



<b>DOCKET</b>	
<b>09-AFC-1</b>	
DATE	MAR 28 2011
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March 28, 2011

Dockets Unit  
California Energy Commission  
1516 Ninth Street, MS 4  
Sacramento, CA 95814-5512

Re: Watson Cogeneration Steam and Electric Reliability Project  
Application for Certification 09-AFC-1

On behalf of Watson Cogeneration Company, the applicant for the above-referenced Watson Cogeneration Steam and Electric Reliability Project, we are pleased to submit the following:

- Responses to CEC Requests from the February 3, 2011 PSA Workshop Continuation.

This document is being submitted to the CEC for docketing.

Sincerely,  
URS Corporation

Cindy Kyle-Fischer  
Project Manager

Enclosure

cc: Proof of Service List

# RESPONSES TO CEC REQUESTS FROM THE FEBRUARY 3, 2011 PSA WORKSHOP CONTINUATION APPLICATION FOR CERTIFICATION (09-AFC-1) for Watson Cogeneration Steam and Electric Reliability Project



Submitted to:  
California Energy Commission  
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Sacramento, CA 95814-5504



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March 2011

**Responses to CEC Requests from the February 3, 2011 PSA Workshop  
Continuation**

Soil and Water Resources.....1

**Attachments**

Attachment A    Revised Section 5.5 Water Resources

## **List of Acronyms and Abbreviations Used in Responses**

AFC	Application for Certification
afy	acre-feet per year
Applicant	Watson Cogeneration Company
BP Refinery	BP Carson Refinery
CEC	California Energy Commission
CEQA	California Environment Quality Act
HRSG	heat recovery steam generator
IEPR	Integrated Energy Policy Report
LORS	laws, ordinances, regulations, and standards
mgd	million gallons per day
%	percent
Project	Watson Cogeneration Steam and Electric Reliability Project
RO	reverse osmosis
WBMWD	West Basin Municipal Water District

## SOIL AND WATER RESOURCES

**Technical Area:** Soil and Water Resources

**Author:** Alan Solomon

### BACKGROUND: PRELIMINARY STAFF ASSESSMENT WORKSHOP WATER DISCUSSION

In the original Application for Certification (AFC), and subsequent data responses, the applicant stated that reclaimed water is the preferred water source option over municipal water and groundwater pumping. Additionally, the applicant also provided a will-serve letter from BP Carson Refinery (an entity separate from the applicant) stating that the refinery will provide the proposed BP Watson project with reclaimed water.

At the workshop, the applicant stated that discussions between BP Carson Refinery and the West Basin Municipal Water District are still on-going. The applicant could not project when the negotiations would be concluded and stated that the discussion may not be finalized by the time the project is either approved and/or construction begins.

The applicant did stress that it is the goal of BP Watson to use reclaimed water. However, until the negotiations between BP Carson Refinery and the West Basin Municipal Water District are finalized, the applicant wants to use the municipal and groundwater which is available to the existing Watson Cogeneration Facility (approved by the Energy Commission in 1986 in Docket No. 85-AFC-1).

Currently, the Watson Cogeneration Facility uses a combination of municipal water and onsite groundwater drawn from wells. The 1986 Conditions of Certification for the Watson Cogeneration Facility do not set a limit as to how much water the existing facility can use; however, the applicant stated that they would be willing to have a water usage limit imposed on them. The water usage limit would be based on historical water use for the existing 4-trains comprising the Watson Cogeneration Facility. The applicant stated that they would use the same amount of water for the 4-trains as for the proposed 5-trains (i.e., there will be no increase in water usage over the historical amount used).

### **Modified AFC and Additional Information Requested by CEC Staff**

Based on a preliminary understanding of the changes proposed by the applicant, staff stated it needed additional information and data on which to base its analysis. This additional information will modify the AFC and includes, but should not be limited to, the following:

#### DATA REQUEST

- 1. An updated project description related to water supply and the LORS & Policy implications of their new proposed water supply. The revised project description should detail:***
  - a) How the 5-train plant can now operate with a significantly smaller water supply (~5,600 AFY vs. 8,600 AFY).***

- b) Why the new proposed freshwater supply meets CEC Policies and LORS as compared to the assertion in the original AFC, which indicated that a Freshwater supply would not meet the LORS/Policy tests. Note that the Energy Commission and State Water Board policies discuss "freshwater use for power plant cooling". Additionally, the State Water Board's 2009-2011 Recycled Water Policy is not discussed in your revised document.**
- c) The status of the recycled water conversion, and why they are changing their proposed supply from recycled water to fresh water.**

RESPONSE

**a)**

The 5,607 acre-feet per year (afy) water use estimate provided in the original Table 5.5-9 in Section 5.5 (Water Resources) of the Application for Certification (AFC) has been reduced to 4,609 afy (or 4.11 million gallons per day [mgd]) as shown in Second Revision Table 5.5-9 (Watson Water Sources and Uses/Wastewater Production) in the Revised Section 5.5, which has been included as Attachment A in this response document. The 5,607 afy from the original Water Resources section in the AFC accounted for gross raw reclaimed water supplied to an 80 percent (%) efficient reverse osmosis (RO) treatment system (for the first pass RO water). Such processing of the reclaimed water, if and when reclaimed water becomes available, will be handled off site (not actually part of the Watson Cogeneration Steam and Electric Reliability Project [Project] or the existing Watson Cogeneration Facility) and the treated water will be provided to the Watson Cogeneration Facility. Therefore, the original estimate overstated actual water consumption at the existing Watson Cogeneration Facility.

All five cogeneration units (i.e., the existing four cogeneration trains plus the Fifth Train that is the Project) can continue to operate on 4,609 afy if Watson Cogeneration Facility (the existing four trains plus the Project) does not materially increase steam provided to the BP Carson Refinery (BP Refinery). The proposed operation without new reclaimed water supplies would satisfy the Project objective of increasing reliability, but would not be able to satisfy the Project objective to increase steam supplies to the BP Refinery. The additional water supply provided by the reclaimed water would be required to allow Watson Cogeneration Facility to materially increase steam supplies to the BP Refinery. The fact that increasing steam supplies to the BP Refinery is one of the Project objectives is significant in two ways: (1) as a matter of law, the California Energy Commission (CEC) could not impose the proposed condition limiting fresh water use to the historic baseline as a California Environmental Quality Act (CEQA) alternative absent the agreement of the Applicant (i.e., Watson Cogeneration Company), and (2) the Applicant has a significant incentive to pursue the reclaimed water supply to meet this Project objective.

**b)**

The assertion in the original Section 5.5 of the AFC that the Project without recycled water would not comply with the CEC's 2003 Integrated Energy Policy Report (IEPR) water policy and therefore not comply with laws, ordinances, regulations, and standards (LORS) was correct only inasmuch as it applies to additional water supply to the Project. That statement was also based on an assumption that recycled water would be economical and available to the Project—a fact which cannot be determined until negotiations with the supplier have been concluded. Furthermore, that statement also pre-dated the Applicant's proposal to limit combined water supply from wells and municipal supplies to the historic baseline use of the existing units (i.e., no additional freshwater supplies will be used). With that limitation included as a condition of certification, and in combination with the Applicant's proposal to use recycled water, if and when it becomes available at reasonable cost, the proposal complies with CEC policies and all applicable LORS. Revised Section 5.5 (included as Attachment A in this response document) contains updated text to reflect the compliance of the Applicant's proposal with the IEPR water policy.

The proposed limitation essentially "offsets" all water use from the Project (i.e., the new Fifth Train unit) with commensurate reductions from the existing Watson Cogeneration Facility (i.e., the existing four units) such that there is no increased use of fresh water as a result of the proposed Project. Therefore, there can be no environmental impact resulting from the use of fresh water.

This offset concept has been employed in similar AFCs approved by the CEC or pending approval with CEC staff endorsement. For example, in the Abengoa Mojave Solar Project (CEC Docket Number 09-AFC-5), the CEC approved the use of groundwater with no limitation on use or commitment to use recycled water where the applicant agreed to offset such use through the surrender of an equivalent amount of adjudicated groundwater rights (CEC, 2010a).

Similarly, in the pending Mariposa Energy Project AFC (CEC Docket Number 09-AFC-3), the applicant has proposed to offset fresh water use with conservation measures resulting in no net increase in fresh water use. The CEC staff has supported this concept as complying with the CEC's policy, stating:

"The fresh water used for construction and plant processes would be offset through the implementation of a voluntary water conservation program resulting in a no-net increase in fresh water use within BBID [Byron Bethany Irrigation District]. Staff would consider the project to be in compliance with the intent of the Energy Commission water use policy with project implementation of facility-specific water conservation measures and development and implementation of a regional water conservation program that would conserve a volume of raw surface water equivalent to the volume used by the project for process requirements." (CEC, 2010b).

Thus, the proposal to limit water use to ensure that there will be no net increase in the use of fresh water resulting from the Project, combined with the intention (as well as a strong,

financial incentive) to use recycled water if it becomes available, is consistent with the CEC's water policy as applied in other cases. Indeed, in many ways, the Watson Project proposal goes further than these other cases as it also includes a strong, financial incentive to use recycled water if and when it becomes available. That incentive, as discussed above, is that a key Project objective (increasing steam supply to the refinery) can only be met if the Project obtains recycled water to meet the additional water supply requirements.

And for the record, the Applicant notes that the CEC's IEPR water policy is not enforceable as a rule of general applicability because it has not been properly adopted as a regulation in compliance with the California Administrative Procedure Act. The mere inclusion of a statement of policy in a report without any rulemaking process or environmental impact analysis under CEQA cannot be deemed to create a legally enforceable requirement.

Additionally, as discussed with CEC staff at a recent workshop, that water policy was adopted based in reliance upon State Water Resources Control Board Resolution 75-58 (California State Water Resources Control Board, 1975), which the CEC staff has interpreted as limiting the use of inland fresh water for power plant cooling in all situations. In fact, the principle in the Resolution that fresh water may only be used for power plant cooling when other sources (e.g., recycled water or dry cooling) are "environmentally undesirable or economically unsound" arguably applies only to new appropriations of surface water, and not to groundwater or changes in use of existing surface water appropriations. This is a critical distinction not only in California water law but also under CEQA because the environmental impact of a change in water use can only be determined by comparing the impacts of the prior use to those of the proposed new use. Thus, a close reading of the Resolution shows that its only specific mandate regarding petitions for changes in surface water use is that they undergo a CEQA review to determine the relative impacts of the change. That is a sensible policy since a change of use to power plant cooling might be environmentally preferable to continuing the existing use or to other likely alternative uses.

The CEC has never received or conducted any such analysis generically, nor has the CEC received or conducted such analysis specific to this Project. As a non-consumptive use, using inland fresh water for power plant cooling may involve fewer environmental impacts than alternative uses such as new residential/commercial development, agriculture, and others. Indeed, the CEC has never done any environmental analysis of the actual impact of its IEPR policy, which likely has growth-inducing impacts as well as direct impacts by shifting water use from power plants to other possibly more damaging uses. Simply put, in the context of a new appropriation, water not used by a power plant can be thought of as "saved." But in the context of a change in use of previously appropriated water, water not used by a power plant is not "saved," but used for some other, possibly more damaging or consumptive purpose.

Finally, specific to this Project, it should be noted that the proposed use of inland fresh water would not even involve a change of use, let alone a new appropriation. Neither the use of groundwater (which is not subject to the policy at all) nor the sale of water to the

Project by a water agency would involve any petition to the State implicating the mandatory provisions of the Resolution.

Nonetheless, while reserving these objections to the application to this Project of the CEC's IEPR policy or of Resolution 75-58, the Applicant reiterates that it has put forward proposals that fully comply with the intent and specific requirements of each of these policies as applied by the CEC and its staff in other recent cases.

As to the question regarding consistency with California State Water Resources Control Board Resolution 2009-0011, Policy for Water Quality Control for Recycled Water (California State Water Resources Control Board, 2009), the Applicant has reviewed that policy and finds that it applies by its terms to the permitting and encouragement of recycled water projects and to the use of recycled water by "water agencies." It is applicable to the instant Project, if at all, only through its introductory statements describing a goal of encouraging the use of recycled water generally. The Project is consistent with this non-mandatory goal as it is designed to utilize recycled water if and when available and would involve a limitation on use of fresh water that will provide a very strong incentive for the use of recycled water. Revised Section 5.5 of the AFC addresses Resolution 2009-0011.

c)

The Project relies on the BP Refinery for water supply and will utilize reclaimed water when available from the BP Refinery. The water supply discussion presented in the original Water Resources section of the AFC was based on the assumption that the West Basin Municipal Water District (WBMWD) and the BP Refinery would come to terms on an agreement to supply reclaimed water to the BP Refinery and that construction of the required WBMWD facilities would be completed prior to commercial operation of the Project. The BP Refinery and WBMWD are still evaluating options and negotiating terms for supplying reclaimed water to the BP Refinery. Until the BP Refinery and WBMWD agree to terms and WBMWD completes construction of the required facilities, the timing of deliveries of reclaimed water supplies will remain uncertain.

## REFERENCES

California Energy Commission (CEC). 2010a. Abengoa Mojave Solar Project, Commission Decision, Docket Number 09-AFC-5. September.

CEC. 2010b. Mariposa Energy Project, Supplemental Staff Assessment, Docket Number 09-AFC-3, Soil & Water Resources. Page 4.12-21. December.

California State Water Resources Control Board. 1975. State Water Resources Control Board Resolution No. 75-58, Water Quality Control Policy on the Use and Disposal of Inland Waters for Power Plant Cooling. June 19.

California State Water Resources Control Board. 2009. Resolution 2009-0011, Policy for Water Quality Control for Recycled Water. February 3.

## DATA REQUEST

- 2. Total water supply for the plant including a breakdown of water to be provided from municipal sources and onsite groundwater.***

## RESPONSE

The requested information was previously provided in subsection 5.5.1.7 (Water Supply History and Future Projections) of the original Section 5.5 of the AFC. The information is also presented with minor clarifications in the Revised Section 5.5 (see Attachment A). The information is reiterated below:

“...the existing Watson configuration requires an annual average total raw water supply of 4.1 mgd (4,609 acre-feet per year [afy]). The raw water, after suitable treatment, is utilized for makeup supply to the heat recovery steam generator (HRSG) boilers, cooling tower cells, utility water, and fire water system. Of the total raw water intake requirements, 2.7 mgd (3,075 afy) is obtained from the California Water Services Company and the remaining 1.4 mgd (1,534 afy) is obtained from onsite wells at the BP Refinery.”

## DATA REQUEST

- 3. *Historic (5-year) data on water use for the existing 4-train plant to help develop baseline.***

## RESPONSE

The requested information has been provided in Revised Section 5.5 of the AFC (see Attachment A). The information is presented in Table 5.5-3A (Annual Average of Daily Water Usage 2000 – 2010) in the Revised Section 5.5.

