

GWF Henrietta Peaker Power Plant Project (01-AFC-18)

Amendment 2

Prepared for

California Energy Commission

April 2013

Submitted by

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with assistance from

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Introduction

1.1 Background

On March 5, 2002, the California Energy Commission (CEC) approved and licensed GWF Energy, LLC's (GWF) Henrietta Peaker Plant (HPP). HPP consists of two GE LM-6000 natural gas-fired combustion turbine generator (CTG) units and is a nominal 95 megawatt (MW) plant. HPP is located on a 20-acre parcel adjacent to the existing Pacific Gas & Electric (PG&E) 70-kilovolt (kV) Henrietta Substation in Kings County, west of the City of Lemoore. HPP was placed in service on July 1, 2002, and initially operated under terms and conditions of a Power Purchase Agreement (PPA) with the California Department of Water Resources (DWR). The DWR PPA was subsequently novated and replaced by a PPA with PG&E for operation of the HPP in simple cycle mode. The HPP currently operates under the terms and conditions of the PG&E PPA.

In October 2008, GWF submitted an amendment petition to allow GWF to convert HPP to a combined cycle power plant with a nominal 25 MW (net) of additional generating capacity. The modification to the facility would be referred to as the GWF Henrietta Combined Cycle Power Plant (GWF Henrietta) with a new nominal generating capacity of 120 MW net. The CEC approved this amendment in March 2010. GWF sought the ability to convert the HPP to combined cycle mode in anticipation of the need for additional combined cycle generation on the part of PG&E. GWF would fully implement this conversion only if a power purchase contract was secured for the additional megawatts. As it turned out, PG&E did not have a need for additional combined cycle generation, and as discussed above, has instead entered into a PPA with GWF for continued operation in a simple cycle mode. It is possible that PG&E will seek additional combined cycle generation in the future, and therefore, GWF seeks to preserve its ability to convert the HPP pursuant to the approved amendments.

By this petition, GWF seeks to install a reverse osmosis (RO) treatment system as a primary water treatment system to augment the existing treatment system and to modify the wastewater disposal method. This modification is described in more detail below.

In addition to the proposed modification, GWF seeks to clarify the interplay between the existing simple cycle license issued by the CEC for the HPP and the associated conditions, and the amendment subsequently approved by the CEC to allow conversion to a combined cycle mode including amendments to certain conditions. Implicit in the decision on the amendment was an understanding that the HPP would continue to comply with the conditions of certification contained in the original license until such time as the modification to combined cycle mode was completed, at which time the Project would be held to the modified conditions. Because this was not made explicit in the decision on the amendment, we believe it would be helpful to obtain clarification on this point to avoid any confusion over the applicable conditions.

1.2 Description of Proposed Amendment

Section 1769 (a)(1)(A) of the CEC Siting Regulations requires a complete description of the proposed modifications. GWF is requesting a change to the water treatment and wastewater disposal process. GWF seeks to install a reverse osmosis (RO) treatment system as a primary water treatment system to augment the existing treatment system. GWF also proposes to discharge the RO reject water to the facility's infiltration/evaporation storm water basin (storm water basin). No excavation will be required for the skid-mounted RO system because it will be installed on an existing concrete pad at the HPP site. The RO system will require the use of a small quantity (400 gallons per year) of an anti-scalant water treatment chemical.

The purpose of this filing is to request an amendment of the HPP project license to allow minor modification of the water treatment system and wastewater disposal process. More detailed information on these proposed changes is provided in Section 2.

1.3 Necessity of Proposed Changes

Sections 1769 (a)(1) (B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed revisions to the HPP project, whether the revisions are based on information known by the petitioner during the certification proceeding. The proposed water treatment and wastewater disposal changes are being proposed to increase the efficiency and reduce the cost of producing process water, and to simplify the wastewater disposal process. This request is based on developments and new information that did not exist at the time that the license was originally granted.

1.4 Environmental Impacts and LORS Compliance

Section 1769 (a)(1)(E) of the CEC Siting Regulations requires that an analysis be conducted to address impacts the proposed revisions may have on the environment, and proposed measures to mitigate significant adverse impacts. Section 1769 (a)(1)(F) requires a discussion of the impacts of proposed revisions on the facility's ability to comply with applicable laws, ordinances, regulations, and standards (LORS). Section 3 discusses the potential impacts of the proposed changes on the environment, as well as the proposed revisions consistency with LORS.

1.5 Consistency of Changes with License

Section 1769 (a)(1)(D) of the CEC Siting Regulations requires an explanation of why the proposed revision should be permitted if it is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the Final Decision. While the proposed revisions are based on new circumstances and information that was not available when the HPP was originally licensed, as discussed in Sections 2 and 3, the new information does not materially undermine the assumptions, rationale, findings, or other bases of the Final Decision for the project.

1.6 Potential Effects on Public, Property Owners and Parties

Sections 1769 (a)(1)(G) and (I) of the CEC Siting Regulations requires a discussion of potential effects of the modifications on the public, nearby property owners and the parties in the application proceedings. This discussion is contained in Section 5.

1.7 List of Property Owners

Section 1769 (a)(1)(H) of the CEC Siting Regulations requires a list of property owners potentially affected by the modifications. This list is contained in Section 6.

Description of Project Changes

Consistent with the CEC Siting Regulations Section 1769(a)(1)(A), this section includes a description of the requested project modifications, as well as the necessity for the changes.

2.1 Proposed Changes

The HPP is located in Kings County, west of Lemoore, California, and is a simple-cycle peaker plant licensed by the CEC in 2002. In 2008, GWF submitted to the CEC a Petition for License Amendment to modify the plant as a combined cycle facility. This modification was approved by the CEC in March 2010; however, GWF will not implement this conversion until a power purchase contract is secured for the additional megawatts. Currently the facility is permitted to receive surface water delivered from the California Aqueduct that is treated and used for make-up water.

When HPP was originally licensed, GWF proposed installing a multi-pass RO system with an electro-deionizer polishing unit (see HPP AFC Figure 8.14-1 for the annual average water balance). However, during final design, it was determined that the RO system would result in prohibitive costs due to the low usage. GWF determined that water treatment needs could be satisfied by a contractor-based deionization system consisting of resin bottle that are periodically removed from the site for regeneration. This change in the water treatment design was discussed with the CEC CPM, who approved the change.

