coordinator will be responsible for encouraging water conservation among the SFPUC's wholesale customers. In addition to these efforts, the SFPUC and its wholesale customers have been negotiating an Interim Water Shortage Allocation Plan, which provides a method for allocating water during shortages due to drought. The Plan removes disincentives for developing water conservation and other supply sources by utilizing an allocation method that is not based on historic use. The Plan was adopted by the SFPUC on October 24, 2000 and is currently before the governing body of each wholesale customer for adoption.

BMP 11--Conservation Pricing

To provide a strong incentive for customers to comply with conservation goals concerning water use devices, San Francisco has implemented a two-tier rate structure for its retail customers. Those customers who have retrofitted their plumbing fixtures and have filed an affidavit as to that action are billed at the normal rate per volume. Those customers that have not retrofitted their plumbing fixtures are charged a rate 50 percent higher than the normal rate.

[20] San Francisco Administrative Code, Chapter 82, Section 4.

In addition to unit rate charges, San Francisco addresses water use violations through its rate schedule. Violations of any water use restriction may result in the discontinuance of water service or the installation of flow restricting devices. The costs of these actions are borne by the customer.

BMP 12--Water Conservation Coordinator

San Francisco hired its first full-time water conservation administrator in 1986. The Water Conservation Section of SFWD has five full-time positions: the Conservation Administrator, a Residential Inspector, a Commercial/Irrigation Inspector, Water Conservation Clerk and a Toilet Rebate Coordinator. Almost all of the work of the Conservation Section, including marketing, toilet rebate program and toilet sale program, is performed in-house.

The Conservation Section also uses high school interns. Working with the Mayor's Youth Works program, Vietnamese Youth Development Center and the Chinese Youth Development Center, the Conservation Section trains 5-6 interns each spring and fall and another 10-15 interns in the summer.

BMP 13--Water Waste Prohibition

In Section D of the SFPUC's Rules and Regulations for Water Service there is a provision regarding water waste prohibition. During the 1987-92 drought, San Francisco enacted numerous water use restrictions and prohibitions in response to the severe water shortage. These measures are discussed in the Water Contingency Planning section of this report. With the ending of the drought in 1993, San Francisco decided to continue certain water use restrictions in furtherance of a long-term conservation program. These measures are listed below and included in Section D of the SFPUC's Rules and Regulations for Water Service:

- *Avoid water waste, including but not limited to flooding or runoff into the sewers or gutters.*
- *Hoses used for any purpose must have positive shutoff valves.*
- *Restaurants shall serve water to customers only upon request.*
- *Decorative fountains must recycle water.*
- *Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes is prohibited if other sources such as groundwater or reclaimed water are available and approved by the Department of Health.*
- *Water used for all cooling purposes and commercial car washes must be recycled.*

Violation of any water use restriction may result in the installation of a flow-restricting device in the service line of the customer. Continued violation could result in termination of service. The customer bears the cost of any enforcement action.

BMP 14--Ultra Low Flush Toilet Replacement Program

San Francisco established a highly visible Ultra Low Flush Toilet (ULFT) rebate program in 1995. The rebate program is open to all residential customers and provides a rebate of up to $50 per toilet. In order to receive the rebate, a customer must purchase a toilet after they have been approved for the rebate. San Francisco has replaced 27,000 toilets over the last five years through the toilet rebate program.

San Francisco also offers high quality, water efficient toilets for only $10 to its residential customers each spring. Over the last three years, this program, referred to as "toilets for $10" has replaced 28,000 toilets. This program in combination with the ULFT rebate program has been successful in replacing 12 percent of residential toilets in the City.

The "Toilets for $10" program engages community groups and high schools in the transfer of the toilets to the intended customer. Through their help the volunteer group receives $4 per toilet. In 1999, San Francisco was awarded "Best Community Partnership" from the California Water Awareness Campaign for this program.

Effectiveness of Water Conservation Measures

Between 1994 and 2000 residential per capita water use has decreased from 74 gallons per capita per day (gpcd) to 61 gpcd. It is assumed that much of the decrease in per capita use is a result of San Francisco's long-term conservation programs and a change in water use habits. In 1996, San Francisco conducted a study to determine the effect of conservation measures on San Francisco's retail demand. The results of the study were used to forecast future retail water demand. The study considered the impact of long-term conservation programs for showerhead retrofits, toilet retrofits, and ultra-low-flush toilet retrofits for both residential and non-residential sectors. The study did not consider the impacts of other long-term conservation programs including water conservation audits because savings are either site or industry specific and little information was available to quantify the water savings that could be applied to a forecasting model. The study also incorporates estimates for market penetration of the long-term conservation programs. Water demand projections provided in this report incorporate the effects of these long-term conservation programs on future water demand.

In addition to this effort, San Francisco has been participating in efforts being made by the California Urban Water Agencies water conservation workgroup and CUWCC to identify and develop methods for providing accurate estimates of water savings due to conservation programs.

Water Shortage Contingency Plan

Law[21]

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, *including* up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

10632 (f) Penalties or charges for excessive use, where applicable.

10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier...[analysis of] proposed measures to overcome those [revenue and expenditure] impacts, such as the development of reserves and rate adjustments.

10632 (h) A draft water shortage contingency resolution or ordinance.

10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Water Shortage Emergency Response

Every water system has vulnerabilities in terms of its ability to provide a safe and reliable supply of water. Water shortages can occur in a number of ways. Very localized shortages can occur due to distribution system problems and system shortages may occur due to major facility failures. Yet, beyond system facility contingencies, there exists the potential vulnerability to drought, which limits the amount of water that is available over a series of years. This latter type of contingency is not necessarily caused by physical facility

[21] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

limitations. Within the last 15 years San Francisco has experienced both localized shortages due to earthquakes and system-wide shortages due to drought.

In 1989, San Francisco experienced the Loma Preieta Earthquake. The SFPUC worked with the Mayor's Office of Emergency Response to reconnect service to those who were impacted by the earthquake. Most of the homes that lost water service were reconnected back to the water system's lines within 72 hours. Using this experience, the SFPUC created an *Emergency Operations Plan (EOP)* in 1992, which was updated in 2000. The *EOP* addresses a broad range of potential emergency situations that may affect the SFPUC and that supplement the City and County of San Francisco's *Emergency Response Plan* prepared by the Mayor's office.

The SFPUC has also initiated a *Facilities Reliability Program* to protect the physical assets of the SFPUC from damage or failure due to seismic events or other emergencies. The Program focuses on both the SFPUC's wholesale and retail operations and distribution systems. Phase I of the program, a Facilities Assessment, was completed in November 1995 and provided an assessment of all water storage, transmission and treatment facilities, as well as power generation and transmission facilities, operated by the SFPUC. Phase II of the program, *Regional System Overview*, was completed in January 2000. This second phase identified the vulnerability of the facilities to seismic damage, demand assumptions during a catastrophic event, availability of water sources and restoration times of damaged facilities. Phase II identifies recommendations to improve facility reliability. A third phase will provide a risk assessment and develop alternatives for facility reliability improvement. A fourth phase will complete environmental review and plan implementation. The recommendations from this Program will also be used to develop the SFPUC *Asset Protection Program*, a multi-year capital improvement program.

In addition to the Facilities Reliability Program, San Francisco has begun construction of a system intertie between the SFPUC and the Santa Clara Valley Water District that will allow the two agencies to use each other's systems during emergencies and short-term facility maintenance and upgrade activities.

The SFPUC also has two interties to the South Bay Aqueduct that facilitate wheeling of State Water Project water to the SFPUC in times of water shortage.

Management Response To Water Shortage

The 1987-92 drought illustrated the deficit between San Francisco's water supplies and its demands. Other than the 1976-77 drought, drought sequences in the past did not seriously affect the ability of the SFPUC to sustain full deliveries to its customers. As the SFPUC progressed into the drought and reservoir storage continued to decline, it became evident that full water deliveries could not be sustained without a risk of running out of water before the drought was over. This circumstance became a painful reality in early 1991 when the Hetch Hetchy Reservoir became so depleted (less than 25,000 acre-feet of storage in a reservoir with over 360,000 acre-feet of capacity) that minimum fishery releases and anticipated demands required the SFPUC to initiate programs to achieve a 45 percent reduction in system-wide water deliveries to balance water supplies with deliveries. Fortunately, unexpected runoff provided relief from the severity of that instance of water shortage; however, the drought was far from over.

The SFPUC could not know how severe the 1987-92 drought would become. However, by necessity the SFPUC operated under a general procedure relating water supply and deliveries. This procedure led to the implementation of water rationing. The procedure triggered different levels of rationing in relation to projected reservoir storage: less water in storage led to higher levels of rationing.

The procedure was developed to protect water customers from being subjected to shortages in supply that could not be achieved by drought-related water demand reduction programs. The concept was to provide drought water delivery protection. That is, some level of assurance that water would be delivered continuously during drought.

Long-term Drought Management Plan

The SFPUC and its wholesale customers have been negotiating an Interim Water Shortage Allocation Plan (IWSAP) that provides a fair and reasonable method for allocating water between the SFPUC and its wholesale customers during times of system-wide water shortages up to 20 percent due to drought. In addition to providing an allocation method, the plan also identifies conditions for both voluntary and mandatory rationing; provides for excess use charges; establishes a water bank for use during droughts; and provides for water transfers. The IWSAP has been approved by the SFPUC and is currently before the governing body of each wholesale customer. The IWSAP cannot be implemented without unanimous approval of the SFPUC and all 29 wholesale customers.

In addition, upon approval of the IWSAP, San Francisco will prepare a long-term water shortage contingency plan for its retail operations that will be based on the allocations identified in the IWSAP.

Near-term Drought Management Plan

In the near-term during the completion of the long-term plan, the SFPUC will assess and react to changing water availability conditions consistent with its historically established practices. These practices include the periodic assessment of water availability each year and a determination of need for water delivery reductions (rationing) or implementation of water management opportunities.

Water Availability Assessment. Each year SFPUC forecasts the amount of water that will become available for its use. This water includes runoff from the local Bay Area watersheds and runoff within the Tuolumne River basin. This forecast is updated periodically during the year and is fairly certain by early summer. The forecasted water supply is then compared to the anticipated water demands of the SFPUC's retail and wholesale customers and other water obligations such as stream flow requirements below San Francisco's reservoirs. Also entering into this comparison are objectives for carry-over reservoir storage for drought water delivery protection.

Preliminary Determination of Delivery Reductions (Rationing). At such time that water supply is forecast to be less than that necessary to achieve full deliveries and reservoir carry-over storage goals, an initial determination of required delivery reduction or rationing is identified. Prior experience leads San Francisco to approach required customer water delivery shortages within a context of three stages of response: the first stage of response is associated with voluntary actions by customers and the second and third stages of response are associated with mandatory rationing programs enforced by the SFPUC.

First Stage Program. San Francisco currently enforces numerous water use prohibitions and restrictions, and continues to use public information venues for the discouragement of wasteful uses of water. San Francisco also has numerous long-term water conservation programs which are providing reductions in water use but which are not at ultimate saturation at this time.

The first stage of the plan will rely on a voluntary public response to a declared water shortage. The objective of this first stage of program is to achieve a system-wide 5 to 10 percent reduction in water use.

Through an increase in public information dissemination, retail water customers will be alerted to the current status of water supply conditions and reminded of water use prohibitions and restrictions and currently available incentives and programs that will lead to reductions in water use. Public information will also target discretionary uses of water.

As a program to achieve near-immediate reductions in retail customer water use (and likely permanent in nature), San Francisco will also consider providing incentives that will accelerate on-going long-term conservation programs. Programs that may be targeted for acceleration include:

- *Toilet Rebate Program*

- *Water Audits and Water System Improvements*
- *Leak Repairs*

The water use reduction goal of this first stage program would also be coordinated with voluntary actions and programs by San Francisco's wholesale water customers to reduce their water demands on SFPUC by 5 to 10 percent. The reduction of water demands to SFPUC from these customers may be achieved through a variety of alternative mechanisms available to each individual wholesale customer including increased utilization of alternative water supplies.

Second Stage Program. The second stage of response will include a mandatory water delivery-rationing program.

The program will entail the enumeration of additional water use prohibitions and restrictions with disincentive consequences resulting from retail water customer non-compliance. The specific prohibitions and restrictions that will be enforced will be determined at the time that the need for the second stage program occurs. However, the water use prohibitions and restrictions associated with San Francisco's historical 25 percent system-wide water use reduction program (as discussed below under 1987-92 Drought Experience) serve as a menu for potential actions to be adopted in time of need.

The second stage program will also provide a specific goal for water use reduction by individual retail customers and wholesale water customers, collectively. Individual retail customer water use, by account or entity, will be targeted for reduction through application of formulas, which consider historical use and indoor and outdoor water consumption. Compliance to water delivery allocations will be addressed through the assessment of excess use charges to those customers, which exceed their allocations.

As an incentive to water use reduction by San Francisco retail water customers, the acceleration of long-term water conservation programs may also be considered during the second stage program.

The specific level of water use reduction that will be targeted by the second stage program is dependent on several factors, which include the current water supply condition and the characteristics of water demand after being affected by the first stage program.

Analysis of current water demand characteristics indicates that a permanent reduction (hardening) of water demand occurred as a result of conservation programs employed during the 1987-92 drought. While San Francisco's customers achieved almost a 30 percent reduction in pre-drought demands during one year of the 1987-92 drought, this level of accomplishment is not expected to be achievable subsequent to the drought on a sustained or short-term basis. It is estimated that implementation of programs similar in effect to those applied during the 1987-92 drought will achieve a 10 to 20 percent reduction in current water demands.

Third Stage Program. The third stage program will be implemented at such time that water supply conditions reach a hydrologic circumstance not previously experienced by the SFPUC.

The third stage program will require additional retail water customer response to an increased number of enforced water use prohibitions and restrictions, and an increased level of rationing. The objective of the third stage program will be to achieve water use reductions in excess of 20 percent.

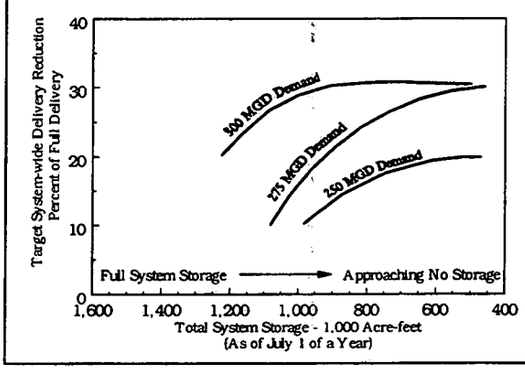
This report discusses various measures employed during the 1987-92 drought during an attempt to achieve a 45 percent reduction in retail water customer demands (as applied to the pre-drought demand). These measures included absolute limitations on water use based on residential customer classification and a proportion of historical use within the non-residential sectors. Although not anticipated to be required in the near-term, San Francisco would employ similar procedures to accommodate system-wide water shortages in excess of 20 percent.

Water Delivery Criteria. San Francisco has established criteria that relate water deliveries to water supply and its objectives to manage water deliveries during extended drought. These criteria provide guidance to the SFPUC for the determination of the annual availability of water. The structure of the criteria was developed during the course of the 1987-92 drought, and incorporates procedures, which were implemented during actual operations.

The water delivery criteria have been developed with the incorporation of a three-level staging of delivery reductions. Depending on the level of water demand that is occurring and the desired objective for maximum delivery reduction, one, two or all three of the stages are required.

Figure 6 shows the relationship between SFPUC reservoir storage, water demands and the target for system-wide delivery reductions. As a drought progressively becomes more severe (as evidenced by declining reservoir storage), the level of required drought response (e.g., rationing) increases. These criteria assume that rationing in excess of 30 percent of full demands is not desired.

Figure 6 Water Delivery Criteria



The water demands of San Francisco's retail and wholesale water customers are projected to increase from 260 mgd to 292 mgd during the period 2000 through year 2020. The water delivery criteria suggest that the first stage of drought response (first stage program) is required when San Francisco's total system storage approaches approximately 1,000,000 acre-feet. As a drought progresses into subsequent years, more intense levels of response (e.g., second and third stage programs) will be required to provide the targeted system-wide delivery reductions indicated by the criteria.

As illustrated in Figure 6, the first stage of drought response will trigger at higher levels of system storage (i.e., earlier in a drought) and potentially at a higher level of delivery reduction as water demands increase in the future.

The above described water delivery criteria were developed through analysis of all historically experienced drought events and a consideration that a worse drought event may occur in the future. The criteria also assume the current operational requirements assigned to SFPUC facilities, and if these responsibilities change in the future the criteria may change.

The criteria have been found to be viable through computer simulation of historical drought events and resultant SFPUC operations.

Implementation of Water Management Opportunities. In-lieu of requiring rationing by the SFPUC customers, San Francisco will also consider the implementation of water purchases and exchanges for the purpose of offsetting the level of rationing.[22]

Program Initiation Procedures. Prior to the initiation of any of the three stages of drought response programs, a draft plan will be prepared for review by the SFPUC. The draft plan will outline the water supply situation, proposed water use reduction objectives, alternatives to water use reductions, methods to calculate water use allocations and adjustments, compliance methodology and enforcement measures, and budget considerations.

[22] The SFPUC has passed a resolution, Resolution 93-0086, directing staff to pursue augmenting Sierra supplies to provide sufficient reliable supply to its customers. In addition, the Water Supply Master Plan identified water purchases and transfers as an action the SFPUC should take to improve water supply reliability.

The proposed plan for implementation, whether initial implementation, reduction or increasing the severity of the water shortage, will be advertised and presented for public hearing at a regularly scheduled Commission meeting for comment and examination in accordance with the requirements of California Water Code Section 6066 of the Government Code.

Mechanisms to Determine Reductions in Water Use. All SFPUC customers are metered. Monthly water use reports are prepared by customer service. Based on a comparison between months the SFPUC is able to determine reductions in water use for both wholesale and retail customers.

