

# TABLE 6. MONTHLY POWER

(in millions of kilowatt-hours)

ITEM	MONTH						
	JAN	FEB	MAR	APR	MAY	JUN	JUL
<b>ENERGY USED BY SWP PUMPING AND POWER PLANTS</b>							
Hyatt-Thermalito Pumpback and Station Service	41.29	5.01	17.67	1.09	12.92	5.19	1.94
North Bay Interim Pumping Plant	0.15	0.06	0.07	0.22	0.33	0.42	0.45
South Bay Pumping Plant	9.84	7.78	13.50	13.70	14.93	14.76	14.95
Del Valle Pumping Plant	0.01	0.01	0.38	0.43	0.18	0.00	0.01
Harvey O. Banks Delta Pumping Plant	40.04	45.44	52.98	39.61	37.06	35.72	65.08
San Luis Pumping-Generating Plant (SWP Share)	0.66	0.73	0.39	0.20	0.98	0.02	0.10
Dos Amigos Pumping Plant (SWP Share)	16.52	19.36	21.48	25.61	31.58	37.86	42.88
Buena Vista Pumping Plant	14.97	20.45	23.05	26.95	30.31	20.79	26.98
Wheeler Ridge Pumping Plant	16.62	20.79	22.25	28.72	31.32	17.46	22.92
Chrisman Wind Gap Pumping Plant	37.43	45.90	48.21	62.52	67.05	35.92	47.66
A. O. Edmonston Pumping Plant	132.16	162.84	168.83	218.71	232.23	119.43	162.98
Alamo Powerplant (Station Service)	0.04	0.02	0.03	0.02	0.00	0.02	0.02
Pearblossom Pumping Plant	10.61	22.23	12.18	30.17	42.55	25.11	22.49
Oso Pumping Plant	11.71	10.38	15.10	13.11	9.84	2.94	6.68
William E. Warne Powerplant (Station Service)	0.05	0.05	0.04	0.05	0.03	0.08	0.05
Las Perillas Pumping Plant (SWP Share)	0.42	0.45	0.55	1.01	1.50	1.77	1.96
Badger Hill Pumping Plant	1.09	1.21	1.45	2.76	4.13	4.73	5.16
Subtotal	333.61	362.71	398.16	464.88	516.94	322.22	424.31
System Losses and Unaccounted for Energy	8.62	4.82	9.92	11.01	4.28	8.14	16.68
Total	342.23	367.53	408.08	475.89	521.22	330.36	440.99
<b>SWP ENERGY SOURCES</b>							
Hyatt-Thermalito Powerplant	82.62	51.73	57.87	120.87	165.60	192.20	239.71
San Luis Pumping-Generating Plant (SWP Share)	0.00	0.00	0.00	21.84	35.65	45.38	25.47
Alamo Powerplant	1.90	4.11	2.34	5.41	7.09	3.88	4.56
Devil Canyon Powerplant	19.69	38.23	20.92	50.07	71.84	42.86	39.82
William E. Warne Powerplant	25.10	22.25	31.68	27.21	20.78	6.14	18.97
Castaic Powerplant	39.62	34.78	51.41	43.43	32.94	8.80	31.49
Bottle Rock Powerplant	23.89	22.24	23.17	21.65	21.67	19.29	19.79
Reid Gardner Unit No. 4	70.27	29.92	71.70	71.35	73.13	88.92	83.15
Pine Flat Powerplant	-0.25	1.89	19.50	0.97	40.99	111.04	67.85
TERA Power Corporation	0.02	0.09	0.17	0.47	0.45	0.47	0.51
MDSC Hydroelectric Plants (Exchange Energy)	10.78	11.90	15.21	17.33	24.01	18.70	17.21
Power Exchange Delivered to SCE	-58.43	-74.37	-63.45	-157.61	-211.66	-190.72	-201.48
Power Exchange Received from SCE	278.91	281.36	316.55	354.82	260.88	233.48	318.20
Power Exchange Bonneville Power Administration	0.00	0.00	0.00	0.00	0.00	0.00	-5.66
SCE-SBVMWD Exchange	-0.16	-0.12	-0.13	-0.15	-0.14	-0.15	-0.10
USBR Schedule Excess	0.37	0.12	0.01	0.02	0.03	0.00	0.00
Purchases							
British Columbia Hydro Power Authority	17.87	14.74	6.24	7.98	0.00	0.00	0.00
Bonneville Power Administration	6.03	0.00	0.00	6.25	146.78	16.40	0.00
Idaho Power Company	3.03	1.30	0.00	0.00	0.00	0.00	0.00
Portland General Electric Company	67.30	18.82	0.00	0.00	0.10	0.00	0.00
Seattle City Light	1.48	0.00	0.00	0.00	0.00	0.00	0.00
Los Angeles Department of Water and Power	0.00	0.00	0.00	0.00	1.04	0.00	0.00
Salt River Project	2.95	14.32	2.05	5.69	10.24	16.30	9.52
Washington Water and Power Company	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	593.54	473.81	555.24	597.60	701.42	612.99	669.01
Less Sales	251.31	106.28	147.16	121.71	180.20	282.63	228.02
Total	342.23	367.53	408.08	475.89	521.22	330.36	440.99