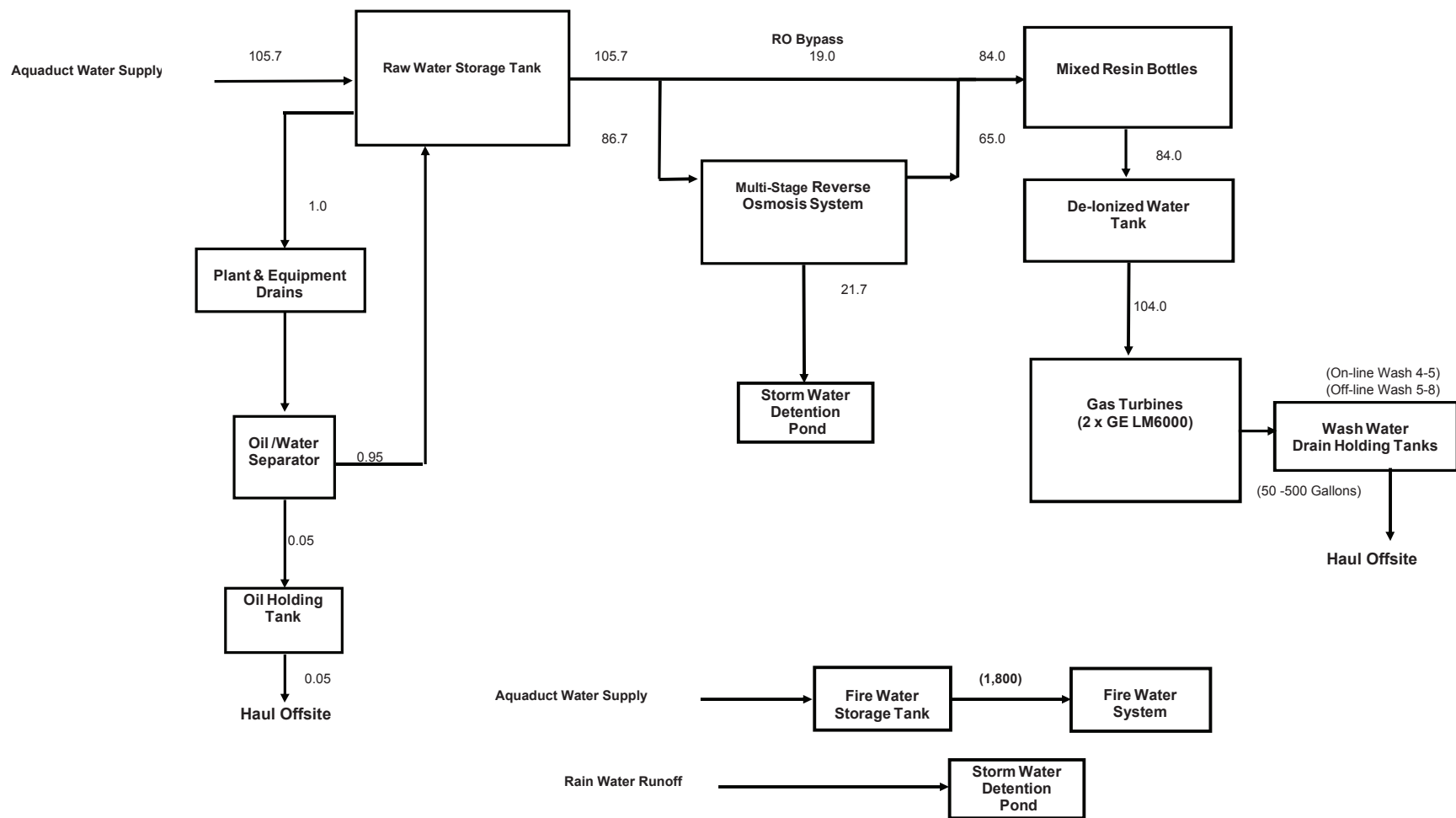
As noted above, HPP uses a contract-based deionization system and GWF seeks to install a permanent single pass RO treatment system as the primary raw water deionization treatment process. The existing portable water treatment system would be used to supplement or “polish” the RO effluent prior to use in the combustion turbines and the primary treatment system when the RO system is in “by-pass” or out of service.

GWF proposes to discharge the RO reject water to the facility’s storm water basin. Figures 2-1a and 2-1b present water balances for peak and annual average water use, respectively. The RO treatment system would require the use of approximately 400 gallons of an anti-scalant for water treatment. This material would be contained in a single tote located near the existing water treatment area. Appendix A is a copy of the Material Safety Data Sheet for the anti-scalant.

The design changes being considered would be constructed within the licensed GWF HPP boundary and would not require any additional acreage for development. No excavation would be required for the skid-mounted RO system, because it would be installed on an existing concrete foundation at the HPP site. This change would not require a change to the water supply or the annual water usage. The offsite wastewater disposal volume would be significantly reduced. The only waste water requiring off-site disposal would be waste water from the combustion turbine water washes.

2.2 Necessity of Proposed Changes

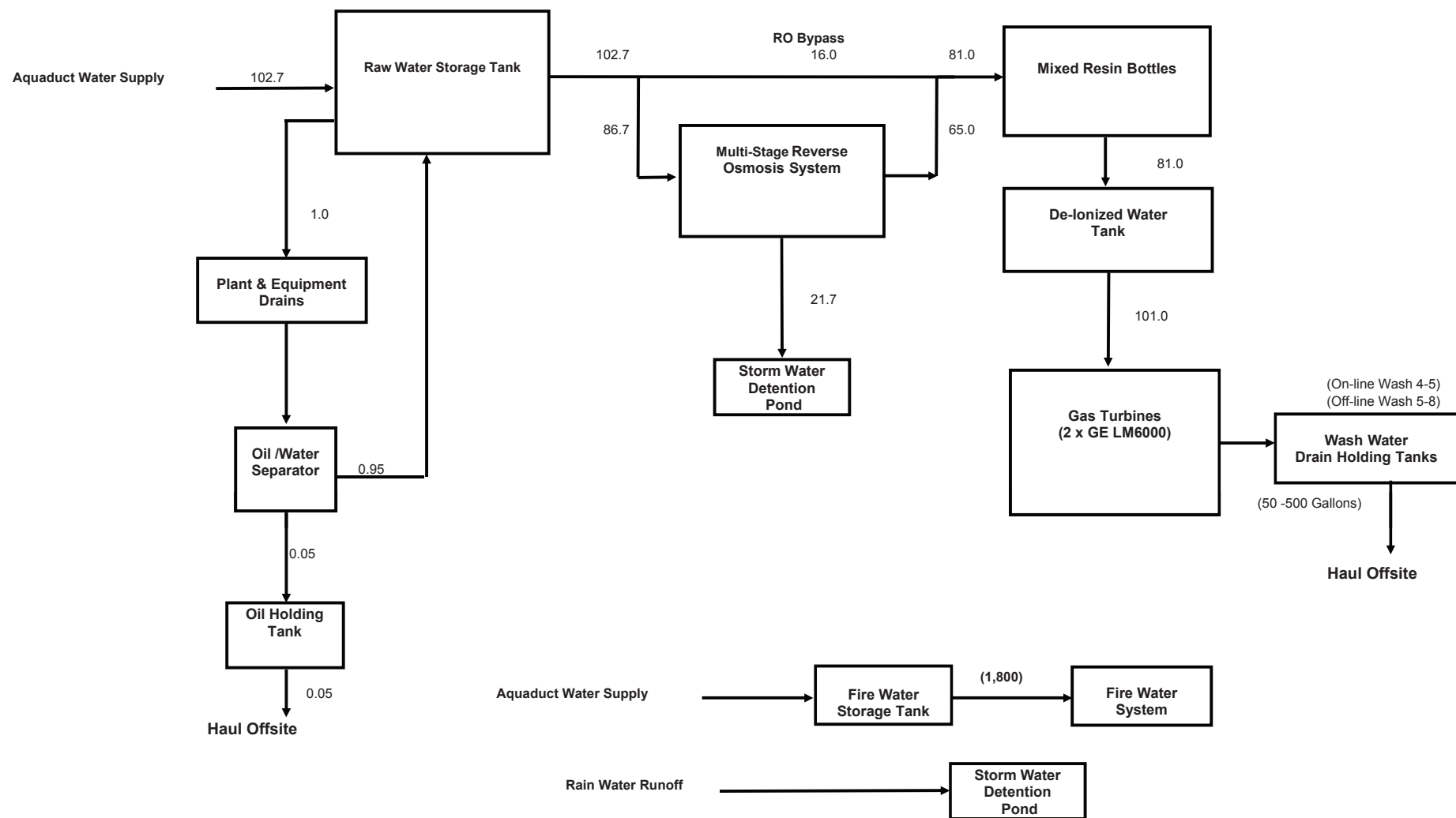
Sections 1769 (a)(1)(B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed changes and whether this modification is based on information that was known by the petitioner during the certification proceeding. The HPP uses a contractor-provided deionization system to provide make-up water for use in the combustion turbines. This system requires the system components (treatment bottles) to be replaced periodically for offsite regeneration. The incorporation of the RO treatment system will reduce HPP’s overall water treatment costs with no change in annual water use.