## DATA REQUEST

- 4. Water balance details for the existing 4-train plant and the proposed 5-train plant. This will help us to understand the volumes of water proposed for process, cooling, and steam/High Pressure water to the Refinery.***

## RESPONSE

Details of the Project's water supply, internal flows, and wastewater are provided in Revised Table 5.5-4 (Water Balance Flow Values) in the Revised Section 5.5 (see Attachment A). This table includes the volumes of water proposed for process, cooling, and steam/high pressure water to the BP Refinery for the Project. Second Revision Table 5.5-9 (Watson Water Sources and Uses/Wastewater Production) summarizes sources and uses of water for the existing, four-train Watson Cogeneration Facility and for the Watson Cogeneration Facility after the addition of the Project. To the extent CEC staff requests information related to the steam requirements of the BP Refinery, the Applicant maintains its objection as stated in the response to CEC Data Request Number 21, submitted on September 21, 2009.

The Applicant's proposal to limit water use to ensure that there will be no net increase in the use of fresh water resulting from the Project alleviates any concern that the mix of freshwater supply to the Watson Facility will change as a result of the Project.

Attachment A  
Revised Section 5.5 Water Resources

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## 5.5 WATER RESOURCES

In its water resources formulation and evaluation of most-plausible water resource options for the Watson Cogeneration Steam and Electric Reliability Project (Project), the Watson Cogeneration Company (Watson or Applicant) considered benefits and impacts on subjects ranging from environmental to financial. Each subject was considered on a local, regional, state, and federal basis, where appropriate. The Project's water resource evaluation included the following criteria.

- The existing water-related conditions and water demands in the surrounding Project Area.
- Water statutes, regulations, jurisdictions, and policies.
- The water usage by the existing Watson Cogeneration Facility configuration.
- The Project source water and wastewater demands (at maximum annual load), and their inter-dependency.
- Mitigation needs and plans, where appropriate.
- Common goal/opportunity advantages.
- Alternatives for additional water supply.

The Project water resources evaluation and preferred raw water source and wastewater disposal options are presented in this section. The water resources data and information for the Project Area, and the water demand data, were used to identify and evaluate the potential effects of the Project on local water resources, and to identify mitigation measures that would reduce potential significant impacts (if any) to a level of insignificance. Details of this evaluation are presented below.

Unlike most other power projects, the objectives of the Project is are to improve reliability of the Watson Cogeneration Facility and to provide increased process steam supplies and electric power to the adjacent BP Carson Refinery (BP Refinery). As such, the water supply requirements will be greater than experienced with a single-purpose power project. It is also important to recognize that the BP Refinery is implementing a separate program to convert the industrial water supplies from municipal and groundwater to reclaimed supplies from the West Basin Municipal Water District (WBMWD). The goal of this program is to displace, to the extent possible, current uses of fresh water, including the requirements of the Watson Cogeneration Facility and to provide increased water supplies to meet the Project objective of providing increased steam supplies to the BP Refinery. WBMWD has performed engineering studies and the BP Refinery and WBMWD are negotiating and evaluating options for reclaimed water. It is anticipated that the BP Refinery will provide a reclaimed water supply to the Watson Cogeneration Facility if and when available as part of this conversion.

### 5.5.1 Existing Site Conditions

#### 5.5.1.1 Site Location

The Project Site is located within the boundary of the existing Watson Cogeneration Facility, at 22850 South Wilmington Avenue, Carson, California. Figure 3-1, Regional Map and Figure 3-2, Project Vicinity Map, depict the Project and surrounding area. The Project Site is located in the City of Carson approximately 0.7 mile south of the 405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east.

The Project Site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre parcel further described as Assessors Parcel Number (APN) 7315-006-003, 1801 Sepulveda Boulevard, Carson, California, 90745 and is integral to BP's existing Carson Refinery (BP Refinery). The street address of the Project Site is located within the boundary of the existing Watson Cogeneration Facility at 22850 South Wilmington Avenue, Carson, California. The site is adjacent to the existing Watson Cogeneration Facility. There is an existing warehouse/maintenance shop currently on a portion of the site which will be removed as part of the Project.

The Construction Laydown and Parking Area is a paved 25-acre parcel located approximately 1 mile southeast of the Project Site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street. The area is owned by BP and is currently used as a truck parking and staging area.

No off-site improvements associated with the Project, such as water supply, natural gas or wastewater pipelines, are currently planned for the Project. The Project will connect to the existing supply pipelines currently located at the facility.

The Project Site elevation is approximately 32 feet above mean sea level (MSL). Because the site is located within the existing BP Refinery property boundary, the Project Site and surrounding areas are highly developed, and have been subject to disturbance for many years. The site topography is shown on Figure 3-10, Preliminary Drainage Plan.

#### 5.5.1.2 Physiographic Setting

The Project Site is located in the City of Carson in the southwestern portion of the Los Angeles Basin, in the Peninsular Ranges physiographic and tectonic province. The Los Angeles Basin extends from the Santa Monica Mountains on the north, San Gabriel Mountains on the east, the Santa Ana Mountains on the south, and the Pacific Ocean on the west.

#### 5.5.1.3 Climate

The climate of the South Coastal area in the vicinity of the Project Site can be characterized as semi-arid. The South Coastal area experiences long, dry summers and relatively mild winters. Monthly mean, maximum, and minimum temperature data based on a 42-year record for the Long Beach weather station are presented in Table 5.5-1, Monthly Temperature (°F) Data for Long Beach, California. Based on 42 years of record, the average annual temperature for Long Beach is 63.1 degrees Fahrenheit (°F).

**Table 5.5-1  
Monthly Temperature (°F) Data for Long Beach, California**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	65.2	66.0	67.4	69.5	71.5	74.1	79.7	80.6	79.6	75.9	71.8	67.0
Mean	55.3	56.7	58.2	60.6	63.4	66.1	70.7	71.6	70.2	66.3	61.3	57.0
Min	45.6	47.4	49.0	51.8	55.3	58.1	61.8	62.5	60.8	56.7	50.9	46.9

Source: National Weather Service, 2008.

Notes:

°F = degrees Fahrenheit

max = maximum

min = minimum

Precipitation in the area is characterized by long dry summers and intermittent wet periods. The Long Beach weather station (No. 045082) has a 42-year record of precipitation. Based on this record, the average annual precipitation is 12.59 inches. See Table 5.5-2, Long Beach Average Monthly Precipitation (Inches).

**Table 5.5-2  
Long Beach Average Monthly Precipitation (Inches)**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.65	2.84	1.73	0.99	0.13	0.05	0.00	0.03	0.20	0.32	1.36	2.29

Source: National Weather Service, 2008.

#### 5.5.1.4 Surface Water and Flooding

The surface water from the area surrounding the Project Site currently flows to the Dominguez Channel. Relative to the Project Site, the Dominguez Channel is located approximately 0.4 mile to the east, the Pacific Ocean is approximately 8.5 miles to the west, and Long Beach Harbor is approximately 5 miles to the south. The principal surface drainage element in the Project vicinity is the Dominguez Channel (Figure 3-5, Topographic Site Plan).

The Dominguez Channel drains approximately 80 square miles west of the Los Angeles River basin. The Dominguez Channel originates in the area southeast of Los Angeles International Airport and flows southward to a point where it enters the East Channel of the Los Angeles Harbor north of Terminal Island. The Dominguez Channel is approximately 80 feet wide at the bottom, with a flood depth capacity of 26.7 feet. The portion of the Dominguez Channel downstream of Vermont, which includes the reach adjacent to the BP Refinery, is classified as an estuary. The banks of the Dominguez Channel in the vicinity of the BP Refinery are lined with rip rap. Average annual discharge through the Dominguez Channel is estimated at 16,000 acre-feet, most of which occurs during winter storm months.

The Project Site is designated as a "C" zone for flood management and there are no Flood Insurance Rate Maps for incorporated areas of Carson. The "C" zone designation indicates that the area does not require flood insurance and that the potential for flooding is low.

### 5.5.1.5 Geology

The South Coast Hydrologic Region covers approximately 6.78 million acres (10,600 square miles) of the southern California watershed that drains to the Pacific Ocean. It is bounded on the west by the Pacific Ocean and the watershed divide near the Ventura-Santa Barbara County line. The northern boundary corresponds to the crest of the Transverse Ranges through the San Gabriel and San Bernardino mountains. The eastern boundary lies along the crest of the San Jacinto Mountains and low-lying hills of the Peninsular Range that form a drainage boundary with the Colorado River Hydrologic Region. The southern boundary is the international boundary with the Republic of Mexico. Significant geographic features include the coastal plain, the central Transverse Ranges, the Peninsular Ranges, and the San Fernando, San Gabriel, Santa Ana River, and Santa Clara River valleys.

### 5.5.1.6 Hydrogeology

The hydrogeology of the South Coast Hydrologic Region is summarized in California Department of Water Resources (DWR) California Groundwater Bulletin 118-2003 (DWR 2004). The Project is located in the West Coast Subbasin of the South Coast Hydrologic Region.

#### *Groundwater Subbasin*

The West Coast Subbasin of the Coastal Plain of the Los Angeles Basin is adjudicated and commonly referred to as the “West Coast Basin.” It is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills (DWR 2004). The surface of the subbasin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay (DWR 2004).

#### *Aquifer Characteristics*

The water-bearing deposits include the unconsolidated and semi-consolidated marine and alluvial sediments of Holocene, Pleistocene, and Pliocene ages. Discharge of groundwater from the West Coast Subbasin occurs primarily by pumping extractions.

The semiperched aquifer of both Holocene and Pleistocene age is unconfined. The water in underlying aquifers is confined throughout most of the subbasin, though the Gage and Gardena aquifers are unconfined where water levels have dropped below the Bellflower aquiclude. These aquifers merge in places with adjacent aquifers, particularly near Redondo Beach.

The Silverado aquifer, underlying most of the West Coast Subbasin, is the most productive aquifer in the subbasin. It yields 80 to 90 percent of the groundwater extracted annually.

### *Groundwater Occurrence and Flow*

Pleistocene and Recent marine and river channel deposits underlie the Project vicinity to a depth of approximately 1,500 feet. These large lenticular to relatively continuous beds of sand and gravels constitute the major aquifers in the area. In order of depth, the four aquifers of interest within the western Los Angeles Basin area are: (1) the Gaspar aquifer; (2) the 200-foot sand aquifer interval; (3) the 400-foot gravel aquifer; and (4) the Silverado water-bearing zone.

- The Gaspar aquifer occurs as a north/south-trending sand and gravel zone that trends beneath the present Los Angeles River flood plain and extends offshore beneath the San Pedro Bay.
- The 200-foot sand aquifer ranges in elevation from the ground surface to about 250 feet below sea level. The 200-foot aquifer consists of unnamed marine gravelly sand, sand, silt, and silty clay of the upper Pleistocene age.
- The “400-foot gravel” aquifer is an entirely confined aquifer occurring within the upper 75 to 80 feet of the middle Pleistocene San Pedro Formation. Water-bearing strata consist of silty sand, coarse sand, and sandy gravel.
- The Silverado water-bearing zone is the thickest and most productive of the Pleistocene water-bearing units in the Wilmington-Long Beach area. The Silverado water-bearing zone consists of numerous aquifers, as well as water-confining layers. Thus, as defined by Zielbauer et al. (1962), the Silverado is considered as all the aquifer portions of the stratigraphic interval between a depth of 390 feet in Long Beach and the base of the San Pedro Formation. The average thickness of the water-bearing zone is on the order of 200 feet, with maximum recorded thickness reaching over 700 feet in the Wilmington District.

The water table ranges from about 10 to 40 feet elevation relative to MSL across the BP Refinery. The water table is encountered between about -25 and -29 feet MSL beneath the Project Site and corresponds to a depth of about 58 to 60 feet beneath the ground surface.

The flow direction of shallow groundwater is to the southwest beneath the northern part of the BP Refinery (including the Watson Cogeneration Facility), to the west beneath the eastern part of the refinery. The average gradient across the site is relatively flat at about 0.003 foot/feet.

### *Groundwater in Storage*

The storage capacity of the primary water producing aquifer, the Silverado aquifer, is estimated to be 6,500,000 acre-feet. Specific yield values range from one percent to 26 percent, with a subbasin average of 13 percent (DWR 2004).

### *Surface Water Quality*

Within the Project vicinity, surface runoff flows into a network of storm drains that are pumped into the BP Refinery’s existing treatment system onsite. During rain events, stormwater runoff can be discharged to the Dominguez Channel under a state General Industrial National Pollutant Discharge Elimination System (NPDES) stormwater permit.

The beneficial uses designated for the Dominguez Channel and water quality objectives to protect those beneficial uses are established by the Regional Water Quality Control Board (RWQCB) in the Water Quality Control Plan.<sup>1</sup> The beneficial uses of the Dominguez Channel are:

- Contact and non-contact water recreation.
- Preservation of rare and endangered species.
- Industrial water supply.
- Navigation.
- Commercial and sport fishing.
- Marine habitat.
- Estuarine habitat.
- Wildlife habitat.
- Migratory and spawning habitat.

The Dominguez Channel drains a highly urbanized area with numerous nonpoint sources of pollution for Benzo(a)pyrene (polyaromatic hydrocarbons [PAHs]) and also contains remnants of persistent legacy pesticides as well as polychlorinated biphenyls (PCBs) which result in poor sediment quality both within the Dominguez Channel and in adjacent inner harbor areas. The Dominguez Channel estuary is identified as impaired<sup>2</sup> for the following pollutants/stressors:

- Ammonia
- Benthic community effects
- Benzo(a)pyrene (PAHs)
- Benzo(a)anthracene
- Chlordane (tissue)
- Chrysene (C1-C4)
- Coliform bacteria
- DDT (tissue & sediment)
- Dieldrin (tissue)
- Indicator bacteria
- Lead (tissue)
- PCBs (Polychlorinated biphenyls)

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<sup>1</sup> Water Quality Control Plan: Los Angeles Regional Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, California Regional Water Quality Control Board, Los Angeles Region. June 13, 1994.

<sup>2</sup> 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments Requiring TMDLs, California Water Resources Control Board, 2006.

- Phenanthrene
- Pyrene
- Zinc (sediment)

### *Groundwater Quality*

The character of water in the Gaspar zone of the West Coast Subbasin is variable. Seawater intrusion has produced deterioration of water quality over time. Early tests indicated that the water was sodium bicarbonate in character. It is questionable whether this is representative of the entire zone, because the higher quality water residing outside the West Coast Subbasin is calcium bicarbonate in nature. However, this is immaterial to the Project as use of additional groundwater supplies is not proposed.

The Gardena water-bearing zone exhibits a calcium-sodium bicarbonate character and is of good quality. In the Silverado zone, the character of water varies considerably. In the coastal region of this zone, the water is calcium chloride in character, and then transitions into sodium bicarbonate moving inland. The Pico formation is sodium bicarbonate in nature and is of good quality. Data from 45 public supply wells shows an average total dissolved solids (TDS) content of 720 milligrams per liter (mg/L) and a range of 170 to 5,510 mg/L.

