4.4 WATER

Would the proposal result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	☐	☐	☒	☐
b) Exposure of people or property to water-related hazards such as flooding?	☐	☐	☐	☒
c) Discharge into surface waters or other alteration of surface water quality (e.g., temperature, dissolved oxygen, or turbidity)?	☐	☐	☒	☐
d) Changes in the amount of surface water in any water body?	☐	☐	☐	☒
e) Changes in currents, or the course or direction of water movements?	☐	☐	☒	☐
f) Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations, or through substantial loss of groundwater recharge capability?	☐	☐	☐	☒
g) Altered direction or rate of flow of groundwater?	☐	☐	☐	☒
h) Impacts to groundwater quality?	☐	☐	☐	☒
i) Substantial reduction in the amount of groundwater otherwise available for public water supplies?	☐	☐	☐	☒

SETTING

Local Setting

Morro Bay

The Morro Bay Power Plant lies in the southwest portion of the Morro Hydrologic Subarea (Morro Basin). The plant is located at the northwestern edge of Morro Bay, and east of the

Pacific Ocean. The boundary of the site is approximately 100 feet from the edge of the Pacific Ocean.

Non-marine surface water in the Morro Basin is restricted to ephemeral streams that originate in the Santa Lucia Mountains, and occurs only in mountain springs or during periods when precipitation exceeds soil infiltration rates. Annual precipitation averages 16 inches and occurs primarily from November through March. This water either recharges the groundwater basin through the alluvial valley floor or is conducted overland to Morro Creek, which is located north of the plant and empties into Estero Bay. A drainage channel, Willow Camp Creek, traverses the northern part of the site and empties into Morro Creek at the site boundary.

Groundwater beneath the plant site lies approximately five to 15 feet below ground surface with general southwesterly flow toward Morro Bay, as influenced by groundwater pumping and tidal fluctuations. A potential east-west groundwater divide is present beneath the plant caused by production wells to the north and tidal influences. There are 26 contaminated soil and groundwater sites at the Morro Bay Power Plant. Contaminants are primarily hydrocarbons and lead (Schwartzbart, April 14, 1997).

The Morro Bay Power Plant primarily uses sea water from an intake at Morro Bay Harbor to supply make-up water to the boilers for steam generation. The plant currently uses about 530 million gallons per day of "once through" cooling water from the bay for condensing steam to water at units 1-4. The cooling water is returned to Estero Bay at a discharge point near Morro Rock, while boiler blowdown is returned to the blowdown tank to be recalculated as steam in the boilers. Well water is used for potable water and the fire system. City water provides a backup to the well water; sea water provides a backup water supply for the fire fighting system.

The cooling water intakes are located easterly of Morro Rock inside Morro Bay Harbor. This location is in "a valued aquatic habitat in the presence of an endangered species, the California Sea Otter" (WDR Order 95-28). As such, it has the potential to have serious effects and is therefore required to use Best Technology Available (BTA) for minimizing adverse effects, specifically impingement and entrainment of aquatic organisms.

The Morro Bay Power Plant has four effluent discharges. Outfall No. 001 discharges primarily cooling water (average 530 million gallons per day (mgd)) from units 1 through 4 northeast of Morro Rock into Estero Bay. Outfall number 001 also discharges small (0.075 to 1.2 mgd) amounts of make-up water, screen wash water, storm runoff, and discharges from surface impoundments and the oily water system. Outfall No. 002 discharges storm water to Morro Bay Harbor. Outfall No. 003 discharges storm water to Willow Camp Creek. Outfall No. 004 discharges screen wash water overflow. All four outfalls are permitted under the National Pollution Discharge Elimination System (NPDES) Permit No. CA0003743, Order No. 95-28. (Tables 4.4.1 and 4.4.2) Morro Bay uses up to 725 mgd of seawater for cooling water. A private

TABLE 4.4.1: POWER PLANTS SEAWATER COOLING SYSTEM SUMMARY

Power Plant	Unit	Cooling Water Volume (mgd)	Intake Location	Discharge Location
Morro Bay	1-4	725	Morro Bay Harbor	Estero Bay
Moss Landing	1-5	560	Moss Landing Harbor	Elkhorn Slough
	6-7	890	Moss Landing Harbor	Monterey Bay

aquaculture facility has also contracted with PG&E to provide cooling water effluent for raising commercial shellfish.