### Energy Sources

Table 6 also shows the monthly sources of SWP energy during 1987. The output of the Hyatt-Thermalito power complex in 1987 was 1.39 billion kWh, about 43 percent lower than last year's output (substantially less than the estimated average annual output of 2.18 billion kWh) and reflects the lower than normal rainfall.

Energy generation at the SWP aqueduct recovery plants (San Luis, Alamo, Devil Canyon, Warne, and Castaic) totaled about 1.32 billion kWh, about 58 percent higher than last year's amount. The combined output of the recovery plants and the Hyatt-Thermalito facilities was sufficient to meet about 56 percent of SWP energy requirements in 1987.

# OPERATIONS IN 1987

(in millions of kilowatt-hours)

MONTH						ITEM
AUG	SEP	OCT	NOV	DEC	TOTAL	
						<b>ENERGY USED BY SWP PUMPING AND POWER PLANTS</b>
17.96	15.25	7.97	41.12	39.25	206.66	Hyatt-Thermalito Pumpback and Station Service
0.46	0.45	0.40	0.37	0.38	3.76	North Bay Interim Pumping Plant
12.60	6.45	5.70	7.10	5.15	126.46	South Bay Pumping Plant
0.00	0.01	0.00	0.01	0.00	1.04	Del Valle Pumping Plant
59.74	55.21	18.75	24.90	83.64	558.17	Harvey O. Banks Delta Pumping Plant
0.19	8.16	3.87	6.09	45.06	66.45	San Luis Pumping-Generating Plant (SWP Share)
38.84	22.62	12.20	8.10	16.19	293.24	Dos Amigos Pumping Plant (SWP Share)
27.95	25.60	12.19	11.05	18.76	259.05	Buena Vista Pumping Plant
25.16	28.25	13.20	12.64	21.49	260.82	Wheeler Ridge Pumping Plant
54.90	62.50	28.49	28.58	47.83	566.99	Chrisman Wind Gap Pumping Plant
191.29	219.11	97.35	99.98	168.43	1,973.34	A. D. Edmonston Pumping Plant
0.05	0.05	0.03	0.05	0.05	0.38	Alamo Powerplant (Station Service)
31.71	24.72	18.21	4.47	7.41	251.86	Pearblossom Pumping Plant
8.16	15.06	3.81	10.17	17.45	126.41	Oso Pumping Plant
0.05	0.00	0.10	0.02	0.00	0.52	William E. Warne Powerplant (Station Service)
1.39	0.62	0.59	0.08	0.09	10.43	Las Perillas Pumping Plant (SWP Share)
3.72	1.73	1.58	0.18	0.18	27.92	Badger Hill Pumping Plant
474.17	485.79	224.44	254.91	471.36	4,733.50	Subtotal
22.97	15.81	14.67	1.09	-1.06	116.95	System Losses and Unaccounted for Energy
497.14	501.60	239.11	256.00	470.30	4,850.45	Total
						<b>SWP ENERGY SOURCES</b>
164.32	101.19	74.52	69.73	69.34	1,389.70	Hyatt-Thermalito Powerplant
