BIO-19 and SOIL&WATER-6

Wetland E Monitoring and Adaptive Management Plan

for the

Oakley Generating Station

(09-AFC-04C)

Prepared for

CCGS LLC

May 2011

CH2MHILL
2485 Natomas Park Drive, Suite 600
Sacramento, California 95833

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Acronyms and Abbreviations

AFC	Application for Certification
BMP	best management practice
CCCWP	Contra Costa County Clean Water Program
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CNPS	California Native Plant Society
COC	Condition of Certification
CPM	Compliance Project Manager
CVRWQCB	Central Valley Regional Water Quality Control Board
kV	kilovolt
LORS	laws, ordinances, regulations, and standards
MW	megawatt
OGS	Oakley Generating Station
PG&E	Pacific Gas and Electric Company
ROW	right-of-way
SWPPP/DESCP	Stormwater Pollution Prevention Plan/Drainage, Erosion, and Sediment Control Plan
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

SECTION 1

Introduction

This document is the Wetland E Monitoring and Adaptive Management Plan for the Oakley Generating Station (OGS or Project). The OGS is a 624-megawatt, natural-gas-fired, combined-cycle generating facility developed and owned by Contra Costa Generating Station LLC (CCGS). The plan is being submitted to comply with Conditions of Certification (COC) BIO-19 and SOIL&WATER-6, as set forth in the California Energy Commission's (CEC) Final Staff Assessment for OGS, dated March 1, 2011, as revised March 15, 2011 by stipulation between Applicant and Staff. This plan may be amended if Conditions BIO-19 and SOIL&WATER-6 are different in the Final Commission Decision, expected to be issued in May 2011. Condition BIO-19 reflects biological resources restoration and management requirements for Wetland E and Condition SOIL&WATER-6 reflects water quality monitoring criteria.

The purpose of the Wetland E Monitoring and Adaptive Management Plan is to restore and enhance Wetland E as wetland habitat and to ensure that the construction and operation of the OGS does not adversely affect the functions and values of Wetland E as wetland habitat. Wetland E is a 1.6-acre area within the boundary of the OGS containing a 0.6-acre wetland that contains wetland vegetation and is inundated for a portion of each year. Wetland E functions to collect and store stormwater, enhance water quality through infiltration to groundwater, provide natural habitat views from Bridgehead Road and Highway 4, and provide habitat to wildlife in an industrial setting.

Wetland E was placed under conservation easement January 1997 (File#97 005086) by the DuPont Corporation as a mitigation measure for development related to the Lauritzen Yacht Harbor. The easement was granted to California Department of Fish and Game (CDFG) which, as the recipient agency, is responsible for managing the property as a wetland preserve. This wetland conservation easement, however, has no active management or endowment for management and maintenance. The OGS incorporates Wetland E as a project element that the project owner will restore and manage as wetland habitat for the life of the project. This Monitoring and Adaptive Management Plan contains specific measures and success criteria that were developed under guidance from CDFG staff (CH2MHILL 2010) for doing so.

Wetland E was delineated as part of a wetland delineation study of the entire DuPont property in 2006 (DuPont Engineering, 2007; 2008). The U.S. Army Corps of Engineers (USACE), in its verification, declared this wetland to be non-jurisdictional because it lacks a connection to jurisdictional waters (is an isolated wetland) (Dady, 2008). Therefore, restoration and management activities there are not subject to permitting under the Clean Water Act.

The wetland receives runoff from the adjacent vineyard and portions of the DuPont property. Common tule (*Schoenoplectus acutus*) and common cattail (*Typha latifolia*) are the dominant species present in the open water portion of the 0.62-acre wetland, while willows (*Salix lasiolepis*) dominate the narrow slope between the edge of water and top of the bank.

The area is isolated from other wetlands, and hydrology is supported by direct precipitation, sheetflow runoff from the adjacent PG&E Antioch natural gas terminal, Bridgehead Road, and surface water inputs from the area of the proposed OGS site.

SECTION 2

Project Overview

The OGS is a combined-cycle, natural gas-fired power plant owned by Contra Costa Generating Station LLC. The project will consist of two natural gas-fired combustion turbines with heat recovery steam generators, a steam turbine, air-cooled condenser, and ancillary equipment. The project site is located at the intersection of Bridgehead Road and Wilbur Avenue, approximately 3,000 feet south of the San Joaquin River in the City of Oakley, Contra Costa County. The project parcel is a 21.95-acre site located within the boundary of an existing 210-acre site owned by DuPont. The power plant would be built on a portion of the DuPont site currently used as a vineyard. The project site is bounded on the west by the PG&E Antioch Terminal, a large natural gas transmission hub; on the north by formerly industrial property belonging to DuPont that has been abandoned; on the east by DuPont's titanium dioxide disposal area; and to the south by a vineyard and the Burlington Northern Santa Fe railroad.

The proposed construction worker parking and laydown area for the project will be located east of the project parcel, and soil from the project will be temporarily stockpiled in three areas north of the project parcel. The construction laydown area will be approximately 20 acres total: approximately 13-acres were formerly used as DuPont's titanium dioxide disposal site, approximately 0.5 acres are covered by a row of mature Eucalyptus trees along the southwest and southern boundary of the paved area, and the remaining area is an existing paved surface. Figure 2-1 shows the project boundaries and location of the proposed construction activities.

Power from the facility will be transmitted 2.4 miles to PG&E's Contra Costa Substation on a new 230-kV single-circuit transmission line. Construction of this line will follow an existing PG&E transmission line right-of-way (ROW) and will consist of replacing existing steel-lattice towers with tubular steel poles and reconductoring the line. It will also be necessary to construct a new sanitary sewer force main from the project tie-in location on Bridgehead Road to the gravity main located in Main Street. Construction of this line would be within the Bridgehead Road and Main Street ROWs.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations. Aerial Data from: http://services.arcgisonline.com/arcgis/services. Service Name: I3_Imagery_Prime_World_2D Includes i-cubed Prime high-resolution imagery for the contiguous United States. Map Service by ESRI (last modified: 13-March-2009; superseded by the World Imagery Service).

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FIGURE 2-1
Project Site
Wetland E Monitoring and Adaptive Management Plan
Oakley Generating Station, Oakley, California

CH2MHILL

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SECTION 3

Project Participants

The Designated Biologist or delegate will be responsible for directing and documenting compliance with COC BIO-19 and SOIL&WATER-6. The Restoration Biologist will implement Wetland E's restoration and will conduct the monitoring necessary to establish the success of the restoration program.

The contact information for the Designated Biologist, Restoration Biologist, the Project Owner, CEC CPM and Construction Compliance Manager are included in Table 3-1. CCGS is the responsible party that will fund the implementation of this monitoring and adaptive management plan in accordance with CEC Conditions of Certification. Any successor entity who is holder of the CEC certification will be bound by the CEC Conditions.