Revenue and Expenditure Impacts During Water Shortages. The SFPUC uses a uniform volume charge. As a result, as sales decrease revenues are lost on a per unit basis. Because the marginal cost of water production is miniscule, as production is reduced the cost of service remains the same. Therefore, during a water shortage, as occurred during the 1987-92 drought, the SFPUC may need to raise water rates to make up for lost revenue due to less water use. The SFPUC retail rates, however, are frozen until 2006 due to Proposition H. As a result, retail rates cannot be adjusted to make up for revenue shortfalls unless voters repeal the Proposition or the Mayor declares an emergency as provided for in the City's Charter. The SFPUC does maintain an unappropriated fund balance that can be used to offset the effects of revenue shortfall. In addition, the current contracts between the SFPUC and its wholesale customers allow the SFPUC to recover thru rates the cost of water service to the wholesale customers.

The 1987-92 Drought Experience

The 1987-92 six year drought provides an example of how the near-term drought management process works in times when the operational capabilities of Hetch Hetchy and other water supplies available to the SFPUC are taxed to a point that forces drastic actions to avoid running out of water. By the sixth year of that drought period, many of the programs and actions identified in the near-term drought management process had been implemented. The following describes some of the major actions that occurred.

Demand Reductions. The extended drought forced San Francisco to adopt a mandatory rationing program, enforced by stiff excess use charges and the threat of shut-off for continued violations of water use prohibitions. Mandatory rationing was in effect May of 1988 through May of 1989, re-instituted in May of 1990, and continued until March of 1993. A Water Shortage Emergency Resolution was passed by the SFPUC declaring these rationing periods. Appendix C provides a copy of one such resolution.

The SFPUC's water rationing program was one of the toughest in the state and the most stringent imposed by any major urban water supply agency. Although the specifics of the program varied over time, the basic outline of the mandatory rationing program was to achieve a 25 percent reduction to 1987 (pre-drought) consumption (system-wide), with water allocations set on an account-by-account basis.

To provide a strong incentive for customers to use no more water than their allotment, the SFPUC adopted a rate structure that incorporated excess use charges. Any customer that used less water than its allotment was charged the normal rate per unit of water consumption, while any customer who used more than its allotment was charged a multiple of the normal rate for every unit of consumption above its allotment. As of January 1, 1992 (the last year of the rationing program), the rate structure shown in Table 14 applied to SFPUC customers.

Table 14
Excess Use Charges

If Water Consumption Is (Over Allotment)	Excess Use Charge Will Be (Times Normal Rate)
Up to 10%	2
10.01 - 20%	8
20.01% or over	10

In the event that water was used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The charge to install and remove the restricting device is shown in Table 15. If a customer continued to consume water in excess of its allotment, the SFPUC had the authority to discontinue the customer's water service and require the customer to bear the cost for the re-connection of water service.

Table 15
Fee For Installing Flow Restricting Devices

Meter Size	Installation/Removal Cost
• • to 1•	$95
1• • to 2•	$149
3• and larger	Actual cost

In addition to pricing disincentives for excess water use, numerous water use restrictions were adopted and enforced. San Francisco retail customers were required to comply with the following water use prohibitions and restrictions:

- *Water waste, including but not limited to, any flooding or runoff into the street or gutters, was prohibited.*
- *Hoses could not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.*
- *Hoses used for any purpose had to have positive shutoff valves.*
- *Restaurants served water to customers only upon request.*
- *Potable water was not to be used to clean, fill or maintain levels in decorative fountains.*
- *Use of additional water was not allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems were employed.*
- *Water service connections for new construction were granted only if water saving fixtures or devices were incorporated into the plumbing system.*
- *Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes was prohibited.*
- *Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water would be reduced by at least the amount specified for outside use in the adopted rationing plan.*
- *Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of service.*
- *Water used for all cooling purposes was to be recycled.*
- *The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas was strongly encouraged.*
- *The use of groundwater and/or reclaimed water for street sweepers/washers was strongly encouraged.*

In addition to water use prohibitions and directives specifically responsive to the drought, the SFPUC coincidentally was implementing long-term conservation programs, which also lowered water demands during the drought period (refer to the Demand Management discussion). Following the drought, several of the measures described above were adopted by San Francisco into permanent, on-going programs.

Water Management. In addition to effecting reductions to water demands, the SFPUC also employed water management activities to control the severity of water shortages to its customers.

During the drought and for the first time in history, the SFPUC utilized a Delta supply within its system. The SFPUC imported water from the Delta through use of State Water Project South Bay Aqueduct facilities. The sources of water transferred included transfers via the California Emergency Water Bank, Placer County and the Modesto Irrigation District. The waters were diverted from the South Bay Aqueduct into the SFPUC's San Antonio Reservoir and then treated and integrated into SFPUC's water distribution system.

The amount of water actually delivered to the SFPUC was constrained due to numerous factors including the lack of willing sellers, allocation procedures, lack of priority in use of the State transmission facilities, storage constraints in San Antonio Reservoir, and water treatment constraints within the SFPUC's system. The total water that was imported into the SFPUC's system amounted to a maximum of approximately 31,000 acre-feet in one year, and in total for the drought period amounted to 59,000 acre-feet.

The importation of additional water into the SFPUC's system allowed the continuation of a 25 percent system-wide rationing program as compared to a potentially higher level of rationing had the transfers not occurred.

System Response and Effects. The system-wide goal of reducing water use by 25 percent was achieved. However, the reduction was not accomplished without cost or hardship.

To achieve its annual 25 percent system-wide rationing goal, the SFPUC targeted a reduction of indoor consumption by 10 percent and outdoor consumption by 60 percent.

Due to the nature of the allocation formula for water allotments and the level of system-wide reduction goals, instances occurred where individual users or wholesale water customers were burdened with up to twice the system-wide average in delivery reductions.

Some of the costs incurred by individuals, property owners and renters have been financial.

- *The cost of installing low-flow toilets, retrofit kits for toilets and showerheads, and special low-water use landscaping and irrigation systems*
- *The financial losses resulting from loss of lawns, plants and trees due to the 60 percent reduction in water available for irrigation*
- *The cost of excess use charges ($12,300,000 in excess use charges was billed to retail accounts in fiscal year 1991-92 alone)*

The ability for customers to achieve a 25 percent reduction in the future is highly unlikely due to the "hardening" of water demands that occurred during and subsequent to the drought. The rationing programs implemented by San Francisco during the 1987-92 drought were measured by comparison to calendar year 1987 water deliveries, i.e., pre-drought conditions.

During the 1987-92 drought San Francisco's retail and wholesale water customers implemented numerous conservation measures that have led to permanent per capita water usage savings. Today's water demand is likely hardened as compared to the 1987 level of water demand. This situation leads to a conclusion that comparable rationing goals (e.g., up to 25 percent reduction) would be more difficult to achieve since the

drought, and would require measures in excess of those implemented during the 1987-92 drought to achieve a comparable percentage of delivery reduction.

As the level of rationing increases, the economic and societal impacts become more severe. The SFPUC has first hand experience in attempting to employ rationing to levels, which are intolerable to citizens and businesses.

In 1991, water storage had deteriorated and the SFPUC was forced to immediately adopt a 45 percent system-wide rationing plan. It was proposed the reduction would be achieved through a 33 percent reduction to inside water use and a 90 percent reduction to outside water use.

San Francisco's plan for meeting its rationing goal included the following minimum and maximum criteria:

- *Maximum Allocation for Single and Multi-family Residences. No single-family residence shall receive an allocation of more than 300 gallons per day: no multi-family residence shall receive an allocation of more than 150 gallons per day times the number of living units in the building.*

- *Minimum Allocation for All Residential Accounts. A minimum of 50 gallons per day per documented resident will be allowed. However, a minimum allocation will not be approved to increase an allocation above current usage absent a documented change in circumstances.*

- *Irrigation Services. Accounts classified for irrigation only will be reduced by 90 percent.*

- *Commercial/Industrial Allocations. Commercial and industrial allocations will be reduced by 32 percent. Hospitals and other health care facilities may be subject to lesser restrictions subject to verification that all conservation measures are in place; such approval shall require an on-site conservation inspection.*

- *Allocations for New Accounts. Initial allocations will be established at 50 gallons per day. These allocations will be re-evaluated after customers have installed retrofit kits provided by the San Francisco Water Department. After verification of installation, allocations will be calculated on the basis of the number of documented residents within a household, or, in the case of commercial or industrial customers, on the basis of business data supplied to the Department.*

Additional water use restrictions and prohibitions were enforced:

- *The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes was prohibited outside of a commercial washing facility.*

- *Exceptions to the above use restriction were windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.*

- *Water used for all cooling purposes or for commercial car washes had to be recycled.*

- *The use of potable water on golf courses was limited to the irrigation of putting greens. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.*

- *The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., was prohibited; topping off was allowed to the extent that the designated allocation was not exceeded.*

- *The irrigation of median strips with potable water was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.*

- *The use of potable water for street sweepers/washers was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.*

Public and commercial response to 45 percent rationing was overwhelmingly negative. During the first weeks after notification of the program, SFPUC received over 2,000 appeal letters per day. In the month before rationing was returned to 25 percent, 19,000 appeals, 12,000 telephone calls, and 1,500 walk-in complaints occurred.

Both the allocation levels and new prohibitions required to meet this level of rationing would have had a devastating effect on commercial enterprises. Some water uses would have simply been prohibited.

Simply put, rationing had been taken to a level that was considered intolerable to citizens and had become economically disastrous.

It is assumed that the same measures and practices would be employed with lower minimum and maximum criteria to achieve a 50 percent system-wide reduction.

Water Recycling

Law[23]

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area...

Introduction

Participation in a Regional Recycled Water Planning

The SFPUC has been involved in the Bay Area Regional Water Recycling Program (BARWRP) as part of its retail efforts to develop its recycled water program. BARWRP is a partnership of San Francisco Bay Area water and wastewater agencies that joined together with state and federal agencies to study the feasibility of using high quality recycled water to augment supplies and help the Bay-Delta ecosystem. In December 1999, BARWRP produced a Recycled Water Master Plan for regional water recycling that identifies demands and provides a plan to achieve 125,000 AF/yr of recycled water in the Bay Area within the next 10 years. Part of Phase I of San Francisco's Recycled Water Master Plan is considered a component of the regional system. As a result of the completion of the Regional Recycled Water Master Plan, BARWRP is now concentrating its efforts in securing funds to complete environmental review on the Master Plan and its implementation.

WateReuse Association Membership

The City is an active member of the Northern California Chapter of WateReuse Association, which helps implement water recycling in California.

Wastewater Generation, Collection, Treatment, & Disposal

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A [...] quantification of the amount of wastewater collected and treated [...] methods of wastewater disposal.

The City and County of San Francisco wastewater collection, treatment and disposal system consists of a combined sewer system (which collects both sewer and stormwater), three water pollution control plants (WPCP) and outfalls to San Francisco Bay and the Pacific Ocean. The collection and conveyance system consists of approximately 900 miles of various sizes of underground sewer pipes and transport structures

[23] California Water Code Division 6, Part 2.6 (Urban Water Management Planning). See Appendix A for a complete copy of the Urban Water Management Planning Act of 2000.

located throughout the City. Two of the City's water pollution control plants, the Southeast WPCP and Oceanside WPCP, operate year-round, while the third plant the North Point WPCP, operates only during wet weather. Ultimate disposal of treated wastewater effluent is currently through outfalls to both the San Francisco Bay and the Pacific Ocean.

The Oceanside WPCP serves the westside of the City with a design average dry-weather flow of 17 mgd and a peak wet-weather flow 65 mgd. It provides primary and secondary-level treatment prior to discharge to the Pacific Ocean through a 4.5 mile Southwest Ocean Outfall. The Southeast WPCP is located on the eastside of the City and treats all eastside sewage flows during dry weather. Secondary-treated dry-weather effluent from the Southeast WPCP is discharged to the San Francisco Bay through Pier 80 Outfall. The North Point WPCP, is a primary treatment facility that operates only during wet weather. Primary-treated wet-weather effluent is discharged to San Francisco Bay, through outfalls at Piers 33 and 45. The City discharges approximately 87 mgd of treated wastewater during dry weather to San Francisco Bay and the Pacific Ocean.

All but the North Point plant has the ability to serve as a source for reclaimed water. However, both plants would require tertiary treatment upgrades. The Oceanside plant is further restrained by the lack of available space to install tertiary treatment and therefore, presents additional challenges.

Recycled Water Uses

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.
>
> 10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
>
> 10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

Recycled Water Currently Being Used

Currently, the City of San Francisco uses recycled water for wastewater treatment plant process water, soil compaction and dust control during construction, and for some wash down operations. Less than 1 mgd of recycled water for these purposes. In 1991, the San Francisco Board of Supervisors passed *Ordinances 390-91* and *391-91*[24] that outlined specific components to be addressed in the Recycled Water Master Plan, and defined recycled (or reclaimed) water use areas within San Francisco. Phasing of the implementation of reclaimed water projects was to be based on 5-year increments, with reclaimed water provided to designated use areas within 10 years. The ordinances require dual plumbing system installation within the non-potable water use areas for the following situations:

[24] San Francisco Public Works Code, Article 22, Sections 1200-1210

- *New or remodeled buildings and all subdivisions (except condominium conversions) with a total area of 40,000 square feet or more*
- *New and existing irrigated areas of 1,000 square feet or more*

A draft *Recycled Water Master Plan* describing the implementation of a Citywide reclamation program was released in September, 1995 (RWMP). The program was developed to meet the following objectives:

- *Maximize City-wide recycled water use while keeping costs reasonable*
- *Improve water supply reliability for the City, particularly during drought periods*
- *Improve reliability and expand the fire protection system within the City*
- *Preserve the high quality Hetch Hetchy system water supply for potable uses*
- *Coordinate management of the City's water supply resources, including surface water, groundwater, and recycled water*

The draft plan identified a phased water reclamation project that would initially provide within San Francisco an estimated 6,100 acre-feet per year (AFY) of recycled water for non-potable use and potentially up to 11,500 AFY by 2011.

Of the initially available recycled water, it is estimated that approximately 2,700 AFY would replace potable water currently being delivered. The amount of recycled water that would ultimately replace future projected potable water demand is estimated to be up to 5,200 AFY.

An EIR was completed and certified for the RWMP in August 1997. The plan has not yet been adopted and is currently being revised to reflect a scaled down, less costly version of the original plan.

Potential Uses of Recycled Water. Various survey and outreach efforts were conducted to identify potential uses and users of recycled water. Potential users expressed concerns about issues dealing with public health and potential impacts to sensitive landscaping.

With the results from these efforts, a list was created of potential users of the project's recycled water, including San Francisco's major urban irrigation areas (parks, golf courses and schools), commercial centers and industrial users. Landscape irrigation represents the project's largest potential use (72 percent).

The RWMP notes that the best alternative for distributing the recycled water is through the San Francisco Fire Department's Auxiliary Water Supply System (AWSS). San Francisco is one of the few cities in the nation that has a separate water system for use in fire protection. San Francisco's RWMP provided a plan to expand its City's fire protection service with thirty-four miles of new pipeline and 600 hydrants while using the system to distribute the recycled water. San Francisco is currently contemplating a revision to its RWMP that reduces the cost of the program by eliminating the use of the AWSS component and provides for implementing smaller phases of the program. In conjunction with this revision, San Francisco has submitted completed water recycling construction program questionnaires for placement on the project priority list for a scaled down version of the first phase and third phase of the RWMP. Under these scaled down versions, the SFPUC anticipates providing approximately 7,000 AFY of recycled water to the Westside and southeast portion of San Francisco.

Encouraging Recycled Water Use

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

Proposed Actions to Encourage Use of Recycled Water

To encourage the use of recycled water in San Francisco, San Francisco adopted *Ordinances 390-91* and *391-91*[25]. As mentioned previously these ordinances require, within a geographic area, dual plumbing for the following:

- *New or remodeled buildings and all subdivisions (with exception of condominium conversions) with a total of 40,000 square feet, or greater, to install dual plumbing for irrigation, toilet flushing, and industrial processes*
- *New and existing landscaped areas 1,000 square feet or larger, to install dual plumbing for irrigation.*

San Francisco also passed *Ordinance 175-91*[26] which requires the use of non-potable water for soil compaction and dust control during construction and demolition projects.

Marketing and Financing Strategy. The recycled water project has been structured in phases. As with all municipal projects, funding is limited, and the phased approach allows flexibility in constructing and implementing this project. San Francisco is currently proceeding with the evaluation of financial options to implement a portion of the first phase of the RWMP. San Francisco is applying for Recycled Water Construction Funds from the State Water Resources Control Board and is seeking CALFED funding to implement the BARWRP Master Plan, of which a portion of San Francisco's Phase I of the RWMP is part.

Economic Considerations. The estimated capital cost for the project described in the RWMP is $194 million (1999 cost). The costs are based on planning-level estimates (approximately ± 30%). The total annual cost for operations and maintenance was estimated to be $4 million per year with an annual recycled water delivery of 11,500 AFA. It has been assumed that various project beneficiaries would likely repay costs of the multi-purpose recycled water use project. Consistent with San Francisco's efforts to revise its recycled water plan, San Francisco is also revising its capital cost estimates for a revised recycled water program.

Recycled Water Optimization Plan

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the

[25] San Francisco Public Works Code, Article 22, Sections 1200-1210
[26] San Francisco Public Works Code, Article 21, Sections 1100-1107

preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

10633 (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

Plan for Optimizing the Use of Recycled Water

As mentioned above, the San Francisco Board of Supervisors passed *Ordinances 390-91* and *391-91* that require installation of dual plumbing in buildings and subdivisions of particular size and for irrigation. The City is in the process of instituting a system to further enforce this ordinance.