12.93	2.26	6.82	1.95	0.00	152.30	San Luis Pumping-Generating Plant (SWP Share)
0.01	0.02	2.54	0.00	0.33	32.19	Alamo Powerplant
54.47	42.25	31.59	7.43	15.64	434.81	Devil Canyon Powerplant
17.63	32.56	7.26	22.98	37.72	270.28	William E. Warne Powerplant
26.24	54.79	10.46	34.68	58.93	427.57	Castaic Powerplant
19.25	18.31	17.80	16.99	15.77	239.82	Bottle Rock Powerplant
102.02	82.64	93.28	88.72	148.68	1,003.78	Reid Gardner Unit No. 4
9.61	-0.22	-0.23	-0.23	-0.24	250.68	Pine Flat Powerplant
0.44	0.44	0.13	0.07	0.08	3.34	TERA Power Corporation
15.90	15.10	11.21	9.68	8.30	175.33	MWDSC Hydroelectric Plants (Exchange Energy)
-187.72	-140.81	-111.14	-68.88	-76.67	-1,542.94	Power Exchange Delivered to SCE
377.26	382.33	386.66	509.83	492.11	4,192.89	Power Exchange Received from SCE
0.00	0.00	5.66	0.00	0.00	0.00	Power Exchange Bonneville Power Administration
-0.08	-0.08	-0.08	-0.06	-0.07	-1.32	SCE-SBVMWD Exchange
0.03	0.09	0.14	0.12	0.09	1.02	USBR Schedule Excess Purchases
0.00	0.00	0.00	0.00	0.00	46.83	British Columbia Hydro Power Authority
13.35	14.31	13.84	0.00	0.00	216.96	Bonneville Power Administration
0.00	0.00	0.00	0.00	0.00	4.33	Idaho Power Company
0.00	0.00	0.00	0.00	0.00	86.22	Portland General Electric Company
0.00	0.00	0.00	0.00	0.00	1.48	Seattle City Light
0.00	0.00	0.00	0.00	0.00	1.04	Los Angeles Department of Water and Power
23.53	23.32	6.86	5.65	0.75	121.18	Salt River Project
0.00	0.00	0.00	0.00	0.00	0.55	Washington Water and Power Company
649.19	628.50	557.32	698.66	770.76	7,508.04	Subtotal
152.05	126.90	318.21	442.66	300.46	2,657.59	Less Sales
497.14	501.60	239.11	256.00	470.30	4,850.45	Total

Other SWP hydroelectric power resources are obtained under contract with the Kings River Conservation District and the Metropolitan Water District of Southern California. The KRCD contract provides DWR with all of the output of the 165-MW Pine Flat Powerplant. The plant furnished 0.25 billion kWh to the SWP in 1987. Under the MWDSC contract, DWR receives energy from five small hydroelectric plants on the

MWDSC system (30 MW total capacity). As explained in Chapter VI, DWR has exchange agreements with Southern California Edison Company and the Los Angeles Department of Water and Power to facilitate transmission of energy from the MWDSC plants to the SWP.