Seawater intrusion occurs in the Silverado zone along the Santa Monica Bay and in the Gaspar zone in the San Pedro Bay. Two seawater barrier projects are currently in operation. The West Coast Basin Barrier Project, which runs from the Los Angeles Airport to the Palos Verde Hills, and the Dominguez Gap Barrier Project which covers the area of the West Coast Subbasin bordering the San Pedro Bay. Injection wells along these barriers create a groundwater ridge, which inhibits the inland flow of salt water into the West Coast Subbasin to protect and maintain groundwater elevations.

#### *5.5.1.7 Water Supply History and Future Projections*

The annual average of daily water usage by the existing Watson Cogeneration Facility (the existing Watson configuration) for the period 2000 through 2010 in millions of gallons per day (mgd) is summarized in Table 5.5-3A, Annual Average of Daily Water Usage 2000–2010 (mgd). Based on this data, the existing Watson configuration requires an annual average total raw water supply of 4.1 mgd<sup>3</sup> (4,609 acre-feet per year [afy]). The raw water, after suitable treatment, is utilized for makeup supply to the heat recovery steam generator (HRSG) boilers, cooling tower cells, utility water, and fire water system. Of the total raw water intake requirements, 2.7 mgd (3,075 afy) is obtained from the California Water Services Company and the remaining 1.4 mgd (1,534 afy) is obtained from onsite wells at the BP Refinery.

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<sup>3</sup> The water use rate of the existing Watson configuration fluctuates on a daily basis, but it averages 4.1 mgd.

**Table 5.5-3A**  
**Annual Average of Daily Water Usage 2000–2010 (mgd)**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg
4.0	4.4	4.5	4.4	4.2	4.3	4.0	4.1	3.8	3.8	3.7	4.1

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2011.

### *Municipal Water Supply*

The California Water Services Company's Rancho Dominguez District provides water service to 89,300 urban residential, commercial, and industrial customer connections through 973 miles of pipeline, 21 wells, 88 booster pumps, and 46 storage tanks, primarily in the South Bay area of Los Angeles County. The Rancho Dominguez District's service area includes Hermosa Beach, Redondo Beach, the Palo Verdes Peninsula, Hawthorne, Torrance, Carson, Compton, Long Beach, and Harbor City. The portion of the service area that includes Watson is supplied with a combination of imported Colorado River and State Water Project water supplies from the Metropolitan Water District of Southern California and groundwater pumped from wells.

The BP Refinery and the Watson Cogeneration Facility currently rely primarily on water supply from the California Water Services Company augmented by on-site wells. The volume of combined municipal and on-site groundwater supply used by the Project will be reduced if and when the BP Refinery completes the reclaimed water conversion project and reclaimed water becomes available to the Project. The quality of the water from the California Water Services Company and groundwater supplies are provided in Table 5.5-3B, Characterization of Existing Water Supplies.

**Table 5.5-3B**  
**Characterization of Existing Water Supplies**

	Cal Water <sup>1</sup>		Well 13 Water Analysis <sup>2</sup>	
	As Such	As CaCO <sub>3</sub>	As Such	As CaCO <sub>3</sub>
Ca, mg/L	63.0	158	35.0	88
Mg, mg/L	22.0	90	7	27
Na, mg/L	97	210	49	106
K, mg/L	4.9	6.3	3	4.0
<b>TOTAL CATIONS</b>	<b>187</b>	<b>465</b>	<b>94</b>	<b>225</b>
M Alkalinity, mg/L		110		170
SO <sub>4</sub> , mg/L	190	198	8	8
Cl, mg/L	97	137	27	38
NO <sub>3</sub> , mg/L	2.1	1.7	0	0.2
SiO <sub>2</sub> , mg/L	9		23	
<b>TOTAL ANIONS</b>	<b>298</b>	<b>446</b>	<b>58</b>	<b>216</b>
HCO <sub>3</sub> , mg/L	134	110	207	170
CO <sub>3</sub> , mg/L	ND		ND	
OH, mg/L	ND		ND	
pH, Standard Units	8.3		8.2	
Specific Conductance, μS/cm	900		430	

**Table 5.5-3B**  
**Characterization of Existing Water Supplies**

	Cal Water <sup>1</sup>		Well 13 Water Analysis <sup>2</sup>	
	As Such	As CaCO <sub>3</sub>	As Such	As CaCO <sub>3</sub>
Total Hardness, mg/L	248		114	
Ortho Phosphate, mg/L	<0.1		<0.5	
Total Phosphorous, mg/L	<0.2		<1.0	
Ba, mg/L	0.11		<0.05	
Fe, mg/L	<0.05		<0.05	
Mn, mg/L	<0.05		<0.05	
TSS, mg/L	<1.6		<1.3	
TOC, mg/L	<2.0		<2.0	
<b>Trace Metals</b>				
Zinc, ppb	<50		<50	
Boron, ppb	20		<100	
Copper, ppb	<50		<50	
Lead, ppb	<0.1		<100	
Arsenic, ppb	ND		ND	
Nickel, ppb	<50		<50	
Cadmium, ppb	<50		<50	
Chromium, ppb	<50		<50	
Cyanide, ppb	ND		ND	
Mercury, ppb	ND		ND	
Selenium, ppb	ND		ND	
Strontium, ppb	900		360	
Antimony, ppb	ND		ND	
Silver, ppb	ND		ND	
Aluminum, ppb	200		<100	

Source: Kiewit Power Engineers Co., 2008.

Notes:

<sup>1</sup> Analysis of 7/30/08.

<sup>2</sup> Sampled 6/30/08.

<	= less than	M	= measured by the methyl orange method
Ba	= barium	Na	= sodium
Ca	= calcium	ND	= not detected
CaCO <sub>3</sub>	= calcium carbonate	NO <sub>3</sub>	= nitrate
Cl	= chlorine	OH	= hydroxide
CO <sub>3</sub>	= carbonate	ppb	= parts per billion (same as micrograms per L or µg/L)
Fe	= iron	SiO <sub>2</sub>	= silicon dioxide
HCO <sub>3</sub>	= bicarbonate	SO <sub>4</sub>	= sulfate
K	= potassium	TOC	= total organic carbon
Mg	= magnesium	µS/cm	= micro Siemens per centimeter
mg/L	= milligrams per liter		

### *Onsite Groundwater Wells*

The BP Refinery has nine onsite groundwater wells, although only three are in service due to poor water quality. Two wells are located in the northern section of the refinery and seven in the south end. These two systems are not connected. Groundwater for the existing Watson configuration comes from Well 13, which is in the north end of the refinery. This supply is blended with municipal supply that has been previously used in the combustion turbine generator (CTG) evaporative coolers. Well water is also pumped into two fire water tanks and a boiler feedwater tank.

In the 1940s the Los Angeles County Court adjudicated the amount of water that could be drawn from the basin by assigning rights to communities and businesses in the area. The BP Refinery utilizes water in accordance with these original rights. These adjudicated rights can also be leased to others. The BP Refinery also leases additional groundwater rights from surrounding parties. The California Water Replenishment Department has an “In-lieu Seasonal Storage Program” that encourages the shutdown of some of these wells during the rainy season. During those periods the incremental water required for the existing Watson Cogeneration Facility is provided by the California Water Services Company.

#### *5.5.1.8 Wastewater History and Future Projections*

Wastewater streams generated at the existing facility include process wastewater, cooling tower cell blowdown, boiler blowdown, boiler feedwater treatment system, stormwater runoff, and sanitary sewage. The BP Refinery employs three separate wastewater management systems: process (oily) water, clean segregated stormwater, and sanitary wastewater.

### *Oily Water Treatment System*

The process wastewater from the existing facility flows to the existing oily water treatment system at the BP Refinery where it is commingled with refinery process wastewaters. Free oil and suspended solids recovered from this equipment are further processed by the refinery for reclamation and reprocessing of hydrocarbons.

Solids remaining after recovery of the hydrocarbons are considered to be Resource Conservation and Recovery Act (RCRA) hazardous waste because they are so listed by the United States Environmental Protection Agency (USEPA). The BP Refinery currently uses a licensed waste hauler to transport these residual solids to RCRA-approved incineration facilities.

Process wastes are also generated in the boiler feedwater treatment system. This system utilizes the hot lime/hot zeolite softening process. A spent lime slurry stream is generated. This stream is routed to holding tanks wherein the solids are allowed to settle and water is decanted for return to the process. The solids are a non-hazardous byproduct that is usable in the manufacture of concrete products. An additional wastewater stream is generated through the process of regenerating the hot zeolite softeners, using sodium chloride (salt) brine as the regenerant. The spent regenerant is routed to the process wastewater system.

The treated wastewater is then directed to a holding tank, from which it is released to the Los Angeles County Sanitation Districts (LACSD) joint treatment facility located in the City of Carson. This release to the LACSD facility is regulated by the terms of an industrial waste discharge permit issued by the LACSD. LACSD provides additional treatment of the refinery's

wastewater in combination with wastewaters from other sources. The treated effluent from the LACSD facility is directed through an outfall extending offshore into the Pacific Ocean.

### *Clean Water System*

The existing clean water system at the BP Refinery is designed to collect only clean stormwater runoff. This system discharges runoff from the Refinery directly to the Dominguez Channel at five points. A portion of this discharge includes commingled runoff from the existing Watson Cogeneration Facility. The discharge is regulated under the terms of an individual National Pollutant Discharge Elimination System (NPDES) permit issued to the BP Refinery by the California RWQCB, Los Angeles Region (Order No. R4-2007-0015, NPDES No. CA0000680), and state General Industrial NPDES stormwater permit.

During normal dry weather operation, a valve in the main sewer line near the point of discharge is maintained in the closed and locked position. During storm conditions, the Cogeneration foreman checks the sewer box upstream of this valve to determine the condition of any accumulated water. If the water is clear and clean, the valve to the Dominguez Channel is opened. If the water quality is questionable, a vacuum truck is used to remove water from this sewer box until it is running clean and clear.

The individual NPDES permit includes numerical and narrative discharge limitations. The state General Industrial stormwater NPDES permit requires maintenance and implementation of a stormwater pollution prevention plan (SWPPP) and the SWPPP provides the rationale for the selection of outfalls to be sampled.

Boiler blowdown from the existing facilities is normally reused by the BP Refinery. This reuse effectively reduces the amount of fresh water required. The BP Refinery's individual NPDES permit allows boiler blowdown from the BP Refinery and the Watson Cogeneration Facility to be discharged directly to the Dominguez Channel if it cannot be reused by the refinery, so long as the discharge limitations are met. This option will continue to exist for the duration of the individual NPDES permit. However, the Project will discharge all runoff to the oily water treatment system and will not utilize the clean water system.

### 5.5.2 Project Water and Wastewater Needs

The Project will consist of a General Electric 7EA CTG, with an inlet fogger cooling system, one duct fired HRSG, electrical distribution system, instrumentation and controls, and all necessary auxiliary equipment as described herein. The Project's primary objective is to provide additional process steam for the refinery's various operations. The General Electric 7EA CTG uses inlet cooling of the combustion air, which increases output by about 12.5 percent and improves heat rate (efficiency) by about 2.5 percent. Not only will use of the inlet cooling system improve the combustion turbine efficiency, requiring less fuel per kilowatt (kW), but it will increase output by 9 megawatts (MW).

As the primary purpose of the Project is to provide process steam and electric power to the adjacent BP Refinery, the use of dry (fin fan) cooling is inconsistent with the primary objective of the Project. Therefore, dry cooling was not evaluated in the design of the Project.

The water balance diagram (Figure 5.5-1 [Second Revision], Water Balance Flow Diagram) shows process water flow streams for the Project. Revised Table 5.5-4, Water Balance Flow Values, shows the maximum daily, average daily, and average annual water supply and disposal flows. Water needs at the Project Site are considerably greater than those required by a combined cycle generating facility as the steam produced is provided for process use in the BP Refinery. As reflected in Figure 5.5-1 (Second Revision) and Revised Table 5.5-4, water use and wastewater production are reduced significantly through re-use of internal waste streams. Wastewater production rates are approximately 6 to 7 percent of the water supply.

**Revised Table 5.5-4  
Water Balance Flow Values**

		<b>Maximum Daily (gal/day)</b>	<b>Average Daily (gal/day)</b>	<b>Average Annual (acre-feet/year)</b>
<b>Water Supply</b>				
A	Treated Water From Watson Cogeneration	2,069,280	2,040,480	2,286
B	Cooling Tower Makeup Water	593,280	391,680	439
	<b>Total</b>	<b>2,662,560</b>	<b>2,432,160</b>	<b>2,724</b>
<b>Internal Flows</b>				
C	Fogger supply	72,000	43,200	48
D	Treated Water to Boiler Feed System	1,997,280	1,997,280	2,237
E	Not Used	0	0	0
F	Not Used	0	0	0
FA	Not Used	0	0	0
FB	Not Used	0	0	0
G	Cycle makeup to steam cycle	1,821,600	1,821,600	2,040
H	Cycle makeup to Fifth Train desuperheater	156,960	156,960	176
I	Steam cycle blowdown to blowdown tank	93,600	93,600	105
J	Steam Cycle Blowdown to Refinery HP Water	70,560	70,560	79
K	Vent steam from blowdown tank	23,040	23,040	26
L	Not Used	0	0	0
M	Process steam to facility header	1,884,960	1,884,960	2,111
N	Not Used	0	0	0
O	Cooling tower cell evaporation	413,280	276,480	310
<b>Wastewater</b>				
P	Cooling tower cell blowdown	180,000	115,200	129
Q	Cycle makeup and miscellaneous losses	18,720	18,720	21
	<b>Total</b>	<b>198,720</b>	<b>133,920</b>	<b>150</b>

Source: Kiewit Power Engineers Co., 2008, 2011; Watson Cogeneration Steam and Electric Reliability Project Team, 2011.  
Notes:

The maximum daily use is based on 24 hours of full-load operation during the design hottest day (102 °F day/16 percent rh).  
The average daily use is 24 hours of the average of the full-load use at the average daily temperature (63.1 °F day/60 percent rh).

The average annual use is based on 8,760 hours/year at the average daily rate.

°F = degrees Fahrenheit

gal = gallon(s)

HP = high-pressure

rh = relative humidity

### 5.5.2.1 Alternative Sources of Additional Water Supplies

California State Water Resources Control Board Resolution No. 75-58<sup>4</sup>, referred to as the California Water Policy, addresses the use and disposal of inland waters used for power facility cooling. The California Water Policy applies to new appropriations of surface water by power plants and not changes in use of existing appropriations. As such, it is not applicable to this Project. Although not applicable, the Applicant has evaluated water supplies for the Project in accordance with the priorities of the California Water Policy, which are as follows (depending on site specifics, such as environmental, technical, and economic feasibility): 1) wastewater being discharged to the ocean; 2) ocean; 3) brackish water from natural sources or irrigation return flow; 4) inland wastewaters of low TDS; and 5) other inland waters. Each of these sources was evaluated for water supply to the Project. The following alternative water supplies were evaluated for the Project.