Notes:

1. All water flow rates are in gallons per minute (gpm).
2. Flows indicated in parenthesis () are intermittent.

FIGURE 2-1a
Water Balance, Peak
GWF Henrietta Peaker Plant



Notes:

1. All water flow rates are in gallons per minute (gpm).
2. Flows indicated in parenthesis () are intermittent.

FIGURE 2-1b
Water Balance, Annual Average
GWF Henrietta Peaker Plant

SECTION 3

Environmental Analysis of the Project Changes and LORS Compliance

GWF has reviewed the modifications proposed herein to determine if the changes will result in any environmental impacts that were not originally analyzed by the CEC when it approved the project in 2002, and whether the modifications will affect the ability of the project to comply with applicable LORS. The only disciplines that could be affected by the changes described in this amendment are hazardous materials, waste management, and water resources.

3.1 Hazardous Materials

With the addition of a RO treatment system, a new anti-scalant, which is a hazardous material, will be used onsite. Information regarding storage and use of this new hazardous material is contained in Table 3-1. Table 3-2 presents information about this material, including trade name, chemical name, Chemical Abstract Service (CAS) number, maximum quantities onsite, reportable quantities (RQ), California Accidental Release Program (CalARP) threshold planning quantities (TPQ), and status as Proposition 65 chemicals (chemicals known to be carcinogenic or to cause reproductive problems in humans). Health hazards and flammability data are summarized for this material in Table 3-3, which also contains information on incompatible chemicals.

This change in materials poses no significant potential for onsite or offsite impacts as a result of the quantities onsite, relative toxicity, and/or environmental mobility. No new significant impacts are expected from the proposed change relative to those presented in the CEC Final Decision.

TABLE 3-1
Use and Location of Hazardous Materials

Chemical	Estimated Delivery Schedule	Use	Quantity	Storage Location	State	Type of Storage
Anti-scalant (e.g., NALCO PermaTreat® PC-191T)	One to two totes per year	Inhibit mineral scale in reverse osmosis (RO) microfiltration (MF) membranes	200 gallons	Water treatment building	Liquid	Continuously onsite

TABLE 3-2

Chemical Inventory, Description of New Hazardous Material Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ ^a	RQ of Material as Used Onsite ^b	EHS TPQ ^c	Regulated Substance TQ ^d	Prop 65
Anti-scalant (e.g., NALCO PermaTreat® PC-191T)	Anti-scalant	Various	400 gallons	e	e	e	e	No

^a Reportable quantity (RQ) for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) (Ref. 40 Code of Federal Regulations [CFR] 302, Table 302.4). Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

^b RQ for materials as used onsite. Because some of the hazardous materials are mixtures that contain only a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lb., the RQ for that material would be (100 lb)/(10 percent) = 1,000 lb.

^c Extremely Hazardous Substance (EHS) threshold planning quantity (TPQ) (Ref. 40 CFR Part 355, Appendix A). If quantities of extremely hazardous materials equal to or greater than the TPQ are handled or stored, they must be registered with the local Administering Agency.

^d TQ is from 19 California Code of Regulations (CCR) 2770.5 (state) or 40 CFR 68.130 (federal).

^e No reporting requirement. Chemical has no listed threshold under this requirement.

TABLE 3-3

Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*
Anti-scalant	Amber liquid	May cause slight irritation to the skin and moderate irritation to the eyes	None	Nonflammable

Notes:

Data were obtained from material safety data sheets (MSDSs) and Lewis, 1991.

Per California Department of Transportation regulations, under 49 CFR 173: "Flammable" liquids have a flash point less than or equal to 141°F; "Combustible" liquids have a flash point greater than 141°F.

3.1.1 Laws, Ordinances, Regulations, and Standards

The HPP currently complies with applicable LORS. The proposed revisions will not change the discussion related to LORS as presented in the CEC Final Decision.

3.1.2 Cumulative Impacts

Although the proposed changes to the HPP will result in a small change to the types of hazardous materials used onsite, these changes in materials pose no significant potential for onsite or offsite impacts as a result of the quantities on-site, relative toxicity, and/or environmental mobility. No new significant cumulative impacts are expected from the proposed changes relative to those presented in the CEC Final Decision. Therefore, no cumulative hazardous materials impacts are expected.

3.2 Waste Management

3.2.1 Construction Waste

During construction, small amounts of construction waste will be generated, such as waste paper, wood, glass, scrap metal, plastics (from packing material), and nonhazardous chemical containers. Managing these wastes will be the responsibility of the contractors. Wastes will be segregated where practical for recycling. Those that cannot be recycled will be placed in covered containers and removed on a regular basis by a certified waste handling contractor for disposal at an appropriate facility.

In addition, small quantities of hazardous materials will also be generated during the construction phase and will consist of used oil, waste paint, and cleaning chemicals. These wastes will be recycled or disposed of at a licensed hazardous waste treatment or disposal facility. Managing these wastes will be the responsibility of the contractor.

3.2.2 Operational Waste

The RO treatment system will generate reject water that will be discharged to the existing storm water basin. GWF has initiated permitting of the RO reject water with the Central Valley Regional Water Quality Control Board (RWQCB). Appendix B is a copy of the Draft RWQCB Waste Discharge Report requirements. The RWQCB indicates that the proposal to discharge the RO reject water to the stormwater basin will not degrade state waters, is consistent with the RWQCB's Basin Plan and is consistent with the RWQCB's Anti-Degradation Policy, as evidenced by the RWQCB's draft Waste Discharge Requirements also presented in Appendix B. Therefore, no operational waste management impacts are expected.

3.2.3 Laws, Ordinances, Regulations, and Standards

The HPP currently complies with applicable LORS. The proposed revisions will not change the discussion related to LORS as presented in the CEC Final Decision.

3.2.4 Cumulative Impacts

Amounts of waste generated are anticipated to be significantly less than those analyzed in the CEC Final Decision; therefore, capacity in local landfills is more than adequate for disposal of any additional wastes. Therefore, no new significant cumulative impacts are expected from the proposed changes relative to those presented in the CEC Final Decision.

3.3 Water Resources

The RO system is skid-mounted and will be installed on an existing foundation. No excavations are expected during the installation and supply and discharge piping for the RO system will be above ground. Minimal construction water will be required, with a majority of the construction water being used to commission the RO system. Therefore, no impacts to water resources are expected during RO system installation.

GWF is not requesting an increase in the operational water use of 160 acre-feet per year analyzed during the licensing of the HPP. Therefore, no impacts to water resources are expected as a result of operational water use.

Discharging the RO reject water to the storm water basin could affect water resources. Based on discussions between GWF and RWQCB staff, the RO reject discharge is not expected to impact state water resources (either ground or surface water).

Discharging the RO reject water to the storm water basin could affect stormwater discharges if the volume of the RO discharge were to reduce the basin's allowable storage capacity required by Kings County (stormwater basin sizing adequate to contain the runoff volume produced by a 10-year, 10-day storm with 1 foot of remaining freeboard). GWF conducted an analysis of the RO discharge's impact on the basin's storage capacity (see Appendix C) and determined that on an annual basis, the RO discharge to the basin would be lower than the expected annual evaporation. However, to avoid the potential of discharging RO reject water to the basin during rain events, GWF would not use the RO system for water treatment and would use the existing water treatment system, which does not have a wastewater discharge. Therefore, the proposed changes will not impact state water resources.