Seasonal rain water incident to the site goes through various drains, sumps, and miscellaneous acid and caustic containments. Some storm water runoff streams go through surface impoundments prior to discharge at one of the three outfalls. All storm water is managed under an existing approved Storm Water Pollution Prevention Plan.

Morro Bay's offsite fuel tank farm is located northeast of the power plant at an elevation of 580 to 650 feet. The site slopes from northwest to southeast. There is one on-site ephemeral stream which drains approximately the western two-thirds of the site and drains to Morro Creek, approximately one mile to the south. There is a second ephemeral stream located east of the site which drains approximately the eastern third of the site and also drains to Morro Creek. The site is completely bermed. Storm water is collected and treated on-site using an oil-water separator and sand filter. Treated runoff may be percolated or discharged to the tributary to Morro Creek. Discharge is regulated under NPDES Permit Number CA0048640, Order No. 87-63 issued by the Central Coast Regional Water Quality Control Board (RWQCB).

The Morro Bay site also includes an offshore oil terminal which consists of anchors connected by a mooring buoy chain, and pipelines from the terminal to a pumping station on shore. The pipes continue underground to a "beach valve" area west of the on-site fuel farm. The oil terminal is in caretaker status. The oil pipeline is currently filled with seawater.

Moss Landing

The Moss Landing Power Plant is located in the Department of Water Resources (DWR) Hydrologic Unit 18060011. The western boundary of the site is located adjacent to Moss Landing Harbor, and approximately one-quarter mile from the edge of the Pacific Ocean. The

TABLE 4.4.2: PG&E POWER PLANT NPDES PERMITS SUMMARY

Power Plant	Permit Number/ Order Number	Expir. Date	Outfall Number	Receiving Water	Discharge Type	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (F)
Morro Bay	CA0003743/ 95-28	2/1/2000	001	Estero Bay	cooling water intake screen wash make-up water impoundments oily water system storm runoff	725	30 degrees F above intake water (35 degrees F above intake during de-musseling)
			002	Morro Bay Harbor	storm water	variable	NA
			003	Willow Camp Creek	storm water	variable	NA
			004	Intake structure	screen wash water		NA
Morro Bay Offsite Fuel Oil Storage Facility	CA0048640/ 87-63		001	tributary to Morro Creek	storm runoff	0.144	NA
Moss Landing	CA0006254/ 95-22	11/10/99	001	Elkhorn Slough	cooling water intake screen wash storm runoff floor drains	560	29 degrees F above intake water (40 degrees F above intake during de-musseling)

TABLE 4.4.2: PG&E POWER PLANT NPDES PERMITS SUMMARY (continued)

Power Plant	Permit Number/ Order Number	Expir. Date	Outfall Number	Receiving Water	Discharge Type	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (F)
Moss Landing (continued)	CA0006254/ 95-22		002	Monterey Bay	cooling water intake screen wash blowdown storm runoff condensate waste water	890	28 degrees F above intake water (40 degrees F above intake during de-musseling)
			003	Moro Cojo Slough	Storm runoff	variable	Not applicable
			004	Moss Landing Harbor	Storm runoff	variable	Not applicable

Notes: mgd = million gallons per day.
N/A = not applicable/available.

site is bounded by Elkhorn Slough National Estuarine Research Reserve on the north, National Refractories and Moro Cojo Slough on the south, Highway 1 and Moss Landing Harbor on the west, and the Southern Pacific Rail Road to the east. There are marshy, wetland areas located across the railroad embankment to the southeast of the site. Immediately offshore in Monterey Bay is the immense 6,000-foot deep Monterey Submarine Canyon, a feature that strongly affects sea water and Elkhorn Slough conditions and movements in the area.

Groundwater is located within five feet of the surface. The Moss Landing Power Plant has three permitted hazardous waste surface impoundments and 17 areas of soil and/or groundwater contamination. (Camp Dresser & McKee, April, 1997a).

Cooling water intakes are located on the east shore of the southern arm of Moss Landing Harbor. Spent cooling water is discharged from two outfalls. Outfall No. 001 for Units 1 through 5, is located off the southern shore of Elkhorn Slough. Units 1 through 5 have been retired, so this outfall is no longer in use. Outfall 002, for Units 6 and 7, is located 600 feet into Monterey Bay.

Surface drainage is discharged through two outfalls to the Morro Cojo Slough (Outfall 003) and Moss Landing Harbor (Outfall 004). Domestic waste is discharged to a septic tank and leachfield system. All four outfalls are permitted under NPDES Permit # CA0006254, Order No. 90-08 from the Central Coast RWQCB.