- Surface water – Water present in lakes, streams and rivers.
- Reclaimed water (Title 22 water) – Wastewater treatment plant (WWTP) effluent that has received tertiary treatment. Two types of reclaimed water are anticipated to become available to the Project from the BP Refinery with the implementation of the conversion project: 1) nitrified water (this is reclaimed water that has received a treatment to remove ammonia; this water is suitable for use in cooling tower cells); and 2) reverse osmosis (RO) Water (this is reclaimed water that has received single-pass treatment by RO to remove minerals).
- Municipal supply – Water available via the municipal water supply system.
- Agricultural wastewater – Drainage water from irrigation practices.
- Groundwater – Groundwater located in the aquifers beneath the Project Site.
- Ocean water – Water from the Pacific Ocean.

#### *Additional Water Supply Alternatives Decision Analysis*

The following hierarchy of “tests” was applied to each alternative source of additional water supply:

**Test 1** – Is the alternative source of additional water supply feasibly available at the Project? (If not, then disregard this alternative. If yes, proceed to Test 2.)

**Test 2** – Will the subject source of additional water supply satisfy the California Water Policy? (If not, then disregard this alternative source. If yes, proceed to Test 3.)

**Test 3** – Is the subject source of additional water supply technologically sufficient (quantity and quality) to guarantee high safety and reliability (98 percent availability)? (If no, then disregard this alternative. If yes, proceed to Tests 4 through 6.)

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<sup>4</sup> Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling, Resolution 75-58, State Water Resources Control Board. June 19, 1975.

Tests 1 through 3 address “fatal flaw” criteria. Alternative sources of additional water supply that did not pass Tests 1, 2 or 3 were not evaluated further.

Test 4 – Evaluate the other impacts associated with each alternative source of additional water supply, including transportation, biological, energy, health and safety, etc.

Test 5 – Evaluate the relative capital costs of each remaining alternative source of additional water supply.

Test 6 – Evaluate relative operations and maintenance (O&M) costs of each of the remaining alternative sources of additional water supply.

For alternative sources of additional water supply passing Tests 1 through 3, the evaluations from application of Tests 4 through 6 were evaluated, with the alternative with the highest evaluation selected.

### *Ocean Water*

This source of additional water supply passed Test 1 as it is available in close proximity to the Project Site. Ocean water may have also passed Test 2 as the source second in priority in the California Water Policy. However, the ocean water failed to pass Test 3 as the high concentration of dissolved solids renders this source of additional water supply unsuitable for the planned uses of water at the Project. Ocean water is unsuitable for use in steam generation and incompatible with the existing cooling tower cell system. This alternative was dropped from further consideration.

### *Reclaimed Wastewater*

Reclaimed wastewater is WWTP effluent that has received tertiary treatment (Title 22 water). The nearest source of reclaimed water is from the WBMWD’s West Basin Carson Regional Facility (formerly Dominguez Water Treatment Plant) in Carson. The West Basin Carson Regional Facility is located approximately 3 miles north-northwest of the Project. It is anticipated that both single-pass RO water and nitrified water will be made available to the Project by the BP Refinery if and when their conversion project is completed. Reclaimed wastewater passed Test 1 as a source of additional water supply as it is anticipated that it will become available to the Project Site in the foreseeable future. This alternative was identified as the preferred source of process water supply to address existing and additional supply needs if and when available from the BP Refinery.

### Reclaimed Wastewater — Reverse Osmosis

Single-pass RO reclaimed wastewater supply passed Test 1 because it is anticipated that it will be available from the BP Refinery’s distribution system at the Project Site if and when the Refinery’s conversion project is completed. Use of this supply would be consistent with California State Water Resources Control Board Resolution 2009-0011<sup>5</sup> by displacing existing uses of local freshwater supplies and beneficial use, rather than disposal, of recycled water. The

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<sup>5</sup> Policy for Water Quality Control for Recycled Water, Resolution 2009-0011, State Water Resources Control Board. February 3, 2009.

water quality characteristics of this supply are described in Table 5.5-5, Reclaimed Water Quality – Reverse Osmosis. This water would require additional treatment by second-pass RO prior to use for steam generator makeup at the Project.

The RO produced reclaimed water passed Test 3 as a primary source of water supply for the CTG fogger cooling system and steam generator makeup if and when it becomes available from the BP Refinery as it is a reliable and high quality source of water to the Project. In addition, as the RO supply is produced by treatment of wastewater that would otherwise be discharged to the ocean, this source is consistent with the California Water Policy and passed Test 2. However, due to the high cost of this supply and the corrosive properties of RO water, it may not be compatible with the metallurgy of existing systems at the Watson Cogeneration Facility. Therefore, this supply may need to be conditioned and/or augmented by nitrified reclaimed water supplies.

The quality of the reclaimed water supply is presented in Table 5.5-5, Reclaimed Water Quality – Reverse Osmosis, and Table 5.5-6, Reclaimed Water Quality – Nitrified.

**Table 5.5-5  
Reclaimed Water Quality – Reverse  
Osmosis (mg/L)**

TDS	10
Ca	0.01
Mg	0.01
Hardness	0.06
Silica	0.04
NH <sub>3</sub> -N	0.1

Source: Kiewit Power Engineers Co., 2008.

Notes:

Ca	=	calcium
Mg	=	magnesium
mg/L	=	milligrams per liter
NH <sub>3</sub> -N	=	Ammonia as Nitrogen
TDS	=	total dissolved solids

#### Reclaimed Wastewater — Nitrified

The nitrified reclaimed wastewater supply passed Test 1 because it is anticipated that it will be available from the BP Refinery's distribution system at the Project Site if and when the BP Refinery's conversion project is completed. The water quality characteristics of this supply are described in Table 5.5-6, Reclaimed Water Quality - Nitrified.

The nitrified water passed Test 3 as a primary source of water supply for Project process supply if and when it becomes available from the BP Refinery as it is a reliable, high quality, and relatively economical source of water to the Project. In addition, as the nitrified reclaimed wastewater supply is produced by treatment of wastewater that would otherwise be discharged to the ocean, this source of additional supply is consistent with the California Water Policy and passed Test 2. However, due to the quality of this supply, it was not selected for future use as steam generator makeup supply. This supply will be used to augment the cooling tower cell makeup supply if and when it becomes available from the BP Refinery.

**Table 5.5-6  
Reclaimed Water Quality – Nitrified<sup>1</sup>**

	As Such	As CaCO <sub>3</sub>
Ca, mg/L	55	138
Mg, mg/L	25	103
Na, mg/L	250	543
K, mg/L	17	22
<b>TOTAL CATIONS</b>	<b>347</b>	<b>805</b>
M Alkalinity, mg/L		47
SO <sub>4</sub> , mg/L	190	198
Cl, mg/L	300	430
NO <sub>3</sub> , mg/L	160	130
SiO <sub>2</sub> , mg/L	20	
<b>TOTAL ANIONS</b>	<b>670</b>	<b>804</b>
HCO <sub>3</sub> , mg/L	57	47
pH, Standard Units	7.6	
Specific Conductance, μS/cm	1,700	
TDS, Calculated, mg/L	1,018	
Total Hardness, mg/L		240
Total Phosphorous, mg/L	0.5	
TSS, mg/L	4.7	
TOC, mg/L	13	

Source: Kiewit Power Engineers Co., 2008

Notes:

<sup>1</sup> West Basin nitrified water (Nalco Analysis of 041508 labeled nitrified water)	mg/L = milligrams per liter
Ca = calcium	M = measured by the methyl orange method
CaCO <sub>3</sub> = calcium carbonate	Na = Sodium
Cl = chlorine	NO <sub>3</sub> = nitrate
CO <sub>2</sub> = carbon dioxide	SiO <sub>2</sub> = silicon dioxide
Fe = iron	SO <sub>4</sub> = sulfate
HCO <sub>3</sub> = bicarbonate	TDS = total dissolved solids
K = potassium	TSS = total suspended solids
Mg = magnesium	μS/cm = micro Siemens per centimeter

### Surface Water

The Dominguez Channel is located in the immediate vicinity of the Project Site. This source passed Test 1 as it is in close proximity to the Project Site. However, the Dominguez Channel is estuarine near the Project Site. The quality of this supply is highly variable, generally exhibiting strong marine water quality influence during non-storm conditions and fresh water quality during high-runoff storm events. As use of this supply is not technically or economically feasible it has been eliminated from further consideration.

### *Agricultural Wastewater*

Agricultural wastewater is drainage water from irrigation practices. This source failed to pass Test 1 as drainage water from irrigation practices is not available in the vicinity of the Project Site. Therefore, this water supply alternative was dropped from further consideration.

### *Groundwater*

As previously described, groundwater provided by a well owned and operated by the BP Refinery is used to augment the primary municipal supply to the existing facility. The BP Refinery groundwater system lacks sufficient capacity to meet the additional water supply needs of the Project. It is anticipated that reclaimed water supplies, which are identified as a higher priority for use by power plants in the California Water Policy, will ultimately be available to the Project. Therefore, use of additional groundwater to meet the additional water supply needs of the Project would be inconsistent with this policy. The groundwater supply alternative was eliminated from further consideration as a primary supply.

### *Municipal Supply*

Municipal supply is available from the California Water Services Company via an existing system in the BP Refinery and is the current primary supply to the Project. The quality of this water is presented in Table 5.5-3B, Characterization of Existing Water Supplies. The municipal supply exhibits a high calcium hardness concentration. As constituents in the circulating water system are cycled up, they begin to deposit and severely foul the cooling tower cell equipment, the circulating water in the cooling tower cell would be limited to approximately 3.4 cycles of concentration. Reclaimed water supplies, which are identified as a higher priority for use by power facilities in the California Water Policy and exhibit a higher quality, are anticipated to become available to the Project in the future. Therefore, use of additional municipal supply to meet the additional water supply needs of the Project would be inconsistent with this policy. The municipal supply alternative was eliminated from further consideration as a source of additional water supply.

The evaluations from application of Tests 4 through 6 were totaled for each alternative, with the highest scoring alternative being selected. The alternative sources of additional water supply are summarized in Revised Table 5.5-7, Evaluation of Alternative Sources of Additional Water Supply.

**Revised Table 5.5-7  
Evaluation of Alternative Sources of Additional Water Supply**

<b>Supply Option</b>	<b>Test #1 Availability (pass?)</b>	<b>Test #2 Satisfy LORS? (pass?)</b>	<b>Test #3 Technologically Feasible? (pass?)</b>	<b>Test #4 Environmental Impacts</b>	<b>Test #5 Relative Capital Costs</b>	<b>Test #6 Relative O&amp;M Costs</b>	<b>Relative Ranking</b>
Surface Water	Yes	No	Yes	NA	NA	NA	NA
Municipal Supply	Yes	No	NA	NA	NA	NA	NA <sup>2</sup>
Reclaimed Wastewater (Reverse Osmosis and Nitrified)	Yes	Yes	Yes	Low	Medium	Low	1 <sup>st</sup> 1,2
Agricultural Wastewater	No	NA	NA	NA	NA	NA	NA
Groundwater	No	No	NA	NA	NA	NA	NA <sup>2</sup>
Ocean Water	Yes	Yes	No	NA	NA	NA	NA

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008; 2011.

Notes:

<sup>1</sup> Reverse osmosis reclaimed water selected as primary water supply if and when available. Nitrified reclaimed water will augment cooling tower cell makeup supply if and when available.

<sup>2</sup> Municipal supply will be used as a back-up supply when reclaimed water supplies become available.

LORS = laws, ordinances, regulations, and standards

NA = not applicable as alternative failed fatal flaw test

O&M = operations and maintenance

Note that only the reclaimed water options (RO and nitrified) met all of the required criteria of Tests 1 through 3 to meet the additional water supply needs of the Project. As such, the Project's water resource evaluation has determined that the use of reclaimed water supplies to meet the additional water supply needs of the Project for the identified specific applications, if and when available, is the most plausible option. Municipal and groundwater supplies will then be used for back up in the event of disruption of reclaimed water supplies.

### 5.5.2.2 Wastewater Disposal Alternatives

Following is a summary of the wastewater disposal alternatives that are discussed in greater detail in Section 4, Alternatives, of this document.

- Zero liquid discharge (ZLD) system – A mechanical system using membrane technology and heat to effectively reduce liquid wastes to a dry waste for landfill disposal.
- Evaporation pond – Large, lined surface impoundment for disposal of wastewater via atmospheric drying, resulting in a sludge that must be disposed in a landfill system.
- Deep injection well – Disposal of wastewater via well discharge to a geologic formation that is unsuitable for potable water production and isolated from aquifers.
- Disposal to WWTP – Discharge to a sanitary sewer discharging to a publicly-owned treatment works.
- Surface discharge – Discharge of wastewater to the ground or receiving waters, including lakes, rivers, and streams.

### *Wastewater Disposal Alternatives Decision Analysis*

The following hierarchy of “tests” was applied to each alternative.

Test 1 – Is the wastewater disposal alternative feasibly available at the Project? (If not, then disregard this alternative. If yes, proceed to Test 2.)

Test 2 – Will the subject alternative satisfy applicable laws, ordinances, regulations, and standards (LORS)? (If not, then disregard this alternative. If yes, proceed to Test 3.)

Test 3 – Is the subject alternative technologically sufficient to guarantee high safety and reliability (98 percent availability)? If no, then disregard this alternative. If yes, proceed to Tests 4 through 6.)

Tests 1 through 3 address “fatal flaw” criteria. Alternatives that did not pass Tests 1, 2 or 3 were not evaluated further.

Test 4 – Evaluate other environmental impacts, including transportation, biological, energy, health and safety, etc.

Test 5 – Evaluate relative capital costs of each remaining alternative.

Test 6 – Evaluate relative O&M costs of each remaining alternative.

For alternatives passing Tests 1 through 3, the evaluations from application of Tests 4 through 6 were evaluated for each wastewater disposal alternative, with the alternative with the highest evaluation selected.

### *ZLD System*

This is a mechanical system using membrane technology and heat to reduce liquid wastes to a dry waste for landfill disposal. This alternative passed Tests 1 – 2, but failed Test 3 due to low reliability of known systems. In addition, this alternative has high parasitic energy losses, high capital and O&M costs, and produced wastes require landfill disposal. As disposal options with superior operating characteristics and lower environmental impacts are available to the Project, this alternative was determined to be a low-priority alternative.

### *Evaporation Pond*

Evaporation ponds are large, lined surface impoundments for disposal of wastewater via atmospheric drying. This process results in a sludge that must be periodically removed and disposed in a landfill system. These ponds also have high installation costs and require large areas of land and may result in significant environmental impacts. This wastewater disposal alternative failed Test 1 due to the lack of adequate area at the Project Site for large evaporation ponds. The use of evaporation ponds for wastewater disposal was eliminated from further consideration.

