CHAPTER 11

ENERGY AND CHEMICALS

Introduction

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INTRODUCTION

This chapter summarizes the potential effects on energy and chemical consumption associated with the 2015 Plan and alternatives. Information on regional energy service and consumption was compiled based on information from Southern California Edison (SCE) and Southern California Gas Company (SCGas). Information on existing and proposed energy and chemical consumption at the VWRP was provided by the Districts. Due to the minor nature of the proposed upgrades at the SWRP and VWRP (reference Chapters 7 and 8), discussion of the existing conditions at the SWRP is not included in this chapter, and only the potential energy and chemical usage impacts associated with the construction and operation of these upgrades are addressed.

SETTING

Regional Setting

Electric Service

Electric service for the SCVJSS service area is provided by SCE. There are six distribution facilities (main substations) located throughout the valley. In 1996, system users had a peak power consumption of approximately 400 megawatts (MW). The existing system has a peak load limit of 460 MW, which will be increased to 488 MW in 1998. As projected development occurs, electrical transmission lines are added or extended as necessary to provide additional service (SCE, 1997).

Natural Gas Service

Natural gas is supplied to all developed portions of the valley by SCGas. Gas service in the valley is provided by interconnected gas mains ranging in size from 2-inch low pressure to 36-inch high pressure mains and distribution appurtenances. Additional supplies and distribution facilities are provided as development occurs (SCGas, 1997).

Valencia Water Reclamation Plant

Electricity Consumption

Electricity is used at the VWRP to power equipment such as pumps, sludge collection equipment, filter presses, compressors, and miscellaneous motor drives. Existing electricity consumption at the VWRP totals approximately 6.25 gigawatt-hour (GW-hr) annually, which corresponds to an hourly average consumption of 715 kilowatts (kW). Beginning in 1999, additional electricity will be provided to the VWRP through the use of two on-site resource recovery engines, with a combined net power output of approximately 1,000 kW. These engines will burn digester gas and natural gas to produce electricity. Installation of these engines is a component of a previous project. Although these engines will generate sufficient electricity to meet the average power demand of the VWRP through 2002, small amounts of additional electricity will still need to be purchased from SCE during peak power consumption periods. After 2002, additional electricity will need to be purchased to meet both peak and average power demands. A maximum annual demand for 6.89 GW-hr (787 kW) of SCE electricity is expected to occur in 2015. The SCE main substation providing power to the VWRP has a peak load capacity of 70 MW.

Natural Gas Consumption

Currently, natural gas purchased from SCGas is used at the VWRP to provide fuel for staff purposes only (hot water heater). However, beginning in 1999, approximately 48 therms of natural gas will be used to supplement the digester gas being utilized as a fuel source for the resource recovery engines. Although

natural gas consumption is estimated to increase to 58 therms in 2002 as VWRP energy demand increases, after 2002 (once the resource recovery engines are producing at maximum capacity), as the amount of digester gas produced by VWRP increases, demand for natural gas will decrease (to approximately 18 therms in 2015). The VWRP receives natural gas via an 8-inch medium pressure gas main located in The Old Road. This gas main currently has approximately 350 therms of available capacity. There is also a 24-inch high pressure gas main located in The Old Road with approximately 4000 therms of available capacity.

Chemical Consumption

Existing annual consumption of chemicals used at the VWRP is shown in Table 11-1. Each of these substances is considered to be hazardous. See Chapter 19, Public Health, for information on the potential project related impacts of using of these substances.

At the VWRP, ferric chloride and anionic polymer are used in the primary clarifier to coagulate solids, which enhances the settling process. Cationic polymer is used as a coagulant in the secondary clarifiers. Aluminum sulfate is used in the tertiary treatment process as a final coagulant aid before the water is sent through the pressure filters. Sodium hypochlorite is used to disinfect tertiary effluent before it is discharged. Sodium bisulfite is used to dechlorinate reclaimed water. Defoamant is used in the final stage of reclamation to remove foam from the water before it is discharged or reused. Cationic polymer is also used as a coagulant in sludge dewatering and the dissolved air flotation thickeners. Ferrous chloride is used to decrease sulfide levels in digester tanks at the VWRP, yielding digester gas with reduced hydrogen sulfide concentrations. Ferric chloride is used to enhance settling of residual solids in the digester supernatant. Sodium hydroxide is used in conjunction with sodium hypochlorite as an odor control agent in the wet scrubbers.