3.3.1 Laws, Ordinances, Regulations, and Standards

The proposed revisions will not change the discussion related to LORS as presented in the CEC Final Decision.

3.3.2 Cumulative Impacts

No new significant cumulative impacts are expected from the proposed changes relative to those presented in the CEC Final Decision.

SECTION 4

Proposed Modifications to the Conditions of Certification

Consistent with the requirements of the CEC Siting Regulations Section 1769 (a)(1)(A), this section addresses the proposed modifications to the project's Conditions of Certification. GWF proposes to modify Condition of Certification Water Quality-4 to reflect the new process wastewater discharge method. Proposed modifications are presented below in an underline/strike-out format.

WATER QUALITY-4: The project owner shall not discharge any process waste water off-site to the storm water basin, except as delivered to licensed waste disposal contractors as described in Section 2.2.9.1 of the Application for Certification consistent with the RWQCB's Waste Discharge Requirements. The project owner shall provide the CPM with copies of all correspondence with the RWQCB in a timely manner. ~~the contract between the project owner and the waste disposal contractor, as well as copies of the contractor's permits and certifications relative to the hauling and disposal of the process wastes and contact storm water wastes. To the extent practicable, notification of any changes in waste disposal contractor or subcontractors shall be made to the CPM within 30 days of the change.~~

Verification: The project owner shall maintain records consistent with the requirements of the RWQCB's Waste Discharge Requirements and shall submit all copies ~~correspondences with the RWQCB to the CPM within 30 days of wastewater hauled off-site, including hauler's Chain of Custody or other signed and dated receipts. Copies of these records shall be submitted to the CPM as part of the project owner's annual compliance report. Before operation of the power plant, the CPM will be supplied with copies of the waste disposal contract and the contractor's certifications and permits. The CPM shall be notified of any change in the contract, contractors or sub-contractors within 30 days of the change.~~

SECTION 5

Potential Effects on the Public, Property Owners and Parties

The proposed changes described in this amendment will have no effect on the public, nearby property owners, or parties to the certification proceedings beyond what was originally approved by the CEC.

The proposed water treatment and wastewater disposal processes design changes are expected to result in comparable impacts to those analyzed during project licensing. Therefore, impacts to the public, nearby property owners and parties are expected to be substantially the same as those analyzed during the licensing of the project.

SECTION 6

List of Property Owners

There are no nearby property owners that will be affected by the proposed modifications.

Appendix A
Material Safety Data Sheet of Anti-scalant

**MATERIAL SAFETY DATA SHEET****PRODUCT****PERMATREAT(R) PC-191T****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION****PRODUCT NAME :** PERMATREAT(R) PC-191T**APPLICATION :** REVERSE OSMOSIS ANTISCALANT**COMPANY IDENTIFICATION :** Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198**EMERGENCY TELEPHONE NUMBER(S) :** (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******CAUTION**

May cause irritation with prolonged contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :**EYE CONTACT :**

May cause irritation with prolonged contact.

SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

May cause gastrointestinal irritation.



MATERIAL SAFETY DATA SHEET

PRODUCT

PERMATREAT(R) PC-191T

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

INHALATION :

May cause irritation of mucous membranes.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If symptoms persist, call a physician.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Use extinguishing media appropriate for surrounding fire. This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable.

FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



MATERIAL SAFETY DATA SHEET

PRODUCT

PERMATREAT(R) PC-191T

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water., Do not allow material to contaminate ground water system., Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :

Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use. Avoid eye and skin contact. Keep away from acids and oxidizing agents.

STORAGE CONDITIONS :

Protect product from freezing. Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., Polyethylene, Polypropylene, PVC, 100% phenolic resin liner, Epoxy phenolic resin

UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Buna-N, EPDM, Neoprene, Polyurethane, Viton, Hypalon

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended.

**MATERIAL SAFETY DATA SHEET****PRODUCT****PERMATREAT(R) PC-191T****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****HAND PROTECTION :**

Nitrile gloves, Butyl gloves, PVC gloves, Neoprene gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Amber - Green
ODOR	Ammoniacal
SPECIFIC GRAVITY	1.36
DENSITY	11.33 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	10.5
VOC CONTENT	0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY**STABILITY :**

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Strong oxidizing agents Strong acids

**MATERIAL SAFETY DATA SHEET****PRODUCT****PERMATREAT(R) PC-191T****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 17,800 mg/kg	Similar Product
Rating : Non-Hazardous		

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 15,800 mg/kg	Similar Product
Rating : Non-Hazardous		

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
0.3 / 8.0	Similar Product
Rating : Slightly irritating	

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
3.7 / 110.0	Product
Rating : Practically non-irritating	

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	> 330 mg/l	Similar Product
Bluegill Sunfish	96 hrs	> 330 mg/l	Similar Product

**MATERIAL SAFETY DATA SHEET****PRODUCT****PERMATREAT(R) PC-191T****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

Channel Catfish	96 hrs	1,212 mg/l	Similar Product
Sheepshead Minnow	96 hrs	8,132 mg/l	Similar Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs		297 mg/l	Similar Product
Grass Shrimp	96 hrs	4,575 mg/l		Similar Product

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Selenastrum capricornutum)	96 hrs	20 mg/l	Similar Product

CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Rainbow Trout	60 Days	23 mg/l / 47.6 mg/l	Growth	Similar Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Daphnia magna	3 Brood	25 mg/l / 50 mg/l	Reproduction	Similar Product

AVIAN RESULTS :

Species	Exposure	LC50	Test Descriptor
Bobwhite Quail	14 Days	> 2,510 mg/kg	Similar Product
Mallard Duck	14 Days	> 2,510 mg/kg	Similar Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low



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If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.



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SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

NSF INTERNATIONAL :

This product has received NSF/International certification under NSF/ANSI Standard 60 in the reverse osmosis antiscalant category. The official name is "Miscellaneous Water Supply Products." Maximum product application dosage is : 15 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :



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WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low



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Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 06/10/2008
Version Number : 1.8

Appendix B
Draft RWQCB Waste Discharge Requirements

Central Valley Regional Water Quality Control Board

TO: Joe Douglas
Compliance Project Manager
CALIFORNIA ENERGY COMMISSION

Casey W. Weaver
Engineering Geologist
Environmental Office
CALIFORNIA ENERGY COMMISSION

FROM: Clay L. Rodgers 
Assistant Executive Officer
CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

DATE: 27 December 2012

SUBJECT: DRAFT REQUIREMENTS FOR GWF ENERGY, LLC, HENRIETTA PEAKER
PLANT (01-ACF-18), KINGS COUNTY

The following contains recommended information and requirements for the California Energy Commission (CEC) to include in its permit for the proposed Henrietta Peaker Plant discharge to an unlined storm water pond. They are arranged under the section headings of Findings, Prohibitions, Discharge Specifications, Effluent Limitations, Groundwater Limitations, Provisions, and Monitoring. These headings are arranged in an order similar to that contained in waste discharge requirements typically adopted by the Central Valley Water Board. We look forward to discussing any changes CEC staff deems appropriate and providing additional rationale for specific requirements, if necessary. To preserve its ability to pursue enforcement should the discharge cause nuisance or pollution problems, the Central Valley Water Board may adopt waste discharge requirements for the discharge following the CEC's permitting action. We understand that the waste discharge requirements will need to mirror the permit approved by the CEC. Please contact Lonnie M. Wass of our Fresno Office at (559) 445-6051 or Dale Harvey at (559) 445-6190 to discuss these requirements.

