

PACIFIC GAS AND ELECTRIC COMPANY

**Kilarc-Cow Creek Hydroelectric Project
FERC Project No. 606**



**Draft License Surrender Application
Volume 1**

September 4, 2008



© 2008, Pacific Gas and Electric Company

PACIFIC GAS AND ELECTRIC COMPANY

Kilarc-Cow Creek Hydroelectric Project

FERC Project No. 606

DRAFT LICENSE SURRENDER APPLICATION

September 4, 2008



© 2008, Pacific Gas and Electric Company



**KILARC-COW CREEK HYDROELECTRIC PROJECT
 FERC PROJECT NO. 606
 DRAFT LICENSE SURRENDER APPLICATION**

TABLE OF CONTENTS

EXHIBIT A: Project Description A-1

- A.1 Description of Project Works..... A-1
 - A.1.1 Kilarc Development A-1
 - A.1.2 Cow Creek Development..... A-3
- A.2 Lands of the United States A-5
- A.3 Proposed Decommissioning Plan A-5

EXHIBIT B: Project Operations and Resource Utilization..... B-1

- B.1 Project Operation B-1
 - B.1.1 Kilarc Operation..... B-1
 - B.1.2 Cow Creek Operation B-1
- B.2 Capacity and Average Annual Energy Production B-2
 - B.2.1 Kilarc Average Annual Energy Production B-2
 - B.2.2 Cow Creek Average Annual Energy Production B-2
- B.3 Power Utilization B-3
- B.4 Proposed Project Operation B-3

EXHIBIT C: Project History and Proposed Decommissioning Schedule C-1

- C.1 Construction History C-1
- C.2 Proposed Schedule for Decommissioning C-1

EXHIBIT D: Statement of Project Cost and Financing..... D-1

- D.1 Original Cost of Project Facilities..... D-1
- D.2 Amount Payable in the Event of Project Takeover..... D-1
- D.3 Estimated Decommissioning Cost D-1
- D.4 Estimated Annual Average Cost of the Project D-2
- D.5 Sources of Financing..... D-2

EXHIBIT E: Environmental Report..... E.1-1

- E.1 Introduction.....E.1-1
- E.2 Affected Environment.....E.2-1
 - E.2.1 Geology and SoilsE.2-1
 - E.2.1.1 Geologic ConditionsE.2-1
 - E.2.1.2 Seismic ConditionsE.2-2
 - E.2.1.3 Soil Conditions.....E.2-2



E.2.2	Hydrology and Water Resources	E.2-7
E.2.2.1	Background.....	E.2-7
E.2.2.2	Climate.....	E.2-8
E.2.2.3	Surface Water Hydrology	E.2-8
E.2.2.4	Impaired and Unimpaired Flow Rate Analysis.....	E.2-10
E.2.2.5	Water Use.....	E.2-14
E.2.2.6	Water Rights	E.2-15
E.2.3	Geomorphology	E.2-17
E.2.3.1	Relicensing Resource Reports and Analyses.....	E.2-17
E.2.3.2	Channel Type and Channel Stability	E.2-17
E.2.3.3	Channel Sediment Storage and Transport Characteristics.....	E.2-21
E.2.3.4	Sediment Storage at Diversions	E.2-25
E.2.4	Water Quality.....	E.2-29
E.2.4.1	Background.....	E.2-29
E.2.4.2	Sacramento River Basin Plan.....	E.2-29
E.2.4.3	Storm Water Regulations.....	E.2-30
E.2.4.4	2003 Water Quality Sampling Investigation.....	E.2-31
E.2.4.5	2003 <i>In Situ</i> Water Quality Study	E.2-33
E.2.4.6	2007 Sediment Chemistry Evaluation	E.2-34
E.2.4.7	2003 Water Temperature Conditions.....	E.2-37
E.2.5	Aquatic Resources	E.2-40
E.2.5.1	Background.....	E.2-41
E.2.5.2	Kilarc Development	E.2-42
E.2.5.3	Cow Creek Development.....	E.2-44
E.2.6	Wildlife Resources.....	E.2-46
E.2.6.1	Methods.....	E.2-47
E.2.6.2	General Wildlife Resources	E.2-52
E.2.6.3	Special-Status Wildlife Species	E.2-57
E.2.7.1	Methods.....	E.2-75
E.2.7.2	Plant Communities.....	E.2-78
E.2.7.3	Special-Status Plant Species	E.2-81
E.2.7.4	Riparian Study	E.2-83
E.2.8	Historical Resources	E.2-85
E.2.8.1	Historical Context	E.2-86
E.2.8.2	Methods and Results.....	E.2-90
E.2.9	Archaeological Resources.....	E.2-92
E.2.9.1	Prehistoric Context.....	E.2-92
E.2.9.2	Ethnographic Context	E.2-94
E.2.9.3	Methods and Results.....	E.2-95
E.2.10	Recreation	E.2-98
E.2.10.1	Regional Recreation Areas	E.2-98
E.2.10.2	Kilarc Forebay and Kilarc Picnic Area.....	E.2-99
E.2.10.3	Kilarc Powerhouse	E.2-100
E.2.11	Aesthetics.....	E.2-100
E.2.11.1	1998 General Plan Guidelines	E.2-101