TABLE 3-1
Oakley Generating Station Project Personnel and Contact Information

Applicant CCGS LLC P.O. Box 1690 Danville, CA 94526	Greg Lamberg, Senior Vice President Phone: (925) 820-5222 Mobile: (925) 799-9463 Email: greg.lamberg@radback.com
Designated Biologist CH2M HILL 33 New Montgomery Street, Suite 1400 San Francisco, CA 94105	Rick Crowe, CH2M HILL Direct: (916) 920-0212 x416 Mobile: (916) 296-5525 Fax: (916) 920-8463 Email: Richard.crowe@ch2m.com
Restoration Biologist Virginia Dains 3371 Ayres Holmes Road Auburn, CA 95602	Virginia Dains Email: virginiadains@gmail.com Direct: 530-888-9180
Biological Monitor CH2M HILL 2485 Natomas Park Drive, Suite 600 Sacramento, CA 95833-2937	Victor Leighton, CH2M HILL Direct: (916) 920-0212 x415 Mobile: (916) 425-7862 Fax: (916) 920-8463 Email: victor.leightoniii@ch2m.com
OGS Environmental Compliance Manager CCGS LLC P.O. Box 1690 Danville, CA 94526	Greg Lamberg, Senior Vice President Phone: (925) 820-5222 Mobile: (925) 799-9463 Email: greg.lamberg@radback.com
CEC CPM 1516 Ninth Street Sacramento, California 95814	Craig Hoffman Phone: (916) 654-4781 Email: choffman@energy.state.ca.us
CDFG Region 3 P.O.Box 47 Yountville, CA 94558	Liam Davis Phone: (707-944-5529) Email: ldavis@dfg.ca.gov

SECTION 4

Biological Resources and Functions

4.1 Vegetation and Cover Types

The stand of emergent vegetation in Wetland E provides nesting and escape cover or foraging habitat for several songbirds including mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), bushtits (*Psaltriparus minimus*), golden-crowned sparrow (*Zonotrichia atricapilla*), and red-winged blackbird (*Agelaius phoeniceus*).

Species composition and cover of wetland vegetation generally consists of clonal stands of common tule (*Schoenoplectus acutus*) and common cattail (*Typha latifolia*), with arroyo willow (*Salix lasiolepis*) and Fremont cottonwood (*Populus fremontii*) found individually along the narrow slope between the edge of water and top of bank. No rare plant or wildlife species were observed during biological surveys of the site.

The extent of cover types within the wetland was mapped on March 9, 2011 (Figure 4-1). Since the growth of emergent vegetation had just begun, standing dead vegetation from the previous growing season was mapped using aerial photography along with direct field observations and measurements. The field drawings were transferred by hand to a geographic information system to calculate the extent of each vegetation type. Vegetation types included cattail (1,640 square meters), tule (354 square meters), and open water (295 square meters). The open water patches support annual wetland vegetation that was present only as seedlings in early March. Density of emergent vegetation was qualitatively estimated at 75 percent cover or greater within the individual patches. Additional quantitative measurements of vegetative cover within the wetland will be made along permanently marked line intercept transects at the end of the nesting season in June 2011.

Upland vegetation within the Wetland E conservation easement was sampled on March 9, 2011 along two permanently marked variable length line intercept transects. These were placed within proposed tree planting and shrub planting zones to characterize the vegetation prior to enhancements.

Along both transects, cover of annual herbs and grasses was high (>90 percent) (Table 4-1). The predominant plant cover observed in the early spring consisted of rip-gut brome (*Bromus diandrus*), vetch (*Vicia* sp.), and cut leaf geranium (*Geranium dissectum*). Seasonal changes in cover is expected as perennial plants such as curly dock (*Rumex crispus*), Himalayan blackberry (*Rubus discolor*), and grape (*Vitis vinifera*) break dormancy. This vegetation is typical of ruderal disturbed areas in the region.

TABLE 4-1
Upland Vegetative Cover in Shrub and Tree Planting Zones

			Shrub Zone	Tree Zone
Absolute percent vegetative cover*	Native	Cal IPC Rating**	122.8	98.9
Bare			0.7	1.7
Thatch			20.0	32.1
Bromus diandrus	No	Mod.	58.4	69.4
Vicia sp.	No	-	34.9	1.1
Vitus vinifera	No	-	10.1	-
Lolium perenne	No	Mod.***	7.9	-
Geranium dissectum	No	Mod.	7.7	19.0
Rubus discolor (R. armeniacus)	No	High	2.6	4.6
Rumex crispus	No	Limited	0.7	0.9
Avena barbata	No	Mod.	0.5	-
Cortaderia selloana	No	High	-	3.2
Cyperus eragrostis	Yes	-	-	0.6

This number can be more than 100 percent because tree and shrub canopies sometimes overlap.

** Cal IPC rating from California Invasive Plant Council Plant Inventory Data base. Accessed online at http://www.cal-ipc.org/ip/inventory/weedlist.php

***Rating for related L. multiflorum

Canopy cover of invasive non-native tree and shrub species was mapped (Figure 4-2) and measured within the Wetland E conservation easement and adjacent Bridgehead Road frontage. Three of these are non-native horticultural escapes are not listed as invasive by Cal-IPC. The remaining five are considered invasive in wildlands and potentially harmful to local ecosystem processes. Minimum and maximum canopy diameters were measured and used to estimate canopy area. The area of large clonal stand of tree of heaven was measured on an aerial photograph. Escaped almond trees were most numerous on the Wetland E site.

TABLE 4-2
Canopy Coverage of Non-native Tree and Shrub Species in Wetland E and Adjacent Road Frontage

	Cal IPC Rating *	Canopy Cover (sq ft)	Stem count
Almond (*Prunus dulcis*)	-	3,745	19
English Walnut (*Juglans regia*)	-	2,293	13
Himalayan Blackberry (*Rubus armeniacus*)	High	2,506	7
Olive (*Olea europea*)	Limited	265	3
Pepper tree (*Schinus molle)*	Limited	300	3
Tree of Heaven (*Alianthus altisimus*)	Mod.	194	21 stems> 6"
Yucca spp.	-	4	1
Pampas grass (*Cortedaria selloana*)	High	760	9

* Cal IPC rating from California Invasive Plant Council Plant Inventory Data base. Accessed online at http://www.calipc.org/ip/inventory/weedlist.php

LEGEND

- Project Site Boundary
- Wetland Preserve Boundary
- Wetland E

Wetlands

- Cattail
- Open Water
- Tule

Note:
Aerial Data from:
http://services.arcgisonline.com/arcgis/services.
Service Name: I3_Imagery_Prime_World_2D
Includes i-cubed Prime high-resolution imagery
for the contiguous United States.
Map Service by ESRI (last modified: 13-March-2009;
superseded by the World Imagery Service).

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Feet

FIGURE 4-1
Wetland Cover Types
Wetland E Monitoring and Adaptive Management Plan
Oakley Generating Station, Oakley, California

LEGEND

- Project Site Boundary
- Wetland Preserve Boundary
- Wetland E

Weeds

- Almond (Prunus dulcis)
- Brazilian Pepper tree (Shismus molle)
- English Walnut (Juglans regia)
- Himalayan Blackberry (Rubus discolor)
- Olive (Olea europea)
- Pampas grass (Cortedaria selloana)
- Tree of Heaven (Alianthus altisimus)

Note:
Aerial Data from:
http://services.arcgisonline.com/arcgis/services.
Service Name: I3_Imagery_Prime_World_2D
Includes i-cubed Prime high-resolution imagery
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Feet

FIGURE 4-2
Canopy Cover of Introduced Shrub and Tree Species
Wetland E Monitoring and Adaptive Management Plan
Oakley Generating Station, Oakley, California

Yellow starthistle (*Centaurea solsticialis*) and Russian thistle (*Salsola tragus*), two annual species included on the Cal-IPC inventory of invasive plants, were observed on the site during previous surveys, but were not found during mapping sessions in March. Seedlings of these species germinate later in the year. Both of these species are considered noxious weeds subject to regulation or quarantine by the California Department of Food and Agriculture through county agricultural departments. Any populations of these species occurring on the site will be removed along with invasive trees and shrubs.