FINDINGS

1. On 1 March 2012, TRC Solutions, on behalf of GWF Energy, LLC (GWF) a Delaware limited liability company, submitted a Report of Waste Discharge (RWD) for the discharge of wastewater to an unlined storm water pond at the Henrietta Peaker Plant (Henrietta Plant).
2. The Henrietta Plant is in the southwest quarter of Section 27, Township 19 South, Range 19 East, Mount Diablo Base and Meridian in Kings County, approximately 2 miles south of the Lemoore Naval Air Station.

3. In August 2001, GWF filed an Application for Certification with the California Energy Commission (CEC) for the Henrietta Plant, a 95-megawatt, simple-cycle power plant that operates 8,000 hours per year on a 20-acre parcel. In March 2002, CEC approved the Henrietta Plant Application for Certification 01-AFC-18 for the simple-cycle power plant. GWF is required to amend its certification with CEC because it is proposing to modify the water treatment and wastewater handling systems by installing a filtration system and a reverse osmosis (RO) system. GWF is further proposing to discharge the RO reject and filter backwash wastewater to an existing unlined storm water pond instead of storing it onsite and then periodically disposing of it off-site at an approved Waste Disposal Site.
4. Source water is stored in a raw water storage tank and then treated using portable demineralizers and then stored in a demineralized water storage tank. The demineralized water is then used in the combustion gas turbines (CTG's) for inlet cooling and control of NOx emissions from the CTG's. Source water from the raw water storage tank is also used for plant wash down and landscape irrigation. Approximately 95% of the water used for plant wash down and treated in the oil-water separator, is recovered and recycled back to the raw water storage tank. Reject from the RO unit is proposed to be discharged to the unlined storm water pond.
5. Source water is surface water from the California Aqueduct and is treated for use in the Henrietta Plant using portable demineralization units and stored in a demineralized water storage tank. Based on data provided in the RWD, source water samples were taken in February, October, and November 2011, the average quality of source water is shown in Table 1:

Table 1. Source Water Quality

<u>Constituent/Parameter</u>	<u>Unit</u>	<u>Source Water</u>
Total Dissolved Solids (TDS)	mg/L	148
Electrical Conductivity (EC)	umhos/cm	258
Sodium (Na)	mg/L	23
Chloride (Cl)	mg/L	24
Boron (B)	mg/L	0.12
Nitrate as nitrogen (NO ₃ -N)	mg/L	0.54

6. Wastewater produced at the Henrietta Plant will include RO reject and filter backwash wastewater. The wastewater will be discharged to the unlined storm water pond. Filters will be backwashed with source water and the backwash wastewater will comprise only about 4 percent of the proposed total wastewater discharge at the Henrietta Plant. GWF estimates that a maximum of 28,000 gallons per day of RO reject and 2,400 gallons of backwash wastewater per backwash every other day will be produced at the Henrietta Plant. The estimated quality of the RO reject discharge is tabulated below.

Table 2. RO Reject

<u>Constituent/Parameter</u>	<u>Unit</u>	<u>RO Reject</u>
TDS	mg/L	577
EC	umhos/cm	1,007
Na	mg/L	89
Cl	mg/L	95
B	mg/L	0.48
NO ₃ -N	mg/L	2.1

7. Land uses in the vicinity of the Henrietta Plant are primarily agricultural and some residential. The primary crops grown in the area are cotton, sugar beets, alfalfa, and pistachios, according to the Kings County 2003 Land Use Map published by the Department of Water Resources (DWR).
8. The Henrietta Plant is in an area with semi-arid climate characterized by dry summers and mild winters. The rainy season generally extends from October to May. According to the National Weather Service, the average annual precipitation is about 9.0 inches, based on 30 years of data from the Hanford weather station. The annual average pan evaporation at the Fresno station is about 74 inches, according to the Western Regional Climate Center.
9. Soil in the vicinity of the Henrietta Plant is Lethent clay loam according to the Web Soil Survey published by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). Lethent clay loam has been assigned a land capability classification of 3s. This soil has severe limitations that restrict the choice of plants or requires special conservation practices. Additionally, this soil has limitations within the root zone, such as shallowness of the root zone, a high content of stones, a low available water capacity, low fertility, and excessive salinity or sodicity. Overcoming these limitations is difficult.
10. According to the Federal Emergency Management Agency maps (Map Number 06031C0300C), the Henrietta Plant is in Zone X, an area outside the one percent annual chance of flooding.
11. GWF is not required to obtain coverage under a National Pollutant Discharge Elimination System General Industrial Storm Water Permit for the discharge because all storm water runoff is retained onsite and does not discharge to a water of the United States.
12. First encountered groundwater in the area exists approximately 15 feet below ground surface (bgs) above the Corcoran Clay. The Corcoran Clay is found at a depth of about 600 to 650 feet.
13. According to the RWD, first encountered groundwater flows to the east towards the Kings River.
14. Based on studies from 1966, the area near the Henrietta Plant has been identified as having saline soils and shallow groundwater requiring drainage. Information from 1985 indicates that the quality of shallow groundwater discharging into local sumps has been of

- poor quality based on data since 1985. Inadequate drainage and accumulating salts have produced problems in parts of the west side of the San Joaquin Valley for over a century according to *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley*, published in September 1990 by the San Joaquin Valley Drainage Program. Electrical conductivity has ranged from 13,140 to 130,000 umhos/cm, total dissolved solids has ranged from 13,000 to 49,000 mg/L, sodium has ranged from 2,450 to 13,600 mg/L, and chloride has ranged from 1,790 to 11,000 mg/L.
15. USGS well 19S19E14SR1M sampled in 1989 shows groundwater as having an electrical conductivity of 6,620 umhos/cm, total dissolved solids of 5,080 mg/L, sodium of 1,400 mg/L, and chloride of 390 mg/L.
 16. According to a shallow groundwater quality map published by Department of Water Resources in 2005, EC in the area below the discharge ranges from 2,000 to 10,000 umhos/cm.
 17. Based on 2007-2011 groundwater monitoring data from an eleven well groundwater monitoring network on the former Land Application Area for Olam Tomato Processors, one mile south of the Henrietta Plant, first encountered groundwater is of poor quality. Average EC (in umhos/cm) is as follows 19,083 (MW-1), 5,426 (MW-2), 11,057 (MW-3), 43,625 (MW-4), 16,583 (MW-5), 9,565 (MW-6), 20,042 (MW-7), 10,255 (MW-8), 9,087 (MW-9), 17,115 (MW-10), and 10,163 (MW-11).
 18. Average chloride and boron concentrations in groundwater are as follows, respectively: 133 mg/L and 6.84 mg/L (Henrietta Plant well), 657 mg/L and 35 mg/L (MW-1), 230 mg/L and 9 mg/L (MW-2), 456 mg/L and 13 mg/L (MW-3), 2,700 mg/L and 73 mg/L (MW-4), 959 mg/L and 19 mg/L (MW-5), 221 mg/L and 14 mg/L (MW-6), 767 mg/L and 27 mg/L (MW-7), 516 mg/L and 15 mg/L (MW-8), 740 mg/L and 6.5 mg/L (MW-9), 1,800 mg/L and 7.9 mg/L (MW-10), 813 mg/L and 6.9 mg/L (MW-11).
 19. Nitrate as nitrogen in groundwater is above the Maximum Contaminant Level (MCL) of 10 mg/L. Average nitrate as nitrogen concentrations have been reported as 15 mg/L for Henrietta Plant well, 28 mg/L for MW-1, 25 mg/L for MW-3, 38 mg/L for MW-4, 25 mg/L for MW-6, 16 mg/L for MW-8, and 37 mg/L for MW-10.
 20. Findings 12 through 19 indicate that first encountered groundwater in the vicinity of the Henrietta Plant is not and has not historically been of high quality with respect to salinity since the early 1970's or before.
 21. The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition, revised January 2004* (Basin Plan) designates beneficial uses, establishes narrative and numerical water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates, by reference, plans and policies of the State Water Board. In accordance with Water Code section 13263(a), these requirements implement the Basin Plan.