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APPENDIX A

URBAN WATER MANAGEMENT PLANNING ACT OF 2000

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Urban Water Management Planning Act

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
SB 553, Kelley, 2000

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. The Legislature finds and declares as follows:

(a) The waters of the state are a limited and renewable resource subject to ever increasing demands.

(b) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(c) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(d) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(e) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet the needs of both existing customers and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 7 (commencing with Section 4010) of Part 1 of Division 5 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier after December 31, 1984, shall adopt an urban water management plan within one year after it has become an urban water supplier.

c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies,to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is

available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a).

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, which offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement

the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to the council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

(e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies within 60 days of the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any future, potential customers.

Article 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive drought assistance from the state until the urban water management plan is submitted pursuant to Article 3 (commencing with Section 10640) of Chapter 3.

SEC. 2. No appropriation is made and no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution or Section 2231 or 2234 of the Revenue and Taxation Code because the local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act.

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APPENDIX B

RESOLUTION TO ADOPT THE URBAN WATER MANAGEMENT PLAN

(to be included in the final Urban Water Management Plan)

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PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. 01-0036

WHEREAS, the Urban Water Management Planning Act of 1983, amended through 2000, requires that an urban water supplier serving 3,000 customers or 3,000 acre-feet per year must prepare an Urban Water Management Plan update every five years beginning in 1985;

WHEREAS, the SFPUC in compliance with this Act has prepared an update to its Plan;

WHEREAS, the 2000 Plan update provides past, current and future water demands to year 2020 for both wholesale and retail customers;

WHEREAS, the 2000 Plan update explores the SFPUC water system reliability and drought contingency plans for both wholesale and retail services;

WHEREAS, the 2000 Plan update explores the SFPUC's plans to improve water supply reliability during droughts for its retail customers by developing groundwater and reclaimed water; now, therefore, be it

RESOLVED, that the SFPUC adopts the 2000 Plan update and submits it to the State of California Department of Water Resources in accordance with the Urban Water Management Planning Act; and, be it

FURTHER RESOLVED, that the SFPUC directs the General Manager to transmit the 2000 plan update to the State of California's Department of Water Resources.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of FEB 13 2001

Jill R. Thompson

Secretary, Public Utilities Commission

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APPENDIX C

SAN FRANCISCO'S WATER SHORTAGE INFORMATION

Resolution to Declare a Water Shortage Emergency

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RESOLUTION No. 88-0155

WHEREAS, The San Francisco Water Department obtains water from the reservoirs operated by the Hetch Hetchy Water and Power and from local Bay Area reservoirs; and

WHEREAS, Due to critically low supplies of water within the reservoirs and anticipated low levels of inflow into the reservoirs, such that unless consumption is decreased there may be insufficient water supplies for human consumption, sanitation and fire protection; and

WHEREAS, Decreases in water consumption may be accomplished by reducing allocations to the Water Department's wholesale customers and by imposing water use restrictions on the Water Department's retail customers, as set forth in the Water Rationing Rules and Regulations, issued on April 21, 1988 and attached hereto as Water Rationing Rules and Regulations; and

WHEREAS, This Commission recognizes the need to declare a Water Shortage Emergency (Water Code Sec. 350, et. seq.) due to critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's Suburban Wholesale Customers; and

WHEREAS, This Commission recognizes the need to adopt a Water Conservation Program (Water Code Sec. 375, et. seq.) due to the critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's retail customers; and

WHEREAS, The City of San Jose is, by Resolution 85-0256, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and certain Suburban Purchasers in San Mateo County, Santa Clara County and Alameda County (Settlement Agreement) requires action by the Commission to interrupt service to the City of San Jose (Section 8.17); and

WHEREAS, The City of Santa Clara is, by Resolution 85-0257, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement requires action by the Commission to interrupt service to the City of Santa Clara (Section 8.17); and

WHEREAS, Additional funding in the amount of $648,780 for FY 1988/89 has been identified by the Water Department for implementation of a mandatory water rationing program; and

WHEREAS, on April 21, 1988, the Water Department submitted to this Commission a Water Conservation Program; and

WHEREAS, The Conservation Program shall cease to exist in whole or in part at such time as the Commission finds that the supply of water available to the Water Department's service area has been replenished or augmented so that there are sufficient supplies to meet the needs of the Water Department's customers without the continued implementation of these measures; and

00191

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 23 1988

Romaine A. Boldridge
Secretary, Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION No. 89-0155

WHEREAS, The recommended Water Conservation Program has received wide-spread public distribution; and

WHEREAS, Members of the public have been given an opportunity to, and have expressed their views on the recommended Water Conservation Program in a public hearing; now, therefore be it

RESOLVED, That this Commission declares a Water Shortage Emergency; and

BE IT FURTHER RESOLVED, That this Commission adopts a Water Conservation Program; and

BE IT FURTHER RESOLVED, That this Commission approves the Water Conservation Program dated April 21, 1988 as amended April 28, 1988, and directs that it be placed in force on May 1, 1988; and

BE IT FURTHER RESOLVED, That it is not the Commission's intention to interrupt water service to the cities of San Jose and/or Santa Clara; however, pursuant to its obligation under the Settlement Agreement and Master Water Sales Contract this Commission authorizes the General Manager of the Water Department to interrupt water service to the cities of San Jose and/or Santa Clara if necessary to achieve the required water saving, however, prior to actual interruption of service to either the City of San Jose or Santa Clara, the General Manager of the Water Department shall report to the Commission the need for interruption and receive affirmation from the Commission prior to institution of the interruption; and the Commission further directs the General Manager of the Water Department to mitigate the effect of the interruptions to the extent possible and consistent with the needs of San Francisco's permanent customers; and

BE IT FURTHER RESOLVED, That this Commission hereby authorizes the additional budget needs to be added to the Water Department's Conservation Programmatic Budget, thus amending the Water Department's budget request for FY 1988/89; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate increases and additional charges for water service and water supplied by the San Francisco Water Department to retail customers; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate structure adjustments for water service and water supplied by the San Francisco Water Department to wholesale customers; and

BE IT FURTHER RESOLVED, That the revenue requirements and an analysis of the rate increases, rate structure adjustments and additional charges be made available for public inspection and review beginning Monday, May 16, 1988 in Room 287, City Hall, San Francisco.

0019f

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 23 1989

Lorraine A. Boldridge
Secretary, Public Utilities Commission

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 324-5676

STATE WATER RESOURCES CONTROL BOARD
1991 NOV 14 PM 3:17
DIV. OF WATER RIGHTS RECEIVED

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

STATEMENT NO: 002635
As Amended

DIVERTER OF RECORD:

HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

TELEPHONE NUMBER:
(415) 550-6500

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~HETCH-HETCHY-RESERVOIR~~ Tuolumne River

CA. C. - Zone 3
N 527800 E 2205400

TRIBUTARY TO: ~~TUOLUMNE-RIVER~~ San Joaquin River

COUNTY: TUOLUMNE

DIVERSION WITHIN: NE1/4 OF NW1/4 SECTION 16, T01N, R20E, MDB&M. (Hetch Hetchy Res.)

INSTRUCTIONS: Please complete Items A. B and C. Item D should be completed if you replaced [illegible] RETURN

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 324-5670

STATE WATER RESOURCES CONTROL BOARD
1991 JAN 14 PM 3:17
DIV. OF WATER RIGHTS
SACRAMENTO

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

STATEMENT NO: 002636
As Amended

DIVERTER OF RECORD:

HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

TELEPHONE NUMBER:
(415) 550-6500

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~LAKE TLOYD~~ Eleanor Creek

CA. C. Zone 3
N 537 200 E 2178150

TRIBUTARY TO: CHERRY CREEK

COUNTY: TUOLUMNE

DIVERSION WITHIN:
a) NW¼ of SE¼ Section 3, T1N, R19E, MDB&M (Lake Eleanor Reservoir)
~~b) NW¼ Section 31, T1N, R19E, MDB&M (Lower Cherry Diversion Dam)~~
~~174 OF N 174 SECTION 05, T01N, R19E, MDB&M.~~

INSTRUCTIONS: Please complete Items A. B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1991. (Additional information on reverse side of this form.)

A. Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not

Amounts below are: ☐ Gallons ☐ Acre-feet

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 324-5676

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIV. OF WATER RIGHTS
SACRAMENTO

DIVERTER OF RECORD:

HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

STATEMENT NO: 002637
As Amended

TELEPHONE NUMBER:
(415) 550-6500

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~HETCH-HETCHY-RESERVOIR~~ Tuolumne River

CA.C Zone 3
N 501 800 E 2 154 000

TRIBUTARY TO: ~~TUOLUMNE-RIVER~~ San Joaquin River

COUNTY: TUOLUMNE

DIVERSION WITHIN: NW¼ of SE¼ Section 11, T1S, R18E, MDB&M (Early Intake)
~~1/4 OF NW1/4 SECTION 16, T01N, R20E, MDB&M.~~

INSTRUCTIONS: Please complete Items A, B and C. Item D should be completed if you replaced

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503

(916) 324-5676

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD:

HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

STATEMENT NO: 002638
As Amended

TELEPHONE NUMBER:
(415) 550-6500

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~LAKE LLOYD~~ Cherry Creek

CA. C Zone 3
N 538 000 E 2 170 000

TRIBUTARY TO: ~~CHERRY CREEK~~ Tuolumne River

COUNTY: TUOLUMNE

DIVERSION WITHIN: NW¼ of ~~NW~~ SE¼ ~~1/4 OF N 1/4~~ SECTION 05, T01N, R19E, MDB&M. (Lake Lloyd)

INSTRUCTIONS: Please complete Items A. B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1991. (Additional information on reverse side of this form.)

A. Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not

Amounts below are: ☐ Gallons ☐ Acre-feet

State of California, State Water Resources Control Board
Division of Water Rights
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400 Web: http://waterrights.ca.gov

S002635%S%2004

2002, 2003, 2004

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

If the information below is inaccurate, please line it out in red and provide current information.
Notify this office if ownership or address changes occur during the coming year.

Please Complete and Return This Form by JULY 1, 2005.

***If the mail recipient's name, address or phone No. is wrong or missing, please correct.**

Owner of Record: CITY & COUNTY OF SAN FRANCISCO;

PRIMARY CONTACT OR AGENT FOR MAIL & REPORTING:
CITY & COUNTY OF SAN FRANCISCO
C/O HETCH HETCHY WATER & POWER
1155 MARKET ST
SAN FRANCISCO, CA 94103

STATEMENT NO.: S002635
CONTACT PHONE NO.: (415)554-0725

STATE WATER RESOURCES CONTROL BOARD
2008 JUL 28 PM 3:35
DIV OF WATER RIGHTS SACRAMENTO

Source Name: TUOLUMNE RIVER
Tributary To: SAN JOAQUIN RIVER
County: Tuolumne
Diversion Within: NE1/4 of NW1/4 Section 16, T01N, R20E, ~~MB&M~~ MDB&M

Year of First Use: 1922
Parcel Number:

A. **Water is Used Under:** Riparian claim _____ Pre-1914 right x Other (explain): _____

B. **Year of First Use:** (Please provide if missing above) _____

C. **Amount of Use:** Enter the amount (or the approximate amount) of water used each month, using the table below.

Amounts below are in: Gallons _____ Million Gallons (MG) _____ Acre-feet (AF) x Other _____

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
2002													
2003				See Attached Table									
2004													

D. **Purpose of Use** – Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation _____ acres; Stockwatering _____; Domestic _____;

Other (specify) Municipal, Industrial & Power

E. **Changes in Method of Diversion** – Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)
None

F. *Please answer only those questions below which are applicable to your project.*

1. Conservation of water
   a. Are you now employing water conservation efforts? YES x NO __
   Describe any water conservation efforts you have initiated: See Urban Water Management Plan

   b. If you are claiming credit for water conservation under section 1011 of the Water Code for your claimed pre-1914 appropriative right, please show the amount of water conserved:

   Reduction in Diversions:

   Year ____ _____ (AF/MG) Year ____ _____ (AF/MG) Year ____ _____ (AF/MG)

   Reduction in consumptive use:

   Year ____ _____ (AF/MG) Year ____ _____ (AF/MG) Year ____ _____ (AF/MG)

   I have data to support the above surface water use reductions due to conservation efforts. YES ____ NO ____

Storm Water
JUL 2008
Division of Water Quality

2. Water quality and wastewater reclamation See Urban Water Management Plan

a. Are you now or have you been using reclaimed water from a wastewater treatment facility, desalination facility or water polluted by waste to a degree which unreasonably affects such water for other beneficial uses? YES X NO ____.

b. If you are claiming credit due to the substitution of reclaimed water, desalinated water or polluted water in lieu of a claimed pre-1914 appropriative right under section 1010 of the Water Code, please show amounts of reduced diversions and amounts of substitute water supply used:

Amount of reduced diversion:
Year ____ _____ (AF/MG) Year ____ _____ (AF/MG) Year ____ _____ (AF/MG)

State the type of substitute water supply: _____

Amount of substitute water supply used:
Year ____ _____ (AF/MG) Year ____ _____ (AF/MG) Year ____ _____ (AF/MG)

I have data to support the above surface water use reductions due to the use of a substitute water supply. YES ____ NO ____.

3. Conjunctive use of surface water and groundwater See Urban Water Management Plan

a. Are you now using groundwater in lieu of surface water? YES X NO ____.

b. If you are claiming credit due to the substitution of groundwater for a claimed pre-1914 appropriative right under section 1011.5 of the Water Code, please show the amounts of groundwater used:

Year ____ _____ (AF/MG) Year ____ _____ (AF/MG) Year ____ _____ (AF/MG)

I have data to support the above surface water use reductions due to the use of groundwater. YES ____ NO ____.

I understand that it may be necessary to document the water savings claimed in "F" above if credit under Water Code sections 1010 and 1011 is sought in the future.

I declare that the information in this report is true to the best of my knowledge and belief.

DATE: 21 July, 2008 at San Francisco, California

SIGNATURE: _____

PRINTED NAME: Michael (first name) P. (middle initial) Carlin (last name)

COMPANY NAME: City and County of San Francisco, Public Utilities Commission

If there is insufficient space for your answers, please use the space provided below.

ITEM	CONTINUATION

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California. They are riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on his riparian land. Riparian land must be in the same watershed as the water source and must never have been severed from the sources of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to store water for later use or to divert water which originates in a different watershed, water previously stored by others, return flows from use of groundwater, or other "foreign" water to the natural stream system.

An appropriative right is required for use of water on non-riparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. Since 1914, new appropriators have been required to obtain a permit and license from the State. Appropriative rights can be granted to waters "foreign" to the natural stream system.

Statements of Water Diversion and Use must be filed by riparian and pre-1914 appropriative water users as set forth in Water Code section 5100 with specific exceptions. The filing of a statement (1) provides a record of water use, (2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversions, and (3) assists the State to determine if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please contact an attorney or write to this office. We have several pamphlets available. They include: (1) Statements of Water Diversion and Use, (2) Information Pertaining to Water Rights in California, and (3) Appropriation of Water in California.

CITY AND COUNTY OF SAN FRANCISCO - QUANTITY OF WATER USED

HOLM POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2002	40,165	17,250	55,077	45,229	51,862	36,188	15,404	17,550	12,472	13,317	23,808	26,160	354,482
2003	42,436	33,562	28,385	33,501	53,098	45,836	16,618	14,364	18,946	10,675	12,920	17,744	328,086
2004	28,889	29,046	51,564	49,442	43,968	34,580	11,020	3,517	56	0	21,921	27,763	301,765

KIRKWOOD POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2002	64,725	39,527	40,383	54,694	68,329	71,266	30,224	28,616	27,677	22,243	15,199	17,956	480,839
2003	23,026	18,912	27,174	61,135	81,174	78,883	34,610	28,748	27,691	24,631	19,799	236	426,018
2004	21,441	37,686	71,151	69,903	62,723	68,481	32,342	31,555	30,226	32,662	20,684	18,089	496,945

MOCCASIN POWERHOUSE FLOW in ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2002	33,870	34,588	39,175	36,547	40,329	37,556	30,503	29,580	28,401	22,002	15,660	17,196	365,408
2003	23,979	18,869	28,108	36,555	39,100	38,305	33,736	29,340	29,165	23,224	12,553	0	312,934
2004	7,190	23,349	26,649	26,720	26,364	36,928	30,010	30,158	28,701	31,006	19,748	17,046	303,868

SAN JOAQUIN PIPELINE (DIVERSION TO SAN FRANCISCO) IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2002	10,256	9,420	17,610	22,236	26,335	26,659	27,515	27,460	26,496	20,040	13,414	15,122	242,563
2003	15,144	13,696	19,623	20,302	22,430	26,077	27,612	27,495	26,499	24,589	10,675	0	234,141
2004	7,755	21,055	18,142	22,289	27,691	26,779	27,722	27,633	26,680	27,575	15,873	14,557	263,752

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 324-5676

9-4

357 1872

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD:

STATEMENT NO: 002635
As Amended

HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

TELEPHONE NUMBER:
(415) 550-6500

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~HETCH HETCHY RESERVOIR~~ Tuolumne River

TRIBUTARY TO: ~~TUOLUMNE RIVER~~ San Joaquin River

COUNTY: TUOLUMNE

DIVERSION WITHIN: NE1/4 OF NW1/4 SECTION 16, T01N, R20E, MDB&M. (Hetch Hetchy Res.)

INSTRUCTIONS: Please complete Items A. B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1991. (Additional information on reverse side of this form.)

A. Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.