E.2.11.2	Landscape Character and Scenic Quality	E.2-101
E.2.11.3	Visual Sensitivity	E.2-103
E.2.12	Land Use	E.2-106
E.2.12.1	Existing Land Jurisdictions	E.2-106
E.2.12.2	Existing Land Ownership and Interests	E.2-107
E.2.12.3	Land Use Plans and Policies	E.2-108
E.3	Project Impacts.....	E.3-1
E.3.1	Geology and Soils.....	E.3-1
E.3.1.1	Soil Erosion or Loss of Top Soil.....	E.3-1
E.3.1.2	Soil Stabilization and Liquefaction.....	E.3-2
E.3.1.3	Summary of Geology and Soils Impacts	E.3-2
E.3.2	Hydrology and Water Resources	E.3-3
E.3.2.1	Evaluation of Hydrologic Impacts below Diversions.....	E.3-3
E.3.2.2	Evaluation of Hydrologic Impacts in Hooten Gulch	E.3-4
E.3.2.3	Evaluation of Water Rights & Use	E.3-4
E.3.2.4	Summary of Hydrologic Impacts.....	E.3-5
E.3.3	Geomorphology	E.3-5
E.3.3.1	Disposition of Sediments in Storage at Diversions.....	E.3-6
E.3.3.2	Bank/Channel Stability	E.3-8
E.3.3.3	Summary of Geomorphology Impacts.....	E.3-11
E.3.4	Water Quality.....	E.3-12
E.3.4.1	Kilarc Development	E.3-12
E.3.4.2	Cow Creek Development.....	E.3-15
E.3.4.3	Summary of Water Quality Impacts	E.3-16
E.3.5	Aquatic Resources	E.3-16
E.3.5.1	Kilarc Development.....	E.3-17
E.3.5.2	Cow Creek Development.....	E.3-19
E.3.5.3	Summary of Aquatic Resources Impacts	E.3-21
E.3.6	Wildlife Resources.....	E.3-21
E.3.6.1	Effects of Decommissioning Activities on Wildlife.....	E.3-22
E.3.6.2	Summary of Wildlife Resources Impacts	E.3-24
E.3.7	Botanical Resources.....	E.3-25
E.3.7.1	Effects of Decommissioning Activities on Botanical Resources	E.3-25
E.3.7.2	Summary of Botanical Resources Impacts	E.3-27
E.3.8	Historical Resources	E.3-28
E.3.8.1	Impacts on Kilarc and Cow Creek Powerhouses.....	E.3-28
E.3.8.2	Summary of Historical Resource Impacts	E.3-28
E.3.9	Archaeological Resources.....	E.3-29
E.3.9.1	Impacts on Prehistoric Archaeological Sites	E.3-29
E.3.9.2	Impacts on Archaeological Materials	E.3-29
E.3.9.3	Impacts on Human Remains	E.3-29
E.3.9.4	Summary of Archaeological Resource Impacts.....	E.3-30
E.3.10	Recreation	E.3-30