22. The Henrietta Plant is in Detailed Analysis Unit (DAU) No. 244, within the Westside Basin hydrologic unit. The Basin Plan identifies the beneficial uses of groundwater in the DAU as municipal and domestic supply, agricultural supply, and industrial service supply.
23. The Henrietta Plant is in the Hanford-Lemoore Hydrologic Area No. 551.90 of the South Valley Floor Hydrologic Unit, as depicted on interagency hydrologic maps prepared by the DWR in August 1986.
24. The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require waters designated as domestic or municipal supply to meet the MCLs specified in Title 22 of California Code of Regulations (CCR). The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.
25. The Basin Plan establishes narrative water quality objectives for Chemical Constituents, Taste and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses.
26. The Basin Plan identifies the greatest long-term problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance. Until then, the Basin Plan establishes several salt management requirements, including the following limits:
 - a. The incremental increase in salts from use and treatment must be controlled to the extent possible. The maximum EC of the effluent discharged to land shall not exceed the EC of the source water plus 500 $\mu\text{mhos/cm}$. When the source water is from more than one source, the EC shall be a weighted average of all sources.
 - b. Discharges to areas that may recharge good quality groundwater shall not exceed an EC of 1,000 $\mu\text{mhos/cm}$, a chloride content of 175 mg/L, or boron content of 1.0 mg/L.
27. The Basin Plan's implementation provisions prohibit the Board from issuing WDRs that require an improvement over naturally-occurring background concentrations.
28. The Basin Plan authorizes an exception for industrial wastewater from the incremental increase of 500 $\mu\text{mhos/cm}$ plus source water provided the Discharger can technically demonstrate that allowing a greater net incremental increase in EC will result in lower mass emissions of salts to water. The Discharger's net incremental increase in salinity concentrations is due in part to water conservation measures, and in part to treatment necessary to make the source water suitable for its use and domestic supply. The RWD indicates that evaporative cooler water is cycled two times, and approximately 95 percent of the water from the oil/water separator is recycled back to the source water storage tank.

While these conservation practices result in an increase in wastewater EC, the net result will be lower mass emissions of salts to first encountered groundwater that will not adversely affect the beneficial uses of that groundwater. Therefore, the discharge as proposed complies with the exception authorized by the Basin Plan.

29. As described in Findings 12 through 19 above, the discharge is not to an area that overlies good quality groundwater with respect to EC, chloride, and boron. Therefore, the Basin Plan limits in Finding 26.b above do not apply to the discharge.
30. State Water Board Resolution No. 68-16 ("Policy with Respect to Maintaining High Quality Water of the State") (hereafter Resolution No. 68-16) prohibits degradation of groundwater unless it has been shown that:
 - a. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives;
 - b. The degradation will not unreasonably affect present and anticipated future beneficial uses;
 - c. The Discharger employs Best Practicable Treatment or Control (BPTC) to minimize degradation; and
 - d. The degradation is consistent with the maximum benefit to the people of the State.
31. The discharge will not degrade first encountered groundwater because the discharge is of better quality than that of underlying groundwater.
32. The requirements herein are consistent with the Antidegradation Policy, since they do not authorize degradation.
33. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and the issuance of discharge permit does not create a vested right to continue the discharge.

PROPOSED PROHIBITIONS

1. Discharge of waste to surface waters or surface water drainage courses is prohibited.
2. Discharge of waste classified as 'hazardous', as defined in section 2521(a) of Title 23, CCR, section 2510 et seq., is prohibited. Discharge of waste classified as 'designated', as defined in Water Code section 13173, is prohibited.
3. Discharge of wastewater in a manner or location other than that described herein is prohibited.
4. Discharge of industrial wastewater to septic systems is prohibited.

Discharge Specifications

1. No waste constituent shall be released, discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of Groundwater Limitations described below.
2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by section 13050 of the Water Code.

Effluent Limitations

1. The effluent shall not have a pH less than 6.5 or greater than 9.0.
2. The rolling annual average effluent electrical conductivity shall not exceed 1,100 umhos/cm.

Groundwater Limitations

1. Release of waste constituents from any treatment, storage, or disposal component associated with the discharge shall not cause or contribute to groundwater exceeding background water quality.

Provisions

1. The Discharger shall operate all systems and equipment to optimize the quality of the discharge.
2. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, or protect the Discharger from liabilities under federal, state, or local laws. These requirements do not convey any property rights or exclusive privileges.
3. Before making a material change in the character, location, or volume of discharge, the Discharger shall file a new Report of Waste Discharge with the California Energy Commission and Central Valley Water Board.
4. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of these requirements shall be available for public inspection at the offices of the California Energy Commission and Central Valley Water Board. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.
5. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the state resulting from noncompliance with these requirements. Such steps shall include accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.

6. The Discharger shall permit representatives of the Central Valley Water Board, the State Water Resources Control Board, and the California Energy Commission, upon presentations of credentials, to:
 - a. Enter premises where wastes are treated, stored, or disposed of and facilities in which any records are kept,
 - b. Copy any records required to be kept under terms and conditions of these requirements,
 - c. Inspect at reasonable hours, monitoring equipment required by these requirements, and
 - d. Sample, photograph and video tape any discharge, waste, waste management unit, or monitoring device.
7. For any electrically operated equipment at the site, the failure of which would cause loss of control or containment of waste materials, or violation of these requirements, the Discharger shall employ safeguards to prevent loss or control over wastes. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means.
8. The fact that it would have been necessary to halt or reduce the permitted activity in these requirements to maintain compliance with these requirements shall not be a defense for the Discharger's violations of these requirements.
9. The disposal pond or structures shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all requirements herein. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
10. On or about **1 October** of each year, available capacity shall at least equal the volume necessary to comply with Provision 9.
11. The pond shall be managed to prevent breeding of mosquitoes. In particular:
 - a. An erosion control plan should assure that coves and irregularities are not created around the perimeter of the water surface.
 - b. Weeds shall be minimized through control of water depth, harvesting, and herbicides.
 - c. Dead algae, vegetation, and other debris shall not accumulate on the water surface.
 - d. Vegetation management operations in areas in which nesting birds have been observed shall be carried out either before or after, but not during, the 1 April to 30 June bird nesting season.
12. The Discharger shall maintain and operate the pond sufficiently to protect the integrity of containment levees and prevent overtopping or overflows. Unless a California registered civil engineer certifies (based on design, construction, and conditions of operation and maintenance) that less freeboard is adequate, the operating freeboard shall never be less than two feet (measured vertically). As a means of management and to discern compliance with this Provision, the Discharger shall install and maintain a permanent

marker with calibration that indicates the water level at the design capacity and enables determination of available operational freeboard.