Amounts below are: ☐ Gallons ☐ Acre-feet ☐ _____ (other)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
1988													
1989		See Attachment											
1990													

B. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation _____

Stockwatering _____

Domestic _____

Other (specify) municipal, industrial and power

C. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)

None

D. If part of the water listed in Part A consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: June 10, 19 91, at San Francisco, California

Signature: [signature]
Anson B. Moran, General Manager

WR 40-I (2/90)

1990

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE
ATTACHMENT FOR AMENDED STATEMENT 2635

Amended Statement of Water Diversion and Use is being filed with this supplemental statement. The attached table shows all diversions to San Francisco for Municipal and Industrial use and diversions through three powerhouses; however, use of water described in this statement is only through the Kirkwood and Moccasin powerhouses. The diversion records are for the years 1981 through 1990.

Marsden Manson. _____ Water _____

Notice of Appropriation of Water. Notice is hereby given that Marsden Manson claims the water now flowing in Tuolumne river at the point where this notice is posted, to the extent of ten thousand (10,000) miners inches measured under a four-inch pressure. The point where this notice is posted is described as follows: On the north bank of the Tuolumne river at the outlet of Hetch Hetchy valley and being in the N.E. $\frac{1}{4}$ of section 17, T.1 N., R.20 E., M.D.B.&M. This notice is nailed to an 8-inch dia. oak tree above the narrowest part of the gorge; at the base of the tree being an old United States Geological Survey bench mark. The water is claimed for irrigation, manufacturing purposes, water power and domestic use, and the place of intended use is in and near the city and county of San Francisco, California, and along the line of the proposed conduit. It is proposed to divert such waters by means of a dam, to allow the same to flow in natural channels, and in canals, tunnels, flumes, wooden and iron or steel pipes to the points of intended use, using such dams and other structures for its recovery from natural channels and its proper control, as may be required. The size of the canal is to be ten feet wide on the bottom, sixteen feet wide on top, six and one-half feet deep on a grade of four feet per mile, or of such other dimensions as will give it an equivalent capacity. The sizes of flumes, pipes, tunnels and other conduits are to be such as to give them sufficient capacity to carry the amount of water claimed.

Drenzy A. Jones.

Posted at the request of Marsden Manson on the 29th day of September, 1908. Witness to posting: Lewlie W. Stocker, Louis R. Mercado.

State of California County of Tuolumne. ss. Leslie W. Stocker and Louis R. Mercado, being each first duly sworn, each for himself and not one for the other, depose and say: That on the 29th day of September 1908, Drenzy A. Jones, posted a full, true and correct copy of the annexed and foregoing Notice of Water Appropriation on the north bank of the Tuolumne river at the outlet of Hetch Hetchy valley, and being in the N. E. $\frac{1}{4}$ of

James D. Phelan _____ Water _____

Notice of Appropriation of Water. Notice is hereby given that James D.Phelan,claims the water now flowing in Tuolumne River at the point where this notice is posted to the extent of ten thousand(10,000) miners inches measured under a four inch pressure. The point where this notice is posted is described as follows:-On the North bank of the Tuolumne River at the outlet of Hetch Hetchy Valley and being in the N.E.¼ of Sec.17 T.1 N.R. 20 E.M.D.B.&M. This Notice is nailed to an 8" dia. oak tree above the narrowest part of the gorge; at the base of the tree being an old U.S. Geological Survey Bench mark. The water is claimed for irrigation,manufacturing purposes,water power,and domestic use and the place of intended use is in and near the City and County of San Francisco,California,and along the line of the proposed conduit. It is proposed to divert such waters by means of a dam,to allow the same to flow in natural channels,and in canals,tunnels,flumes, wooden,and iron or steel pipes to the points of intended use,using such dams and other structures for its recovery from natural channels and its proper control as may be required. The size of the canal is to be ten feet wide on the bottom,sixteen feet wide on top,six and one-half feet deep on a grade of four feet per mile or of such other dimensions as will give it an equivalent capacity. The sizes of flumes, pipes,tunnels and other conduits are to be such as to give them sufficient capacity to carry the amount of water claimed.

Jas. D. Phelan.

Posted at the request of James D. Phelan, on the 29th day of July,1901. H.E.Green. Witness to posting: W.W.Cockins Jr.

State of California, County of Tuolumne ss. W.W.Cockins Jr. and H.E.Green, being each first duly sworn, each for himself and not one for the other,depose and say: that on the 29th,day of July, 1901,H.E.Green,posted a full,true and correct copy of the annexed and foregoing Notice of Water Appropriation on the North bank of the Tuolumne River at the outlet of Hetch Hetchy Valley and being in the N.E.¼ of Sec.17 T.1 N.R. 20 E.M.D.M. This notice is nailed to an 8" dia. oak tree above the narrowest part of the gorge;at the base of the three being an old U.S.Geological Survey Bench mark.

H.E.Green.

3. W.W.Cockins Jr.

City and County of San Francisco._____Water._____

Notice of Appropriation of Water. The City and County of San Francisco, a municipal corporation, hereby claims the water, natural or stored, here flowing in the Tuolumne River to the extent of twenty five thousand (25,000) inches, measured under a four inch pressure, and the purpose for which the same is claimed is for municipal, domestic, irrigation, water power and manufacturing purposes, and the place of intended use is in and near the City and County of San Francisco, California, and along the line of the proposed conduit. The point where this notice is posted is described as follows: on an oak tree about 150 feet easterly from the point of intersection of the westerly boundary line of the Yosemite National Park with the southeasterly bank of the Main Tuolumne River. The means by which it is intended to divert said water is by bedrock and surface dam, or both, dams, ditches, iron, steel and wooden pipes, flumes, canals, and the natural channels to points of intended use, or any or either of such means as may be found most practicable, using such dams or other structures for its recovery from natural channels and its proper control as may be required. The size of the canals is to be ten (10) feet wide on the bottom, sixteen (16) feet wide on top and six and one-half ($6\frac{1}{2}$) feet deep on a grade of four (4) feet per mile or of such other dimensions as will give it an equivalent capacity. The size of such pipes is to be forty-eight (48) inches in diameter or larger if necessary and the sizes of the flumes and other conduits are to be such as to give them a sufficient capacity to carry the amount of water claimed. Posted on the ground this 20th day of Feb'y. 1911.

162

City and County of San Francisco (a municipal corporation)

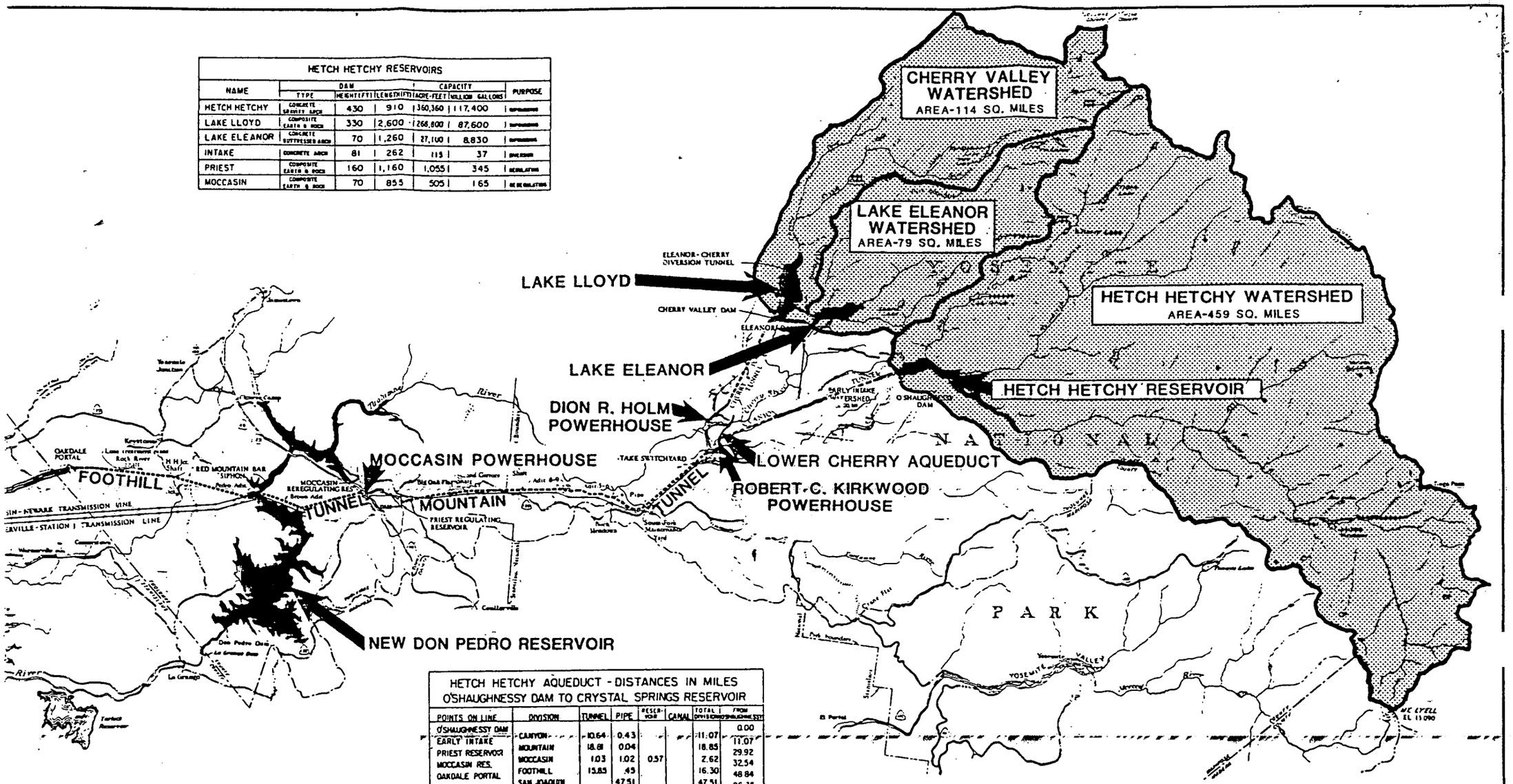
By Marsden Manson, City Engineer.

Witness to posting:
Drenzy A. Jones.
Geo. F. Bartlett.

Recorded at the request of Marsden Manson, Feb. 24th, 1911 at 9 o'clock

W. F. K.

HETCH HETCHY RESERVOIRS						
NAME	DAM			CAPACITY		PURPOSE
	TYPE	HEIGHT (FT)	LENGTH (FT)	ACRE-FEET	MILLION GALLONS	
HETCH HETCHY	CONCRETE GRAVITY ARCH	430	910	360,360	117,400	[illegible]
LAKE LLOYD	COMPOSITE EARTH & ROCK	330	2,600	268,800	87,600	[illegible]
LAKE ELEANOR	CONCRETE BUTTRESSED ARCH	70	1,260	27,100	8,830	[illegible]
INTAKE	CONCRETE ARCH	81	262	115	37	[illegible]
PRIEST	COMPOSITE EARTH & ROCK	160	1,160	1,055	345	REGULATING
MOCCASIN	COMPOSITE EARTH & ROCK	70	855	505	165	RE REGULATING



HETCH HETCHY AQUEDUCT - DISTANCES IN MILES O'SHAUGHNESSY DAM TO CRYSTAL SPRINGS RESERVOIR							
POINTS ON LINE	DIVISION	TUNNEL	PIPE	RESERVOIR	CANAL	TOTAL DIVISION	FROM O'SHAUGHNESSY
O'SHAUGHNESSY DAM							0.00
EARLY INTAKE	CANYON	10.64	0.43			11.07	11.07
PRIEST RESERVOIR	MOUNTAIN	18.81	0.04			18.85	29.92
MOCCASIN RES.	MOCCASIN	1.03	1.02	0.57		2.62	32.54
OAKDALE PORTAL	FOOTHILL	15.85	.45			16.30	48.84
TESLA PORTAL	SAN JOAQUIN		47.51			47.51	96.35
IRVINGTON PORTAL	COAST RANGE	28.64	.59			29.23	125.58
PULGAS E. PORTAL	BAY CROSSING		21.24			21.24	146.82
CRYSTAL SPRGS. RES	PENINSULA	1.71			0.18	1.89	148.71
	TOTAL	76.68	71.28	0.57	0.18	148.71	

SCALE OF MILES

1 0 1 2 3 4 5 10 15 20 25

LEGEND

SAN FRANCISCO WATER DEPARTMENT SERVICE AREA

WATERSHED AREAS

ISCO
TEM

MIT/KSN
S002635

ELLISON, SCHNEIDER & HARRIS L.L.P.

CHRISTOPHER T. ELLISON
ANNE J. SCHNEIDER
JEFFERY D. HARRIS
DOUGLAS K. KERNER
ROBERT E. DONLAN
ANDREW B. BROWN

ATTORNEYS AT LAW
2015 H STREET
SACRAMENTO, CALIFORNIA 95814-3109
TELEPHONE (916) 447-2166 FAX (916) 447-3512

LYNN M. HAUG
PETER J. KIEL
JAMES D. McNAIRY
CHRISTOPHER M. SANDERS
JONATHAN R. SCHUTZ
GREGGORY L. WHEATLAND

October 11, 2004

STATE WATER RESOURCES CONTROL BOARD
2004 OCT 13 AM 11:03
DIV. OF WATER RIGHTS SACRAMENTO

Koso Nodohara
State Water Resources Control Board
Division of Water Rights
1001 I Street
Sacramento, CA 95812-2000

Re: City and County of San Francisco
Statement of Water Diversion and Use, S002635
1996-1998

Dear Mr. Nodohara:

A review of the State Water Resources Control Board files revealed that they do not contain the City and County of San Francisco's Statement of Water Diversion and Use, S002635, for the years 1996-1998.

Enclosed please find the City and County of San Francisco's Statement of Water Diversion and Use Number S002635, with accompanying documentation, for the years 1996-1998.

Sincerely,

Anne J. Schneider

Anne J. Schneider

AJS:ps

State of California, State Water Resources Control Board
Division of Water Rights, P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400, Web: http://www.waterrights.ca.gov

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

If the information below is inaccurate, please line it out in red and provide current information.
Notify this office if ownership or address changes occur during the coming year.

*If the mail recipient's name, address or phone No. is wrong or missing, please correct.

Owner of Record: City and County of San Francisco

PRIMARY CONTACT OR AGENT FOR MAIL & REPORTING:

City and County of San Francisco
1155 Market Street
San Francisco, CA 94103

STATEMENT NO.: S002635
CONTACT PHONE NO.: (415) 554-0725

Source Name: Tuolumne River
Tributary To: San Joaquin River
County: Tuolumne
Diversion Within: NE 1/4 of NW 1/4 Section 16, T01N, R20E, MDB&M
Year of First Use: 1922
Parcel Number:

A. Water is used under: Riparian claim _____ Pre 1914 right X Other (explain): _____

B. Year of first use (Please provide if missing above) _____

C. Amount of Use – Enter the amount (or the approximate amount) of water used each month.

Amounts below are: Gallons ____ Acre-feet ____ Other ____

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
1996													
1997					SEE ATTACHED TABLE								
1998													

D. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation _____ acres; Stockwatering _____; Domestic _____;

Other (specify) Municipal, Industrial & Power

E. Changes in Method of Diversion – Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)
NONE

F. Please answer only those questions below which are applicable to your project.

1. Conservation of water
   a. Are you now employing water conservation efforts? YES ___ NO ___
   Describe any water conservation efforts you have initiated: See attached Urban Water Management Plan

   b. If credit toward beneficial use of water under claimed pre 1914 appropriative water right for water not used due to a conservation effort is claimed under section 1011 of the Water Code, please show the amounts of water conserved:

   Reductions in Diversions:

   yr____ _____ (af/mg) yr____ _____ (af/mg) yr____ _____ (af/mg)

   Reductions in consumptive use:

   yr____ _____ (af/mg) yr____ _____ (af/mg) yr____ _____ (af/mg)

   I have data to support the above surface water use reductions due to conservation efforts. YES ___ NO ___

ST-SUPPL (6-03)

OCT 15 2004

2. Water quality and wastewater reclamation See attached Urban Water Management Plan

a. Are you now or have you been using reclaimed water from a wastewater treatment facility, desalination facility or water polluted by waste to a degree which unreasonably affects such water for other beneficial uses? YES _____ NO _____.

b. If credit toward use under a claimed pre 1914 appropriative water right through substitution of reclaimed water, desalinated water or polluted water in lieu of appropriated water is claimed under section 1010 of the Water Code, please show amounts of reduced diversions and amounts of reclaimed water used:

yr_____ _____ (af/mg) yr_____ _____ (af/mg) yr_____ _____ (af/mg)

I have data to support the above surface water use reductions due to wastewater reclamation. YES ___ NO ___

3. Conjunctive use of surface water and groundwater See attached Urban Water Management Plan

a. Are you now using groundwater in lieu of surface water? YES _____ NO _____

b. If credit toward use under a claimed pre 1914 appropriative right through substitution of groundwater in lieu of appropriated water is claimed under section 1011.5 of the Water Code, please show the amounts of groundwater used:

yr_____ _____ (af/mg) yr_____ _____ (af/mg) yr_____ _____ (af/mg)

I have data to support the above surface water use reductions due to conjunctive use efforts. YES ___ NO ___

I understand that it may be necessary to document the water savings claimed in "F." above if credit under Water Code sections 1010 and 1011 is sought in the future.

I declare that the information in this report is true to the best of my knowledge and belief.

DATE: September 22, 2004 at San Francisco, California

SIGNATURE: Michael P. Carlin

PRINTED NAME: Michael (first name) P. (middle init.) Carlin (last name)

COMPANY NAME: City and County of San Francisco, Public Utilites Commission

If there is insufficient space for your answers, please use the space provided below.

ITEM	CONTINUATION

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

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The above discussion is provided for general information. For more specific information concerning water rights, please contact an attorney or write to this office. We have several pamphlets available. They include: (1) Statements of Water Diversion and Use, (2) Information Pertaining to Water Rights in California, and (3) Appropriation of Water in California.