4.2 Soils

The conservation easement is underlain with disturbed sandy soils that do not possess hydric indicators. However, based on the USACE guidance, the soils were considered hydric because of the presence of wetland hydrology and hydrophytic vegetation, as well as an abrupt change in topography (wetland report).

4.3 Hydrology

4.3.1 Precipitation and Surface Runoff

The hydrology of Wetland E is supported by direct precipitation as well as surface stormwater runoff from Bridgehead Road, the PG&E Antioch terminal, and a portion of the DuPont property to the east of the wetland. The sandy soils underlying Wetland E allow the wetland to function in groundwater recharge. The wetland is seasonally ponded. The duration of ponding will be determined for the 2010-2011 rainfall year as part of pre-construction hydrologic monitoring.

4.3.2 Bioswale Drainage Design

Hydrology of the OGS site will be managed after construction by a series of bioswales, each draining a particular portion of the facility. Stormwater will flow from each area to its bioswale, where it will be bio-treated (cleaned) in the bioswale. The flow rate and duration of treatment in each bioswale will be managed by the gradient in the bioswale that controls the time the water will take to flow through the bioswale.

Outflow from each bioswale takes place through a vertical standpipe with drainage holes spaced vertically, such that each standpipe essentially functions as an overflow weir. The drainage holes that pass water out of each bioswale are 2 inches in diameter 3 inches apart. There are eight 1-inch diameter drainage holes, evenly spaced, in the detention pond outlet standpipe.

As stormwater runoff increases, a larger number of drainage holes come into play and the flow rate out of the bioswale increases. From an adaptive management standpoint, if it is determined that the wetland pond is getting too much or too little water, the number of holes and their locations can be modified. For example, if more water is needed during minor rain events to reach the wetland, it would be possible to add holes at lower elevations. Similarly, to increase the amount of water reaching the wetlands during extreme rain events, it would be possible to add drainage holes at the upper elevations.

SECTION 5

Habitat Improvement Plan

Habitat improvements proposed for the Wetland E conservation area are designed to enhance functions and values for wildlife through providing increased structure and diversity in the upland vegetation. These plantings will increase opportunities for seed, insect, and nectar foraging, as well as provide nesting and escape cover to wildlife drawn to the wetland resource on the property. The wetland resource will be monitored to insure no loss in function and value to wetland habitat.

The goals and objectives of this plan are to make improvements in the upland community while maintaining the wetland functions. The first goal is to re-establish native vegetation by replacing non-native trees (almond, tree-of-heaven) with coast live oak and to establish 0.30 acres of native upland dune shrubs and herbs while controlling invasive and noxious weeds. The second goal is to maintain existing wildlife habitat value and wildlife use through the maintenance of wetland hydrology and emergent plant cover. The performance standards for these goals are given in section 6.2

5.1 Site Preparation

Prior to planting, the site will be cleared of non-native plants, including shrubs and trees (Table 5-1). This will include some clearing of non-native plants along the Bridgehead Road corridor outside of the Wetland E conservation easement, as this area is part of the OGS transmission line upgrade. Removal of these plants will also benefit the long-term maintenance of the conservation easement, as they serve as an adjacent seed source for non-native species.

TABLE 5-1
Non-native Plant Removal Methods

Species	Removal Method
Almond (*Prunus dulcis*)	Cut, chip, and stump grind
English Walnut (*Juglans regia*)	Cut, chip, and stump grind
Himalayan Blackberry (*Rubus armeniacus*)	Root and shoot removal offsite
Olive (*Olea europea*)	Cut, chip, and stump grind
Pepper tree (*Schinus molle)*	Cut, chip, and stump grind
Tree of Heaven (*Alianthus altisimus*)	Bark application of herbicide, cut and chip when dead
Yucca spp.	Root and shoot removal offsite
Pampas grass (*Cortedaria selloana*)	Root and shoot removal offsite
Star thistle (Centarea solsticialis)	Hand removal of seedlings prior to flowering
Russian thistle (Salsola tragus)	Hand removal of seedlings prior to flowering

Removal of almond, English walnut, olive, and pepper tree will be through cutting, chipping, and stump grinding to ground level. Removal of trees of heaven will be by done first chemically treating the bark with herbicides appropriate for the season of use (Burch and Zedaker 2003). The application of all herbicide treatments will be completed by a certified pesticide in compliance with the specified herbicide application prescription. The use of herbicides will follow the pesticide use restrictions include in Appendix B. After the above-ground portions are dead, the trees will be cut and chipped. All above- and below-ground parts of pampas grass, Himalayan blackberry, and yucca will be cut and removed from the site to a landfill or green waste composting site along with construction debris. The locations of non-native trees and shrubs removed from the site will be monitored for regeneration and actions such as seedling removal will be taken to prevent reestablishment or re-growth. Yellow star thistle and Russian thistle populations will be controlled by hand removal as part of weed control around native plantings.

After removal of non-native plants, trash, and construction of bioswale outlets and blocking the north drain is complete, the planting sites will be disked and irrigated. The seedling crop of non-native annual grasses and herbs will be left to desiccate in sun. Additional cycles of irrigation and desiccation will be completed over the summer of 2011 until the bank of weed seeds in the soil is diminished.

5.2 Restoration Plantings and Planting Design

Native shrub and tree mitigation plantings will be located in areas suitable for long-term establishment and survival. No perennial shrub plantings will occur over the pipeline easements that are located on the west side of the conservation area, along Bridgehead Road. Planting areas designated for trees are outside of existing and proposed power line corridors. These areas are designated in Figure 5-1.

Shrub and tree planting will occur in the fall or early winter 2011 after first rains have sufficiently wetted the soil to support root growth.

Planting of native shrubs and trees will be limited to those listed in Table 5-1 unless otherwise approved by the Designated Biologist and CPM.

TABLE 5-2
Native Plants Appropriate for Wetland E Upland Community Enhancements

Species	Wildlife Habitat Attributes
Interior live oak (*Quercus wislizenii*)	Tree- bark gleaners, nesting cover
Coast live oak (*Quercus agrifolia*)	Tree- bark gleaners, nesting cover
Coyote brush *(Baccharis pilularis)*	Large shrub-nesting and escape cover, nectar source
Blue elderberry (*Sambucus mexicana)*	Large shrub-nesting and escape cover, nectar source
California matchweed (*Gutierrezia californica*)	Low Shrub- nectar source
Deerweed (*Lotus scoparius)*	Low Shrub- nectar source
Silver lupine *(Lupinus albifrons)*	Low Shrub- nectar source
Bush buckwheat (*Eriogonum fasciculatum*)	Low Shrub- nectar source
Butterweed (Senecio douglasii)	Perennnial Herb/low shrub - nectar

TABLE 5-2
Native Plants Appropriate for Wetland E Upland Community Enhancements

Species	Wildlife Habitat Attributes
Common sunflower (*Helianthus annua*)	Biennial Herb- nectar, insects
Elegant Clarkia (*Clarkia unguiculata)*	Annual Herb- nectar
Hooker's evening primrose *(Oenothera elata ssp. hookeri*)	Biennial Herb-nectar
California poppy (*Eschscholzia californica)*	Annual Herb-nectar
Red maids *(Calandrinia ciliata)*	Annual Herb-nectar
Telegraph weed (*Heterotheca grandiflora*)	Biennial Herb-nectar
Creeping rye (*Elymus triticoides*)	Perennial Grass- soil binder, cover
California Croton (Croton californica)	Perennial Herb-sand binder
Naked buckwheat (Eriogonum nudum var. auriculatum)	Perennial Herb-nectar

Planting densities will be determined by the mature size of the plants. Twenty-five interior live oak trees will be planted within the 0.39 acres of the tree planting zone. Trees will be clustered in groups of 3 or 5 with 20-30 feet between stems. Each tree will be individually identified for monitoring. With 75 percent survival of planted trees at monitoring year 5, initial planting of 25 trees will ensure that 18 oaks become established and meet the tree mitigation goal for City of Oakley of 18 replacement trees. Coast live oak trees will be planted to replace non-native trees as shown in the detailed planting plan (figure 5-2)

Tree planting stock will be obtained from local sources (Appendix C) as 1- or 5-gallon material. Planting holes will be excavated to twice the size of the source pot and the sides of the hole scarified. The surface soil around the planting site will be rototilled to a distance of 3 feet from the stem. Trees will be planted, watered in, mulched with wood chips in to a minimum of 3 feet out from the stem, and staked as necessary.