E.3.10.1	Impacts on Kilarc Forebay and Picnic Area	E.3-30
E.3.10.2	Kilarc Powerhouse	E.3-31
E.3.10.3	Summary of Recreation Impacts	E.3-31
E.3.11	Aesthetics	E.3-31
E.3.11.1	Impacts on the Kilarc Development	E.3-31
E.3.11.2	Impacts on Cow Creek Development	E.3-32
E.3.11.3	Impacts on other Aesthetic Resources	E.3-32
E.3.11.4	Summary of Aesthetic Impacts	E.3-32
E.3.12	Land Use	E.3-32
E.3.12.1	Compliance with Plans and Policies	E.3-33
E.3.12.2	Impacts on Land Management	E.3-34
E.3.12.3	Impacts on Land Ownership	E.3-34
E.3.12.4	Summary of Land Use Impacts	E.3-35
E.4	Protection, Mitigation, and Enhancement Measures	E.4-1
E.4.1	Geology and Soils	E.4-1
E.4.1.1	Soil Erosion or Loss of Top Soil	E.4-1
E.4.1.2	Soil Stabilization and Liquefaction	E.4-2
E.4.2	Hydrology and Water Resources	E.4-3
E.4.3	Geomorphology	E.4-3
E.4.3.1	Disposition of Sediments in Storage	E.4-3
E.4.3.2	Bank Erosion at Kilarc Main Canal Diversion Dam and South Cow Creek Diversion Dam	E.4-5
E.4.3.3	Bank Erosion at Mill Creek, North Canyon Creek, and South Canyon Creek E.4-6	
E.4.4	Water Quality	E.4-6
E.4.4.1	Degradation of Water Quality from Sediment Input	E.4-6
E.4.5	Aquatic Resources	E.4-7
E.4.3 1	Impacts Resulting from Instream Decommissioning Activities	E.4-7
E.4.5.1	Potential Fish Passage Barriers	E.4-8
E.4.3 2	Impacts Associated with Decommissioning of Canals and Forebays	E.4-8
E.4.3 3	Impacts in Hooten Gulch	E.4-9
E.4.6	Wildlife Resources	E.4-10
E.4.6.1	Potential Habitat Loss Associated with Removal of Diversions	E.4-10
E.4.6.2	Habitat Loss Associated with Decommissioning of Forebays, Intake Structures and Spillways	E.4-11
E.4.6.3	Potential Habitat Loss and Mortality Associated with the Decommissioning of Canals, Tunnels, Flumes, and Siphons	E.4-11
E.4.6.4	Potential Loss of Roosting Habitat Associated with Decommissioning of Powerhouses and Penstocks	E.4-13
E.4.6.5	Potential Habitat Loss Associated with Access Road Construction and Improvement	E.4-13
E.4.7	Botanical Resources	E.4-13
E.4.7.1	Potential Loss of Vegetation Associated with Decommissioning of Diversions E.4-13	



E.4.7.2	Potential Loss of Vegetation Associated with Decommissioning of Forebays, Intake Structures and Spillways.....	E.4-14
E.4.7.3	Potential Loss of Vegetation Associated with Decommissioning of Canals, Tunnels, Flumes, and Siphons	E.4-15
E.4.7.4	Potential Loss of Vegetation Associated with Decommissioning of the Powerhouses and Penstocks.....	E.4-15
E.4.7.5	Potential Loss of Vegetation Associated with Access Road Construction and ... Improvement	E.4-16
E.4.8	Historical Resources	E.4-16
E.4.9	Archaeological Resources.....	E.4-17
E.4.10	Recreation	E.4-18
E.4.10.1	Loss of Kilarc Forebay for Recreational Use	E.4-18
E.4.10.2	Decommissioning of Kilarc Powerhouse.....	E.4-20
E.4.11	Aesthetics.....	E.4-20
E.4.11.1	Decommissioning the Kilarc and Cow Creek Powerhouses.....	E.4-20
E.4.12	Land Use	E.4-20
E.4.12.1	Conflicts with CAL FIRE’s Fire and Resource Assessment Program ...	E.4-20
E.4.13	Desired Conditions.....	E.4-21
E.5	Literature Cited	E.5-1
E.5.1	Geology and Soils.....	E.5-1
E.5.2	Hydrology and Water Resources	E.5-1
E.5.3	Geomorphology	E.5-3
E.5.4	Water Quality.....	E.5-3
E.5.5	Aquatic Resources	E.5-5
E.5.6	Wildlife Resources.....	E.5-7
E.5.7	Botanical Resources.....	E.5-10
E.5.8	Historical Resources	E.5-12
E.5.9	Archaeological Resources.....	E.5-13
E.5.10	Recreation	E.5-14
E.5.11	Aesthetics.....	E.5-15
E.5.12	Land Use	E.5-15
EXHIBIT G:	Maps	G-1