**TABLE 6A. RECONCILIATION OF ENERGY USE IN 1987 FOR S**

(in millions of kilowatt-hours)

ITEM	MONTH						
	JAN	FEB	MAR	APR	MAY	JUN	JUL
<b>Harvey O. Banks Delta Pumping Plant</b>							
Energy Metered at Pumping Plant	40.04	45.44	56.90	46.17	37.06	35.72	79.03
Less Energy Scheduled by USBR for CVP Pumping	0.00	0.00	-3.92	-6.56	0.00	0.00	-13.95
Plus Excess Daily Energy Scheduled by USBR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	40.04	45.44	52.98	39.61	37.06	35.72	65.08
<b>Dos Amigos Pumping Plant</b>							
Energy Metered at Pumping Plant	33.24	38.07	31.95	43.03	54.64	72.24	80.65
Less Energy Scheduled by USBR for CVP Pumping	-16.72	-18.71	-10.47	-17.42	-23.06	-34.38	-37.77
Less Energy Scheduled by USBR for Station Service	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plus Excess Daily Energy Scheduled by USBR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	16.52	19.36	21.48	25.61	31.58	37.86	42.88
<b>San Luis Pumping Plant</b>							
Energy Metered at Pumping Plant	38.05	10.71	2.78	0.92	1.12	0.05	0.18
Less Energy Scheduled by USBR for CVP Pumping	-37.57	-9.79	-2.04	-0.56	0.00	0.00	0.00
Less Energy Scheduled by USBR for Station Service	-0.19	-0.29	-0.36	-0.17	-0.14	-0.03	-0.08
Plus Excess Daily Energy Scheduled by USBR	0.37	0.10	0.01	0.01	0.00	0.00	0.00
Energy Used for SWP Pumping	0.66	0.73	0.39	0.20	0.98	0.02	0.10
<b>Las Perillas Pumping Plant</b>							
Energy Metered at Pumping Plant	0.42	0.45	0.55	1.01	1.50	1.77	1.96
Less Energy Scheduled by USBR for CVP Pumping	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	0.42	0.45	0.55	1.01	1.50	1.77	1.96
<b>San Luis Generating Plant</b>							
Energy Metered at Pumping Plant	0.00	0.39	0.00	30.22	85.64	112.64	67.64
Less Energy Scheduled by USBR for CVP Pumping	0.00	0.41	0.00	8.39	50.02	67.26	42.17
Plus Excess Daily Energy Scheduled by USBR	0.00	0.02	0.00	0.01	0.03	0.00	0.00
SWP Share of Energy Generated	0.00	0.00	0.00	21.84	35.65	45.38	25.47

Under the 1979 power contract between the Department and Southern California Edison, in effect since April 1983, and the 1981 Capacity Exchange Agreement, in effect since April 1987, part of the Hyatt-Thermalito generation and all of the output of Devil Canyon and Alamo powerplants are delivered to SCE. The energy is generally delivered during on-peak periods, and a greater amount of energy is returned during off-peak periods. The additional energy is primarily in payment for the power capacity available to SCE. Table 6 shows the monthly quantities of energy both delivered and returned under these contracts. The net gain to the SWP during 1987 was 2.65 billion kWh.

The Bottle Rock Powerplant provided 0.24 billion kWh during 1987. DWR paid MCR Geothermal Corporation \$4,154,797 for the steam supply.

Reid Gardner Unit No. 4 supplied 1.00 billion kWh in 1987. Final accounting of start-up energy banked with Nevada Power Company in 1983 indicates that all of

the energy had been returned to DWR by the end of 1986.

DWR also has a contract with TERA Power Corporation for the purchase of energy produced at Bethany Wind Park, near the South Bay Pumping Plant. About 45 50-kW wind turbines were operational at the end of 1987; over 3.3 million kWh of wind-generated energy was delivered to DWR during the year.

From time to time the SWP has energy resources in excess of its requirements and has the option to sell this excess. If power requirements sometimes exceed SWP resources, short term power purchases can be made to meet the load requirements. Another option available to the SWP (and one that was used in 1987) is to bank excess energy with another utility and have the banked energy returned during a period when the SWP would normally make a short-term power purchase. In July 1987 the SWP delivered 5.66 million kWh of on-peak energy to Bonneville Power Administration and

# AND CVP PUMPING AT SWP PLANTS AND JOINT-USE FACILITIES

(in millions of kilowatthours)