Table 11-1
EXISTING AND PROJECTED ANNUAL CHEMICAL CONSUMPTION AT THE VWRP

CHEMICAL	EXISTING (9.3 MGD)	2015 PROJECT (27.6 MGD)
Ferric Chloride	177,600 gals	527,071 gals
Anionic Polymer	11,491 lbs	34,102 lbs
Cationic Polymer	22,938 lbs	68,074 lbs
Sodium Hypochlorite	163,444 gals	485,060 gals
Sodium Bisulfite	75,332 gals	223,566 gals
Ferrous Chloride	2,150 gals	6,381 gals
Aluminum Sulfate	43,540 gals	129,215 gals
Defoamant	850 gals	2,523 gals
Sodium Hydroxide	12,880 gals	38,225 gals

Diesel Consumption for Biosolids Transport

Since March 20, 1995, all biosolids generated at the VWRP are transported by Pima Gro Systems, Inc. to various sites in Kern County for land application and agricultural purposes. These land application sites have an approximate average distance from the VWRP of 100 miles. Available land application sites within 150 miles are expected to continue receiving all biosolids generated at the VWRP through 2015. Table 11-2 provides information on present and projected diesel fuel consumption for biosolids transport.

Table 11-2
DIESEL FUEL CONSUMED TRANSPORTING BIOSOLIDS FROM VALENCIA WRP TO LAND APPLICATION SITES (1995)

	EXISTING (1995)	2015 PROJECT
Biosolids Delivered (Dry Tons per Year)	3,981	11,807
Truck Round Trips	181	540
Diesel Consumed (Gallons per Year)	3,750	16,770

Notes: Truck capacity is 22 tons.
Average fuel efficiency is 9.66 miles per gallon.
Average round trip distance is estimated at up to 300 miles for 2015.

Energy Associated With Water Reuse

Currently, all reclaimed water from the SCVJSS is discharged to the Santa Clara River. While all of the reclaimed water produced is suitable for reuse, distribution systems have not yet been developed by any local water agencies. Therefore, no energy is consumed for the distribution of reclaimed water.

IMPACTS AND MITIGATION MEASURES OF THE 2015 PLAN ALTERNATIVES

Methodology and Assumptions for Impact Analysis

Construction related energy impacts are evaluated in this chapter using a qualitative assessment of construction practices. Construction activities associated with implementation of the 2015 Plan are not expected to involve the consumption of chemicals. Therefore, the consumption of chemicals during construction is not discussed further in this chapter. It should be noted that it has not yet been specifically determined which dust suppressant mitigation measure would be used during construction, and it is possible that a chemical suppressant would be used. However, as discussed in Chapter 13, Air Quality, if a chemical suppressant is used, it will be nontoxic and used in a manner to be deemed as not wasteful.

Operations related energy impacts are evaluated using a comparison of the increase in annual energy consumption generated by implementation of the recommended alternative with regional energy demand. The increase in annual energy consumption is the difference between annual energy consumption for the VWRP in 2015 under the recommended project conditions and annual energy consumption under the existing conditions. Regional energy demand is defined as the annual energy demand projected to exist in the valley area in 2015 without the proposed project.

Operations related chemical consumption impacts for the VWRP are evaluated using a comparison of annual chemical consumption in 2015 under the recommended project conditions with annual chemical consumption under existing conditions.

Criteria for Determining Significance

Based on Appendices G and I of the State CEQA Guidelines, an alternative is considered to have a significant impact if it would result in any of the following:

- Use of energy or chemicals in a wasteful manner during construction or operation.
- Consumption of enough energy during construction or operation to cause energy suppliers difficulty in meeting the increased energy demand.
- Consumption of enough energy during construction or operation to require construction of additional facilities for energy generation or distribution to meet the increased demand.