List of Photographs

Photograph E.2.3-1. South Canyon Creek Dam and Diversion.....E.2-28

Photograph E.2.3-2. Mill Creek Diversion and Dam.....E.2-28

Photograph E.2.11-1. KOP 1E.2-104

Photograph E.2.11-2. KOP 2E.2-104

List of Figures

Figure A.1-1. Features of the Kilarc Development..... A-7

Figure A.1-2. Features of the Cow Creek Development..... A-9

Figure A.1-3. Schematic of Creeks, Canals, and Diversions A-11

Figure E.2.1-1. NRCS Soils Map: Kilarc Development.....E.2-173

Figure E.2.1-2. NRCS Soils Map: Cow Creek DevelopmentE.2-175

Figure E.2.2-1. Surface Water Hydrology.....E.2-177

Figure E.2.2-2. Estimated Montly FlowsE.2-179

Figure E.2.3-1. Geomorphic Reference Map for the Kilarc DevelopmentE.2-181

Figure E.2.3-2. Geomorphic Reference Map for the Cow Creek DevelopmentE.2-183

Figure E.2.4-1. 2003 Water Quality and Temperature Monitoring Stations.....E.2-185

Figure E.2.6-1. (Map 1) South Cow Creek Study Area – Special Status Terrestrial Species Observed during 2003 and 2008 Surveys.....E.2-181

Figure E.2.6-1. (Map 2) South Cow Creek Study Area – Special Status Terrestrial Species Observed during 2003 and 2008 Surveys.....E.2-183

Figure E.2.6-2. (Map 1) Old Cow Creek Study Area – Special Status Terrestrial Species Observed during 2003 and 2008 Surveys.....E.2-185

Figure E.2.6-2. (Map 2) Old Cow Creek Study Area – Special Status Terrestrial Species Observed during 2003 and 2008 Surveys.....E.2-187



Figure E.2.6-2.	(Map 3) Old Cow Creek Study Area – Special Status Terrestrial Species Observed during 2003 and 2008 Surveys.....	E.2-189
Figure E.2.6-3.	South Cow Creek Study Area – Vegetation Communities and Wildlife Habitats.....	E.2-191
Figure E.2.6-4	Old Cow Creek Study Area – Vegetation Communities and Wildlife Habitats.....	E.2-193
Figure E.2.6-5.	South Cow Creek Study Area – CNDDDB Special Status Species Occurances	E.2-195
Figure E.2.6-6.	Old Cow Creek Study Area – CNDDDB Special Status Species Occurances	E.2-197
Figure E.2.7-1.	South Cow Creek Study Area – Riparian Vegetation Survey Reaches ...	E.2-199
Figure E.2.7-2.	Old Cow Creek Study Area – Riparian Vegetation Survey Reaches.....	E.2-201
Figure E.2.8-1.	Project Area of Potential Effect Map (APE): Kilarc Development	E.2-203
Figure E.2.8-2.	Project Area of Potential Effect Map (APE): Cow Creek Development	E.2-205
Figure E.2.10-1.	Recreation Regional Map.....	E.2-207
Figure E.2.12-1.	Kilarc Development Land Ownership Map	E.2-209
Figure E.2.12-2.	Cow Creek Development Land Ownership Map	E.2-211



List of Tables

Table B.3-1.	PG&E Planning Area Forecast Comparison	B-4
Table B.3-2.	Annual Average Growth Rates.....	B-4
Table C.2-1.	Decommissioning Activities	C-2
Table E.2.1-1.	Soil Resources in the Vicinity of the Kilarc Development.....	E.2-110
Table E.2.1-2.	Soil Characteristics in the Kilarc Development.....	E.2-111
Table E.2.1-3.	Soil Resources in the Vicinity of the Cow Creek Development.....	E.2-111
Table E.2.1-4.	Cow Creek Development Soil Properties	E.2-112
Table E.2.2-1.	Gaging Stations in the Cow Creek Watershed.....	E.2-113
Table E.2.2-2.	Estimated Peak Flow (cfs) for Old Cow Creek and South Cow Creek	E.2-113
Table E.2.2-3.	Summary of Average Monthly Unimpaired Flow (cfs) for Old Cow Creek.....	E.2-114
Table E.2.2-4.	Summary of Average Monthly Unimpaired Flow (cfs) for South Cow Creek.....	E.2-114
Table E.2.2-5.	Water Rights	E.2-115
Table E.2.3-1.	Rosgen Stream Classifications.....	E.2-116
Table E.2.3-2.	Diagnostic Features of Montgomery–Buffington Channel Types.....	E.2-117
Table E.2.3-3.	Summary of Bank Stability Ratings for South Cow Creek, Old Cow Creek, and Hooten Gulch.....	E.2-118
Table E.2.3-4.	Summary Bar Sediment Storage Data	E.2-118
Table E.2.3-5.	Pool Fine Sediment Surface Area and Sediment Thickness.....	E.2-119
Table E.2.3-6.	Percentage of Particle Sizes by Class, Kilarc Main Canal Diversion Dam.....	E.2-119
Table E.2.3-7.	Summary of Bulk Particle Size Analysis, Kilarc Main Canal Diversion Dam	E.2-120