The thermal discharge has some beneficial effects. The Monterey Bay Aquarium is planning to use water from the power plant's recirculating system for a tropical fish facility to be built at Moss Landing. Experiments have been conducted by commercial shellfish companies in raising commercial shellfish with warmed water from Outfall 002. These experiments have shown excellent growth with over a dozen species of shellfish. Fish catch data show that some fish species, including shiner perch, starry flounder, topsmelt, and speckled sanddabs, show a preference for the warmer water, although there was no statistical difference in catches of fish.

Oakland

The Oakland Power Plant is located on the eastern shoreline of San Francisco Bay adjacent to the Oakland Estuary. The 2-acre site is bordered by industrial and commercial uses on the north, east, and west, and by the Port of Oakland Howard Terminal adjacent to the Oakland Inner Harbor on the south. The harbor is about 150 feet from the southern site boundary. There are no other surface water bodies in the vicinity.

The site is at an elevation of less than 20 feet and slopes gently from northeast to southwest. Groundwater on the site is slightly brackish, due to the proximity to San Francisco Bay, and approximately 4 to 7 feet below grade. There are 15 areas of contaminated soil and/or groundwater at the plant. (Camp, Dresser, McKee, April, 1997d).

The Oakland Power Plant does not take in cooling water, and therefore has no cooling water discharge. Storm water runoff discharges to the Bay, and is managed under an existing approved Storm Water Pollution Prevention Plan.

CHECKLIST ISSUES

a) Absorption Rates, Drainage Patterns, and Surface Runoff

Morro Bay

The project may result in some minor construction, such as fences and access improvements, at the Morro Bay site. The creation of more impervious surface area could further reduce absorption rates in the area, change drainage patterns, and increase surface runoff. All storm water runoff is collected on-site and discharged directly to Estero Bay, Morro Bay Harbor, or Willow Camp Creek. An increase or change in surface runoff could be accommodated by new or existing on-site storm water facilities and would not affect off-site flood hazards. A decrease in absorption rates would not significantly affect the groundwater under the site.

Moss Landing

The project may result in some minor construction, such as fences and access improvements, at the Moss Landing site. The creation of more impervious surface area could further reduce absorption rates in the area, change drainage patterns, and increase surface runoff. All storm water runoff is collected on-site and discharged directly to Moro Cojo Slough or Moss Landing Harbor. An increase or change in surface runoff could be accommodated by new or existing on-site storm water facilities and would not affect off-site flood hazards. A decrease in absorption rates would not significantly affect the groundwater under the site.

Oakland

The Oakland Power Plant is completely developed. Any new construction would be unlikely to add any new impervious surface area at the site or change absorption patterns or surface runoff. Surface runoff quality and discharge points are regulated under the site's existing NPDES Storm Water Pollution Prevention Plan.

Conclusion

Impacts related to changes in absorption rates, drainage patterns and surface runoff would be less than significant at Morro Bay and Moss Landing. No impact would occur at Oakland.

b) Water-Related Hazards

None of the plants are located in either a 100- or 500-year flood plain. Also, the project would not include any physical modifications that would involve changes to hydrologic hazards such as flooding. Therefore, no impacts related to flooding would occur.

Conclusion

No impacts related to water related hazards would occur.

c) Discharges and Surface Water Quality

Local Issues

Morro Bay

The existing discharges at Morro Bay are regulated by both an NPDES permit and a Storm water Pollution Prevention Plan. The NPDES permit discharge limits allow the plant to operate up to its generation capacity.

The Morro Bay Power Plant has a marine terminal in caretaker status. PG&E has no current intention to resume operation of the marine terminal. Both the terminal and pipeline would require extensive repair prior to use. With or without divestiture, marine terminal and pipeline repair and reactivation would require construction permits for repair activities, and use permits. In addition, the reactivation of the terminal facility would require environmental review. It is thus not foreseeable that a new owner would reactivate the facility. There is no reason to believe that the new owner of the plant would undertake the permitting and repair that would be needed to resume operation of the marine terminal. Therefore, the project has a less than significant impact on marine water quality.

Moss Landing

The existing discharges at Moss Landing are regulated by both an NPDES permit and a Storm Water Pollution Prevention Plan. The NPDES Permit discharge limits would allow the plant to operate up to its generating capacity. Since the plant is expected to operate within its existing permitted capacity, the project will not significantly impact marine water quality.