13. The unlined storm water pond shall be maintained to prevent leakage caused by erosion, slope failure, or animal burrowing.
14. Objectionable odors shall not be perceivable beyond the limits of the Henrietta Plant property at an intensity that creates or threatens to create nuisance conditions.
15. As a means of discerning compliance with Provision 14, the dissolved oxygen (DO) content in the upper one foot of any wastewater pond shall not be less than 1.0 mg/L for three consecutive weekly sampling events. If the DO in any single pond is below 1.0 mg/L for three consecutive sampling events, the Discharger shall report the findings to the California Energy Commission and the Central Valley Water Board in writing within 10 days and shall include a specific plan to resolve the low DO results within 30 days.
16. The Discharger must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of these requirements. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. This Provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger only when the operation is necessary to achieve compliance with the conditions of these requirements.
17. By-pass (the intentional diversion of waste streams from any portion of a treatment facility, except diversions designed to meet variable effluent limits) is prohibited. The California Energy Commission may take enforcement action against the Discharger for by-pass unless:
 - a. By-pass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a by-pass. Severe property damage does not mean economic loss caused by delays in production); and
 - b. There were no feasible alternatives to by-pass, such as the use of auxiliary treatment facilities or retention of untreated waste. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a by-pass that would otherwise occur during normal periods of equipment downtime or preventive maintenance; or (1) by-pass is required for essential maintenance to assure efficient operation; and (2) neither effluent nor receiving water limitations are exceeded; and (3) the Discharger notifies the Commission and Central Valley Water Board ten days in advance. The Discharger shall submit notice of an unanticipated by-pass in accordance with Provision 18 below.
18. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of these requirements for any reason, the Discharger shall notify

the Commission and Central Valley Water Board by telephone at (916)-653-4677 and (559) 445-5116, respectively, as soon as it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing within **two weeks**. The written notification shall state the nature, time and cause of noncompliance, and shall include a timetable for corrective actions.

19. The Discharger shall have a plan for preventing and controlling accidental discharges, and for minimizing the effect of such events. This plan shall:
 - a. Identify the possible sources of accidental loss or leakage of wastes from each waste management, treatment, or disposal facility.
 - b. Evaluate the effectiveness of present waste management/treatment units and operational procedures, and identify needed changes of contingency plans.
 - c. Predict the effectiveness of the proposed changes in waste management/treatment facilities and procedures and provide an implementation schedule containing interim and final dates when changes will be implemented.
20. All reports shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. A duly authorized representative of a person designated in 3a or 3b of this requirement if; (1) the authorization is made in writing by a person described in 3a or 3b of this provision; (2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a waste management unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and (3) the written authorization is submitted to the Commission and Central Valley Water Board

Any person signing a document under this Section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of the those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

21. All technical reports and work plans required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1. As required by these laws, completed technical reports and work plans must bear the signature(s) and seal(s) of the registered professionals(s) in a manner such that all work can be clearly attributed to the professional responsible for the work. All reports required herein are required pursuant to Water Code section 13267.

22. The Department of Water Resources set standards for the construction and destruction of groundwater wells, as described in California Well Standard Bulletin 74-90 (June 1991) and Water Well Standards: State of California Bulletin 94-81 (December 1981). These standards, and any more stringent standards adopted by the State or county pursuant to Water Code section 13801, apply to all monitoring wells.
23. **Within 120 days of the notification that the discharge will start**, the Discharger shall submit an operations and maintenance manual for the power plant wastewater treatment and disposal facilities.

MONITORING

The Discharger shall maintain a written sampling program sufficient to assure compliance with the terms of these requirements. Anyone performing sampling on behalf of the Discharger shall be familiar with the sampling plan.

Field test instruments (such as pH) may be used provided that the operator is trained in the proper use of the instrument and each instrument is serviced and/or calibrated at the recommended frequency by the manufacturer and in accordance with manufacturer instructions. At minimum, all monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring requirements shall be properly maintained and calibrated at least yearly to ensure their continued accuracy.

Analytical procedures shall comply with the methods and holding times specified in the following: *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA); *Test Methods for Evaluating Solid Waste* (EPA); *Methods for Chemical Analysis of Water and Wastes* (EPA); *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA); *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125). Approved editions shall be those that are approved for use by the United States Environmental Protection Agency or the California Department of Public Health's Environmental Laboratory Accreditation Program.

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by these requirements, and records of all data used to complete the application for these requirements. Records shall be maintained for a minimum of three years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the California Energy Commission or Central Valley Water Board Executive Officer. Record of monitoring information shall include:

- a. the date, exact place, and time of sampling or measurements,
- b. the individual(s) who performed the sampling of the measurements,
- c. the date(s) analyses were performed,
- d. the individual(s) who performed the analyses,
- e. the laboratory which performed the analysis,
- f. the analytical techniques or methods used, and
- g. the results of such analyses.

Effluent Monitoring

When there is no wastewater discharge to the unlined storm water pond, the monitoring report shall state that during the required monitoring period(s), there was not flow to record or no sample collected. When there is wastewater flow, the Discharger shall sample wastewater at the point of discharge into the unlined storm water pond or where a representative sample may be obtained prior to disposal. Time of collection of the sample shall be recorded.

Effluent monitoring shall include the following:

<u>Frequency</u>	<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>
Continuous	Flow	mgd	Meter
Weekly	pH	pH units	Grab
Weekly	Electrical Conductivity (EC)	µmhos/cm	Grab
Monthly	Total Dissolved Solids (TDS)	mg/L	Grab
Monthly	TDS Load	lbs/month	Calculated
Monthly	Boron	mg/L	Grab
Monthly	Sodium	mg/L	Grab
Quarterly	General Minerals ¹	mg/L	Grab
Quarterly	Metals ^{1,2}	mg/L	Grab

¹ With the exception of wastewater samples, samples must be filtered. If field filtering is not feasible, samples shall be collected in unpreserved containers and submitted to the laboratory within 24 hours with a request (on the chain-of-custody form) to immediately filter then preserve the sample.

² Metals reference hereafter in this program include: Aluminum, Antimony, Arsenic, Barium, Copper, Cadmium, Chromium, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, and Zinc.

Storm Water Basin Monitoring

Permanent markers (e.g., staff gauges) shall be placed in the evaporation/percolation pond. The markers shall have calibrations indicating water level at the design capacity and available operational freeboard. Evaporation/percolation pond monitoring shall include at least the following:

<u>Frequency</u>	<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>
Weekly	Freeboard	Feet ¹	Observation
Weekly	Odors	---	Observation
Weekly	Berm Condition	---	Observation

¹ To nearest tenth of a foot

The Discharger shall inspect the condition of the evaporation/percolation pond weekly and record visual observations in a bound logbook or electronic data platform acceptable to the RWQCB and CEC. Notations shall include observations of whether weeds are developing in the water or along the bank, and their location; whether grease, dead algae, vegetation, scum, or debris are accumulating on the evaporation/percolation pond surface and their location; whether burrowing animals or insects are present; and the color of the reservoirs (e.g., dark

sparkling green, dull green, yellow, gray, tan, brown, etc.). A summary of the entries made in the log shall be included in the subsequent monitoring report.

Source Water Monitoring

For each source (either well or surface water supply), the Discharger shall calculate the flow-weighted average concentrations for the specified constituents utilizing monthly flow data and the most recent chemical analysis conducted in accordance with the following requirements. Alternatively, the Discharger may establish representative sampling stations within the facility's distribution system.

<u>Frequency</u>	<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>
Quarterly	pH	pH units	Grab
Quarterly	EC	umhos/cm	Grab
Quarterly	TDS	mg/L	Grab
Quarterly	Boron	mg/L	Grab
Quarterly	Sodium	mg/L	Grab
Quarterly	General Minerals ¹	mg/L	Grab
Quarterly	Metals ^{1,2}	mg/L	Grab

¹ With the exception of wastewater samples, samples must be filtered. If field filtering is not feasible, samples shall be collected in unpreserved containers and submitted to the laboratory within 24 hours with a request (on the chain-of-custody form) to immediately filter then preserve the sample.

² Metals reference hereafter in this program include: Aluminum, Antimony, Arsenic, Barium, Copper, Cadmium, Chromium, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, and Zinc.