Table E.2.3-8. Percentage of Particle Sizes by Class, South Cow Creek Diversion Dam E.2-120

Table E.2.3-9. Summary of Bulk Particle Size Analysis, South Cow Creek Diversion Dam..... E.2-121

Table E.2.4-1. Basin Plan Water Quality Objectives Relevant to the Project AreaE.2-122

Table E.2.4-2. Water Quality Sampling Location Stations, Kilarc Development 2003..... E.2-123

Table E.2.4-3. Water Quality Sampling Location Stations, Cow Creek Development and Hooten Gulch 2003.....E.2-123

Table E.2.4-4. Summary of Methods and Purpose for Laboratory Water Quality Analyses in 2003 SamplingE.2-124

Table E.2.4-5. Summary of Water Quality Data for Metals, Kilarc Development, May and October 2003.....E.2-125

Table E.2.4-6. Summary of Water Quality Data for Metals, Cow Creek Development, May and October 2003.....E.2-126

Table E.2.4-7. Summary of 2003 Water Quality Data for Minerals, Nutrients, and . Additional Parameters, Kilarc Development.....E.2-127

Table E.2.4-8. Summary of 2003 Water Quality Data for Minerals, Nutrients, and . Additional Parameters, Cow Creek Development.....E.2-128

Table E.2.4-9. Results of *In Situ* Monitoring, Kilarc Development, May to October 2003..... E.2-129

Table E.2.4-10. Results of *In Situ* Monitoring, Cow Creek Development, May to October 2003E.2-129

Table E.2.4-11. Diversion Dam Bulk Sediment Sample Results, 2007.....E.2-130

Table E.2.4-12. Kilarc Main Canal Diversion Dam Bulk Sediment Sample Total Copper (Cu) and Leachable Copper Results 131

Table E.2.4-13. Summary of Temperature Data for Kilarc Development, 2003E.2-132

Table E.2.4-14. Water Temperature Monitoring Results, Cow Creek Development, May to September 2003E.2-134

Table E.2.5-1. Fish Present within the Project Area.....E.2-136



Table E.2.5-2. Special-Status Species Potentially Present within the Kilarc-Cow Project Area .
.....E.2-137

Table E.2.6-2. Special-Status Wildlife Species Potentially Occurring in the Kilarc and Cow
Creek developments.....E.2-139

Table E.2.7-1. Special-Status Plant Taxa Potentially Present or Known to Occur in the
Vicinity of the Kilarc and Cow Creek DevelopmentsE.2-150

Table E.2.7-2. Plant Species Observed During 2003 and 2008 Botanical Resource Studies.....
.....E.2-152

Table E.2.7-3. Riparian Communities Occurring in the Kilarc and Cow Creek .. Developments
(2003)E.2-160

Table E.2.8-1. Architectural and Historical Resources within 0.5-mile Radius by Site Type
.....E.2-166

Table E.2.8-2. New and Updated Architectural and Historical Resources.....E.2-166

Table E.2.9-1. Cultural Resources within 0.5-mile Radius by Site Type.....E.2-167

Table E.2.10-1. PG&E Recreational Facilities Near Project Area.....E.2-168

Table E.2.10-2. Shasta-Trinity National Forest Recreation Location, Facilities, and Activities
(Federal)E.2-168

Table E.2.10-3. Lassen National Forest Recreation Location, Facilities, and Activities (Federal)
.....E.2-171

Table E.2.10-4. Other Recreation Facilities within Close Proximity of the Project Area
(Private).....E.2-172