Oakland

There is no existing discharge at the Oakland Power Plant. Storm water is regulated under a Storm Water Pollution Prevention Plan. If a new owner wished to operate the plant so that cooling water discharges could be made into the Oakland Estuary, the new owner would need to apply for a NPDES permit from the RWQCB, San Francisco Region. The application for this permit would require environmental review. Any amendment(s) to the NPDES permit would ensure that the permit modifications did not have an adverse impact on marine water quality based upon the allowed discharge. Therefore, the project would have a less than significant impact on marine water quality.

Combined Issues

The project could result in additional generation of energy and, therefore, require additional water for cooling. The coastal plants take cooling water from the ocean. When a generating unit is in operation, all of the circulation water pumps for that unit normally are utilized, regardless of that unit's level of operation. Therefore, a unit in operation uses the same volume of cooling water in any given period regardless of whether it is operating at full capacity or at less than full capacity or at less than full capacity. If the unit is completely off, some or all of the units' circulation pumps are typically off, although at times a volume of water less than full operation volume is kept circulating for various process needs. Therefore, while additional generation of energy will likely include additional time when the pumps are in full operation and additional water is extracted from the ocean and subsequently discharged, the additional amount of water used would not correlate directly to the increase in generation. Furthermore, these discharges would be in compliance with NPDES permit conditions for flow quantity since the permit flow limits are on a flow rate basis (mgd) and not on a mass loading basis.

Although increased generation by new owners would result in additional discharges of cooling water, the operation of plants would be constrained by the existing effluent limitations in NPDES permits, which would be transferred to the new owner and would continue to be enforced by the local Regional Water Quality Control Boards. No significant impacts would be expected wince the permit limits account for operation a full design capacity. In the event that permit violations occur, the Regional Water Quality Control Boards, which monitor discharges from the plants monthly, would take action to eliminate chronic violations.

Because of the long history at each of the power plants, the potential exists that some portion of the surface and subsurface soils and groundwater at each plant may have been contaminated with various wastes or otherwise adversely affected by past structures and operations.

PG&E recently has conducted Phase I Environmental Site Assessments at each plant and will follow up, as appropriate, with Phase II testing to determine the nature and extent of contaminants. The Phase I Report (Camp Dresser & McKee, 1997) identified the following:

- Morro Bay: 26 "recognized environmental conditions" and at least 11 impaired conditions defined as "material recognized environmental conditions".
- Moss Landing: 17 "recognized environmental conditions" and at least 9 impaired conditions defined as "material recognized environmental conditions".
- Oakland: 15 "recognized environmental conditions" and at least 9 impaired conditions defined as "material recognized environmental conditions".

"Recognized environmental conditions" represent past or present incidents of release of hazardous substances or petroleum products to the ground, groundwater, or surface water. Impaired conditions are defined in the report as a situation of environmental contamination

"requiring extensive investigation and / or remedial efforts to address." (See section 4.9 - Hazards for further discussion of this issue.)

Cleanup of these contaminated soil and groundwater sites could require the use of heavy equipment and stockpiling of contaminated soil on or off-site. Contamination of run off from soil remediation activities has the potential to affect surface water quality, but permits may need to be obtained prior to any remediation work, and a remediation plan is usually prepared before such work begins. Remediation plans, and sometimes permits themselves, require that specified precautions be taken during remediation to protect human health and the environment. Examples of procedures and operational controls that are typically implemented during remediation activities or construction activities include: covering soil stockpiles to prevent any erosion and reduce infiltration, construction of a containment cell to prevent any runoff, watering disturbed areas to reduce dust generation, installation of a leachate control system to capture leachate generated and wearing proper protective equipment to prevent worker contact with contaminated soil. Many of these controls are contained in permit requirements that are issued by the regulatory agencies overseeing remediation activities.

Whatever entities own these plants, PG&E or any future purchaser, they would be subject to the same environmental and worker safety laws, rules and regulations. The plants, under whatever ownership, would be expected to conform to all pertinent environmental and safety requirements.

All of the construction and remediation activities would be conducted in accordance with applicable laws and regulations under the oversight of local agencies prior to any earth-moving activities in the affected areas. Further under the terms and conditions of the purchase and sale agreement, PG&E will be responsible for any legally required remediation of existing contaminated soil. Accordingly, PG&E would be responsible for remediation activities that are a part of, or result from, the ownership transition. Therefore, the impact would be less than significant because of current agreements and the regulatory environment.