MONTH						ITEM
AUG	SEP	OCT	NOV	DEC	TOTAL	
90.91	81.12	31.81	24.90	89.18	658.28	Harvey O. Banks Delta Pumping Plant
-31.17	-25.91	-13.06	0.00	-5.54	-100.11	Energy Metered at Pumping Plant
0.00	0.00	0.00	0.00	0.00	0.00	Less Energy Scheduled by USBR for CVP Pumping
59.74	55.21	18.75	24.90	83.64	558.17	Plus Excess Daily Energy Scheduled by USBR
						Energy Used for SWP Pumping
66.33	28.36	18.53	11.25	24.25	502.54	Dos Amigos Pumping Plant
-27.49	-5.73	-6.33	-3.00	-8.01	-209.09	Energy Metered at Pumping Plant
0.00	-0.01	0.00	-0.15	-0.05	-0.21	Less Energy Scheduled by USBR for CVP Pumping
0.00	0.00	0.00	0.00	0.00	0.00	Less Energy Scheduled by USBR for Station Service
38.84	22.62	12.20	8.10	16.19	293.24	Plus Excess Daily Energy Scheduled by USBR
						Energy Used for SWP Pumping
3.96	42.02	30.90	57.14	102.37	290.20	San Luis Pumping Plant
-3.57	-33.88	-26.98	-51.12	-57.40	-222.91	Energy Metered at Pumping Plant
-0.23	-0.07	-0.19	-0.05	0.00	-1.80	Less Energy Scheduled by USBR for CVP Pumping
0.03	0.09	0.14	0.12	0.09	0.96	Less Energy Scheduled by USBR for Station Service
0.19	8.16	3.87	6.09	45.06	66.45	Plus Excess Daily Energy Scheduled by USBR
						Energy Used for SWP Pumping
1.39	0.64	0.59	0.08	0.09	10.45	Las Perillas Pumping Plant
0.00	-0.02	0.00	0.00	0.00	-0.02	Energy Metered at Pumping Plant
1.39	0.62	0.59	0.08	0.09	10.43	Less Energy Scheduled by USBR for CVP Pumping
						Energy Used for SWP Pumping
29.37	2.26	6.82	1.95	0.00	336.93	San Luis Generating Plant
16.44	0.00	0.00	0.00	0.00	184.69	Energy Metered at Pumping Plant
0.00	0.00	0.00	0.00	0.00	0.06	Less Energy Scheduled by USBR for CVP Pumping
12.93	2.26	6.82	1.95	0.00	152.30	Plus Excess Daily Energy Scheduled by USBR
						SWP Share of Energy Generated

scheduled the return of the energy during the on-peak period in October 1987. During early 1988 the SWP exchanged off-peak energy with Bonneville Power Administration for on-peak energy at an additional cost of 4 mills per kWh.

## Power Purchases and Power Service Costs

Power purchases and transmission service costs during 1987 are summarized in Table 7. DWR purchased 0.90 billion kWh of energy for \$19.30 million and paid \$4.15 million for geothermal steam at the Bottle Rock Powerplant. Transmission, capacity, losses, and dispatching services amounted to \$14.69 million. Other costs associated with the operation and management of SWP power resources not in Table 7 include:

- debt service, auditing costs, and OM&R costs of \$9.37 million associated with the output of Pine Flat Powerplant;

- OM&R and fuel costs of \$41.41 million associated with Reid Gardner Unit No. 4; and
- debt service and OM&R costs associated with other SWP-owned generation facilities.

## Power Sales

Existing SWP resources, short-term power purchase and sales contracts, and long-term power and transmission contracts combine to ensure that the SWP has enough energy and capacity to meet future needs. DWR entered into power sales contracts to sell any excess capacity and energy, within the limit of SWP's contractual transmission capabilities, at Malin, Tesla, Vincent, Sylmar, and Eldorado substations.

DWR sells this excess capacity and energy on a daily basis to utilities at current market rates. The decision to sell the power, or to wait for a more opportune time, takes into consideration projected SWP operations and changes in the power market as well as energy losses,