Table E.3.4-1. Summary of Copper Water Quality in the Kilarc DevelopmentE.3-36

Table E.4.9-1. Recommendations for Archaeological Resources Identified within the
APE.....E.4-18

Table E.4.13-1. Desired Conditions and Proposed PM&E Measures or CommitmentsE.4-22



List of Appendices

Volume 2

Appendix A – Proposed Decommissioning Plan (PDP)

Appendix B – Exceedence Curve

Appendix C – Unimpaired Monthly Flow

Appendix D – Streamflow Data

Appendix E – Rosgen Classification

Appendix F – Kilarc Diversion Dam Geomorphic Assessment

Appendix G – South Cow Creek Diversion Dam Geomorphic Assessment

Volume 3

Appendix H – Water Quality Lab Reports

Appendix I – Botanical, and Terrestrial and Aquatic Wildlife Resources Report

Appendix J – Habitat Assessment for the California Red-Legged Frog in the Kilarc Cow Project Area

Appendix K – 2008 Botanical Technical Report

Appendix L – Cultural Report (Contains confidential information – Do not release)

Appendix M – Copper Analysis



Glossary of Terms, Acronyms and Abbreviations

Term	Definition
A	
AbD	Aiken stony loam
ac ft	acre feet
ACB	air circuit breaker
A.D.	<i>Anno Domini</i>
Agreement	Kilarc-Cow Creek Project Agreement
alluvial	Pertaining to alluvium; the deposits made by flowing water; washed away from one place and deposited in another as soil or mud
anadromous	Migrating (fish) from the sea to fresh water to spawn
andesitic	A dark-colored volcanic rock composed essentially of plagioclase feldspar and one or more mafic minerals, as hornblende or biotite
APE	area of potential effect
aquatic	Operating or living or growing in water
aquatic macrophytes	Aquatic vegetation that is larger than microscopic
B	
BA	Biological Assessment
basaltic	Containing basalt; a dark, dense igneous rock of a lava flow or minor intrusion, composed essentially of labradorite and pyroxene and often displaying a columnar structure
baseload	A load that varies only slightly over a specified time period; a plant that operates most efficiently at a relatively constant level of generation
Basin Plan	Water Quality Control Plan
B.C.	Before Christianity
bedrock	Solid unweathered rock lying beneath surface deposits of soil
BLM	Bureau of Land Management
BMPs	best management practices
BO	biological opinion
B.P.	Before Present
breccia	A course grained clastic rock, composed of angular broken rock fragments held together by a mineral cement of fine-grained matrix
C	
°C	degrees Celsius
CID	Cohasset loam



Term	Definition
CA	California
CAL FIRE	California Department of Forestry and Fire Protection
canal	An artificial waterway or artificially improved river used for travel, shipping, or irrigation
capacity	The maximum sustainable amount of power that can be produced by a generator or carried by a transmission facility
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CED	California Energy Demand
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second - a unit of measurement pertaining to flow or discharge of water. One cfs is equal to 449 gallons per minute
CGS	California Geological Survey
CmE	Cohasset stony loam
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
cobble	Pieces of rock larger than a pebble and smaller than a boulder
CoE	Cohasset very stony loam
coffer dam	An enclosure beneath the water constructed to allow water to be displaced by air for the purpose of creating a dry work environment
CPUC	California Public Utilities Code
CRHR	California Register of Historic Resources
cultural resources	The nonrenewable evidence of human occupation or activity as seen in any district, site, building, structure, artifact, ruin, object, work of art, architecture, or natural feature that was important in human history at the national, state, or local level.
culvert	A sewer or drain crossing under a road or embankment
CWA	Clean Water Act
CwF	Cone very stony loam
D	
dacitic	Igneous, volcanic rock with a high iron content
decommission	To deactivate; shut down
demand	The rate at which electric energy is used, whether at a given instant or averaged over any designated period of time.
discharge	The volume of water flowing at a given time, usually expressed in cubic feet per second.