### *Deep Injection Well*

This alternative includes the disposal of wastewater via wells that discharge to a geologic formation that is unsuitable for potable water production and is isolated from aquifers. The following geologic conditions protective of an underground source of drinking water are required to obtain a permit to construct a Class I Deep Injection Well.

- A thick sequence of permeable sediments capable of accepting the injected wastewater.
- A thick sequence of impermeable sediments that would confine the injected wastewater, and prevent migration towards underground sources of drinking water.
- The injection operation should not facilitate the fracturing of the rocks or the integrity of the injection well.

Information about the stratigraphy beneath the Project Site is readily available from geophysical well logs of exploratory oil wells in the vicinity of the Project. It is anticipated that this information would identify this site as suitable for construction of a Class I Deep Injection Well. Although this alternative passed Tests 1 through 3, it was determined that superior alternatives for disposal of wastewaters from the Project Site are available. The use of a deep injection well for wastewater disposal was determined to be a lower priority alternative.

### *Disposal to WWTP*

This method includes discharge of process wastewater consisting of cooling tower cell blowdown and stormwater to a sanitary sewer discharging to a publicly-owned treatment works. As previously described, the existing Watson Cogeneration Facility discharges process wastewaters and runoff from process areas to the BP Refinery oily water system for treatment prior to discharge to the LACSD wastewater treatment plant. A copy of the industrial waste discharge permit issued to the BP Refinery by the LACSD is provided in Appendix R of the Application for Certification (AFC).

A letter has been received from the BP Refinery stating that the oily water system can accept the process wastes and stormwater from the Project Site and that the discharge to the LACSD facilities can meet the discharge requirements established in the industrial waste discharge permit issued by the LACSD. A copy of this letter is presented in AFC Appendix R. Therefore, disposal of process wastewater to the WWTP would pass Tests 1 through 6 and has been identified as the preferred alternative.

### *Surface Discharge*

This alternative would involve the discharge of wastewater to receiving waters including lakes, rivers, and streams (Table 5.5-8, Evaluation of Process Wastewater Disposal Options). This method failed to pass Test 2 for process wastewater as it is anticipated that the quality of this waste stream would not meet state and federal discharge limitations for direct discharge to the Dominguez Channel. This method also failed Test 3 as stormwater discharges may not reliably meet anticipated changes in regulations. This alternative was eliminated from further consideration for process wastewater and stormwater.

**Table 5.5-8  
Evaluation of Process Wastewater Disposal Options**

<b>Wastewater Option</b>	<b>Test #1 Availability (pass?)</b>	<b>Test #2 Satisfy LORS? (pass?)</b>	<b>Test #3 Technologically Feasible? (pass?)</b>	<b>Test #4 Environmental Impacts</b>	<b>Test #5 Relative Capital Costs</b>	<b>Test #6 Relative O&amp;M Costs</b>	<b>Relative Ranking</b>
ZLD	Yes	Yes	Yes	NA	High	High	3 <sup>rd</sup> <sup>1</sup>
Evaporation pond	No	No	No	NA	NA	NA	NA
Deep injection well	Yes	Yes	Yes	Low	High	High	2 <sup>nd</sup> <sup>1</sup>
WWTP	Yes	Yes	Yes	Low	Medium	Low	1 <sup>st</sup>
Surface discharge	Yes	No	NA	NA	NA	NA	NA

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008.

Notes:

<sup>1</sup>Process wastewater

LORS = Laws, Ordinances, Regulations, and Standards  
 NA = not applicable as alternative failed fatal flaw test.  
 O&M = operation and maintenance  
 WWTP = wastewater treatment plant  
 ZLD = zero liquid discharge

Note that, although the WWTP and Deep Injection Well options for disposal of process wastewater met all of the required criteria of Tests 1 through 3, the capital and O&M costs for the Deep Injection Well option was determined to be much greater. As such, the Project's wastewater evaluation has determined that the use of the existing oily wastewater system that discharges to the LACSD's WWTP is the most plausible option for disposal of process wastewater and storm runoff.

### 5.5.3 Water Resources and Wastewater Management

#### 5.5.3.1 Project Water Resources Plan

Water will be used at the Project Site for industrial and potable uses. The primary uses in order of volume of use will be for steam supply to the BP Refinery, cooling tower cell makeup, and CTG fogger. Under normal operating conditions, on an annual basis the Project's average water requirement will be approximately 2.4 mgd (1,689 gallons per minute [gpm]), and the maximum daily water consumption will be approximately 2.7 mgd (1,849 gpm). The Project will use the existing water supply provided by the BP Refinery with no net increase in use of the combined supply of municipal water and groundwater from the existing annual average baseline of 4.1 mgd for the existing four cogeneration trains. If and when the BP Refinery completes the reclaimed water supply conversion, the Project will utilize reclaimed water provided by the BP Refinery to the extent possible and without limitation.

As summarized in Second Revision Table 5.5-9, Watson Water Sources and Uses/Wastewater Production, annual water use by the facility will increase by 1,718 acre-feet, or 37 percent above the water use without the addition of the fifth train. Current operations at the BP Refinery are constrained by the available steam supply from the existing four units at the Watson Cogeneration Facility. Optimization and enhancement of operations using steam is integral to the continued operations at the BP Refinery. As such, the Project will incorporate heavily fired duct burners in the HRSG to maximize steam production for refinery use. Prior to the

availability of reclaimed water supplies, steam production of the existing Watson Cogeneration Facility and the Project will be curtailed as needed to ensure that water consumption does not exceed the combined municipal water and groundwater annual average supply baseline of 4.1 mgd. When available, reclaimed water will be used without limitation to meet the steam requirements of the BP Refinery. The Project will be able to operate at the permitted energy output level (i.e., 85 MW) with the curtailed water use.

**Second Revision Table 5.5-9  
Watson Water Sources and Uses/Wastewater Production**

	Average Daily <sup>1</sup> mgd		Maximum Daily mgd		Average Annual acre/feet		Percent Increase from Fifth Train
	Existing Watson Facilities	With Fifth Train	Existing Watson Facilities	With Fifth Train	Existing Watson Facilities	With Fifth Train	
<b>Sources:</b>							
Existing Water Supply <sup>2</sup>	4.11	4.11	5.65	≤7.41	4,609	4,609	
Reclaimed Water	0	1.53	0	≥0	0	1,718	
<b>Total Sources</b>	<b>4.11</b>	<b>5.64</b>	<b>5.65</b>	<b>7.41</b>	<b>4,609</b>	<b>6,327</b>	<b>37%</b>
<b>Uses:</b>							
BFW	2.92	4.06	3.78	4.95	3,274	4,519	
Foggers	0.14	0.14	0.14	0.14	160	194	
Cooling Tower	1.05	1.44	1.73	2.32	1,175	1,614	
<b>Total Uses</b>	<b>4.11</b>	<b>5.64</b>	<b>5.65</b>	<b>7.41</b>	<b>4,609</b>	<b>6,327</b>	<b>37%</b>
<b>Wastewater to Sewer</b>	<b>0.81</b>	<b>0.94</b>	<b>1.21</b>	<b>1.41</b>	<b>904</b>	<b>1,054</b>	<b>17%</b>

Source: Kiewit Power Engineers Co., 2008; Watson Cogeneration Steam and Electric Reliability Project Team, 2011.

Notes:

<sup>1</sup>The average daily use is computed by dividing the average annual use by 365 days per year.

<sup>2</sup>Existing water supply = sum of municipal water supply and groundwater supply.

≤ = less than or equal to

≥ = greater than or equal to

BFW = boiler feed water

mgd = million gallons per day

### *Source of Project Water Supply*

The Project will use the existing water supply provided by the BP Refinery with no net increase in the annual use of the combined blend of municipal water and groundwater from the existing baseline of the existing four cogeneration trains. Nitrified and RO reclaimed water supplies provided to the BP Refinery by the WBMWD were selected to meet the additional Project Site process and other water needs when they become available. In addition to meeting Tests 1 and 3 of the decision analysis described in Section 5.5.2.1, Alternative Sources of Additional Water Supplies, evaluation of Tests 4 through 6 was much more favorable than the other remaining alternatives. In support of this option, the WBMWD and the BP Refinery have executed a Memorandum of Understanding (MOU) acknowledging that they intend to develop adequate capacities in the nitrified and RO reclaimed water systems to meet the needs of the BP Refinery and the Project Site, provided a final agreement to do so is consummated. WBMWD has

performed engineering studies, and the BP Refinery and WBMWD are negotiating and evaluating options for reclaimed water. In addition, the BP Refinery has provided documentation that it will provide water supply and manage process wastewater from the Project (AFC Appendix P, Water Resources, West Basin Municipal Water District MOU).

Following completion of the BP Refinery's reclaimed water conversion, water supplied to the Project will consist of nitrified and RO reclaimed water from the West Basin Carson Regional Facility. Municipal supply provided by the California Water Service Company will be used as a backup supply in the event of a disruption of the reclaimed water supplies. The BP Refinery's on-site wells may be used to augment this backup supply for water quality purposes. The qualities of the nitrified and RO reclaimed water supplies are provided in Table 5.5-5, Reclaimed Water Quality – Reverse Osmosis, and Table 5.5-6, Reclaimed Water Quality – Nitrified.

### *Process Water Uses*

Uses of the water supply will include fire protection water, plant service water, cooling tower cell makeup, and CTG inlet air fogger makeup. Water will be required for the following applications.

- Feedwater to the HRSG.
- CTG inlet air fogger.
- Cooling water for CTG and HRSG equipment.
- Cooling tower cell makeup.

The amounts of water used for each purpose are summarized in Revised Table 5.5-4, Water Balance Flow Values.

### *Project Water Supply Facilities*

The existing water supply to the Watson Cogeneration Facility is provided by the BP Refinery. When and if available, the reclaimed water will enter the BP Refinery at two locations and will be provided to the Project. Two lines, one for first-pass RO water and another for nitrified water, enters the northernmost part of the BP Refinery on 223<sup>rd</sup> Street, near Wilmington Avenue on the east side of the Dominguez Channel. Two more lines, one for first-pass RO water and another for nitrified water, enter the BP Refinery along Wilmington Avenue near the Refinery Gate 7. Water supply will be provided to the Project from the BP Refinery's existing distribution system.

### *Project Water Treatment*

#### Cooling Tower Cell Makeup Water

Two cells will be added to the existing cooling tower cell for the Project. The tower will provide heat rejection for the lube oil coolers connected to the Project's General Electric 7EA CTG for gas compressor cooling and for generator cooling.

Cooling tower cell makeup water will be provided by second-pass RO treatment reject augmented by raw water supplied by the BP Refinery, or nitrified reclaimed water supplies if and when they become available. Makeup is provided to the cooling tower cell basin as required to

replace water lost from evaporation, blowdown and drift. This use of internal waste streams for cooling tower cell makeup conserves significant quantities of water, significantly reducing the need for additional makeup supplies.

The circulating water blowdown rate will be controlled in order to stay within acceptable water quality limits. It is expected that this will result in approximately 3.4 cycles of concentration in the cooling tower cells. The concentration limit is determined by the TDS concentration (~3,000 parts per million [ppm]) in the circulating water. High TDS concentrations result in adverse scaling in the equipment and piping systems. TDS concentrations in the cooling tower cell system are managed by blowdown to the sanitary sewer.

A chemical feed system supplies water-conditioning chemicals to the circulating water in the cooling tower cell system to minimize corrosion and control the formation of mineral scale and bio-fouling. Sulfuric acid is fed into the circulating water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the circulating water. The acid feed equipment consists of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps. The cooling tower cells operating characteristics are summarized in Table 5.5-10, Average Cooling Tower Cell Operating Characteristics.

**Table 5.5-10**  
**Average Cooling Tower Cell Operating Characteristics**

Parameter	Cooling Tower Cells
Circulating Water, gpm	18,600
Number of Cells/Coolers	2
Makeup, gpm	272
Blowdown, gpm	80
Drift, gpm	0.19
Evaporation, gpm	192

Source: Kiewit Power Engineers Co., 2009.

Notes:

All numbers are estimates for full load at 63.1°F dry bulb, and 60 percent relative humidity  
gpm = gallons per minute

To further inhibit scale formation, a polymeric dispersant is fed into the circulating water system as a sequestering agent in an amount proportional to the circulating water blowdown flow. The scale inhibitor feed equipment will consist of a chemical solution bulk storage tank and a full-capacity scale inhibitor-metering pump.

To prevent bio-fouling in the circulating water system, sodium hypochlorite is fed into the system. The hypochlorite feed equipment consists of a bulk storage tank and two full-capacity hypochlorite metering pumps.

In general, the cooling tower cells water treatment system is used to maintain the circulating water quality within the requirements of the cooling tower cells manufacturer and the limits of the WWTP, as shown in Table 5.5-11, Circulating Water Quality Limits.

**Table 5.5-11  
Circulating Water Quality Limits**

Parameter	Concentration (ppm)
Alkalinity, as CaCO <sub>3</sub>	<200
Silica, as SiO <sub>2</sub>	<150
Iron	<3.0
Manganese	<0.1
Sulfides	<1.0
Ammonia	<50
TDS	<3,575
Calcium as CaCO <sub>3</sub>	<1,125
Chlorides, as Cl	<2,000
Sulfates as CaCO <sub>3</sub>	<2,500
Nitrates, as NO <sub>3</sub>	<300

Source: Kiewit Power Engineers Co., 2008.

Notes:

<	=	less than
CaCO <sub>3</sub>	=	calcium carbonate
Cl	=	chlorine
NO <sub>3</sub>	=	nitrate
ppm	=	parts per million
SiO <sub>2</sub>	=	silica dioxide
TDS	=	total dissolved solids

### CTG Inlet Air Foggers Makeup Water

The makeup water to the CTG foggers will be provided by the treated water supply. The makeup water to the CTG foggers will be provided by second-pass RO reclaimed water supply if and when this supply becomes available.

### *Construction Supply*

Water supply for the construction of the Project will be provided by existing water systems at the BP Refinery. It is estimated that dust suppression water and other miscellaneous construction uses will require 20,000 gallons per month over a 15-month construction period. During construction the small quantity of potable water (domestic consumption by the Project's construction workforce) will be provided from the existing facility from a bottled water purveyor.

#### *5.5.3.2 Project Wastewater Management Plan*

The Project Site will generate industrial and stormwater for disposal. The primary source of wastewater will be from cooling tower cells blowdown. This wastewater will continue to be discharged to the existing oily water system at the BP Refinery. In addition, runoff from the Project will also be directed to the oily water system. The average daily wastewater volume will be approximately 133,920 gallons (based on 93 gpm); the maximum daily wastewater volume will be 198,720 gallons (based on 138 gpm). It is anticipated that the quality of the wastewater

from the cooling tower cell system will be unchanged with the two additional cells. The characterization of the wastewater is provided in Table 5.5-12, Projected Wastewater Quality.