"The energy challenge facing California is real. Every California needs to take immediate action to reduce energy consumption For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov"

SSWDU

CITY AND COUNTY OF SAN FRANCISCO

HOLM POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	25,081	52,034	58,003	56,953	58,098	55,283	29,831	32,644	33,596	21,229	30,186	58,990	511,928
1997	33,471	54,178	60,234	58,171	47,498	40,947	21,099	35,389	39,402	34,213	1,194	1,228	427,024
1998	15,519	52,201	60,002	58,046	59,139	57,336	59,090	30,067	10,213	7,908	20,083	33,951	463,555

KIRKWOOD POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	31,793	73,743	79,442	75,356	77,619	81,626	64,530	20,402	22,423	23,689	19,541	60,387	630,551
1997	67,864	72,841	77,451	75,854	83,653	82,046	48,895	30,655	29,123	25,045	22,229	29,377	645,032
1998	56,894	70,022	72,171	68,666	74,844	72,151	80,573	44,902	21,598	18,696	16,310	26,481	623,308

MOUNTAIN TUNNEL - MOCCASIN POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	22,435	33,499	36,393	36,303	37,539	35,109	35,897	21,447	23,494	24,976	18,877	35,502	361,471
1997	38,267	34,572	38,362	38,331	40,955	38,924	37,650	31,210	30,099	25,533	22,005	29,903	405,811
1998	36,446	34,631	38,785	37,386	39,130	37,974	40,044	34,147	22,358	19,371	16,713	27,019	384,004

SAN JOAQUIN PIPELINE FLOW (DIVERSION TO SAN FRANCISCO) IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	17,756	13,847	14,858	14,116	21,223	20,799	21,372	17,207	20,644	21,289	12,959	14,624	210,694
1997	1,221	8,583	15,401	17,942	24,052	27,260	28,063	27,926	26,917	22,804	20,529	15,122	235,820
1998	12,428	7,847	13,210	17,447	20,190	21,358	23,002	23,976	19,902	15,189	14,571	15,128	204,248

LOWER CHERRY AQUEDUCT FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0

State of California, State Water Resources Control Board
Division of Water Rights, P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400, Web: http://www.waterrights.ca.gov

S002635 S 2001

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

1999, 2000, 2001

If the information below is inaccurate, please line it out in red and provide current information.
Notify this office if ownership or address changes occur during the coming year.

Please Complete and Return This Form by July 1, 2002.
***If the mail recipient's name, address or phone No. is wrong or missing, please correct.**

Owner of Record: CITY & COUNTY OF SAN FRANCISCO

STATE WATER RESOURCES CONTROL BOARD
2004 OCT 13 AM 11:05
DIV. OF WATER RIGHTS SACRAMENTO

PRIMARY CONTACT OR AGENT FOR MAIL & REPORTING:
CITY & COUNTY OF SAN FRANCISCO
1155 MARKET ST
SAN FRANCISCO, CA 94103

STATEMENT NO.: S002635
CONTACT PHONE NO.: (415)554-0726

FOR ONLINE REPORTING AT
www.waterrights.ca.gov

USER NAME: S002635
PASSWORD: C21182

Source Name: TUOLUMNE RIVER
Tributary To: SAN JOAQUIN RIVER
County: Tuolumne
Diversion Within: NE1/4 of NW1/4 Section 16, T01N, R20E, MB&M

Year of First Use: 1922
Parcel Number:

A. Water is used under: Riparian claim _____ Pre 1914 right X Other (explain); _____

B. Year of first use (Please provide if missing above) _____

C. Amount of Use – Enter the amount (or the approximate amount) of water used each month.

Amounts below are: Gallons ____ Acre-feet ____ Other ____

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
1999													
2000					SEE ATTACHED TABLE								
2001													

D. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation _____ acres; Stockwatering _____; Domestic _____;

Other (specify) Municipal, Industrial & Power

E. Changes in Method of Diversion – Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)
NONE

F. Please answer only those questions below which are applicable to your project.

1. Conservation of water
   a. Are you now employing water conservation efforts? YES ___ NO ___
   Describe any water conservation efforts you have initiated: See attached Urban Water Management Plan

   b. If credit toward beneficial use of water under claimed pre 1914 appropriative water right for water not used due to a conservation effort is claimed under section 1011 of the Water Code, please show the amounts of water conserved:

   Reductions in Diversions:

   yr____ _____ (af/mg) yr____ _____ (af/mg) yr____ _____ (af/mg)

   Reductions in consumptive use:

   yr____ _____ (af/mg) yr____ _____ (af/mg) yr____ _____ (af/mg)

   I have data to support the above surface water use reductions due to conservation efforts. YES ___ NO ___ WRMS

6-7-05 PLM

5-11-05 PLM

ST-SUPPL (6-03)

2. Water quality and wastewater reclamation See attached Urban Water Management Plan

a. Are you now or have you been using reclaimed water from a wastewater treatment facility, desalination facility or water polluted by waste to a degree which unreasonably affects such water for other beneficial uses? YES _____ NO _____.

b. If credit toward use under a claimed pre 1914 appropriative water right through substitution of reclaimed water, desalinated water or polluted water in lieu of appropriated water is claimed under section 1010 of the Water Code, please show amounts of reduced diversions and amounts of reclaimed water used:

yr_____ _____ (af/mg) yr_____ _____ (af/mg) yr_____ _____ (af/mg)
I have data to support the above surface water use reductions due to wastewater reclamation. YES ___ NO ___

3.. Conjunctive use of surface water and groundwater See attached Urban Water Management Plan

a. Are you now using groundwater in lieu of surface water? YES _____ NO _____.

b. If credit toward use under a claimed pre 1914 appropriative right through substitution of groundwater in lieu of appropriated water is claimed under section 1011.5 of the Water Code, please show the amounts of groundwater used:

yr_____ _____ (af/mg) yr_____ _____ (af/mg) yr_____ _____ (af/mg)
I have data to support the above surface water use reductions due to conjunctive use efforts. YES ___ NO ___

I understand that it may be necessary to document the water savings claimed in "F." above if credit under Water Code sections 1010 and 1011 is sought in the future.

I declare that the information in this report is true to the best of my knowledge and belief.

DATE: September 22, 20 04 at San Francisco, California

SIGNATURE: Michael P. Carlin

PRINTED NAME: Michael (first name) P. (middle init.) Carlin (last name)

COMPANY NAME: City and County of San Francisco, Public Utilities Commission

If there is insufficient space for your answers, please use the space provided below.

ITEM	CONTINUATION

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California. They are riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on his riparian land. Riparian land must be in the same watershed as the water source and must never have been severed from the sources of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to store water for later use or divert water which originates in a different watershed, water previously stored by others, return flows from use of groundwater, or other "foreign" water to the natural stream system.

An appropriative right is required for use of water on nonriparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. Since 1914, new appropriators have been required to obtain a permit and license from the State. Appropriate rights can be granted to waters "foreign" to the natural stream system.

Statements of Water Diversion and Use must be filed by riparian and pre 1914 appropriative water users as set forth in Water Code section 5100 with specific exceptions. The filing of a statement (1) provides a record of water use, (2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversions, and (3) assists the State to determine if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please contact an attorney or write to this office. We have several pamphlets available. They include: (1) Statements of Water Diversion and Use, (2) Information Pertaining to Water Rights in California, and (3) Appropriation of Water in California.

"The energy challenge facing California is real. Every California needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov"

SSWDU

CITY AND COUNTY OF SAN FRANCISCO

HOLM POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1999	17,968	48,371	59,292	58,372	60,040	58,493	24,409	20,916	12,333	13,868	2,344	1,273	377,679
2000	5,794	39,741	60,722	55,585	60,932	58,026	56,700	49,698	49,093	25,817	0	4,612	466,719
2001	12,032	25,248	18,926	11,064	16,007	3,709	13,878	18,676	11,635	2,521	3,187	46,742	183,626

KIRKWOOD POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1999	26,231	61,966	81,535	74,761	81,650	82,772	51,586	24,175	26,003	23,032	15,832	19,809	569,351
2000	24,056	32,660	78,591	75,187	83,583	82,858	33,882	26,761	23,752	24,010	24,468	20,099	529,906
2001	17,012	32,507	38,400	54,690	79,799	35,143	29,871	28,877	28,040	27,729	24,740	30,756	427,565

MOUNTAIN TUNNEL - MOCCASIN POWERHOUSE FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1999	25,341	33,540	37,860	36,268	38,323	37,537	32,043	25,271	26,325	23,661	16,298	20,190	352,657
2000	24,379	28,707	39,084	37,676	39,961	39,479	28,566	26,909	24,438	24,702	25,071	20,700	359,672
2001	16,322	32,947	38,182	37,299	38,993	33,096	29,191	29,619	28,679	28,451	25,404	25,914	364,098

SAN JOAQUIN PIPELINE FLOW (DIVERSION TO SAN FRANCISCO) IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1999	15,197	12,129	10,798	18,619	21,525	20,694	21,390	23,264	24,008	21,316	14,503	18,726	222,169
2000	21,822	14,525	8,801	13,480	22,953	22,151	22,788	22,671	21,798	22,443	21,269	15,150	229,851
2001	8,588	14,013	21,505	20,600	23,004	26,975	27,868	27,810	26,783	25,765	23,359	12,508	258,778

LOWER CHERRY AQUEDUCT FLOW IN ACRE-FEET

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	7	0	0	7
2001	0	0	0	0	0	0	0	0	0	0	0	0	0

The 7 acre-feet was a rough estimate for Oct 2000 Diversion. The water was used for maintence purpose.

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

HETCH HETCHY WATER AND POWER

1155 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103
554-0725

June 6, 1991

Mr. Jesse Diaz, Chief
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

SUBJECT: Statements 2635, 2636, 2637 and 2638

Dear Mr. Diaz:

Enclosed are Amended Statements of Water Diversion and Use for the Hetch Hetchy Project. These amended statements are being submitted because the original statements did not separately describe the various features of the project nor did they identify all of the points of rediversion and places of use of the water. Also enclosed are supplemental statements, together with a table showing use of water through the aqueduct to San Francisco and the three power plants involved in the Hetch Hetchy Project. This table provides a monthly diversion record for the years 1981 through 1990.

Future correspondence concerning these water use statements should be mailed directly to Hetch Hetchy Water and Power at the address shown on the enclosed forms. If you or your staff, however, have any questions concerning these amended statements and the supplements transmitted with this letter, please contact me directly.

Sincerely,

Anson B. Moran
General Manager

ABM:gg

Enclosures

H007164

cc: T. Berliner
J. Milstein
A. Schneider
D. Kienlen

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

S-2636

AMENDED STATEMENT OF WATER DIVERSION AND USE

(This is not a Water Right)

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water and Power City and County of San Francisco

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

B. Name of body of water at point of diversion Eleanor Creek

Tributary to Cherry Creek thence Tuolumne River

C. Place of diversion a) b) NW ¼ NW ¼ Section 3 31, Township 1N 1N, Range 19E 19E, _____ B&M, _____ County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks. (See Attachment for PORD)

D. Name of works a) Lake Eleanor Reservoir b) Lower Cherry Diversion Dam

E. Capacity of diversion works b) 200 cubic feet per second ~~gallons per minute~~

Capacity of storage reservoir a) 27,100 ~~gallons~~ acre-feet

State quantity of water used each month in gallons or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
	SEE	ATTA	CHMEN	T TO	SUPP	LEMEN	TAL S	TATEM	ENT				

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc.

Maximum annual water use in recent years _____ gallons acre-feet

Minimum annual water use in recent years _____ gallons acre-feet

Type of diversion facility: gravity _____, pump _____

Method of measurement: weir _____, flume _____, electric power meter _____, water meter _____, estimate _____

F. Purpose of use (what water is being used for) Municipal, industrial and power generation

G. General description or location of place of use (use sketch of section grid on reverse side if you desire)

H. Year of first use as nearly as known May 1918

I. Name of person filing statement Anson B. Moran

Position General Manager Organization CCSF Hetch Hetchy Water & Power

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

I declare under penalty of perjury that the above is true and correct to the best of my knowledge and belief.

DATED: June 10, 19 91, at San Francisco, California.

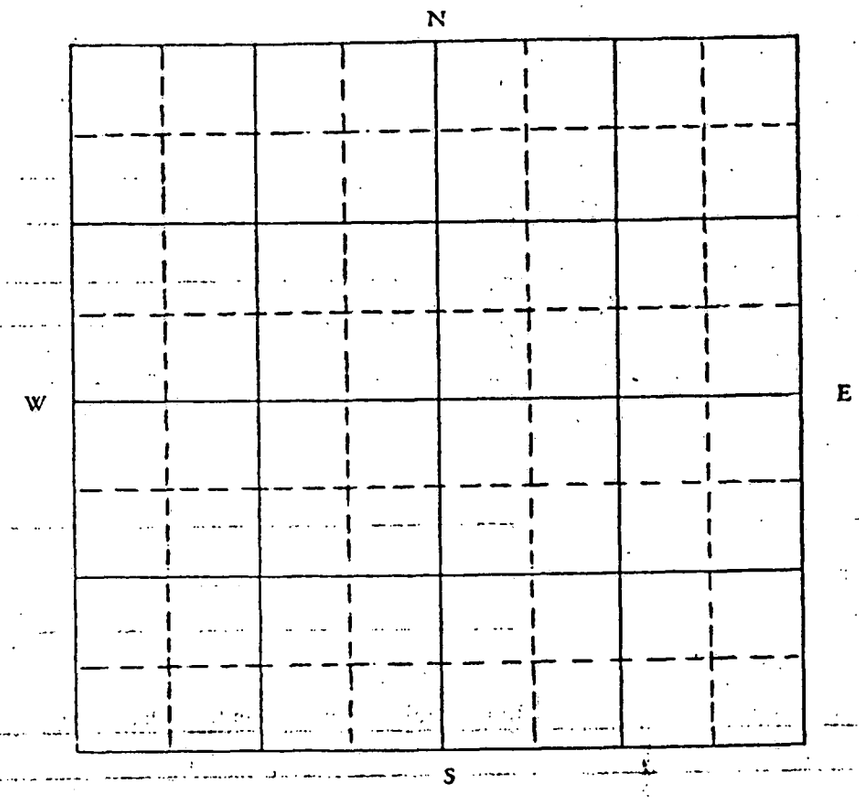
Signature: Anson B. Moran

Anson B. Moran, General Manager

See Instructions on Reverse Side

WW 40 (6/83)

The location of the diversion point and place of use may be sketched on this sc n grid. If it is used, please enter the section(s), township and range below and show any streams or other landmarks that will assist in identifying the area.



Section(s)_____

Township_____; Range _____; _____ B&M

INSTRUCTIONS:

A separate statement should be filed for each point of diversion.

A duplicate copy will be returned for your file.

Please send the completed statement to: STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

ATTACHMENT TO AMENDED STATEMENT
WATER DIVERSION AND USE

C. Additional Points of Rediversion

Lake Lloyd -- NW¼ Sec. 5, T1N, R19E*

Early Intake -- NW¼ Sec. 11, T1S, R18E

Priest Reservoir -- Sec. 31, T1S, R16E

Moccasin Reservoir -- NE¼ Sec. 34, T1S, R15E

San Antonio Reservoir -- SE¼ Sec. 22, T4S, R1E

Crystal Springs Reservoir -- NW¼ proj. Sec. 1, T5S, R5W

San Andreas Reservoir -- SE¼ proj. Sec. 16, T4S, R5W

G. Place of Use

Power Generation --

Holm	Sec. 35, T1N, R18E
Moccasin	Sec. 34, T1S, R15E

Municipal and Industrial -- within San Francisco Bay service area.

---

* All references to township and range are to Mt. Diablo Base and Meridian (MDB&M).