Reporting

All monitoring results shall be reported in **Quarterly Monitoring Reports** which are due by the first day of the second month after the calendar quarter. Copies shall be mailed to:

California Energy Commission
1516 9th Street
Sacramento, CA 95814

and

Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93726

A transmittal letter shall accompany each monitoring report. The transmittal letter shall discuss any violations that occurred during the reporting period and all actions taken or planned for correcting violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions or a time schedule for implementing the corrective actions, reference to the previous correspondence is satisfactory.

The following information is to be included on all monitoring and annual reports, as well as report transmittal letters:

Discharger Name
Facility Name
Contact Information (telephone number and email)

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner that illustrates clearly, whether the Discharger complies with waste discharge requirements.

Monitoring information shall include the method detection limit (MDL) and the reporting limit (RL) or practical quantitation limit (PQL). If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent that are below the RL (or PQL) but above the MDL shall be reported and flagged as estimated.

Laboratory analysis reports do not need to be included in the monitoring reports; however, the laboratory reports must be retained for a minimum of three years.

All monitoring reports shall comply with the signatory requirements in Provision 20.

All monitoring reports that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

Fourth Quarter Monitoring Reports, in addition to the above, shall include the following:

Henrietta Plant Information

1. The names and general responsibilities of all persons in charge of wastewater treatment and disposal.
2. The names and telephone numbers of persons to contact regarding the Henrietta Plant for emergency and routine situations.
3. A statement certifying when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who performed the calibrations.
4. A statement whether the current operation and maintenance manual, sampling plan, and contingency plan, reflect the Henrietta Plant as currently constructed and operated, and the dates when these documents were last reviewed for adequacy.
5. A summary and discussion of the compliance record for the reporting period. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with these requirements.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of these requirements.

GLOSSARY

BOD ₅	Five-day biochemical oxygen demand
CBOD	Carbonaceous BOD
DO	Dissolved oxygen
EC	Electrical conductivity at 25° C
FDS	Fixed dissolved solids
NTU	Nephelometric turbidity unit
TKN	Total Kjeldahl nitrogen
TDS	Total dissolved solids
TSS	Total suspended solids
Continuous	The specified parameter shall be measured by a meter continuously.
24-Hour Composite	Samples shall be a flow-proportioned composite consisting of at least eight aliquots.
Daily	Samples shall be collected at least every day.
Twice Weekly	Samples shall be collected at least twice per week on non-consecutive days.
Weekly	Samples shall be collected at least once per week.
Twice Monthly	Samples shall be collected at least twice per month during non-consecutive weeks.
Monthly	Samples shall be collected at least once per month.
Bimonthly	Samples shall be collected at least once every two months (i.e., six times per year) during non-consecutive months.
Quarterly	Samples shall be collected at least once per calendar quarter. Unless otherwise specified or approved, samples shall be collected in January, April, July, and October.
Semiannually	Samples shall be collected at least once every six months (i.e., two times per year). Unless otherwise specified or approved, samples shall be collected in April and October.
Annually	Samples shall be collected at least once per year. Unless otherwise specified or approved, samples shall be collected in October.
mg/L	Milligrams per liter
mL/L	milliliters [of solids] per liter
µg/L	Micrograms per liter
µmhos/cm	Micromhos per centimeter
mgd	Million gallons per day
MPN/100 mL	Most probable number [of organisms] per 100 milliliters
General Minerals	Analysis for General Minerals shall include at least the following:
	Alkalinity
	Bicarbonate
	Calcium
	Carbonate
	Chloride
	Hardness
	Magnesium
	Potassium
	Sodium
	Sulfate
	TDS
	Nitrate

General Minerals analyses shall be accompanied by documentation of cation/anion balance.

Appendix C

Reverse Osmosis Discharge Impacts



Owner	GWF	Computed By	Leroy Kashka	Date	05/16/08
Plant	Henrietta	Checked By		Date	
Project #	160129			Page	#REF!

POST-CONSTRUCTION RETENTION POND DESIGN

The pond shall be designed to provide storage for a 100-year, 10 day storm. Calculate the volume of runoff for the 2 yr. -24 hr., 5 yr. - 24 hr., 25 yr. - 24 hr. and a 100 yr. - 24 hr. storms and compare to the volume of storage available.

Compute Runoff Coefficient:

	C	Area (ac)	Product A*C
paved	0.95	1.96	1.86
aggregate	0.75	4.36	3.27
pond	1.00	1.77	1.77
Total Area		8.08	acres
Wt C		0.85	

Volume Required :

Sources: Kings County, CA Department of Public Works Improvement Standards, and Technical Paper No. 40, Rainfall Frequency Atlas of the United States, US Department of Commerce Weather Bureau, 1961.

Volume of Runoff to be Contained: $V_{req} (ft^3) = C A R$ (Based on Kings County Public Works)
Design for 10 yr - 10 day storm (4 in.), Check for 100 yr - 10 day storm (6 in.)

C = Runoff Coef.	0.85
A = Drainage Area (ft ²)	352,152.00
R = Rainfall (ft) for 10 yr, 10 day	0.33
R = Rainfall (ft) for 100 yr, 10 day	0.50

Vrunoff (10 yr - 10 day)=	99,147 ft ³
Vrunoff (100 yr - 10 day)=	150,223 ft ³

Volume of Runoff for the 5, 10, 25, and 100 yr storms

Storm	Rainfall (in)	Volume (ft ³)	x 2*
5 yr, 24 hr	1.3	32,548.24	65,096.47
10 yr, 24 hr	1.5	37,555.66	75,111.31
25 yr, 24 hr	1.9	47,570.50	95,141.00
100 yr, 24 hr	2.3	57,585.34	115,170.68

* indicates the volume of runoff in the event of 2 storms back to back

Calculate Volume of Pond :

Contour Elevation	Area of Contour (ac)	Average Area Volume (ft ³)	Cumm. Avg Volume (ft ³)
222.5	1.83	39,340	187,428
222	1.78	38,404	148,088
221.5	1.74	37,477	109,685
221	1.70	36,559	72,208
220.5	1.66	35,650	35,650
220	1.62	0	0

Required top of basin elevation = Water surface elevation for 10 yr -10 day storm + 1 ft.

Water surface elevation for 10 yr - 10 day storm event = 221.4 ft.

Required top of basin elevation = 222.4 ft.

Actual top of basin is approximately 222.5 ft. due to natural topography

Top of Basin Elevation	222.50	Depth	Freeboard
Water Elevation for 10 yr. - 10 day storm	221.36	1.36	1.14
Water Elevation for 100 yr. - 10 day storm	222.03	2.03	0.47
Water Elevation for 25 Yr, 24 Hr. Storms	220.66	0.66	1.84
Water Elevation for 100 Yr, 24 Hr. Storms	220.80	0.80	1.70

Basin shall hold 100 yr. - 10 day event without overflowing

Water surface elevation for 100 yr. - 10 day event = 222.03 ft.

With RO reject to Pond:

Water reject stream	21.7 gpm
=	5,013 cubic inches per minute
	300,762 cubic inches per hour
Basin bottom surface area	10,161,677 square inches
Increasing basin level	0.0296 inches per hour
Assumed infiltration rate	0.025 inches per hour
Basin fill rate	0.0046 inches per hour
Maximum RO run hours/year	8760 hours
Annual basin fill rate	40.3 inches

Annual evaporation 62.5 inches

(Kings County annual average per CIMIS, California Department of Water Resources 2010)

Note: The annual evaporation rate is greater than the estimated basin fill rate, therefore a standing water level is not expected given normal operating scenarios. The water treatment system design allows for operation while bypassing the RO by utilizing portable deionized treatment tanks for water treatment. Operation in bypass mode will be used to stop RO reject flow into the storm water retention pond during high rain scenarios when the entire pond volume is required.