**Table 5.5-12  
Projected Wastewater Quality**

	Cooling Tower Blowdown Calculated at Cycles of Concentration = 3.4	
	As Such	As CaCO <sub>3</sub>
Ca, mg/L	187	468
Mg, mg/L	85	349
Na, mg/L	850	1845
K, mg/L	58	74
<b>TOTAL CATIONS</b>	<b>1180</b>	<b>2735</b>
M Alkalinity, mg/L		150
SO <sub>4</sub> , mg/L	655	682
Cl, mg/L	1037	1462
NO <sub>3</sub> , mg/L	544	441
SiO <sub>2</sub> , mg/L	68	
<b>TOTAL ANIONS</b>	<b>2304</b>	<b>2734</b>
HCO <sub>3</sub> , mg/L	183	150
pH, Standard Units	7.9	
Specific Conductance, μS/cm	5780	
TDS, mg/L	3469	
Total Hardness, mg/L		817
Total Phosphorous, mg/L	8	
TSS, mg/L	35	
TOC, mg/L	44	
Chlorine residual - Total, mg/L	0.2	

Source: Kiewit Power Engineers Co., 2008.

Notes:

Cooling tower blowdown characteristics calculated based on using nitrified water at 3.4 cycles of concentration as determined by BP and their water consultant.

Nitrified water analysis adjusted to balance cations and anions.

Sulfates of circulating water adjusted for sulfuric acid feed used to control alkalinity.

Alkalinity, pH, phosphorous, TSS and TOC estimated assuming treatment with an alkaline scale inhibitor.

No credit included for reuse of plant waste water in cooling tower.

Ca	=	calcium	Na	=	sodium
CaCO <sub>3</sub>	=	calcium carbonate	NO <sub>3</sub>	=	nitrate
Cl	=	chlorine	SiO <sub>2</sub>	=	silicon dioxide
HCO <sub>3</sub>	=	bicarbonate	SO <sub>4</sub>	=	sulfate
K	=	potassium	TDS	=	total dissolved solids
Mg	=	magnesium	TOC	=	total organic carbon
mg/L	=	milligrams per liter	TSS	=	total suspended solids
M	=	measured by the methyl orange method	μS/cm	=	micro Siemens per centimeter

### *Selected Wastewater Disposal Alternative*

Based on the evaluation described in Section 5.5.2.2, Wastewater Disposal Alternatives, discharge to the existing oily water treatment system at the BP Refinery was identified as the superior alternative for disposal of process wastewater and storm runoff. A letter has been provided to Watson by the BP Refinery acknowledging that adequate wastewater treatment capacity is available to support the Project Site operations and that the process wastewater and storm runoff will not prevent the discharge to the LACSD facilities from meeting discharge requirements specified in the BP Refinery's industrial waste discharge permit. The Project proposes to interconnect to the existing BP Refinery's oily water collection system.

The Project wastewater will be conveyed to the process wastewater treatment system operated by the BP Refinery. This system discharges to the LACSD collection sewer. The LACSD WWTP provides wastewater treatment services for the greater Los Angeles County metropolitan area. Treatment consists of two major steps; primary and secondary treatment, and a process to treat solids removed in the process at the plant. Treated wastewater is discharged to the Pacific Ocean under a NPDES permit issued by the Los Angeles RWQCB. These discharges must comply with the discharge limits established in the NPDES permit and which are protective of all beneficial uses of the receiving water established in the Ocean Plan.

### *Project Wastewater Streams*

The combined process wastewater discharge from the Project Site will consist of cooling tower cell blowdown and runoff from the Project Site. Circulating (or cooling) water system blowdown will consist of water supplies that have been concentrated by RO and evaporative losses in the cooling tower cells and residues of the chemicals added to the circulating water. These chemicals control scaling and biological growth in the cooling tower cells and corrosion of the circulating water piping and heat exchanger tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (polyacrylate polymer), corrosion inhibitors (phosphate based), and biocide (sodium hydroxide or equivalent). A portion of this concentrated water will then be removed from the cooling tower cells via the blowdown to prevent the mineral scale formation on heat transfer surfaces.

Figure 5.5-1 (Second Revision), Water Balance Flow Diagram, shows the Project wastewater streams and Revised Table 5.5-4, Water Balance Flow Values, provides the flow values for each of the streams. The resultant wastewater will consist entirely of cooling tower blowdown and runoff. The wastewater is non-hazardous and will be treated and disposed in the sanitary sewer. A characterization of the current cooling tower blowdown quality is provided in Table 5.5-13, Current Cooling Tower Blowdown Quality. The projected wastewater quality is provided in Table 5.5-12, Projected Wastewater Quality.

**Table 5.5-13  
Current Cooling Tower Cell Blowdown Quality<sup>1</sup>**

	As Such	As CaCO <sub>3</sub>
Ca, mg/L	310	775
Mg, mg/L	120	493
Na, mg/L	620	1,345
K, mg/L	25	32
<b>TOTAL CATIONS</b>	<b>1,075</b>	<b>2,646</b>
M Alkalinity, mg/L		39
SO <sub>4</sub> , mg/L	1,500	1,560
Cl, mg/L	650	917
NO <sub>3</sub> , mg/L	12	10
SiO <sub>2</sub> , mg/L	56	
<b>TOTAL ANIONS</b>	<b>2,218</b>	<b>2,525</b>
HCO <sub>3</sub> , mg/L	0	
CO <sub>3</sub> , mg/L	0	
OH, mg/L	0	
pH, Standard Units	7.2	
Specific Conductance, μS/cm	4,700	
TDS, Calculated, mg/L	3,318	
Total Hardness, mg/L		1,268
Turbidity, NTU	4.2	
Ortho Phosphate, mg/L	19	
Total Phosphorous, mg/L	25	
Ba, mg/L	0.37	
Fe, mg/L	<0.25	
Mn, mg/L	<0.25	
TSS, mg/L	<1.7	
TOC, mg/L	37	

Source: Kiewit Power Engineers Co., 2008.

Notes:

<sup>1</sup> Nalco Analysis of 071108 labeled CT-16 Return

<	=	less than	Mg	=	magnesium
Ba	=	barium	mg/L	=	milligrams per liter
CaCO <sub>3</sub>	=	calcium carbonate	NTU	=	nephelometric turbidity units
CO <sub>3</sub>	=	carbonate	OH	=	hydroxide
Fe	=	iron	SO <sub>4</sub>	=	sulfate
HCO <sub>3</sub>	=	bicarbonate	TDS	=	total dissolved solids
K	=	potassium	TOC	=	total organic carbon
M	=	measured by the methyl orange method	TSS	=	total suspended solids
			μS/cm	=	micro Siemens per centimeter

On an annual basis, the average daily wastewater generation rate that will require disposal is expected to be 0.12 mgd, or approximately 80 gpm, and the maximum daily wastewater volume will be 0.17 million gallons (120 gpm).

### *Stormwater Runoff*

The Project Site will be located within a drivable berm to prevent run-on from adjacent areas and runoff from the Project. Stormwater from the Project Site generation system site will be conveyed by overland flow and swales to a sump located near the center of the site. The runoff collected in the sump will be discharged to the oily water system at the BP Refinery. Runoff from the Project Site will not be discharged to receiving waters.

A construction phase SWPPP will be prepared prior to construction for the construction phase of the Project. This SWPPP will be implemented at the site to control and minimize contamination of stormwater during the construction of the Project. The SWPPP will employ best management practices (BMPs) such as stabilized construction entrances, silt fencing, berms, hay bales, and detention basins to control runoff from all construction areas. The Project will comply with requirements of the Los Angeles County Standard Urban Stormwater Mitigation Plan (SUSMP) as applicable.

#### 5.5.4 Effect of Project on Water Resources

Project effects on water resources can be evaluated relative to significance criteria derived from the California Environmental Quality Act (CEQA) Appendix G checklist. Under CEQA, the Project is considered to have a potentially significant effect on water resources if it would do the following.

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which will result in substantial erosion or siltation on- or off-site, or in flooding on- or off-site.
- Create or contribute runoff water which will exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells will drop to a level which will not support existing land uses or planned uses for which permits have been granted).
- Place within a 100-year flood hazard area structures that will impede or redirect flood flows.

##### *5.5.4.1 Effect on Water Supply*

The Project will have no impact on water supply as there will be no increase in the use of the existing freshwater supply provided by the BP Refinery. If and when available, the Project will convert the existing primary water supply consisting of municipal and groundwater to reclaimed water supplies that otherwise would be discharged to the ocean and the existing sources of supply will be used as backup.

#### 5.5.4.2 *Effect on Subbasin Water Balance*

The Project will have no effect on the subbasin water balance as there will be no increase in groundwater use by the Project for primary supply. The Project will use reclaimed water supplies if and when they become available and the existing supplies provided by the BP Refinery will be used as backup.

#### 5.5.4.3 *Water Level Drawdown Effects*

The Project will have no effect on the water level drawdown in the West Coast Basin area as there will be no increase in groundwater use by the Project for primary supply. The Project will use reclaimed water supplies if and when they become available and the existing supplies provided by the BP Refinery will be used as backup.

#### 5.5.4.4 *Water Quality Effects*

##### *Groundwater Quality*

The Project will be operated in accordance with all applicable laws and regulations that protect groundwater quality. The oily water management system in place at the BP Refinery has operated effectively and has not resulted in groundwater contamination at the Project Site. The Project Site will continue to utilize these existing waste discharge systems. There will be no increase in groundwater use by the Project for primary supply and there will be no discharges from the Project to groundwater. The Project will use reclaimed water supplies if and when they become available and will dispose of wastewater in the existing oily water system at the BP Refinery which discharges to the sanitary sewer system. Therefore, the Project will have no effect on groundwater quality in the West Coast Subbasin area.

##### *Surface Water Quality*

The Project will discharge process wastewater and runoff to the existing oily water system at the BP Refinery. A small incremental increase in process wastewater from the Watson Cogeneration Facility may result from the operation of the Project. Although the BP Refinery's existing NPDES permit allows boiler blowdown to be discharged directly to the Dominguez Channel, all boiler blowdown from the Project will be used to augment the supply in the firewater storage tank or to augment water makeup to the cooling tower cells. The Project Site will be located within a drivable berm to prevent run-on from adjacent areas and runoff from the Project. Stormwater from the Project Site generation system site will be conveyed by overland flow and swales to a sump located near the center of the site. The runoff collected in the sump will be discharged to the existing oily water system at the BP Refinery. Therefore, no significant water quality impacts on surface waters will result from this Project.

#### 5.5.4.5 *Surface Water/Flooding*

The principal surface water in the vicinity of the Project Site is the Dominguez Channel. The Project will not alter drainage patterns or flow rates in the Dominguez Channel. Therefore, the Project will not result in a significant impact to surface water. As the Project Site is already

impervious, by berming the site and directing the runoff to the cooling tower cells it will incrementally decrease the potential discharge of runoff from the BP Refinery to the Dominguez Channel.

As previously described, the Project Site is located in an area with a low potential for flooding. Therefore, it is unlikely that the Project Site would be impacted by flood waters, or that the Project would in any way increase the potential for flooding.

### 5.5.5 Cumulative Effects

The following currently proposed projects have been identified within the affected area (1 mile from the Project Site), Table 5.5-14, Currently Proposed Projects within Affected Area.

**Table 5.5-14  
Currently Proposed Projects within Affected Area**

<b>Project</b>	<b>Location</b>
Alameda Corridor Improvement Study. The proposed Alameda Corridor Improvement Study consists of major improvements along the Alameda Corridor to reduce delays, improve safety, and enhance traffic flows.	Adjacent to BP Refinery. Alameda Corridor. This Project also includes a proposed replacement of the Schuyler Heim Bridge along Alameda Street.
BP Refinery Project	At BP Refinery
Shell Oil Products US is proposing the redevelopment of the 446-acre Shell Carson Terminal facility. The project will allow for the subsequent development of additional product storage tanks and light industrial storage.	Adjacent to BP Refinery. 20945 South Wilmington Avenue.
Tesoro Proposed Project (Refinery)	Adjacent to BP Refinery.
BP Safety, Compliance and Optimization Project (Refinery)	At BP Refinery.
Kinder Morgan (Industrial)	Adjacent to BP Refinery.
Chemoil Project (Industrial)	Adjacent to BP Refinery.
ConocoPhillips Tank Project (Industrial)	Adjacent to BP Refinery.
Pacific LA Marine Crude Terminal (Port-related)	Adjacent to BP Refinery.
BP Crude Logistics Optimization Program (Industrial)	Adjacent to BP Refinery.
Ultramar Olympic Tank Farm (Refinery)	Adjacent to BP Refinery.
ICTF Expansion and Modernization Project (Intermodal container facility)	Adjacent to BP Refinery.
Southern California International Gateway (SCIG) Project (near-dock rail facility)	Adjacent to BP Refinery.
Smart Energy Transport System Project (Phase I)	Adjacent to BP Refinery. Pipeline from Wilmington to LAX.
I-710 Freeway Upgrades	Adjacent to BP Refinery. I-710.
Highway Improvement	Adjacent to BP Refinery. ACTA – SR-47 Port Access.
Alameda Street Sound-Wall and Noise Mitigation (Sound Wall)	Adjacent to BP Refinery. Alameda Street.

**Table 5.5-14  
Currently Proposed Projects within Affected Area**

Project	Location
81-Unit Residential	Adjacent to BP Refinery. 2001 River Ave., Long Beach.
Parking lot and recreation area	Adjacent to BP Refinery. 2254 East 223 <sup>rd</sup> Street, Carson.
Industrial project	Adjacent to BP Refinery. 2116 East 220 <sup>th</sup> Street.

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008.

ACTA = Alameda Corridor Transportation Agency

I-270 = Interstate 270

SR = State Route

The City of Carson Development Service has not identified any trends on recent zoning changes. The Project will contribute to the industrial nature of the immediate project vicinity.

By limiting the combined use of groundwater and municipal supply to existing annual levels and using the reclaimed water supplies if and when they become available, there will not be any Project contribution to a cumulative water supply impact. Process wastewater and runoff from the Project Site will be discharged to the BP Refinery's existing oily water system. The discharges from the oily water system are required to comply with industrial waste discharge requirements which are protective of the waste treatment facilities. Treated wastewater is discharged to the Pacific Ocean under a NPDES permit issued by the Los Angeles RWQCB. These discharges must comply with the discharge limits established in the NPDES permit which are required to be protective of all beneficial uses of the receiving water established in the Ocean Plan. Therefore, the Project will not affect ground or surface water resources or water supplies.

#### 5.5.6 Available Documents and Information

The geology and hydrogeology of the West Coast Subbasin has been studied by the United States Geological Survey and the California Department of Water Resources (DWR). The Project is located within the service area of the Dominguez Water Services Company. The Dominguez Water Services Company monitors well facilities in the Project Area, and has performed and commissioned groundwater studies within its boundaries. The Dominguez Water Services Company and the BP Refinery annually collect water quality and water level data and other water-related information for the Project Area and develops estimates of groundwater pumpage. The available historic records document long-term hydrologic and water-related conditions in the area.