Large shrubs will be planted on 8-foot centers, and low shrubs will be planted on 2.5 foot centers clustered by species. Herbs will be planted from nursery stock such as plugs for creeping ryegrass or from broadcast seed depending on availability of local material and condition of the planting site.

5.3 Initial Maintenance of Plantings

Maintenance of the trees will include limited deep watering during the summers of 2012 and 2013 under direction of the Designated Biologist, Restoration Biologist, or Biological Monitor, hand weeding and maintenance of mulch cover, and removal of tree stakes in year two. The plantings will be monitored for rodent damage and appropriate actions such as wire mesh cages, spiral wraps, or repellants shall be used. Natural predator control will be facilitated with the installation of a barn owl nest box on site as part of implementation of the plan. Trees shall be replaced if losses exceed 20 percent by year 3 and the maintenance and monitoring period shall be treated as year one for any trees replaced at that time.

Cool weather annuals sprouting after the first fall rains will be sprayed with either a general herbicide or a grass-specific herbicide depending on seedling type. All herbicide use will be in accordance with best management practices (Appendix B). Hand pulling of persistent perennials or other mechanical removal of seedlings will be undertaken.

LEGEND

- Project Site Boundary
- Wetland Preserve Boundary
- Wetland E

Plant Type

- Large shrub
- Small shrub
- Tree

Note:
Aerial Data from:Aerial Data from:
http://services.arcgisonline.com/arcgis/services.
Service Name: I3_Imagery_Prime_World_2D
Includes i-cubed Prime high-resolution imagery
for the contiguous United States.
Map Service by ESRI (last modified: 13-March-2009;
superseded by the World Imagery Service).

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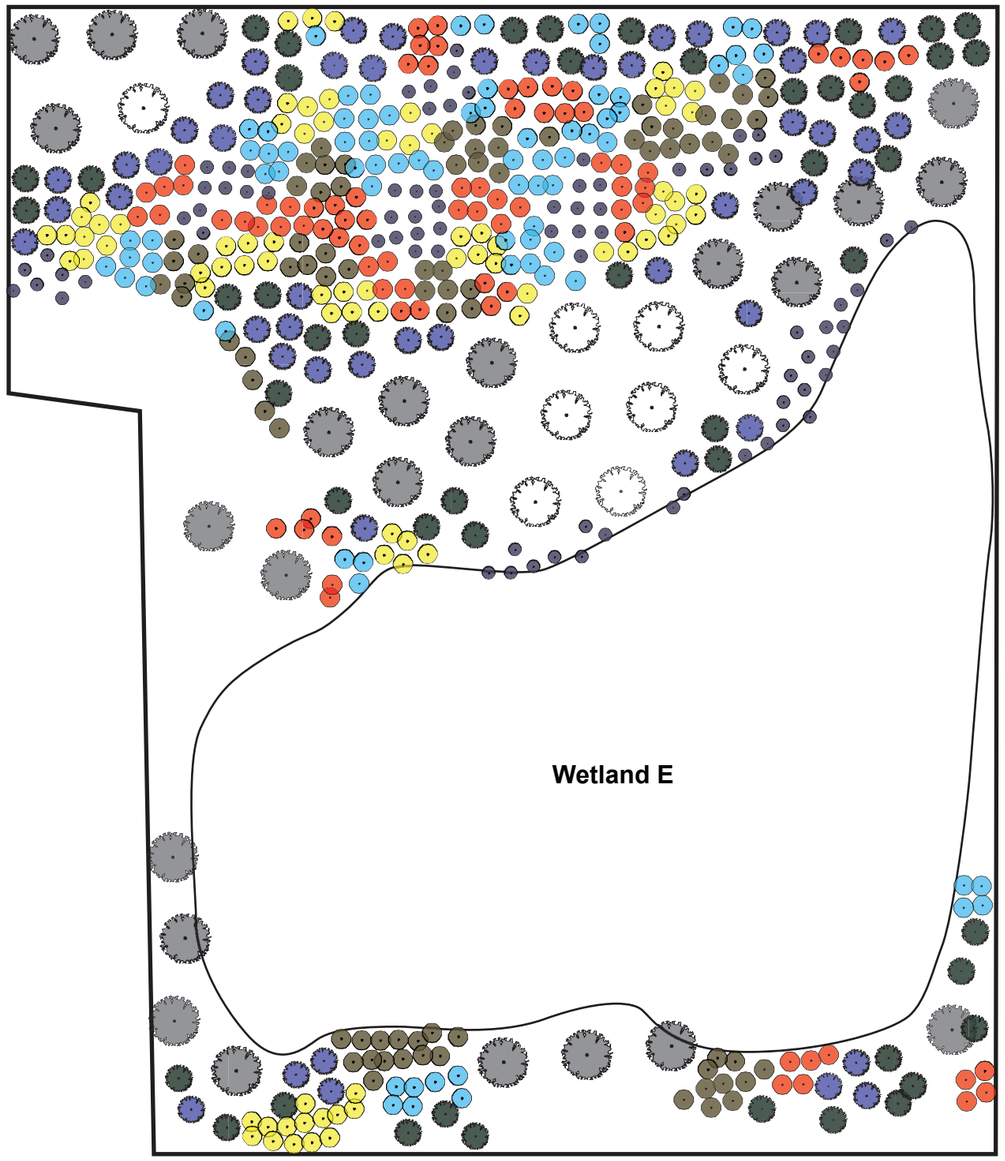
FIGURE 5-1
Shrub and Tree Mitigation Planting Zones Within Wetland E
Wetland E Monitoring and Adaptive Management Plan
Oakley Generating Station, Oakley, California



Plant Habit	Mature Width in Feet	Number	Symbol
Trees > 15 feet in height – Planting radius 20 ft		**33**	
Interior live oak (*Quercus wislizenii*)	30	25	
Coast live oak (*Quercus agrifolia*)	30	8	
Large Shrubs > 3 ft. in height – Planting radius 4 ft.		**100**	
Coyote brush *(Baccharis pilularis)*	5	50	
Blue elderberry (*Sambucus mexicana)*	4-10	50	
Small Shrubs < 3 ft. in height – Planting radius 3 ft.		**320**	
California matchweed (*Gutierrezia californica*)	3	80	
Deerweed (*Lotus scoparius)*	3	80	
Silver lupine *(Lupinus albifrons)*	4	80	
Bush buckwheat (*Eriogonum fasciculatum*)	3	80	
Perennial/Biennial Herbs < 2 ft. in width – Planting radius 2 ft.		**180**	
Butterweed (Senecio douglasii), Common sunflower (*Helianthus annua*), Hooker's evening primrose *(Oenothera elata ssp. hookeri*), Telegraph weed (*Heterotheca grandiflora*), Creeping rye (*Elymus triticoides*), California Croton (*Croton californica,* Naked buckwheat (*Eriogonum nudum* var. *auriculatum*), Creeping wild rye (*Leymus triticoides*)			