The Recommended Project

VWRP Expansion Construction Impacts

Impact: *Increase in Energy Consumption Resulting from Construction at the VWRP.* Construction at the VWRP would neither result in consumption of an unnecessary amount of energy nor consume energy in a wasteful manner, nor would consume enough energy to require the construction of additional facilities for energy generation or distribution. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

VWRP Expansion Operations Impacts

Impact: *Increase in Electricity and Natural Gas Consumption Resulting from Operations at the VWRP.* The treatment capacity of the VWRP would be increased to 27.6 mgd to accommodate projected flows. The recommended project would result in an estimated consumption of SCE electricity in 2015 of 6.89 GWH per year at the VWRP, placing an average hourly demand of 787 kW on the supplying electrical distribution system. This demand represents a slight increase over the existing demand. However, an electrical distribution system power grid of 488 MW is sufficiently sized to accommodate the additional demand. Construction of additional facilities for electricity generation or distribution would not be necessary to meet this demand. Therefore, this impact is considered less than significant.

There would be an increase in consumption of natural gas in 2015 over existing conditions of approximately 18 therms. However, the existing 8-inch gas main serving the VWRP has sufficient capacity to transport the needed natural gas, and the 24-inch gas line would be available for service, too, if required. No additional facilities for natural gas production or distribution would need to be constructed to meet the increased demand. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: *Increase in Chemical Consumption Resulting from Wastewater Treatment Expansion at the VWRP.* Table 11-1 shows that increasing wastewater treatment capacity at the VWRP would result in additional use of chemicals over existing conditions. However, this increase in usage is not expected to cause a market shortage of these chemicals or require additional production facilities. This impact is considered less than significant.

Mitigation: No mitigation is required.

SWRP and VWRP Upgrade Construction Impacts

Impact: *Increase in Energy Consumption Resulting from Construction at the SWRP and VWRP.* Construction of the nitrification-denitrification upgrade at the SWRP and VWRP would not consume energy in a wasteful manner, or consume enough

energy to require the construction of additional facilities for energy generation or distribution. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

SWRP and VWRP Upgrade Operations Impacts

Impact: *Increase in Electricity Consumption Resulting from the Upgrade at the SWRP and VWRP.* The nitrification-denitrification upgrade would require installation of one 15 horsepower (hp) variable-speed pump and two 3.5 hp mixers in each aeration channel at the SWRP and VWRP, resulting in a total of 15 pumps and 30 mixers. Total peak power requirement would be 330 hp, which is equivalent to 246 kW. This demand represents a slight increase over the existing demand. However, the existing electrical distribution system power grid is sufficiently sized to accommodate the additional demand. Construction of additional facilities for electricity generation or distribution would not be necessary to meet this demand. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Impact: *Increase in Chemical Consumption Resulting from the Upgrade at the SWRP and VWRP.* The current disinfection systems at the SWRP and VWRP rely on ammonia naturally present in the water to aid in the disinfection process. With the installation of the nitrification-denitrification upgrade, the ammonia could be reduced to below optimal concentrations. Therefore, it may be necessary to restore the ammonia concentration in the water to approximately 2 mg/l via chemical addition. Based on a projected 2015 flow of 27.6 mgd and assuming a need to restore the ammonia concentration to 2 mg/l, the maximum annual demand for ammonia would be 168,000 lbs, or 103,000 gallons (19.5 percent solution) in 2015. However, this additional demand for ammonia is not expected to cause a market shortage or require additional production facilities. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

Biosolids Disposal and Reuse Impacts

Impact: *Increase in Diesel Fuel Consumption Resulting from Biosolids Disposal and Reuse Through 2015.* As shown in Table 11-2, approximately 3,981 gallons of diesel fuel are currently consumed each year to transport biosolids by truck from the VWRP to appropriate disposal and reuse sites under existing conditions. In 2015, there will be an estimated 295 percent increase in the amount of biosolids produced at the VWRP over existing conditions. Consumption of diesel for transport of biosolids would likely experience a similar increase, depending on locations of land application sites. However, it is not expected that diesel fuel suppliers would experience difficulty in meeting the increased demand. Construction of additional diesel facilities for fuel production or distribution would not be necessary to meet the increased demand. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is required.

No Project Alternative

Under the No Project Alternative, no increase in treatment capacity would occur at the VWRP. However, it should be noted that the VWRP is not currently operating at full capacity. Under the No Project Alternative, the VWRP would continue to operate until reaching permitted capacity. However, although consumption of energy, chemicals, and diesel would increase in proportion to increases in wastewater flow and biosolids generation, no significant impacts related to energy, chemical, or diesel use would occur under this alternative.