#### 5.5.7 Stipulated Conditions

The analysis of the effect of the Project on water resources indicates that the Project will have no significant effect on the water resources in the West Coast Subbasin. Implementation of the following Conditions of Certification will help ensure that the project complies with the LORS as identified in Section 5.5.9, Water Related Laws, Ordinances, Regulations and Standards.

#### 5.5.7.1 *Soil and Water 1: General Industrial Activity Stormwater Permit*

There will be no off-site runoff from the Project Site as it will be constructed to contain runoff from areas of industrial activities for discharge to the BP Refinery oily water system. Therefore, the Project will not be required to obtain coverage under the General Industrial Activity Stormwater Permit and a SWPPP will not be required for operation of the Project.

#### 5.5.7.2 *Soil and Water 2: Stormwater Pollution Prevention Plan*

Prior to beginning any clearing, grading or excavating activities associated with Project construction, and as required by the NPDES General Construction Activity Stormwater Permit, the Applicant will develop and implement a SWPPP prepared under the requirements of the General Construction Activity Stormwater Permit.

#### *Verification*

At least 30 days prior to the start of construction, the Applicant will submit a draft SWPPP to the Compliance Project Manager (CPM) for review and comment. Two weeks prior to the start of construction, the Applicant will submit to the CPM a copy of the final SWPPP for review and approval. The final SWPPP shall contain all the elements of the draft plan with changes made to address staff comments and the final design of the project. Approval of the plan by the CPM must be received prior to the initiation of any clearing, grading or excavation activities associated with Project construction.

#### 5.5.7.3 *Soil and Water 3: Erosion Control and Revegetation Plan*

Prior to beginning clearing, grading or excavation activities associated with Project construction, the Applicant shall submit an Erosion Control and Revegetation Plan to the CPM for approval. The final plan shall contain all the elements of the draft plan with changes made to address the final design of the Project.

#### *Verification*

Two weeks prior to the initiation of any clearing, grading or excavation activities associated with Project construction, the Applicant will submit the final Erosion Control and Revegetation Plan to the CPM for review and approval. Approval of the plan by the CPM must be received prior to the initiation of any clearing, grading or excavation activities associated with Project construction.

#### 5.5.7.4 *Soil and Water 4: Standard Urban Stormwater Mitigation Plan*

Prior to issuance of permits to construct, the Applicant will submit a SUSMP to minimize, to the maximum extent practicable, the discharge of pollutants of concern from new and redevelopment as required by the Los Angeles County Municipal Stormwater NPDES Permit.

#### *Verification*

Approval of the SUSMP by the CPM must be received prior to issuance of permits to construct.

### 5.5.8 Mitigation Measures

In relation to water resources, mitigation measures for the Project would be applied in situations where the Project has or would have an unmitigated significant impact. As discussed above, the evaluation of water resources impacts considered both the occurrence and the quality of water in the area. For the occurrence of groundwater in the area, the Project will have no significant impact on the depth to water in the aquifer, or water resources in the area as a result of limiting the supply to the existing use and the use of reclaimed water supplies, if and when they become available. Process wastewater and Project Site runoff disposed to the existing oily water disposal system will not impair the ability of the discharge to the sanitary sewer to comply with pretreatment requirements of the WWTP. Thus, no mitigation is required for water resources.

### 5.5.9 Water-related Laws, Ordinances, Regulations and Standards

The construction and operation of the Project Site will be in accordance with all federal, state, county, and local LORS applicable to water resources. Applicable LORS are discussed in this section and are summarized in Revised Table 5.5-15, Summary of LORS – Water Resources.

#### *5.5.9.1 Federal Authorities and Administering Agencies*

*Clean Water Act of 1977 (including 1987 amendments) Section 402; 33 USC Section 1342; 40 CFR Parts 122 – 136*

The Clean Water Act (CWA) requires a National Pollutant Discharge Elimination System (NPDES) permit for any discharge of pollutants from a point source to waters of the U.S. This law and its regulations apply to stormwater and other discharges into waters of the U.S. The CWA requires compliance with a general construction activities permit for the discharge of stormwater from construction sites disturbing one acre or more. This federal permit requirement is administered by the State Water Resources Control Board (SWRCB).

Construction activities at the Project Site will be performed in accordance with a SWPPP and associated monitoring plan that is required in accordance with the NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the SWRCB. The SWPPP will include control measures including BMPs to reduce erosion and sedimentation as well as other pollutants associated with vehicle maintenance, material storage and handling, and other activities occurring at the Project Site. The administering agencies for the above authority are the Los Angeles RWQCB.

*Clean Water Act Section 311; 33 USC Section 1342; 40 CFR Parts 122 – 136*

This portion of the CWA requires reporting of any prohibited discharge of oil or hazardous substance. The Project will conform by proper management of oils and hazardous materials both during construction and operation. The administering agency is the Los Angeles RWQCB and the California Department of Toxic Substances Control.

### 5.5.9.2 State Authorities and Administering Agencies

#### *Water Code Section 13552.6*

This portion of the California Water Code (CWC) relates to the use of potable domestic water for cooling tower cells. Increased use of potable domestic water for the new cooling tower cells would be unreasonable if a suitable non-potable source, including recycled water or brackish groundwater, is available. Additional water supply to the Project will consist of reclaimed water provided by the West Basin Carson Regional Facility when this supply becomes available. When reclaimed water becomes available, the Project will only use municipal supply provided by the California Water Services Company and groundwater from on-site wells as a backup supply to the reclaimed water supply (see Revised Table 5.5-15, Summary of LORS – Water Resources).

#### *Los Angeles County Municipal Stormwater NPDES Permit<sup>6</sup>*

The Project falls within Los Angeles County which has been covered by a municipal separate storm sewer system (MS4) NPDES permit (MS4 Permit) since 1990. The MS4 Permit covers Los Angeles County and all the incorporated cities, except the City of Long Beach, which was issued a separate municipal stormwater permit in 1999. Under the requirements of the MS4 Permit, the City of Carson is required to implement the Storm Water Quality Management Plan which includes the following programs: Industrial/ Commercial Facilities; Development Planning; Construction Sites; and Illicit Connection/Illicit Discharge Elimination.

An important requirement of the MS4 permit is implementation of the SUSMPs and numerical design standards for BMPs. The SUSMP is designed to ensure that stormwater pollution is addressed in one of the most effective ways possible, i.e., by incorporating BMPs in the design phase of new development and redevelopment. It provides for numerical design standards to ensure that stormwater runoff is managed for water quality and quantity concerns. The purpose of the SUSMP requirements is to minimize, to the maximum extent practicable, the discharge of pollutants of concern from new development and redevelopment. The numerical design standard requires that post-construction treatment BMPs be designed to mitigate (infiltrate or treat) stormwater runoff from the first  $\frac{3}{4}$  inch of rainfall, prior to its discharge to a stormwater conveyance system.

#### *NPDES General Industrial Activities Storm Water Permit<sup>7</sup>*

The Industrial Storm Water General Permit Order 97-03-DWQ (General Industrial Permit) is an NPDES permit that regulates discharges associated with 10 broad categories of industrial

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<sup>6</sup> 2001 Los Angeles County Municipal Storm Water National Pollutant Discharge Elimination System (NPDES) Permit As Amended by Regional Board Order R4-2007-0042, California Regional Water Quality Control Board, Los Angeles Region. August 9, 2007.

<sup>7</sup> Water Quality Order NO. 97-03-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit), Waste Discharge Requirements (WDRS) for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities, State Water Resources Control Board. 1997.

activities. The General Industrial Permit requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable and best conventional pollutant control technology. The General Industrial Permit requires that an annual report be submitted each July 1.

To obtain authorization for continued and future stormwater discharge under the General Permit, each industrial facility operator must submit a Notice of Intent (NOI). The General Industrial Permit generally requires facility operators to do the following.

1. Eliminate unauthorized non-stormwater discharges.
2. Develop and implement a SWPPP. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce stormwater pollution are to be described.
3. Perform monitoring of stormwater discharges and authorized non-stormwater discharges.

The administering agency is the Los Angeles RWQCB (see Revised Table 5.5-15, Summary of LORS – Water Resources).

#### *NPDES General Construction Activities Storm Water Permit*

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the NPDES General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a SWPPP that covers the construction phase of the Project. The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project. The SWPPP must list BMPs the discharger will use to protect stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. The administering agency is the Los Angeles RWQCB (see Revised Table 5.5-15, Summary of LORS – Water Resources).

#### *NPDES Individual Permit Issued to BP Refinery*

Order No. R4-2007-0015 (NPDES No. CA0000680) authorizes discharges of steam condensates, service water, irrigation runoff, fire hydrant water, and process wastewater commingled with stormwater to the Dominguez Channel.

**Revised Table 5.5-15  
Summary of LORS – Water Resources**

<b>LORS</b>	<b>Applicability</b>	<b>Conformance and Timing</b>	<b>Conformance (AFC Section)</b>
<b>Federal</b>			
CWA Section 402; 33 USC Section 1342; 40 CFR Parts 110, 112, 116	Requires NPDES Permits for construction and industrial stormwater discharges. Requires preparation of a SWPPP and Monitoring Program.	All stormwater runoff from the Project Site will be collected and discharged to the BP Refinery oily water system for disposal to the LACSD. As there will be no discharge of runoff, no coverage under the NPDES industrial stormwater permit will be required. NOI for coverage under NPDES construction stormwater permit will be filed prior to construction and plant operation. A SWPPP will also be prepared for construction activity.	5.5.3.2 5.5.7.1 5.5.7.2 5.5.9.2
CWA Section 311; 33 USC Section 1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	The Project will conform by proper management of oils and hazardous substances both during construction and operation.	5.5.3.2 5.5.7.1 5.5.7.2 5.5.9.2
<b>State</b>			
CWC Section 13552.6	Use of potable domestic water for additional cooling tower cells is unreasonable use if suitable recycled water is available.	The Applicant has determined that there will be no increase in the combined use of municipal and groundwater supplies. If and when recycled water supplies are feasibly available, they will be utilized as the primary supply for power plant cooling.	5.5.3.1
California Constitution Article 10 Section 2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	The Project includes appropriate water conservation measures, both during construction and operation. Significant quantities of water will be conserved through reuse of internal waste streams. The Project will comply through limiting combined use of municipal and groundwater supplies to existing levels and the use of reclaimed water as the primary supply for power plant cooling, if and when this supply becomes available.	5.5.3.1
SWRCB, Resolution No. 75-58	Addresses new appropriations of surface water supplies for cooling power plants.	Not applicable. However, combined use of municipal and groundwater supplies will be limited to existing levels. Reclaimed water supplies will be utilized as the primary supply for power plant cooling if and when these supplies become available.	5.5.3.1
SWRCB Resolution 2009-0011	Promotes use of recycled water as a means towards achieving sustainable water supplies.	The Project will utilize reclaimed water supplies if and when they become available.	5.5.3.1
Porter-Cologne Water Quality Act of 1972; CWC Section 13000-14957, Division 7, Water Quality	Requires State and RWQCBs to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative, and numerical water quality standards.	The Project will conform to applicable state qualitative and quantitative water standards prior to plant operation.	5.5.3.2

**Revised Table 5.5-15  
Summary of LORS – Water Resources**

<b>LORS</b>	<b>Applicability</b>	<b>Conformance and Timing</b>	<b>Conformance (AFC Section)</b>
Title 22, CCR	Addresses the use of recycled water for cooling equipment.	The Applicant has investigated the technical and economic feasibility of using reclaimed water and determined that this resource will be used as the primary water supply for power plant cooling, if and when this supply becomes available.	5.5.3.1
The Safe Drinking Water and Toxic Enforcement Act of 1986 (proposition 65), Health and Safety Code 25241.5 <i>et seq.</i>	Prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.	The Project will conform to all state qualitative and quantitative water quality standards.	5.5.3.2 5.5.8
CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	The Applicant has investigated the technical and economic feasibility of using reclaimed water and determined that it will be used as the primary supply for power plant cooling, if and when this source becomes available. Significant quantities of water will also be conserved through reuse of internal waste streams.	5.5.3.1
California Public Resources Code Section 25523(a); 20 CCR Sections 1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part (1)	The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection.	The Project Site will comply with the requirements of the CEC to assure protection of water resources.	5.5.4 5.5.7
CWC Sections 13271 – 13272; 23 CCR Sections 2250 – 2260	Reporting of releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products.	The Project will conform to all qualitative and quantitative State water quality standards.	5.5.3.2 5.5.7.2
CEQA, Public Resources Code Section 21000 <i>et seq.</i> ; CEQA Guidelines, 14 CCR Section 15000 <i>et seq.</i> ; Appendix G	The CEQA Guidelines (Appendix G) contain definitions of projects which can be considered to cause significant impacts to water resources.	The Project will comply with the requirements of the CEC to assure protection of water resources.	5.5.4
2001 Los Angeles County Municipal Storm Water NPDES Permit As Amended by Regional Board Order R4-2007-0042	Requires the development and implementation of a SUSMP.	The Project will conform to all applicable requirements, including requirements to prepare and implement a SUSMP.	5.5.7.4

**Revised Table 5.5-15  
Summary of LORS – Water Resources**

<b>LORS</b>	<b>Applicability</b>	<b>Conformance and Timing</b>	<b>Conformance (AFC Section)</b>
Section 402 of the CWA and implementing regulations adopted by the USEPA and Chapter 5.5, Division 7 of the CWC. Article 4, Chapter 4 of the CWC. Water Quality Order No. R4-2007-0015, NPDES No. CA0000680.	Authorizes discharge of steam condensates, service water, irrigation runoff, fire hydrant water, and stormwater to the Dominguez Channel. This permit also requires monitoring and the preparation and implementation of a SWPPP.	The Project will not impair the BP Refinery from meeting the discharge limitations established in this permit.	5.5.3.2
Water Quality Order No. 97-03-DWQ NPDES General Permit No. CAS000001 Waste Discharge Requirements (WDRS) for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities	Requires the development and implementation of a SWPPP and monitoring plan for industrial activities.	Runoff associated with industrial activities at the Project Site will be collected and discharged to the BP Refinery oily water system for disposal to the LACSD. Since there will be no discharge from the Project Site, coverage under NPDES General Industrial Stormwater Permit is not required.	5.5.3.2 5.5.7.2 5.5.9.2
General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ)	Requires the development and implementation of a SWPPP and monitoring plan for construction activities.	NOI for coverage under NPDES construction stormwater permit will be filed prior to construction and plant operation. A SWPPP will also be prepared and implemented for construction activity.	5.5.7.2
<b>Local</b>			
City of Carson General Plan: Water Quality Policies and Programs	Non-point sources of water pollution, such as runoff from urban areas, grading, construction, and agricultural activities shall be recognized as potentially significant impacts of development.	The Project will conform to all water quality policies and programs, and will have zero discharge off-site from industrial activities. Grading and erosion control plans will prevent construction impacts.	5.5.3.2

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008; 2011.