FIGURE 5.2
Final Planting Design
Oakley Generating Station
Oakley, California

CH2MHILL

Planting site preparations for shrubs will be similar as described for trees, with individuals mapped and marked for monitoring. Large shrubs will be placed in groups of three and five to cover 700 square meters, or to reach a goal of planting approximately 100 large shrubs. Small shrubs will be clustered in species groups of 10 to 20 over 600 square meters or to reach a planting goal of approximately 500 small shrubs. Maintenance of the shrubs shall include limited deep watering during the summers of 2012 and 2013 under direction of the Restoration Biologist, Designated Biologist, or Biological Monitor, and by hand weeding. No mulch will be applied between shrub plantings. If annual grasses become a weed problem in years two and three, the Designation Biologist or Restoration Biologist may require straw mulch to be placed around the base of shrubs to limit competition. Hand weeding of perennial weeds will be undertaken as necessary to promote establishment of the plantings. Shrubs shall be replaced if losses exceed 20 percent by year three and the maintenance and monitoring period will be treated as year one for any shrubs replaced at that time.

Annual and biennial native herb seed will be broadcast on bare soil in fall 2011. Revegetation liner stock of creeping rye will be planted on 1-foot centers in a 3-foot-wide band out from the boundary of Wetland E and upper edges of the bioswale outfalls. Maintenance of these plantings will consist of weeding of annual and perennial exotics. Creeping rye plantings will be watered once or twice during the summer of 2012 and 2013 as requested by the Designated Biologist or Restoration Biologist.

SECTION 6

Monitoring and Performance Standards

6.1 Biological Resources Monitoring

Biological resources monitoring will be done along permanent monitoring line intercept transects (Figure 6-1). Planted oaks and shrubs will be tagged so that survival of individual plantings can be individually identified and assessed. Key monitoring tasks and specifications will be as follows:

- Tree growth will be monitored by averaging the measured leader (annual) growth of 4 branches per tree during spring and fall monitoring sessions.
- The success of annual or biennial herbaceous species will be assessed by areal coverage and estimate of individuals with populations.
- Each planted tree will be mapped and identified and its status monitored as part of a complete tree survey.
- Individual shrubs will be monitored for survival growth (height and width) to assess the need for contingency replanting to meet survival success criteria.
- Populations will be mapped and monitored for regeneration.
- Perennial creeping rye plantings will be monitored for cover along meandering line intercept transects placed within the center of the 3-foot-wide planting zone around Wetland E.
- The presence of exotic or noxious (invasive) plants (Cal-IPC rating High) will be monitored by conducting general floristic surveys in spring and fall.

Invasive species will be removed from the conservation easement as part of general weed control and maintenance of mitigation plantings. If new Cal-IPC rated High species are detected additional methods for noxious weed treatment will be developed in coordination with the CPM and CDFG and included in the annual monitoring reports.

The methods for assessing population numbers will vary with population size. Direct counts will be made for small populations. For larger populations, estimates of population size will be made from randomly placed sample plots.

Survey results, including a list of all taxa (plant and wildlife) detected during spring and fall surveys, will be included in the annual monitoring reports. Incidental observations of special-status species at Wetland E will also be reported. All observations of special-status species will be documented and the data will be submitted to the California Natural Diversity Database (CNDDB) during each monitoring year. CNDDB data will be submitted following the current instructions on the CDFG website. Representative photographs of the upland habitat improvements and wetland habitat will also be included in the annual monitoring reports.

Annual monitoring reports will be submitted for five years, with the first year beginning one year after the habitat improvements are implemented. If habitat improvements are not deemed successful after five years, the project owner will propose adaptive management measures developed in coordination with CPM and CDFG to meet required goals, objectives and performance standards. The project owner shall submit an addendum to the CPM for review and approval and to CDFG and CV RWQCB for review and comment prior to implementing adaptive management measures. Annual monitoring reports shall be submitted to the CPM for review and approval and to CDFG and CV RWQCB for review and comment for the life of the project.

6.2 Wetland and Upland Habitat Success Criteria

For the CPM and CDFG to deem the enhancements successful:

- The site will have 75 percent survivorship of planted oaks by year 5.
- Surviving trees will show leader growth for 2 out of the last 3 years of monitoring.
- The site will have 75 percent survivorship of planted upland dune shrubs by year 5.
- The native upland herbaceous species will be established without reseeding for 2 out of the last 3 years of monitoring.
- The site will not require watering or maintenance other than weed control after year 3.
- The site will not contain more than 5 percent invasive exotics (Cal-IPC rating High) after 5 years.
- The project owner will maintain wildlife habitat value and wildlife use of Wetland E.

6.3 Water Level Monitoring

The project owner will monitor the water level in Wetland E on a daily basis for one rainy season before construction begins, during construction. Monitoring will continue for the first five years of operation or until the CDFG and CPM agree that water level monitoring is no longer needed to establish that there is no adverse impact to Wetland E (SOIL&WATER-6, #1). The monitoring will be done using a transducer placed in the deepest part of the wetland or other suitable method. Data from the transducer will be downloaded periodically and evaluated to determine whether or not the water level in the has changed significantly in comparison with the baseline given comparable rainfall levels in the period of time leading up to the evaluation. Rainfall data will be developed using the nearest publicly available meteorological station that provides this data or an on-site rain gauge.

The purpose of the water level monitoring is to make certain that stormwater running off of the OGS plant site does not increase or decrease the level of water in the wetland in such a way that the functions and values of the wetland are adversely affected. The project owner will report on the Wetland E water level; the effectiveness of the drainage, erosion and sediment control measures; and the results of monitoring and maintenance activities in

LEGEND

- Project Site Boundary
- Wetland Preserve Boundary
- Wetland E
- Permanent Monitoring Line Intercept Transect

Note:
Aerial Data from:
http://services.arcgisonline.com/arcgis/services.
Service Name: I3_Imagery_Prime_World_2D
Includes i-cubed Prime high-resolution imagery for the contiguous United States.
Map Service by ESRI (last modified: 13-March-2009; superseded by the World Imagery Service).

N

0 37.5 75
Feet

FIGURE 6-1
Permanent Monitoring Line Intercept Transects
Wetland E Monitoring and Adaptive Management Plan
Oakley Generating Station, Oakley, California

the monthly compliance reports during construction and annual compliance reports during project operation.

The annual reports will include an assessment by the Restoration Biologist or Designated Biologist regarding the effects of water level on the functioning of the wetland as wetland habitat. If, in the judgment of the Restoration Biologist, the water level in the pond has been too low or two high for proper functioning of the wetland as habitat, then the Restoration Biologist will make recommendations to the project owner regarding the adaptive management of stormwater flow into the wetland .

If the CPM agrees, in consultation with the Restoration Biologist and CDFG, that water level monitoring is no longer necessary because monitoring has shown that there is no adverse effect to the functioning of Wetland E as wetland habitat, then the CPM may notify the project owner that the owner may cease monitoring the water level.

6.4 Water Quality Monitoring

6.4.1 Sampling Program

The project owner will conduct a water quality sampling program by collecting samples from the OGS stormwater detention pond discharge point to Wetland E when the discharge is functioning during the rainy season. The owner will collect samples following the first three rainfall events of 0.5 inches or greater for each of the first year of construction and the first five years of OGS operation. If the CPM agrees, in consultation with the Restoration Biologist and CDFG, that water quality monitoring is no longer necessary because monitoring has shown that there is no adverse effect to the functions and values of Wetland E as wetland habitat, then the CPM may notify the project owner that the owner may cease monitoring the water level.