04/04/91

MONTH	YEAR	Holm Power-house	Kirkwood Power-house	Mountain Tunnel = Moccasin PH	Diversion to San Francisco
Jan	1981	4,861	44,024	40,977	9,794
Feb	1981	11,276	17,263	17,788	13,688
Mar	1981	17,901	22,457	22,850	15,205
Apr	1981	26,299	27,416	27,880	18,042
May	1981	29,203	46,251	40,122	28,060
Jun	1981	26,692	46,748	39,501	23,040
Jul	1981	26,604	46,018	40,431	21,564
Aug	1981	24,311	45,555	40,606	26,174
Sep	1981	24,549	43,637	39,400	23,476
Oct	1981	25,018	37,148	37,103	26,858
Nov	1981	25,039	35,957	36,262	24,240
Dec	1981	35,758	43,506	40,203	23,145
TOTAL	1981	277,511	455,980	423,123	253,286
Jan	1982	44,337	50,611	40,860	10,048
Feb	1982	36,298	48,099	37,196	7,498
Mar	1982	41,857	56,727	41,000	10,019
Apr	1982	48,038	45,069	39,502	7,813
May	1982	51,925	28,134	40,848	16,221
Jun	1982	50,916	18,232	39,237	21,297
Jul	1982	47,341	35,111	40,606	21,963
Aug	1982	31,837	51,949	40,538	21,965
Sep	1982	29,835	51,120	39,356	14,862
Oct	1982	32,352	50,549	40,756	10,259
Nov	1982	44,456	51,500	39,457	7,765
Dec	1982	52,175	55,863	40,844	7,331
TOTAL	1982	511,367	542,964	480,200	157,041
Jan	1983	33,753	51,462	40,364	10,975
Feb	1983	36,190	47,403	36,758	8,947
Mar	1983	52,048	48,561	40,909	11,833
Apr	1983	50,499	47,090	39,382	11,367
May	1983	52,163	53,079	40,782	16,508
Jun	1983	50,116	51,130	39,229	21,092
Jul	1983	52,011	62,626	40,669	19,722
Aug	1983	52,253	68,151	40,415	19,148
Sep	1983	30,835	53,984	38,967	15,181
Oct	1983	42,285	52,880	40,338	15,715
Nov	1983	43,819	49,264	39,057	11,314
Dec	1983	50,995	51,328	40,322	7,966
TOTAL	1983	546,967	636,958	477,192	169,768

04/04/91

MONTH	YEAR	Holm Power-house	Kirkwood Power-house	Mountain Tunnel = Moccasin PH	Diversion to San Francisco
Jan	1984	51,082	49,702	40,126	7,980
Feb	1984	36,960	45,378	37,702	7,597
Mar	1984	41,673	51,051	40,427	19,831
Apr	1984	29,280	50,414	39,120	22,586
May	1984	32,959	47,695	40,203	25,004
Jun	1984	35,175	43,194	38,870	27,856
Jul	1984	30,508	49,690	39,975	29,010
Aug	1984	29,244	44,624	40,203	24,922
Sep	1984	26,461	42,870	38,515	18,918
Oct	1984	27,314	43,451	39,786	19,170
Nov	1984	27,826	43,129	38,444	15,495
Dec	1984	34,633	38,900	36,750	8,136
TOTAL	1984	403,115	550,098	470,121	226,505
Jan	1985	38,565	44,427	39,527	9,683
Feb	1985	37,613	38,443	35,770	17,556
Mar	1985	27,703	43,786	39,743	22,302
Apr	1985	26,170	51,961	38,400	22,487
May	1985	27,485	54,102	39,733	23,268
Jun	1985	21,999	43,348	38,525	25,428
Jul	1985	26,757	41,974	39,660	28,526
Aug	1985	27,675	41,105	39,679	28,300
Sep	1985	26,763	40,598	38,410	27,416
Oct	1985	25,779	31,700	31,658	26,711
Nov	1985	16,677	25,317	25,230	20,898
Dec	1985	13,537	26,366	26,436	15,060
TOTAL	1985	316,723	483,127	432,771	267,635
Jan	1986	22,709	38,561	38,507	14,930
Feb	1986	25,757	36,157	34,685	13,517
Mar	1986	47,088	51,483	40,393	15,001
Apr	1986	49,275	57,124	38,652	15,592
May	1986	49,855	65,458	40,110	22,495
Jun	1986	41,911	60,518	38,561	27,495
Jul	1986	22,850	51,769	39,820	28,364
Aug	1986	23,004	44,945	39,780	23,022
Sep	1986	22,542	38,981	37,531	21,076
Oct	1986	26,047	40,277	39,531	24,099
Nov	1986	21,810	17,201	37,964	14,247
Dec	1986	24,034	31,618	31,259	14,686
TOTAL	1986	376,882	534,092	456,793	234,524

04/04/91

MONTH	YEAR	Holm Power-house	Kirkwood Power-house	Mountain Tunnel = Moccasin PH	Diversion to San Francisco
Jan	1987	17,871	25,906	25,692	2,854
Feb	1987	11,026	12,454	12,539	5,332
Mar	1987	1,309	18,223	18,300	14,035
Apr	1987	381	24,820	24,914	20,578
May	1987	95	30,518	30,611	28,302
Jun	1987	38	26,743	26,981	27,642
Jul	1987	20	28,648	28,861	28,417
Aug	1987	2,626	28,752	28,758	28,578
Sep	1987	5,633	31,858	27,806	27,134
Oct	1987	6,329	29,872	29,693	28,044
Nov	1987	0	28,804	28,923	27,094
Dec	1987	298	29,445	29,631	28,322
TOTAL	1987	45,626	316,043	312,709	266,332
Jan	1988	39,562	30,513	30,518	28,616
Feb	1988	28,949	27,628	27,707	26,916
Mar	1988	157	29,453	29,546	28,562
Apr	1988	35,147	29,307	29,234	27,429
May	1988	37,458	29,763	29,897	28,215
Jun	1988	51,400	52,296	37,039	23,635
Jul	1988	41,365	40,237	34,215	25,829
Aug	1988	35,546	29,121	29,720	28,578
Sep	1988	36,910	24,130	24,520	22,891
Oct	1988	28,479	22,775	22,973	15,578
Nov	1988	2,231	32,063	32,267	13,993
Dec	1988	0	37,533	36,454	14,646
TOTAL	1988	337,204	384,819	364,090	284,888
Jan	1989	0	36,433	35,320	14,606
Feb	1989	3,287	30,156	29,603	13,301
Mar	1989	7,605	30,923	30,619	25,420
Apr	1989	23,853	51,501	39,751	28,044
May	1989	46,153	69,578	40,306	28,951
Jun	1989	31,692	80,226	39,654	25,706
Jul	1989	22,195	38,450	35,744	22,320
Aug	1989	23,800	36,528	35,072	22,140
Sep	1989	17,480	39,951	38,678	26,342
Oct	1989	18,793	36,662	36,678	23,829
Nov	1989	24,845	38,444	38,055	21,820
Dec	1989	24,282	39,872	39,602	15,253
TOTAL	1989	243,985	528,724	439,082	267,732

04/04/91

MONTH	YEAR	Holm Power-house	Kirkwood Power-house	Mountain Tunnel = Moccasin PH	Diversion to San Francisco
Jan	1990	21,896	36,565	36,633	15,416
Feb	1990	22,487	32,289	32,539	13,908
Mar	1990	33,195	33,824	33,830	16,054
Apr	1990	36,383	32,661	32,820	19,313
May	1990	36,599	26,668	26,840	21,584
Jun	1990	38,160	47,202	35,232	25,997
Jul	1990	24,639	34,094	34,106	27,880
Aug	1990	24,821	35,763	35,459	25,732
Sep	1990	20,654	38,534	38,223	25,029
Oct	1990	11,419	34,356	34,290	21,416
Nov	1990	30,534	10,796	10,852	1,035
Dec	1990	5,837	29,374	29,395	11,863
TOTAL	1990	306,624	392,126	380,219	225,227

WR

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

HETCH HETCHY WATER AND POWER

1155 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103
554-0725

June 6, 1991

Mr. Jesse Diaz, Chief
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

SUBJECT: Statements 2635, 2636, 2637 and 2638

Dear Mr. Diaz:

Enclosed are Amended Statements of Water Diversion and Use for the Hetch Hetchy Project. These amended statements are being submitted because the original statements did not separately describe the various features of the project nor did they identify all of the points of rediversion and places of use of the water. Also enclosed are supplemental statements, together with a table showing use of water through the aqueduct to San Francisco and the three power plants involved in the Hetch Hetchy Project. This table provides a monthly diversion record for the years 1981 through 1990.

Future correspondence concerning these water use statements should be mailed directly to Hetch Hetchy Water and Power at the address shown on the enclosed forms. If you or your staff, however, have any questions concerning these amended statements and the supplements transmitted with this letter, please contact me directly.

Sincerely,

Anson B. Moran
General Manager

ABM:gg

Enclosures

H007164

cc: T. Berliner
J. Milstein
A. Schneider
D. Kienlen

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

S-2635

AMENDED STATEMENT OF WATER DIVERSION AND USE

(This is not a Water Right)

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water and Power City and County of San Francisco

Address 1155 Market St., San Francisco, CA 94103 Telephone (415) 554-0725

B. Name of body of water at point of diversion Tuolumne River

Tributary to San Joaquin River

C. Place of diversion ____ ¼ NW ¼ Section 16, Township 1N, Range 20E, MD B&M, ____ County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks. (See Attachment for PORD)

D. Name of works Hetch Hetchy Reservoir

E. Capacity of diversion works 1300 cubic feet per second ~~gallons per minute~~

Capacity of storage reservoir 360,400 ~~gallons~~ acre-feet

State quantity of water used each month in gallons or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
	SEE ATTACHMENT TO SUPPLEMENTAL STATEMENT												

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc.

Maximum annual water use in recent years ____ gallons acre-feet

Minimum annual water use in recent years ____ gallons acre-feet

Type of diversion facility: gravity X, pump ____

Method of measurement: weir ____, flume ____, electric power meter ____, water meter ____, estimate ____

F. Purpose of use (what water is being used for) Municipal, industrial and power generation

G. General description or location of place of use (use sketch of section grid on reverse side if you desire) See Attachment

H. Year of first use as nearly as known Storage began Nov. 15, 1922

I. Name of person filing statement Anson B. Moran

Position General Manager Organization CCSF Hetch Hetchy Water & Power

Address 1155 Market St., San Francisco, CA 94103 Telephone (415) 554-0725

I declare under penalty of perjury that the above is true and correct to the best of my knowledge and belief.

DATED: June 10, 19 91 at San Francisco, California.

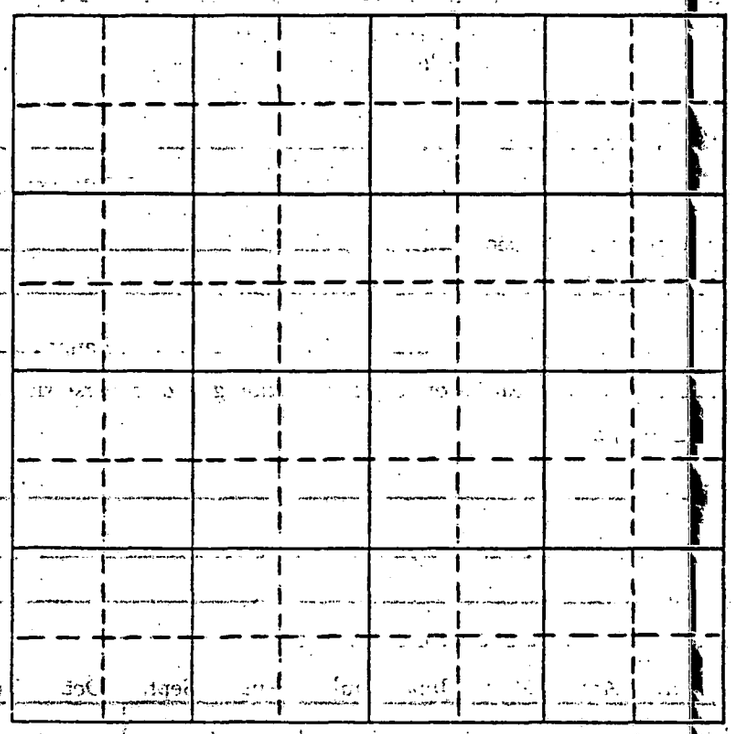
Signature: Anson B. Moran

Anson B. Moran, General Manager

See Instructions on Reverse Side

WW 40 (6/83)

The location of the diversion point and the place of use may be sketched on this section grid. If it is used, please enter the section(s), township and range below and show any streams or other landmarks that will assist in identifying the area.



Section(s)_____

Township_____; Range _____; _____ B&M

INSTRUCTIONS:

A separate statement should be filed for each point of diversion.

A duplicate copy will be returned for your file.

Please send the completed statement to: STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

ATTACHMENT TO AMENDED STATEMENT
WATER DIVERSION AND USE

C. Points of Rediversion are:

Early Intake -- NW¼ Sec. 11, T1S, R18E*

Priest Reservoir -- Sec. 31, T1S, R16E

Moccasin Reservoir -- NE¼ Sec. 34, T1S, R15E

San Antonio Reservoir -- SE¼ Sec. 22, T4S, R1E

Crystal Springs Reservoir -- NW¼ proj. Sec. 1, T5S, R5W

San Andreas Reservoir -- SE¼ proj. Sec. 16, T4S, R5W

G. Place of Use

Power Generation --

Kirkwood	Sec. 2, T1S, R18E
Moccasin	Sec. 34, T1S, R15E

Municipal and Industrial -- within San Francisco Bay service area.

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* All references to township and range are to Mt. Diablo Base and Meridian (MDB&M).

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

STATE WATER RESOURCES CONTROL BOARD

S-2636

1991 JUN 14 PM 3 16

DIV. OF WATER RIGHTS SACRAMENTO

AMENDED STATEMENT OF WATER DIVERSION AND USE

(This is not a Water Right)

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water and Power City and County of San Francisco

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

B. Name of body of water at point of diversion Eleanor Creek

Tributary to Cherry Creek thence Tuolumne River

C. Place of diversion a) b) NW ¼ NW ¼ Section 31 (a) 3 (b), Township 1N (a) 1N (b), Range 19E (a) 19E (b), _____ B&M, _____ County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks. (See Attachment for PORD)

D. Name of works a) Lake Eleanor Reservoir b) Lower Cherry Diversion Dam

E. Capacity of diversion works b) 200 cubic feet per second ~~gallons per minute~~ ~~gallons~~ acre-feet

Capacity of storage reservoir a) 27,100 gallons acre-feet

State quantity of water used each month in gallons or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
	SEE	ATTA	CHMENT	TO	SUPPL	EMENTA	L	STATEM	ENT				

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc.

Maximum annual water use in recent years _____ gallons acre-feet

Minimum annual water use in recent years _____ gallons acre-feet

Type of diversion facility: gravity _____, pump _____

Method of measurement: weir _____, flume _____, electric power meter _____, water meter _____, estimate _____

F. Purpose of use (what water is being used for) Municipal, industrial and power generation

G. General description or location of place of use (use sketch of section grid on reverse side if you desire)

H. Year of first use as nearly as known May 1918

I. Name of person filing statement Anson B. Moran

Position General Manager Organization CCSF Hetch Hetchy Water & Power

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

I declare under penalty of perjury that the above is true and correct to the best of my knowledge and belief.

DATED: June 10, 19 91, at San Francisco, California.

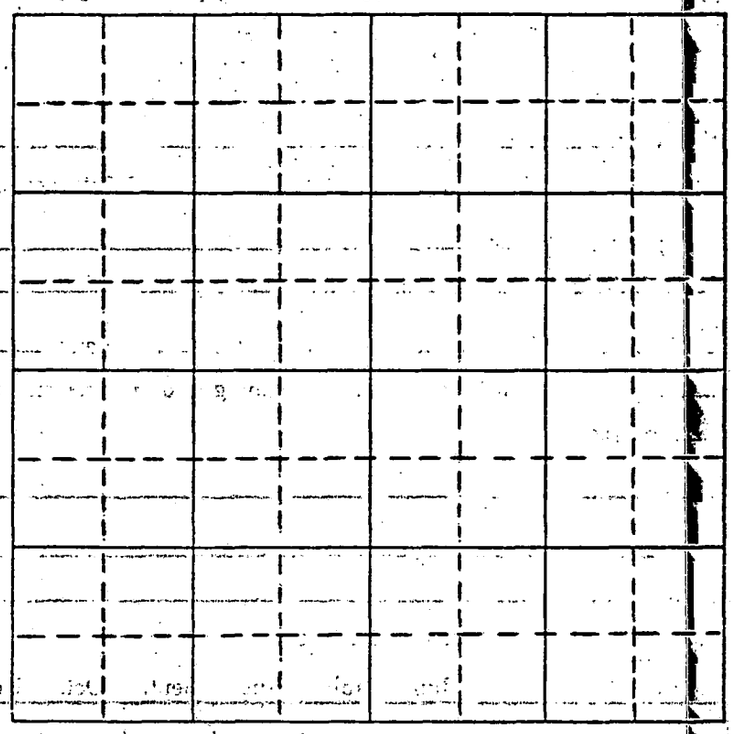
Signature: Anson B. Moran

Anson B. Moran, General Manager

See Instructions on Reverse Side

WW 40 (6/83)

The location of the diversion point and the place of use may be sketched on this section grid. If it is used, please enter the section(s), township and range below and show any streams or other landmarks that will assist in identifying the area.



Section(s)_____

Township_____; Range _____; _____ B&M

INSTRUCTIONS:

A separate statement should be filed for each point of diversion.

A duplicate copy will be returned for your file.

Please send the completed statement to: STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

ATTACHMENT TO AMENDED STATEMENT
WATER DIVERSION AND USE

C. Additional Points of Rediversion

Lake Lloyd -- NW¼ Sec. 5, T1N, R19E*

Early Intake -- NW¼ Sec. 11, T1S, R18E

Priest Reservoir -- Sec. 31, T1S, R16E

Moccasin Reservoir -- NE¼ Sec. 34, T1S, R15E

San Antonio Reservoir -- SE¼ Sec. 22, T4S, R1E

Crystal Springs Reservoir -- NW¼ proj. Sec. 1, T5S, R5W

San Andreas Reservoir -- SE¼ proj. Sec. 16, T4S, R5W

G. Place of Use

Power Generation --

Holm	Sec. 35, T1N, R18E
Moccasin	Sec. 34, T1S, R15E

Municipal and Industrial -- within San Francisco Bay service area.

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* All references to township and range are to Mt. Diablo Base and Meridian (MDB&M).

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

STATE WATER RESOURCES CONTROL BOARD

S-2637

1991 JUN 14 PM 3:16

DIV. OF WATER RIGHTS SACRAMENTO

AMENDED **STATEMENT OF WATER DIVERSION AND USE**

(This is not a Water Right)

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water and Power City and County of San Francisco

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

B. Name of body of water at point of diversion Tuolumne River

Tributary to San Joaquin River

C. Place of diversion _____ ¼ NW ¼ Section 11, Township 1S, Range 18E, MD B&M, _____ County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks.

D. Name of works Early Intake

E. Capacity of diversion works 740 cubic feet per second ~~gallons per minute~~

Capacity of storage reservoir 115 ~~gallons~~ acre-feet

State quantity of water used each month in gallons or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
	SEE ATTCHMENT TO SUPPLEMENTAL STATEMENT												

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc.

Maximum annual water use in recent years _____ gallons acre-feet

Minimum annual water use in recent years _____ gallons acre-feet

Type of diversion facility: gravity _____, pump _____

Method of measurement: weir _____, flume _____, electric power meter _____, water meter _____, estimate _____

F. Purpose of use (what water is being used for) Municipal, industrial and power generation

G. General description or location of place of use (use sketch of section grid on reverse side if you desire) See Attachment

H. Year of first use as nearly as known August 1925

I. Name of person filing statement Anson B. Moran

Position General Manager Organization CCSF Hetch Hetchy Water & Power

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

I declare under penalty of perjury that the above is true and correct to the best of my knowledge and belief.