Conclusion

Increased operation of the Morro Bay and Moss Landing power plants would be covered under their existing NPDES permits, and would therefore have a less-than-significant effect on surface water quality. If a new owner of the Oakland plant wished to operate the plant so that cooling water discharges could be made they would need to apply for a NPDES permit. The stipulations of the permit would regulate the discharge and ensure that no adverse environmental impacts would occur as a result. Therefore, the project has a less than significant impact on surface water quality in the San Francisco Bay. For a discussion on temperature impacts resulting from plant discharges, see section 4.7.

The remediation of contaminated soil and groundwater would be conducted in accordance with applicable laws and regulations under the oversight of local agencies prior to any earth-moving activities in the affected areas. PG&E will be responsible for any legally required remediation of

existing contaminated soil and would be responsible for remediation activities that are a part of, or result from, the ownership transition. Therefore, the impact of the project on the remediation of contaminated soils and groundwater would be less than significant because of current agreements and the regulatory environment. The resumption of the use of the marine terminal and pipeline at the Morro Bay Power Plant is considered very unlikely. It is no more likely under divestiture than under restructuring without divestiture, and regardless of the facility ownership, would require additional permits and environmental review before reactivation. Therefore, the project would have a less than significant impact on surface water quality.

d) Amount of Surface Water

The project could result in an increase in generating capacity, and therefore in the amount of surface water required by the Morro Bay and Moss Landing power plants. However, since the water source for these plants is the Pacific Ocean, any increase in water intake would be negligible and therefore, no impact would occur.

The Oakland power plant does not currently use water in the electrical generation process. If the Oakland Power Plant were to be reconfigured to require the use of cooling water, its most likely source would be the Oakland Estuary. Since Oakland Estuary has a direct hydrologic connection to San Francisco Bay, the use of a few hundred mgd of water would be negligible and therefore, no impact would occur.

Conclusion

There would be no impact related to changes in the volume of surface water.

e) Currents and Water Movements

Any of the power plants included in the project could be operated in a manner in which larger amounts of cooling water would be required. Increases in cooling water intakes and discharges from any of the divested plants have the potential to cause changes in the direction or rate of flow of surface waters. However, this potential impact is regulated by the Regional Water Quality Control Boards under Section 316(b) of the Clean Water Act. Power plants are required to perform analyses of currents caused by cooling water intakes, and may be required to institute Best Available Technology (BAT) to avoid significant impacts caused by intakes and outfalls. These studies and the BAT's are required in the NPDES permit for each plant. The effects of tides and littoral currents would be expected to overshadow any additional effects on the subject estuaries and ocean. Therefore, any impacts related to changes in the direction or rate of flow of surface water are assumed to be less than significant.

Conclusion

Any impacts related to changes in the direction or rate of flow of surface water would be less than significant.

f) Quantity of Ground Waters

Conclusion

There is no reasonably foreseeable scenario resulting from the project which would either use significant amounts of groundwater, or inject significant volumes of water into the groundwater system. Therefore, there would be no impacts related to changes in the quantity of groundwater.

g) Direction and Flow of Groundwater

Conclusion

There is no reasonably foreseeable scenario resulting from the project which would either use significant amounts of groundwater, or inject significant volumes of water into the groundwater. There is also no reasonably foreseeable construction under the project which would be likely to intercept local groundwater aquifers via major excavation. Therefore, there would be no impacts related to changes in the direction and flow of groundwater.

h) Groundwater Quality

As described in section 4.9, Hazards, soil and/or groundwater contamination has been found at each site.

Under the terms of the project, PG&E would retain all liability for soil and groundwater contamination resulting from PG&E activities on-site. Property transactions often have a beneficial impact on groundwater quality by hastening the identification and clean-up of contaminated sites. However, the new owners and PG&E would be under no obligations to remediate the sites unless required to by a regulatory agency.

Conclusion

The physical changes that are foreseen resulting from the project would not impact groundwater quality. However, should the project also hasten the clean up of contaminated soils or groundwater at the plants, this would be a beneficial impact on groundwater quality.

i) Groundwater available for Public Water Supplies

None of the power plants to be divested are located in the vicinity of major water supplies drawn from local groundwater. In addition there is no reasonably foreseeable action related to the

project that would change the amount of potable water or groundwater required by the power plants.

Conclusion

No impacts related to the amount of groundwater available for public water supplies would occur.