Sample analyses will include tests for pH, Dissolved Oxygen, Total Suspended Solids, Specific Conductance, Oil & Grease, and metals (Arsenic, Chromium, Iron, Selenium, Lead, Mercury, etc.). Sample analysis results will be compared to RWQCB Benchmark Values and US EPA Ambient Water Quality criteria for Protection of Freshwater Aquatic Life. If analysis results exceed, RWQCB Benchmark values or US EPA Water Quality Criteria, contingency plans should be implemented to improve or augment the stormwater quality treatment Best Management Practices on site and will continue testing until the RWQCB and EPA standards are met. If sample analysis results exceed criteria during the first five years of operation, water quality sampling and analysis shall continue until three contiguous years of water quality analyses meet the criteria.

Water quality sampling and analysis will also be undertaken following a reported release of hazardous materials at the site for the first three rainfall events of 0.5 inch or greater (SOIL&WATER-6, #2). During the first five years of operation or following a release of hazardous materials, if sample analysis results exceed RWQCB Benchmark values or US EPA Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life water quality sampling and analysis will continue until three contiguous years of water quality analyses meet the RWQCB Benchmark values and US EPA Water Quality Criteria.

6.4.2 Sampling Procedures

Sampling supplies and equipment will be stored in a cool-temperature environment that will not contact rain or direct sunlight. Supplies maintained at the project site will include surgical gloves, sample collection equipment, coolers, an appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody forms.

A sample container will be used to collect water, which will be transferred to sample bottles for laboratory analysis. Once the sample container is filled, the water sample will be poured directly into sample bottles provided by the laboratory for the analyte(s) being monitored.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of surgical gloves prior to the collection and handling of each sample at each location
- Prevent the inside of the sample bottle from contacting any material other than the water sample
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection
- Prevent the cooler lid from remaining open for an extended period of time once samples are placed inside
- Avoid touching the exposed end of a sampling tube, if applicable
- Prevent rainwater from rain gear or other surfaces from dripping into sample bottles
- Avoid eating, smoking, or drinking during sample collection
- Avoid sneezing or coughing in the direction of an open sample bottle
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample to take place
- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water
- Dispose of decontamination water/soaps appropriately; such as avoiding discharge to the receiving water

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, and documented on a chain-of-custody form provided by the analytical laboratory; sealed in a re-sealable storage bag; placed in an ice-chilled cooler, as close to 4°C as practicable; and delivered within 24 hours to the California-certified laboratory:

Immediately following collection, samples for field analysis will be tested in accordance with the field instrument manufacturer's instructions and results will be recorded on the Sampling Activity Log (Attachment N).

Original data documented on sample bottle identification labels, chain-of-custody forms, Sampling Activity Logs, and Inspection Checklists will be recorded using waterproof ink. These will be considered accountable documents. If an error is made on an accountable

document, the individual will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. Corrections will be initialed and dated.

Sampling and field analysis activities will be documented using the following:

Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label:

- Project name
- Project number
- Unique sample identification number and location:
- [Project Number]-[Six digit sample collection date]-[Location] (*Example:* OGSWLE-081811-DPOutlet)
- Quality assurance/quality control (QA/QC) samples will be identified similarly using a unique sample number or designation (*Example:* OGSWLE-081811-DUP1)
- Collection date and time (no time applied to QA/QC samples)
- Analysis constituent

Sampling Activity Logs: A log of sampling events will identify:

- Sampling date
- Separate times for collected samples and QA/QC samples recorded to the nearest minute
- Unique sample identification number and location
- Analysis constituent
- Names of sampling personnel
- Weather conditions (including precipitation amount)
- Field analysis results
- Other pertinent data

Chain of Custody Forms: Samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Only the sample collectors will sign the COC form over to the lab. COC procedures will be strictly adhered to for QA/QC purposes.

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or one duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicate samples will be used as a check on laboratory quality assurance.

6.5 Long-term Management and Maintenance Requirements

The Wetland E site will be closed to the general public. Access to the site will be limited to scientific and educational uses through prearranged written permission from the owner of

the property. CCGS will take appropriate steps to control trespass and prevent littering. The removal of litter and control of noxious weeds such as pampas grass, almond, and Himalayan blackberry within the conservation easement will be part of regular yearly landscape maintenance activities by CCGS facility staff or contractors. Noxious weed control will follow BMPs listed in Section 5.

6.6 Implementation and Monitoring Timeline

Water level and rainfall monitoring began in November of 2010 and will take place at a minimum for the first year of construction and the first 5 years of operation or until the Restoration Biologist and CPM agree that monitoring is no longer necessary.

Habitat improvements will begin at the site within 12 months of the start of construction. Site restoration activities such as non-native plant removal may begin during the summer and fall months of 2011. To ensure planting success, tree and shrub and other plantings will take place in the fall or early months, when soil is most. Annual and biennial native herb seed will be broadcast on bare soil in fall. Trees and shrubs will be deep-watered during the second and third summers after planting to ensure young plant survival.

Monitoring of the habitat improvements will take place at least twice annually for the first five years after planting. Monitoring will be monthly for the first six months after planting and quarter for the second six months and the second year. The site will be inspected in spring during the spring and fall.

6.7 Reporting Requirements

6.7.1 Monthly Reporting

The monthly compliance report will include a report of the daily water level and rainfall data and will also include a report of the effectiveness of the drainage, erosion and sediment control measures implemented during construction.

6.7.2 Annual Reporting

Annual reporting requirements will be as follows:

Submitted to: CPM, CDFG, and the CV RWQCB

Restoration Plan Content: The annual report will describe planting, monitoring, and maintenance activities implemented and will document of compliance with the goals, objectives and performance standards in the Management Plan. The report will describe the status of habitat improvements at the Wetland E conservation area, and adaptive management methods implemented.

Water Quality Data: Results of water level monitoring and water quality sampling and analysis. The annual reports will describe the status of the hydrology at Wetland E, document water quality at the OGS discharge point, and any adaptive management measures implemented.

Distribution and Timing: Reports of the habitat improvement program will be provided the CPM for review and approval and to CDFG for review and comment for years 1, 2, 3, 4, and 5. The first year will begin one year after the habitat improvements are implemented. General site and water quality monitoring reports shall be submitted to the CPM for review and approval and to the CDFG and CV RWQCB for review and comment annually within 30 days of the anniversary date of the commencement of habitat improvements for the life of the project.

In the event of a hazardous materials release, additional samples would be taken and additional monitoring and reporting would take place.