DATED: June 10, 19 91, at San Francisco, California.

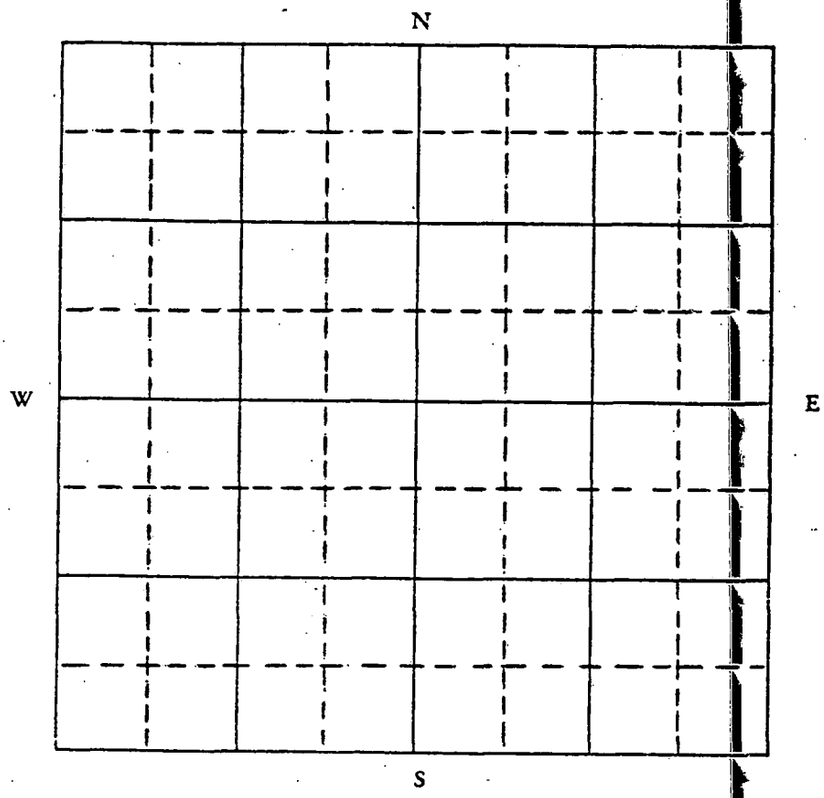
Signature: [signature]

Anson B. Moran, General Manager

See Instructions on Reverse Side

WW. 40 (6/83)

The location of the diversion point and the place of use may be sketched on this section grid. If it is used, please enter the section(s), township and range below and show any streams or other landmarks that will assist in identifying the area.



Section(s)_____

Township_____; Range _____; _____ B&M

INSTRUCTIONS:

A separate statement should be filed for each point of diversion.

A duplicate copy will be returned for your file.

Please send the completed statement to: STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

ATTACHMENT TO AMENDED STATEMENT
WATER DIVERSION AND USE

C. Additional Points of Rediversion

Priest Reservoir -- Sec. 31, T1S, R16E*

Moccasin Reservoir -- NE¼ Sec. 34, T1S, R15E

San Antonio Reservoir -- SE¼ Sec. 22, T4S, R1E

Crystal Springs Reservoir -- NW¼ proj. Sec. 1, T5S, R5W

San Andreas Reservoir -- SE¼ proj. Sec. 16, T4S, R5W

G. Place of Use

Power Generation --

Moccasin Sec. 34, T1S, R15E

Municipal and Industrial -- within San Francisco Bay service area.

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* All references to township and range are to Mt. Diablo Base & Meridian (MDB&M).

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

STATE WATER RESOURCES CONTROL BOARD

1991 JUN 14 PM 3:16

DIV. OF WATER RIGHTS SACRAMENTO

S-2638

AMENDED STATEMENT OF WATER DIVERSION AND USE

(This is not a Water Right)

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water and Power City and County of San Francisco

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

B. Name of body of water at point of diversion Cherry Creek

Tributary to Tuolumne River

C. Place of diversion ____ ¼ NW ¼ Section 5, Township 1N, Range 19E, MD B&M, ____ County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks. (See Attachment for PORD)

D. Name of works Lake Lloyd Reservoir

E. Capacity of diversion works 900 cubic feet per second ~~gallons per minute~~

Capacity of storage reservoir 268,800 ~~gallons~~ acre-feet

State quantity of water used each month in gallons or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
	SEE ATTACHMENT TO SUPPLEMENTAL STATEMENT												

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc.

Maximum annual water use in recent years ____ gallons acre-feet

Minimum annual water use in recent years ____ gallons acre-feet

Type of diversion facility: gravity ____, pump ____

Method of measurement: weir ____, flume ____, electric power meter ____, water meter ____, estimate ____

F. Purpose of use (what water is being used for) Municipal, industrial and power generation

G. General description or location of place of use (use sketch of section grid on reverse side if you desire) See Attachment

H. Year of first use as nearly as known August 1960

I. Name of person filing statement Anson B. Moran

Position General Manager Organization CCSF Hetch Hetchy Water & Power

Address 1155 Market St., San Francisco, CA 94103 Telephone: (415) 554-0725

I declare under penalty of perjury that the above is true and correct to the best of my knowledge and belief.

DATED: June 10, 19 91 at San Francisco, California.

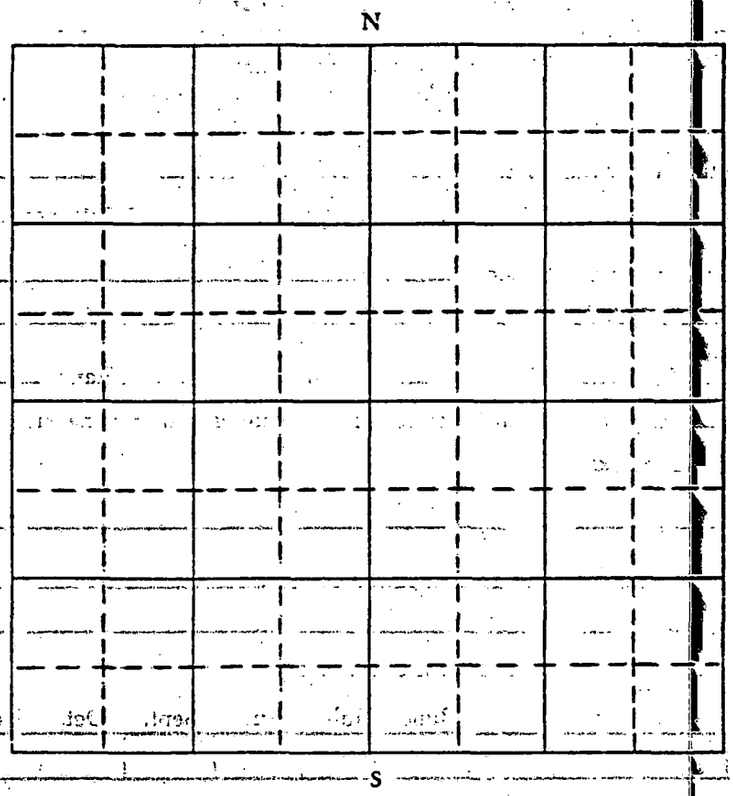
Signature: [signature]

Anson B. Moran, General Manager

See Instructions on Reverse Side

WW 40 (6/83)

The location of the diversion point and the place of use may be sketched on this section grid. If it is used, please enter the section(s), township and range below and show any streams or other landmarks that will assist in identifying the area.



Section(s)_____

Township_____; Range _____; _____ B&M

INSTRUCTIONS:

A separate statement should be filed for each point of diversion.

A duplicate copy will be returned for your file.

Please send the completed statement to: STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P. O. Box 2000
Sacramento, CA 95812-2000

ATTACHMENT TO AMENDED STATEMENT
WATER DIVERSION AND USE

C. Additional Points of Rediversion

Lower Cherry Diversion Dam -- NW¼ Sec. 31, T1N, R19E*

Early Intake -- NW¼ Sec. 11, T1S, R18E

Priest Reservoir -- Sec. 31, T1S, R16E

Moccasin Reservoir -- NE¼ Sec. 34, T1S, R15E

San Antonio Reservoir -- SE¼ Sec. 22, T4S, R1E

Crystal Springs Reservoir -- NW¼ proj. Sec. 1, T5S, R5W

San Andreas Reservoir -- SE¼ proj. Sec. 16, T4S, R5W

G. Place of Use

Power Generation --

Holm	Sec. 35, T1N, R18E
Moccasin	Sec. 34, T1S, R15E

Municipal and Industrial -- within San Francisco Bay service area.

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* All references to township and range are to Mt. Diablo Base and Meridian (MDB&M).

Holm Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	8091	301	83	24202	51695	52524	29129	23365	10483	10177	8295	7129	225474
1992	9283	21469	27023	44166	38301	18970	13575	12776	10717	8932	10479	16435	232126
1993	20817	25753	52614	55394	57540	55236	36799	11367	11687	482	216	355	328260

Kirkwood Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	26432	8644	9308	16324	42389	40641	39086	37680	30518	31500	30290	31684	344496
1992	35869	19339	40443	38620	38293	28243	22645	24206	23626	25702	23371	38573	358930
1993	47839	49113	57648	62031	75132	75132	71913	35520	22693	24125	18815	11135	551096

Mountain Tunnel - Moccasin Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	25275	8918	9168	15822	40334	38692	37083	35577	28592	30750	29107	32069	331387
1992	34546	18934	38692	36962	36853	27540	22312	23109	22865	22635	22459	36732	343639
1993	41076	37158	40651	39507	42577	41403	42442	27245	23304	25074	19148	11810	391395

San Joaquin Pipeline Flow(Diversion to San Francisco), AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	13293	6466	6635	14120	12337	6496	19882	21074	17994	15047	14405	15096	162845
1992	15108	14212	15261	14678	20513	21025	16881	15039	14485	15078	10871	6924	180075
1993	7470	14102	15465	15223	22116	21180	21679	22088	21943	22407	11421	8166	203260

Lower Cherry Aqueduct Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

HETCH HETCHY WATER AND POWER

1155 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103
554-0725

July 12, 1991

File: M005067

Department of Water Resources
Division of Safety of Dams
2200 X Street
P.O. Box 942836
Sacramento, CA 94236-0001

Subject: Application for Enlargement of the Moccasin Re-Regulating Reservoir

Enclosed are the proposed changes and forms to request approval to add 1.7 feet of flashboards to the lower Moccasin Spillway. The addition of these flashboards will allow the Hetch Hetchy System increased operational flexability to the water for domestic use and increase the capacity of the Moccasin Low Head Generating Plant which uses this reservoir as a forebay.

Any questions of a technical nature should be directed to Matthew Gass in Moccasin who is coordinating this project. He can be reached at (209) 989-2431 Ext. 30.

Very truly yours,

Anson B. Moran
General Manager, Hetch Hetchy Water & Power

MG:ABM:tlc

cc: Wm. J. Melia Jr.
M. Gass
MoccFile

Haddad
Travel
966-4662

Holm Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	8091	301	83	24202	51695	52524	29129	23365	10483	10177	8295	7129	225474
1992	9283	21469	27023	44166	38301	18970	13575	12776	10717	8932	10479	16435	232126
1993	20817	25753	52614	55394	57540	55236	36799	11367	11687	482	216	355	328260

Kirkwood Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	26432	8644	9308	16324	42389	40641	39086	37680	30518	31500	30290	31684	344496
1992	35869	19339	40443	38620	38293	28243	22645	24206	23626	25702	23371	38573	358930
1993	47839	49113	57648	62031	75132	75132	71913	35520	22693	24125	18815	11135	551096

Mountain Tunnel - Moccasin Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	25275	8918	9168	15822	40334	38692	37083	35577	28592	30750	29107	32069	331387
1992	34546	18934	38692	36962	36853	27540	22312	23109	22865	22635	22459	36732	343639
1993	41076	37158	40651	39507	42577	41403	42442	27245	23304	25074	19148	11810	391395

San Joaquin Pipeline Flow(Diversion to San Francisco), AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	13293	6466	6635	14120	12337	6496	19882	21074	17994	15047	14405	15096	162845
1992	15108	14212	15261	14678	20513	21025	16881	15039	14485	15078	10871	6924	180075
1993	7470	14102	15465	15223	22116	21180	21679	22088	21943	22407	11421	8166	203260

Lower Cherry Aqueduct Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0

S-2 635

STATE WATER RESOURCES CONTROL BOARD, DIVISION OF WATER RIGHTS
P.O. BOX 2000 SACRAMENTO, CA 95812-2000
(916) 657-2170

STATE WATER RESOURCES CONTROL BOARD
96 JUN 26 PM 3:00
DIV. OF WATER RIGHTS SACRAMENTO

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

If the information below is inaccurate, please line it out in red and provide current information.
Notify this office if ownership or address changes occur during the coming year.

PLEASE COMPLETE AND RETURN THIS FORM BY JULY 1, 1996.

OWNER OF RECORD: CITY & COUNTY OF SAN FRANCISCO

CITY & COUNTY OF SAN FRANCISCO
1155 MARKET ST
SAN FRANCISCO, CA 94103

STATEMENT NO: S002635

SOURCE: TUOLUMNE RIVER
TRIBUTARY TO: SAN JOAQUIN RIVER
COUNTY: TUOLUMNE
DIVERSION WITHIN: NE¼ OF NW¼ SECTION 16, T1N, R20E, MB&M.

TELEPHONE NUMBER: (415) 554-0725
YEAR OF FIRST USE: 1922
PARCEL NO:

A. Water is used under: Riparian claim _____; Pre 1914 right XX; Other (explain) _____

B. Year of first use (Please provide if missing above) _____.

C. Amount of Use - Enter the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.

Amounts below are: ☐ Gallons ☒ Acre-feet ☐ (other) _____

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT	OCT.	NOV.	DEC	TOTAL ANNUAL
1993													
1994				(See attached Table)									
1995													

D. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.
Irrigation _____ acres; Stockwatering _____; Domestic _____
Other (specify) Municipal, Industrial, & Power

E. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)
None

F. If part of the water listed in Part C consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: June 14, 19 96, at San Francisco, California

SIGNATURE: L. T. Klein

PRINTED NAME: Lawrence (FIRST NAME) T. (M. NAME) Klein (LAST NAME)

COMPANY NAME: Hetch Hetchy Water & Power, City & County of San Francisco

See back of page for General Information. If there is insufficient space for your answers, please number them in the space provided on the back of this form.

WR40-1 (4/96)

ITEM CONTINUATION

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California, riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on their riparian land. Riparian land must be in the same watershed as the water source and must never have been severed from the sources of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to store water for later use or to divert water which originates in a different watershed, or return flows from use of groundwater.

An appropriative right is required for use of water on nonriparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. Since 1914 new appropriators have been required to obtain a permit and license from the State.

Statements of Water Diversion and Use must be filed by riparian and pre-1914 appropriative water users. The filing of a statement (1) provides a record of water use, (2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversion, and (3) assists the State to determine if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please contact an attorney or write to this office. We have several pamphlets available, including the following:

"Statements of Water Diversion and Use"
"Information Pertaining to Water Rights in California"
"Water Rights for Stockponds Constructed Prior to 1969"
"Appropriation of Water in California"

Holm Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	20,817	25,753	52,614	55,394	57,540	55,236	36,799	11,367	11,687	482	216	355	328,260
1994	2,261	8,118	57,463	47,720	60,823	21,814	18,474	19,622	4,352	7,991	36,702	53,048	338,388
1995	44,805	52,554	41,578	56,803	58,838	57,608	60,970	37,732	18,581	25,450	740	19,043	474,702

Kirkwood Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	47,839	49,113	57,648	62,031	75,132	75,132	71,913	35,520	22,693	24,125	18,815	11,135	551,096
1994	11,863	15,616	68,584	42,363	52,088	47,203	26,335	26,973	27,713	35,230	35,147	42,272	431,387
1995	62,846	66,837	70,215	69,154	71,841	72,175	64,465	66,395	26,473	22,780	15,790	18,962	627,933

Mountain Tunnel - Moccasin Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	41,076	37,158	40,651	39,507	42,577	41,403	42,442	27,245	23,304	25,074	19,148	11,810	391,395
1994	12,353	15,775	40,502	37,985	42,161	35,724	24,216	25,232	27,794	35,722	36,060	38,686	372,210
1995	39,901	33,814	38,580	37,946	38,537	37,244	41,088	41,199	27,138	23,564	16,606	20,910	396,527

San Joaquin Pipeline Flow(Diversion to San Francisco), AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	7,470	14,102	15,465	15,223	22,116	21,180	21,679	22,088	21,943	22,407	11,421	8,166	203,260
1994	8,186	13,380	21,788	21,820	20,571	21,737	22,383	23,744	26,388	22,971	14,664	14,797	232,429
1995	12,530	1,311	7,047	12,811	17,004	21,013	21,491	21,511	20,717	20,265	14,271	14,797	184,768

Lower Cherry Aqueduct Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0

MURRAY, BURNS AND KIENLEN
A CORPORATION
CONSULTING CIVIL ENGINEERS
1616 29th STREET, SUITE 300
SACRAMENTO, CALIFORNIA 95816
TELEPHONE (916) 456-4400
FAX (916) 456-0253

JOSEPH I. BURNS, P.E.
DONALD E. KIENLEN, P.E.
JOSEPH D. COUNTRYMAN, P.E.
GILBERT COSIO, JR., P.E.
MARC E. VAN CAMP, P.E.

JOHN F. WRIGHT, P.E.
MICHAEL C. ARCHER, P.E.
SCOTT A. MORRIS, P.E.
MARK E. FORTNER

ANGUS NORMAN MURRAY
1913 - 1985

November 14, 1991

Mr. Wynne Rowlands
Division of Water Rights
State Water Resources Control Board
P. O. Box 2000
Sacramento, California 95812-2000

Dear Wynne:

In accordance with your request, enclosed are descriptions of the points of diversion by California Coordinates for Supplemental Water Use Statements 2635, 2636, 2637 and 2638.