Notes:

AFC	= Application for Certification	LORS	= laws, ordinances, regulations, and standards
CCR	= California Code of Regulations	NOI	= Notice of Intent
CEC	= California Energy Commission	NPDES	= National Pollutant Discharge Elimination System
CEQA	= California Environmental Quality Act of 1970	RWQCB	= Regional Water Quality Control Boards
CFR	= Code of Federal Regulations	SUSMP	= Standard Urban Stormwater Mitigation Plan
CWA	= Clean Water Act	SWPPP	= Stormwater Pollution Prevention Plan
LACSD	= Los Angeles County Sanitation Districts	SWRCB	= State Water Resources Control Board
CWC	= California Water Code	USC	= United States Code
<i>et seq.</i>	= Et Sequens and the Following	USEPA	= United States Environmental Protection Agency

*State Water Resources Control Board, Resolution 75-58 (June 18, 1975)*

The SWRCB prescribes new appropriations of surface water for power facility cooling. As the Project will use groundwater and existing appropriations, this policy is not applicable. However, the Project will use reclaimed water if and when available as the primary water supply source, consistent with the priorities of this policy.

*State Water Resources Control Board, Resolution 2009-0011 (February 3, 2009)*

The SWRCB promotes the increased acceptance and use of recycled water as a means towards achieving sustainable local water supplies and reduction of greenhouse gases. This Policy also encourages the beneficial use of, rather than solely disposal of, recycled water. The Project intends to use recycled water if and when it becomes available.

*CEC 2003 Integrated Energy Policy Report (IEPR)*

The Project will meet the California Energy Commission's (CEC's) water policies as first articulated in the 2003 Integrated Energy Policy Report (IEPR). The 2003 IEPR states that the Commission will approve the use of fresh water for cooling purposes where alternative cooling technologies are shown to be environmentally undesirable or economically unsound. While this policy has not been adopted into regulation and appears to be based largely on SWRCB Policy 75-58, which is inapplicable to this Project as discussed above, the Applicant is nevertheless committed to avoiding adverse impacts on the state's water resources by avoiding any increase in the combined average annual use of groundwater and municipal water at the existing Watson Cogeneration Facility. The existing four cogeneration units at the Watson Cogeneration Facility use an annual average of 4.1 mgd of combined municipal and groundwater. As discussed, the Project will accept a condition of certification limiting its future use of groundwater and municipal water to this historic baseline. Thus, notwithstanding the addition of the proposed fifth-train cogeneration unit (the Project), combined groundwater and municipal water use by the entire Watson Cogeneration Facility as a whole will not increase. In addition, as also discussed, the Watson Cogeneration Facility plans to use reclaimed water to the extent it becomes available at a reasonable cost in the future. Since the Watson Cogeneration Facility would not cause an annual increase in the combined use of groundwater and municipal water for cooling purposes, the Watson Cogeneration Facility (including the Project) will adhere to the CEC's IEPR policies on water use for power plant cooling.

*California Porter-Cologne Water Quality Control Act 1998; California Water Code Section 13000 – 14957; Division 7, Water Quality*

The Porter-Cologne Water Quality Control Act authorizes the state to develop and implement a statewide program for the control of the quality of all waters of the state. The Act establishes the SWRCB and the nine RWQCBs as the principal state agencies with primary responsibility for the coordination and control of water quality. Under Section 13172, siting, operation, and closure of waste disposal sites are regulated. The SWRCB requires classification of the waste and the disposal site. Discharges of waste must comply with the groundwater protection and monitoring requirements of the Resource Conservation and Recovery Act of 1976 (RCRA), as amended (42 U.S. Code [USC] Section 6901 *et seq.*), and any federal acts which amend or

supplement RCRA, together with any more stringent requirements necessary to implement this revision or Article 9.5 (commencing with Section 25208) of Chapter 6.5 of Division 20 of the Health and Safety Code. The Project will comply with the regulations set forth in this Act.

The administering agencies for the above authority are the CEC, SWRCB and the Los Angeles RWQCB.

### *Title 22, CCR Division 4, Chapter 3*

This regulation requires maximum use of reclaimed water in the satisfaction of requirements for beneficial uses of water. The Project satisfies this requirement in that it complies with the Los Angeles Region Basin Plan's designated beneficial uses for local groundwater. The Project will also use reclaimed water if and when available as the primary water supply source. The administering agency is the Los Angeles RWQCB.

### *California Public Resources Code Section 25523(a); 20 CCR Sections 1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5 Article 1, Appendix B, Part (1)*

The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection. The administering agency for the above authority is the CEC.

### *California Water Code Sections 13271 – 13272; 23 CCR Sections 2250 – 2260*

These code sections require reporting of releases of specified reportable quantities of hazardous substances or sewage (Section 13272), when the release is into, or where it will likely discharge into, waters of the state. For releases into or threatening surface waters, a "hazardous substance" and its reportable quantities are those specified at 40 Code of Federal Regulations (CFR) Section 116.5, pursuant to Section 311(b)(2) of the CWA, 33 USC Section 1321(b)(2). For releases into or threatening groundwater, a "hazardous substance" and its reportable quantities are those specified at 40 CFR Section 116.5, pursuant to Section 311(b)(2) of the CWA, 33 USC Section 1321(b)(2). For releases into or threatening groundwater, a "hazardous substance" is any material listed as hazardous pursuant to the California Hazardous Waste Control Act, Health & Safety Code Sections 25100 – 2520.24, and the reportable quantities are those specified at 40 CFR Part 302. Although such releases are not anticipated, the project would comply with the reporting requirements.

The administering agencies for the above authority are the Los Angeles RWQCB and the California Office of Emergency Services.

### *California Water Code Section 13260 – 13269; 23 CCR Chapter 9*

The code requires the filing of a Report of Waste Discharge and provides for the issuance of Waste Discharge Requirements (WDRs) with respect to the discharge of any waste that can affect the quality of the waters of the state. The WDRs will serve to enforce the relevant water quality protection objectives of the Los Angeles Region Basin Plan and federal technology-based effluent standards applicable to the Project. With respect to potential water pollution from

construction activities, the WDRs may incorporate requirements based on the CWA Section 402(p) and implementing regulations at 40 CFR Parts 122 seq., as administered by the Los Angeles RWQCB. The administering agency for the above authority is the Los Angeles RWQCB.

*California Environmental Quality Act, Public Resources Code Section 21000 et seq.; CEQA Guidelines, 14 CCR Section 15000 et seq.; Appendix G*

The CEQA Guidelines (Appendix G, Control Systems Engineering Design and Criteria) contain definitions of projects that can be considered to cause significant unmitigated impacts to water resources. The Project is not expected to cause significant impacts to water resources, as described in Section 5.5.2, Project Water and Wastewater Needs. The administering agency of the above authority is the CEC.

### *5.5.9.3 Local Authorities and Administering Agencies*

#### *Los Angeles County Sanitation District*

The LACSD Ordinance (April 1, 1972, as amended) authorizes each sanitation district to require the operators of projects that discharge industrial wastes to county sewers to procure an Industrial Discharge Permit and to meet effluent pretreatment standards. Any discharge to county sewers will not exceed the standards specified in the existing Industrial Discharge Permit issued to the BP Refinery.

The LACSD has issued an Industrial Waste Discharge Permit to the BP Refinery that specifies quality limitations for the disposal of industrial wastewater to the sanitary sewer. The Project will discharge industrial wastewater to the refinery's existing wastewater system that is regulated under this permit.

#### *City of Carson*

Under contract by the City of Carson, the Los Angeles County Department of Public Works (DPW) has the responsibility to maintain and operate all local public sewer systems within the City. In addition, the DPW, in coordination with the LACSD, is responsible for reviewing, approving, and issuing wastewater discharge permits.

#### *City of Carson General Plan, Water Quality Policies G-3*

The purpose of these policies are to help control potentially significant impacts of development, including non-point sources of water pollution, such as runoff from urban areas, grading, construction, and agricultural activities. Project compliance with other LORS, such as the CWA, will result in general compliance with this objective.

*Industry Codes and Standards*

With regards to water resources and the related Project facilities, including pipelines, sewers and other facilities, all construction will be in compliance with the LORS mentioned in this report section or state and local building codes.

*5.5.9.4 Agency Contacts and Permits*

See Table 5.5-16, Agency Contacts, for agency contacts.

**Table 5.5-16  
Agency Contacts**

<b>Agency</b>	<b>Contact</b>	<b>Title</b>	<b>Telephone</b>
California Regional Water Quality Control Board, Los Angeles Region	Mazhar Ali 320 West Fourth Street, Suite 200 Los Angeles, CA 90013	Water Resource Control Engineer	213-576-6652
Los Angeles County Sanitation District	Brent Perry P.O. Box 4998 Whittier, CA 90607-4998	Permit Engineer	562-699-7411 x2930

The water-related permits that are required for the project are identified in Revised Table 5.5-15, Summary of LORS – Water Resources. The timing for the preparation of each permit is noted in the table. These permits include the following.

- General Construction Activity Stormwater Permit. Notice of Intent to comply with this general permit to be prepared and submitted to the SWRCB at least two weeks prior to the start of project operation.
- Draft of SWPPP to be prepared and submitted to CPM at least 30 days prior to the start of construction for review and comment. A final plan to be submitted to the CPM no later than two weeks prior to the start of construction.

## 5.5.10 References

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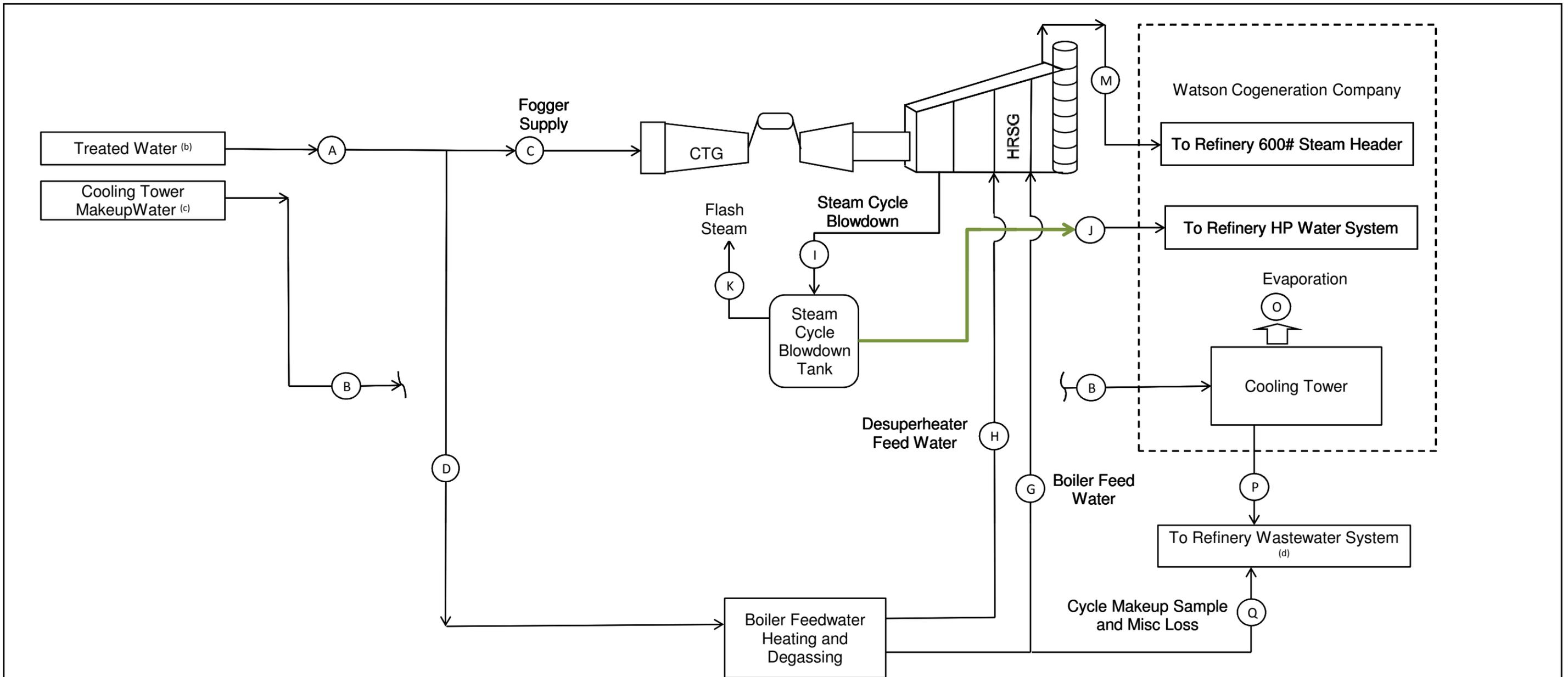
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Western Regional Climate Center, [wcc@dri.edu](mailto:wcc@dri.edu).

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Notes:

- a. Bold green lines indicate waste water reuse.
- b. Makeup water supplied by Watson; including condensate return
- c. Cooling tower makeup water provided by Watson.
- d. Utilities services provided by Refinery; not part of the 5th Train Project.

2	Revised per Watson Procedures	PDF	SMG	SMG	2/1/11
1	Revised Water Supply Notation	JBL	BMC	SMG	2/4/09
0	Issued for AFC	JBL	BMC	SMG	10/30/08
Rev	DESCRIPTION	Dwn	Chk	App	Date

Watson Cogeneration Steam and Electric Reliability Project



8455 Lenexa Drive  
Lenexa, Kansas 66214

**WATER BALANCE FLOW DIAGRAM**  
FIGURE 5.5-1 (Second Revision)

	by	date	DRAWING NUMBER
Drawn	JAR	8/22/08	2007-047-WB-001-01
Checked	BMC	8/22/08	
Approved	SMG	8/22/08	



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
1516 NINTH STREET, SACRAMENTO, CA 95814  
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APPLICATION FOR CERTIFICATION  
FOR THE **WATSON COGENERATION  
STEAM AND ELECTRICITY RELIABILITY  
PROJECT**

Docket No. 09-AFC-1

PROOF OF SERVICE LIST  
(Revised 3/21/11)

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\*indicates change

## DECLARATION OF SERVICE

I, Cindy Kyle-Fischer, declare that on March 28, 2011, I served and filed copies of the attached *Responses to CEC Requests from the February 3, 2011 PSA Workshop Continuation*, dated March 2011. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[[www.energy.ca.gov/sitingcases/watson](http://www.energy.ca.gov/sitingcases/watson)]**.

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

**(Check all that Apply)**

### **FOR SERVICE TO ALL OTHER PARTIES:**

X sent electronically to all email addresses on the Proof of Service list

X by personal delivery or by depositing in the United States mail at Denver, Colorado with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

**AND**

### **FOR FILING WITH THE ENERGY COMMISSION:**

X sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (**preferred method**);

**OR**

\_\_\_ depositing in the mail an original and \_\_\_ paper copies, as follows:

#### **CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 09-AFC-1  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct.



\_\_\_\_\_  
**Cindy Kyle-Fischer**