SECTION 7

Adaptive Management

Adaptive Management, or contingency plans for general habitat improvements may include additional noxious weed treatments, replanting, reseeding, or selection of alternate species for the restoration plantings. Other contingencies and adaptive management responses are as follows:

- **Loss of Plantings**—Success of the habitat improvements, including survival and growth of trees and shrubs will be monitored twice per year in spring and fall. Loss of plantings will be noted and replacements will be made if survival drops below 80 percent by year three.
- **Non-Native Cover Increase**—Additional weed control measures will be implemented if cover of non-native annual grasses and herbs reaches greater than 70 percent in year two. These measures may include mulch, herbicide treatments, or additional hand or mechanical removal of noxious weeds around the bases of trees and shrubs.
- **Habitat Improvement Failure**—If habitat improvements are not deemed successful after five years, the project owner will propose adaptive management measures developed in coordination with CPM and CDFG to meet required goals, objectives and performance standards. Under these circumstances, project owner will submit an addendum to the CPM for review and approval and to CDFG and CV RWQCB for review and comment prior to implementing adaptive management measures.
- **Water Level Too High**—If the water level in the wetland become sufficiently high that bird nests in the wetland are threatened with inundation under normal rainfall conditions, the bioswale outfall design may be altered so that stormwater from the bioswale/detention pond system does not drain as quickly into the Wetland E pond. This could be done by decreasing the number or size of the drainage release holes at various elevations in the outlet standpipes.
- **Water Level Too Low**—If the water level in the wetland becomes significantly lower than otherwise expected over some portion of the rainy season, the bioswale outfall design may be altered so that stormwater from the bioswale/detention pond system drains more quickly into the Wetland E pond. This could be done by increasing the number or size of the drainage release holes at various elevations in the outlet standpipes.
- **Water Quality Parameters not Met due to OGS Discharge**—If water quality testing indicates failure to meet RWQCB Benchmark values or US EPA Water Quality Criteria at the OGS outfall to Wetland E, contingency plans will be immediately implemented and testing will continue until the RWQCB and EPA standards are met. The contingency plans will first involve close inspection of all project drainage inputs to the wetland that may have caused the water to fail to meet the standards. If the source is

identified, then measures will be taken immediately to address or restore best management practices and to prevent further contamination.

- **Water Quality Parameters not Met due to Offsite Discharge**—If inspection of the Wetland E conservation area indicates unusual stress to vegetation that may have resulted from an offsite discharge, CCGS will inspect the wetland and attempt to determine the source of the discharge. Similarly, if it comes to CCGS's attention that there has been an off-site release of hazardous materials that may affect the wetland, PG&E will take measures to protect the wetland. If the apparent source is the PG&E Antioch Terminal, CCGS will contact PG&E immediately. If the apparent source is Bridgehead Road, PG&E will contact the City of Oakley. In the event of an offsite spill, for example, of hazardous materials or other contaminants, CCGS will work closely with and advise the responsible party to plan their restitution or restoration efforts and will review the responsible party's restoration implementation for consistency with the Wetland E management and restoration plan.
- **Significant Flood Event**—In the event of significant flooding (unusual flood greater than the design flood), it is likely that water will flow across the roadway adjacent to and south of the wetland conservation area and into a shallow basin that is next to DuPont's entrance area parking lot. CCGS will monitor the wetland after the flood event to assess any flood damage to vegetation and will restore damaged vegetation by replanting or other measures as necessary and consistent with this plan.

SECTION 8

References Cited

Burch, Patrick L. and Shepard M. Zedaker. 2003. Removing the invasive Tree *Ailanthus altissima* and Restoring Natural Cover. *Journal of Arboriculture* 29 (1), January 2003.

Dady, Kathleen/U.S. Army Corps of Engineers. 2008. Personal communication with Chuck Orwig/DuPont Engineering. December 23.

DuPont Engineering. 2007. Delineation Report for Potential Jurisdictional Waters of the United States Including Wetlands. Submitted to the US Army Corps of Engineers, Sacramento District. Prepared by URS Corporation on behalf of DuPont Engineering, Houston, Texas.

DuPont Engineering. 2008. Supplemental Information for request for verification of wetland boundaries, DuPont Oakley Site. Letter from Chuck Orwig, DuPont Engineering, to Mr. William Guthrie

CH2M HILL. 2010. Wetland E Management Plan for the Oakley Generating Station. Prepared for Contra Costa Generating Station, LLC.

Appendix A
CEC Conditions of Certification
SOIL&WATER-6 and BIO-19

SOIL&WATER-6: Upon project approval, the project owner shall develop and implement a Wetland E Monitoring and Adaptive Management Plan (Plan) (see **BIO-19**). The Plan shall include:

1. Monitoring of water levels within Mitigation Wetland E on a daily basis for at least one rainy season prior to construction, during construction, and during operations until the CDFG and CPM agree that water level monitoring is no longer needed to establish that there is no adverse impact to Wetland E. Water level monitoring shall demonstrate no adverse impacts to Wetland E's function as wetland habitat due to changes in ponding extent or duration as compared to pre-project conditions.

2. Water quality samples shall be collected from the point to Wetland E during the rainy season. Discharge samples shall be collected following the first three rainfall events of 0.5 inch or greater for each year of construction and the first five years of operation. In addition, water quality sampling and analysis shall be required for the first three rainfall events of 0.5 inch or greater following a reported release of hazardous materials at the site. If sample analysis results exceed the Regional Water Quality Control Board (RWQCB) Benchmark Values and US Environmental Protection Agency (US EPA) Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life during the first five years of operation or following a release of hazardous materials, water quality sampling and analysis shall continue until three contiguous years of water quality analyses meet the RWQCB Benchmark Values and US EPA Water Quality Criteria. Sample analyses shall include tests for pH, Dissolved Oxygen, Total Suspended Solids, Specific Conductance, Oil & Grease, and metals (Arsenic, Chromium, Iron, Selenium, Lead, Mercury, etc.). Sample analysis results shall be compared to RWQCB Benchmark Values and US EPA Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life. If analysis results exceed RWQCB Benchmark values or US EPA Water Quality Criteria, contingency plans should be implemented to improve or augment the stormwater quality treatment Best Management Practices on site. The plan should describe the sampling and analysis methods proposed.

3. Contingency plans to address adverse impacts to wetland habitat caused by changes in the duration or extent of ponding or water quality in Wetland E that are attributable to project operation.

4. Identify the responsible parties and funding source(s) for the implementation of the Monitoring and Adaptive Management Plan for the life of the project.

5. Annual monitoring reports shall be submitted to the CPM for review and approval for the life of the project or until the CPM determines reporting can be less frequent or eliminated. If adverse impacts to the functioning of Wetland E as wetland habitat are documented, the annual monitoring report shall outline measures to be implemented to address the adverse impacts. The annual monitoring report shall provide an update on the implementation of any contingency measures identified in previous annual monitoring reports.

Verification: At least 60 days prior to the start of any construction related ground disturbance, the project owner shall submit a copy of the Draft Wetland E Monitoring and Adaptive Management Plan to the Compliance Project Manager (CPM) for review and approval, and the California Department of Fish and Game (DFG), and the Central Valley RWQCB (CV RWQCB) for review and comment. The CPM will determine the plan's acceptability. At least 15 days prior to the start of any construction related ground disturbance, the project owner shall provide the CPM with the final version of the Wetland E Monitoring and Adaptive Management Plan that has been reviewed and approved by the CPM, in consultation with DFG and the CV RWQCB.

The Wetland E Monitoring and Adaptive Management Plan shall be implemented prior to construction, including a minimum of one rainy season of pre-construction data collection. During construction, the project owner shall provide all monitoring data in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. The project owner shall submit copies to the CPM of all correspondence between the project owner and DFG and/or the CV RWQCB regarding the Wetland E Monitoring and Adaptive Management.

The project owner shall submit annual reports to the CPM, DFG, and the CV RWQCB detailing the results of water level monitoring and water quality sampling and analysis. The annual reports shall also document all maintenance activities implemented and compliance with all goals, objectives and performance standards in the Wetland E Monitoring and Adaptive Management Plan. The annual monitoring reports shall fully describe the status of the hydrology and water quality at Wetland E and any adaptive management measures implemented. Annual monitoring reports shall be submitted for review and approval annually within 30 days of the anniversary date of the commencement of habitat improvements for the life of the project.