Please call if you have any questions.

Sincerely,

D. E. Kienlen

GK:DEK:bl
cc: Mr. Anson B. Moran
Mr. Thomas M. Berliner
Ms. Anne J. Schneider

STATE WATER RESOURCES
CONTROL BOARD
1991 NOV 15 AM 10: 34
DIV. OF WATER RIGHTS
SACRAMENTO

Hetch Hetchy Water and Power
City and County of San Francisco

Statement Number	Diversion Name	Diversion Location (All references MDB&M)	California Coordinate	
S-2635				
Point of Diversion				
	Hetch Hetchy Reservoir	NENW;SEC16;T1N;R20E	527,800 N	2,205,400 E
Points of Rediversion				
	Early Intake	NW;SEC11;T1S;R18E	501,800 N	2,154,000 E
	Priest Reservoir	SEC31;T1S;R16E	473,800 N	2,069,000 E
	Moccasin Reservoir	NE;SEC34;T1S;R15E	477,000 N	2,056,000 E
	San Antonio Reservoir	SE;SEC22;T4S;R1E	393,250 N	1,608,750 E
	Crystal Springs Reservoir	NW;proj.SEC1;T5S;R5W	380,000 N	1,460,250 E
	San Andreas Reservoir	SE;proj.SEC16;T4S;R5W	401,500 N	1,445,000 E
S-2636				
Point of Diversion				
	Lake Eleanor Reservoir	NW;SEC3;T1N;R19E	537,200 N	2,178,150 E
	Lower Cherry Creek Diversion Dam	NW;SEC31;T1N;R19E	509,600 N	2,163,600 E
Points of Rediversion				
	Lake Lloyd	NW;SEC5;T1N;R19E	538,000 N	2,170,000 E
	Early Intake	NW;SEC11;T1S;R18E	501,800 N	2,154,000 E
	Priest Reservoir	SEC31;T1S;R16E	473,800 N	2,069,000 E
	Moccasin Reservoir	NE;SEC34;T1S;R15E	477,000 N	2,056,000 E
	San Antonio Reservoir	SE;SEC22;T4S;R1E	393,250 N	1,608,750 E
	Crystal Springs Reservoir	NW;proj.SEC1;T5S;R5W	380,000 N	1,460,250 E
	San Andreas Reservoir	SE;proj.SEC16;T4S;R5W	401,500 N	1,445,000 E

Hetch Hetchy Water and Power
City and County of San Francisco

Statement Number	Diversion Name	Diversion Location (All references MDB&M)	California Coordinate
S-2637			
Point of Diversion			
	Early Intake	NW;SEC11;T1S;R18E	501,800 N 2,154,000 E
Points of Rediversion			
	Priest Reservoir	SEC31;T1S;R16E	473,800 N 2,069,000 E
	Moccasin Reservoir	NE;SEC34;T1S;R15E	477,000 N 2,056,000 E
	San Antonio Reservoir	SE;SEC22;T4S;R1E	393,250 N 1,608,750 E
	Crystal Springs Reservoir	NW;proj.SEC1;T5S;R5W	380,000 N 1,460,250 E
	San Andreas Reservoir	SE;proj.SEC16;T4S;R5W	401,500 N 1,445,000 E
S-2638			
Point of Diversion			
	Lake Lloyd	NW;SEC5;T1N;R19E	538,000 N 2,170,000 E
Points of Rediversion			
	Lower Cherry Creek Diversion Dam	NW;SEC31;T1N;R19E	509,600 N 2,163,600 E
	Early Intake	NW;SEC11;T1S;R18E	501,800 N 2,154,000 E
	Priest Reservoir	SEC31;T1S;R16E	473,800 N 2,069,000 E
	Moccasin Reservoir	NE;SEC34;T1S;R15E	477,000 N 2,056,000 E
	San Antonio Reservoir	SE;SEC22;T4S;R1E	393,250 N 1,608,750 E
	Crystal Springs Reservoir	NW;proj.SEC1;T5S;R5W	380,000 N 1,460,250 E
	San Andreas Reservoir	SE;proj.SEC16;T4S;R5W	401,500 N 1,445,000 E

~~OPS~~
WR 7/28/94

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO
HETCH HETCHY WATER & POWER
1155 MARKET Street - 4th Floor
SAN FRANCISCO, CALIFORNIA 94103
(415) 554-0725 - (FAX) 554-0796

July 19, 1994

Mr. Murt Lininger
Division of Water Rights
State Water Resources Control Board
Post Office Box 2000
Sacramento, CA 95812-2000

Subject: **Statements 2635, 2636, 2637 and 2638**

Enclosed are Supplemental Statements of Water Diversion and Use under 2635, 2636, 2637, and 2638 together with a table showing use of water through the aqueduct to San Francisco and the three power plants involved in the Hetch Hetchy Project.

In accordance with your discussion with Don Kienlen, we have modified the Supplemental Statement form for 2636 to agree with the amended statements transmitted with our letter of February 11, 1993. We would appreciate your making these changes in your records, if this has not already been done.

A new statement for the Lower Cherry Diversion Dam was also filed with our February 11, 1993 letter. We have not been advised of the number assigned to this statement.

If you require any additional information or have any questions regarding these amended statements, please contact Don Kienlen or myself.

Sincerely,

L. T. Klein

Lawrence T. Klein
Deputy General Manager

mf

cc: T. Berliner
A. Schneider
D. Kienlen
H010613

MAR 2 1994 S-2635

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
(916) 657-1875

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD: STATEMENT NO: 002635

CITY & COUNTY OF SAN FRANCISCO
C/O HETCH HETCHY WATER & POWER
1155 MARKET ST
SAN FRANCISCO CA 94103

TELEPHONE NUMBER:
(415) ~~550-6500~~ 554-0725

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: ~~XXXX

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California. They are riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on his riparian land. Riparian land must be in the same watershed as the water source and must never have been severed from the sources of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to store water for later use or to divert water which originates in a different watershed, or return flows from use of groundwater.

An appropriate right is required for use of water on nonriparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. Since 1914 new appropriators have been required to obtain a permit and license from the State.

Statements of water Diversion and Use must be filed by riparian and pre-1914 appropriative water users. The filing of a statement (1) provides a record of water use, (2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversion, and (3) assists the State to determine if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please contact an attorney or write to this office. We have several pamphlets available. They include:

"Statements of Water Diversion and Use"
"Information Pertaining to Water Rights in California"
"Water Rights for Stockponds Constructed Prior to 1969".
"Appropriation of Water in California"

Holm Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	8091	301	83	24202	51695	52524	29129	23365	10483	10177	8295	7129	225474
1992	9283	21469	27023	44166	38301	18970	13575	12776	10717	8932	10479	16435	232126
1993	20817	25753	52614	55394	57540	55236	36799	11367	11687	482	216	355	328260

Kirkwood Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	26432	8644	9308	16324	42389	40641	39086	37680	30518	31500	30290	31684	344496
1992	35869	19339	40443	38620	38293	28243	22645	24206	23626	25702	23371	38573	358930
1993	47839	49113	57648	62031	75132	75132	71913	35520	22693	24125	18815	11135	551096

Mountain Tunnel - Moccasin Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	25275	8918	9168	15822	40334	38692	37083	35577	28592	30750	29107	32069	331387
1992	34546	18934	38692	36962	36853	27540	22312	23109	22865	22635	22459	36732	343639
1993	41076	37158	40651	39507	42577	41403	42442	27245	23304	25074	19148	11810	391395

San Joaquin Pipeline Flow(Diversion to San Francisco), AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	13293	6466	6635	14120	12337	6496	19882	21074	17994	15047	14405	15096	162845
1992	15108	14212	15261	14678	20513	21025	16881	15039	14485	15078	10871	6924	180075
1993	7470	14102	15465	15223	22116	21180	21679	22088	21943	22407	11421	8166	203260

Lower Cherry Aqueduct Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0

S-2 635

12/18/95

***** PLEASE COMPLETE, SUBMIT THE ORIGINAL AND MAKE A COPY FOR YOUR RECORDS *****

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

P.O. BOX 2000 SACRAMENTO, CA 95812-2000

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

STATEMENT NO: S002635
OWNER OF RECORD: CITY & COUNTY OF SAN FRANCISCO

~~XXXXXXXXXXXXXXXXXXXXXXXXXXXX~~ HETCH HETCHY WATER & POWER
1155 MARKET STREET
SAN FRANCISCO, CA 94103

RECEIVED
MAR 20 1995
H.H.W.P.

STATE WATER RESOURCES CONTROL BOARD
1995 JUN 28 PM 12:28
DIV. OF WATER RIGHTS SACRAMENTO

SOURCE: ~~XXXXXXXXXXXXXXXXXXXXXX~~ TUOLUMNE RIVER
TRIBUTARY TO: ~~XXXXXXXXXXXXXX~~ SAN JOAQUIN RIVER
COUNTY: TUOLUMNE
DIVERSION
WITHIN: NE¼ OF NW¼ SECTION 16, T1N, R20E, MDB&M.

TELEPHONE NUMBER:
(415) ~~XXXXXXX~~ 554-0725
YEAR OF FIRST USE: 1922
PARCEL NO:

(If any of the above information is inaccurate or missing, please correct. Notify this office if ownership or address changes occur during the coming year.)

COMPLETE AND RETURN THIS FORM BY JULY 1, 1995.

A. Water is used under: Riparian claim _____; Pre 1914 right ___X___; Other (explain) _____

B. Year of first use (Please provide if missing above) _____.

C. Amount of Use - Enter the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.

Amounts below are: ☐ Gallons ☒ Acre-feet ☐ (other) _____

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC	TOTAL ANNUAL
1992	SEE	ENCL	OSED	TABLE									
1993													
1994													

D. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.
Irrigation _____ acres; Stockwatering _____; Domestic _____
Other (specify) MUNICIPAL, INDUSTRIAL & POWER

***** CONTINUE ON BACK PAGE *****

***** PLEASE COMPLETE, SUBMIT THE ORIGINAL AND MAKE A COPY FOR YOUR RECORDS *****

E. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)

NONE

F. If part of the water listed in Part C consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: 6/20/98, 19 ____, at San Francisco, California

SIGNATURE: Lawrence J Klein

PRINTED NAME: Lawrence (FIRST NAME) J (M. NAME) Klein (LAST NAME)

COMPANY NAME: Hetch Hetchy Water & Power

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

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"Statements of Water Diversion and Use"
"Information Pertaining to Water Rights in California"
"Water Rights for Stockponds Constructed Prior to 1969"
"Appropriation of Water in California"

Date: 6/15/95 Time: 15:02:28

From: Michael Tsang To: Don Kienlen

Holm Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	8091	301	83	24202	51695	52524	29129	23365	10483	10177	8295	7129	225474
1992	9283	21469	27023	44166	38301	18970	13575	12776	10717	8932	10479	16435	232126
1993	20817	25753	52614	55394	57540	55236	36799	11367	11687	482	216	355	328260
1994	2261	8118	57463	47720	60823	21814	18474	19622	4352	7991	36702	53048	

Kirkwood Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	26432	8644	9308	16324	42389	40641	39086	37680	30518	31500	30290	31684	344496
1992	35869	19339	40443	38620	38293	28243	22645	24206	23626	25702	23371	38573	358930
1993	47839	49113	57648	62031	75132	75132	71913	35520	22693	24125	18815	11135	551096
1994	11863	15616	68584	42363	52088	47203	26335	26973	27713	35230	35147	42272	

Mountain Tunnel - Moccasin Powerhouse Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	25275	8918	9168	15822	40334	38692	37083	35577	28592	30750	29107	32069	331387
1992	34546	18934	38692	36962	36853	27540	22312	23109	22865	22635	22459	36732	343639
1993	41076	37158	40651	39507	42577	41403	42442	27245	23304	25074	19148	11810	391395
1994	12353	15775	40502	37985	42161	35724	24216	25232	27794	35722	36060	38686	

San Joaquin Pipeline Flow(Diversion to San Francisco), AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	13293	6466	6635	14120	12337	6496	19882	21074	17994	15047	14405	15096	162845
1992	15108	14212	15261	14678	20513	21025	16881	15039	14485	15078	10871	6924	180075
1993	7470	14102	15465	15223	22116	21180	21679	22088	21943	22407	11421	8166	203260
1994	8186	13380	21788	21820	20571	21737	22383	23744	26388	22971	14664	14797	

Lower Cherry Aqueduct Flow, AF

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS
P.O. Box 2000
Sacramento, CA 95812-2000

STATEMENT OF WATER DIVERSION AND USE INFORMATION SHEET

STATEMENT NO. S002635

DIVERSION SITE:

OWNER'S NAME UNITED STATES
(FIRST) (MIDDLE) (LAST)

PARCEL NO. NONE

PLACE OF USE:

OWNER'S NAME SERVICE AREA OF THE CITY & COUNTY OF SAN FRANCISCO
(FIRST) (MIDDLE) (LAST)

1. **PARCEL NO.** _____
2. **PARCEL NO.** _____
3. **PARCEL NO.** _____

PERSON OR FIRM TO RECEIVE ALL CORRESPONDENCE AND SUPPLEMENTAL STATEMENTS:

OWNER/~~LESSEE/AGENT/OTHER~~ CITY & COUNTY OF SAN FRANCISCO

NAME c/o HETCH HETCHY WATER AND POWER
(FIRST) (MIDDLE) (LAST)

MAILING ADDRESS 1155 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103
(CITY) (STATE) (ZIP)

TELEPHONE NO. (415) 554 - 0725

OTHERS USING ABOVE DIVERSION LOCATION: NONE

1. **NAME** _____
(FIRST) (MIDDLE) (LAST)

MAILING ADDRESS _____
_____
(CITY) (STATE) (ZIP)

TELEPHONE NO. (_____) _____ - _____

2. **NAME** _____
(FIRST) (MIDDLE) (LAST)

MAILING ADDRESS _____
_____
(CITY) (STATE) (ZIP)

TELEPHONE NO. (_____) _____ - _____

☐ ADDITIONAL INFORMATION CONTINUED ON BACK OF PAGE OR ATTACHED

PLEASE USE THE OTHER SIDE TO PROVIDE THE ABOVE INFORMATION FOR ADDITIONAL OWNERS OR PLACES OF USE AND CHECK THE ADDITIONAL INFORMATION BOX.

(1/95)

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

HETCH HETCHY WATER AND POWER

1155 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103
554-0725

June 26, 1995

Mr. Wynne Rowlands
Division of Water Rights
P. O. Box 2000
Sacramento, California 95812-2000

Re: Statements 2635, 2636, 2637 and 2638

Dear Mr. Rowlands:

Enclosed are Supplemental Statements of Water Diversion and Use under 2635, 2636, 2637 and 2638, together with a table showing use of water through the aqueduct to San Francisco and the three power plants involved in the Hetch Hetchy Project. In accordance with your discussions with Janelle Fortner and Don Kienlen, we have modified the Supplemental Statement form for 2636 to agree with the amended statements transmitted with our letter of February 11, 1993. We understand you will make these changes in your records.

A new statement for the Lower Cherry Diversion Dam also was filed with our February 11, 1993 letter. We understand that you will advise of the number assigned to this statement.

If you require any additional information or have any questions regarding these amended statements, please contact Don Kienlen or myself.

Sincerely,

L. T. Klein

Lawrence T. Klein
General Manager

Enclosures
cc: Mr. Thomas Berliner
Ms. Anne Schneider
Mr. D. E. Kienlen

THE RESOURCES AGENCY
STATE WATER RIGHTS BOARD

STATEMENT OF WATER DIVERSION AND USE

This statement should be typewritten or legibly written in ink.

A. Name of person diverting water Hetch Hetchy Water Supply (City & County of San Francisco

Address 425 Mason Street, San Francisco, California

B. Name of body of water at point of diversion Hetch Hetchy Reservoir

Tributary to Tuolumne River

C. Place of diversion ~~NE~~ NW ¼ Section 16, Township 1N, Range 20 E, MD B&M

Tuolumne County, or locate it on sketch of section grid on reverse side with regard to section lines or prominent local landmarks.

D. Name of works Hetch Hetchy Reservoir

E. Capacity of diversion works _____ cubic feet per second / gallons per minute / ~~gallons~~ / acre-feet

Capacity of storage reservoir 360,400

State quantity of water used each month in ~~gallons~~ or acre-feet

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
1966	43,458	38,555	43,904	43,016	114,355	57,503	59,336	45,535	43,640	44,850	42,182	48,644	622,478

If monthly and annual use are not known, check months in which water was used. State extent of use in units, such as acres of each crop irrigated, average number of persons served, number of stock watered, etc. Above water releases and flows down the Tuolumne River to Early Intake where part is diverted through Hetchy Mountain Tunnel to Moccasin Powerhouse and then through Hetch Hetchy Aquad San Francisco Bay Area. Balance flows down Tuolumne River to Don Pedro Reservoir.

Maximum annual water use in recent years 1,156,368 acre-feet / gallons / acre-feet

Minimum annual water use in recent years 297,295

Type of diversion facility: gravity X, pump _____

Method of measurement: weir _____, flume _____, electric power meter _____, water meter _____, continuous stage record, estimate _____

F. Purpose of use (what water is being used for) Municipal and industrial, power generation and flood control.

G. General description or location of place of use (use sketch of section grid on reverse side if you desire) Moccasin Powerhouse and San Francisco Bay Area

H. Year of first use as nearly as known Storage began Nov. 15, 1922

I. Name of person filing statement O. L. MOORE

Position General Manager Organization Hetch Hetchy Water Supply

Address 425 Mason Street, San Francisco 94101, California

I certify that the foregoing statements are true and correct to the best of my knowledge and belief.

Date signed June 30, 1967

Signature O. L. MOORE, General Manager
By [signature]

See Instructions on Reverse Side

SWRB 40 (3-66)