BIO-19 The project owner shall develop and implement a Wetland E Monitoring and Adaptive Management Plan (Plan). The plan must include monitoring methods, planting design, responsible parties, long-term management and maintenance requirements, contingency plan, and details on the funding source. The plan must be developed by the project owner in coordination with the CPM and CDFG, consistent with the stated purposes of the 1997 conservation easement on the property. The Plan will include all proposed habitat improvements and enhancement goals, objectives and performance standards developed by the applicant in coordination with CDFG (CH2MHILL 2010k). Detailed baseline maps which show the current species composition or cover of wetland vegetation as well as current extent of noxious weed cover as determined by standard vegetation sampling methods will be included in the Plan. Sampling methods would also be fully described in the Plan.

For the CPM to deem the enhancements successful:

1. The site will have 75 percent survivorship of planted coast live oak by year 5.

2. Surviving trees shall show leader growth for 2 out of the last 3 years of monitoring.

3. The site will have 75 percent survivorship of planted upland dune shrubs by year 5.

4. The native upland herbaceous species shall be established without reseeding for 2 out of the last 3 years of monitoring.

5. The site will not require watering or maintenance other than weed control after year 3.

6. The site shall not contain more than 5 percent invasive exotics (Cal-IPC rating High) after 5 years.

The project owner shall maintain wildlife habitat value and wildlife use of Wetland E. Any adverse impacts to wetland habitat caused by changes in the duration and extent of ponding or water quality will be addressed by contingency plans to be included in the Wetland E Monitoring and Adaptive Management Plan (see SOIL&WATER-6 for details). Any significant change in species composition or cover of wetland vegetation compared to pre-project conditions (based upon standard vegetation sampling techniques) shall maintain Wetland E as wetland habitat. Annual monitoring reports will be submitted for years 1, 2, 3, 4, and 5, with the first year beginning one year after the habitat improvements are implemented. If habitat improvements are not deemed successful after 5 years, the project owner will propose adaptive management measures developed in coordination with the CPM and CDFG to meet required

goals, objectives, and performance standards. Annual monitoring reports shall be submitted to the CPM for review and approval for the life of the project.

Verification: At least 60 days prior to the start of any construction-related ground disturbance the project owner shall submit a Draft Wetland E Monitoring and Adaptive Management Plan to the CPM for review and approval, and the California Department of Fish and Game (CDFG) and the CV RWQCB for review and comment. The CPM in consultation with CDFG the CV RWQCB will determine the plan's acceptability. At least 15 days prior to the start of any construction-related ground disturbance, the project owner shall provide the CPM with the final version of the Wetland E Monitoring and Adaptive Management Plan that has been reviewed and approved by the CPM.

Habitat improvements shall be initiated no later than 12 months from the start of construction. Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Wetland E Monitoring and Adaptive Management Plan have been completed.

The project owner shall submit annual reports to the CPM~~,~~ CDFG, and the CV RWQCB describing planting, monitoring, and maintenance activities implemented as well as documentation of compliance with all goals, objectives and performance standards in the Wetland E Monitoring and Adaptive Management Plan. The reports shall fully describe the status of the habitat improvement at the Wetland E conservation area, and shall describe any adaptive management methods implemented. Annual monitoring reports will be submitted to the CPM for review and approval and to CDFG for review and comment for years 1, 2, 3, 4, and 5, with the first year beginning one year after the habitat improvements are implemented. The annual report for years 1, 2, 3, 4, and 5 shall be submitted within 30 days after the anniversary date of the commencement of habitat improvements. If after 5 years, habitat improvements are not deemed successful, the project owner will develop adaptive management measures in coordination with CPM and CDFG to meet required goals, objectives, and performance standards. The project owner shall submit an addendum to the CPM for review and approval and to CDFG and CV RWQCB for review and comment prior to implementing adaptive management measures. Annual monitoring reports shall be submitted as specified above within 30 days of the anniversary date of the commencement of habitat improvements for the life of the project.

The conditions of certification will ensure that the OGS will comply with all applicable laws, ordinances, regulations and standards (LORS) and will not result in significant impacts to biological resources.

Appendix B
Best Management Practices for Pesticide Use

Best Management Practices for Pesticide Use

The Project Owner will conduct pesticide (herbicide) management in accordance with Best Management Practices (BMPs). These BMPs are non-point source pollution control measures that were developed and documented cooperatively between the California Department of Fish and Game and California Energy Commission. BMPs that are applicable and will be implemented during the license for the Oakley Generating Station Project as part of the management of the Wetland E conservation easement are listed below. Also see U.S. Fish and Wildlife Service Standard Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS 2011).

Pesticide and Fertilizer Use. In general, since the toxicological properties of various pesticides (including herbicides, insecticides and rodenticides) cannot be predicted under all conditions, CDFG discourages pesticide application near open water wherever and whenever possible.

Integrated pest management solutions that emphasize non-chemical pest management shall be used over chemical pesticides to the extent feasible for management of the Wetland E conservation area. Chemical fertilizers, rodenticides, and insecticides shall not be used within the Wetland E conservation easement without prior written permission from the CPM. Herbicides may be used at the Project Owner's discretion with implementation of the following protective measures:

BMP 1: Project owner shall use caution to apply the least practicable amount of herbicides necessary to effectively control nuisance plants.

BMP 2: Project owner shall use the least concentrated formulation of herbicide possible and practicable to accomplish his/her task.

BMP 3: All herbicides shall be applied by a certified pesticide applicator in accordance with regulations set by the California Department of Pesticide Regulation and according to labeled instructions.

BMP 4: Project Owner shall use extreme caution to not to apply any herbicide directly to water. If herbicides must be applied next to water. Project Owner shall use preventative BMPs to ensure that the chemical does not accidentally flow into or stream through the air into the water.

BMP 5: Herbicides shall only be applied on calm days with winds below 5 miles per hour.

BMP 6: Care shall be taken to avoid spraying native vegetation with herbicides. Spraying within 100 feet of existing mitigation sites shall be done by hand.

BMP 7: Should any fish or animal kills occur following application of herbicides, such kills shall be reported to CPM and CDFG Bay Delta Region within 24 hours.

BMP 8: Project Owner shall only use pesticides for which a "no effect" determination has

been issued by the U.S. EPA's Endangered Species Protection Program (http://www.epa.gov/espp/) for any species likely to occur within the project area or downstream. Prior to applying pesticides, the Project Owner shall verify that selected pesticides are not on an endangered species bulletin issued by the U.S. EPA for Contra Costa County. Bulletins are posted at:
http://www.epa.gov/oppfead1/endanger/bulletins.htm.

Project Owner is responsible for any environmental damage caused by the application or use of substances that prove harmful to fish and aquatic wildlife.

The websites below provide more background on the pesticide injunction and strategies that the EPA is using to minimize pesticide-related impacts to this species. Only pesticides for which the EPA has issued a No Effect determination should be used near water bodies.

http://www.epa.gov/oppfead1/endanger/litstatus/effects/
http://www.epa.gov/oppfead1/endanger/litstatus/factsheet.html
http://www.epa.gov/oppfead1/endanger/bulletins.htm

Appendix C
Native Plant Nurseries

Appendix C Native Plant Nurseries

Hartland Nursery (Hart Restoration, Inc.)
13737 Grand Island Road
Walnut Grove, CA 95690
Contact: Jeff Hart
916-775-4021

North Coast Native Nursery
PO Box 660
2700 Chileno Valley Road
Petaluma, CA 94953
Contact: Dave Kaplow
707-769-1213