Term	Definition
dissolved gas concentrations	The amount of chemicals normally occurring as gases, such as nitrogen and oxygen, which are held in solution in water, expressed in units such as milligrams of the gas per liter of liquid
diversion dam	A dam that diverts all or a portion of the flow of a river from its natural course
DLSA	Draft License Surrender Application
DPR	Department of Parks and Recreation
DPS	distinct population segment
DWR	California Department of Water Resources
E	
EA	Environmental Assessment
endangered	A plant or animal species which is in danger of extinction throughout all or a significant portion of its range because its habitat is threatened with destruction, drastic modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors; Federally endangered species are officially designated by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service and published in the <i>Federal Register</i>
entrainment	The drawing of fish and other aquatic organisms into tubes or tunnels carrying water for cooling purposes into thermal plants, or for power generating purposes into hydroelectric plants. Entrainment increases mortality rates for those organisms
EPA	Environmental Protection Agency
ephemeral	Lasting a very short time
ESA	Endangered Species Act (federal)
F	
°F	degrees Fahrenheit
fecal coliform	Bacteria originating from faeces
FERC	Federal Energy Regulatory Commission
fish ladder	Structures on or around artificial barriers (such as dams and weirs) to facilitate fish migration. Also known as fishways or fish passes.
fish screen	A barrier designed to prevent fish from swimming or being drawn into an aqueduct, cooling water intake, dam, or other diversion on a waterway where water is taken for human use
flume	An artificial channel or trough for conducting water, as one used to transport logs or provide water power
forebay	The portion of the reservoir at a hydroelectric plant which is immediately upstream of the generating station
FPA	Federal Power Act
FSCD	First State Consultation Document



Term	Definition
G	
generation	An act or process of producing electric energy from other forms of energy. Also refers to the amount of electric energy so produced
geologic	Pertaining to the origin, history, and structure of the earth
geomorphology	The study of the characteristics, origin, and development of landforms
geotextile	Any permeable textile material used to increase soil stability, provide erosion control or aid in drainage
GIS	Geographical Information System
GPS	Global Positioning System
grizzly	A device for screening ore, consisting of a row of iron or steel bars
gross head	The true vertical distance from intake to turbine
GsD	Guenoc very stony loam
GuD	Guenoc very rocky loam
H	
HP	Horsepower
hydraulic	Moved or operated by water under pressure
hydroelectric	The production of electric power through use of the gravitational force of falling water
hydrology	The science dealing with the properties of the waters of the earth and its atmosphere
I	
inflow	Water that flows into a reservoir or forebay during a specified period
inlet	A narrow passage of water
intake	The entrance to a conduit through a dam or water facility
ISQG	Interim Sediment Quality Guideline
J	
K	
KIE	The Kilarc unit
KID	Kilarc soil unit
knickpoint	A place in a river where its gradient changes and it begins to flow more steeply; a sharp drop in streambed elevation



Term	Definition
KOPs	Key Observation Points
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt hour(s)
L	
LgE	Lyonsville-Jiggs complex
lithic	Consisting of stone
lithic scatter	A surface scatter of cultural artifacts and debris that consists entirely of lithic (i.e., stone) tools and chipped stone debris
loam	A kind of soil; a fertile mixture of clay, silt, sand and organic matter
LSA	License Surrender Application
M	
mainstem	The principal river in a basin, as opposed to the tributary streams and smaller rivers that feed into it
MCL	maximum contaminant levels
MDB&M	Mount Diablo Baseline and Meridian
Megawatt	One million watts, a measure of electrical power
mi ²	square miles
MMP	Mitigation and Monitoring Plan
morphological	Pertaining to the form or structure of anything
MPN	most probable number
MSL	mean sea level
MW	Megawatts
N	
NAHC	Native American Heritage Commission
NAL	numeric action level
NCPC	Northern California Power Company
NEIC	Northeast Information Center
NELs	numeric effluent limitations
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act



Term	Definition
NLPC	Northern Light and Power Company
NOAA	National Oceanic and Atmospheric Administration, formerly National Marine Fisheries Service (NMFS)
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	North State Resources, Inc.
NTU	Nephelometric Turbidity Units
O	
outlet	A way or passage outwards or for releasing
overstory	The uppermost layer of foliage in a forest, forming the canopy
P	
PAOT	people-at-one-time
PCBs	polychlorinated biphenyls
PDP	Proposed Decommissioning Plan
PEL	Probable Effect Level
penstock	A conduit for conveying water to a power plant
perennial	Lasting or continuing throughout the entire year
PG&E	Pacific Gas and Electric Company
PM&E	Protection, Mitigation, and Enhancement Measures
pool	Reservoir, a body of water impounded by a dam
powerhouse	An electricity generating station
PPDP	Preliminary Proposed Decommissioning Plan
Project	Kilarc-Cow Creek Hydroelectric Project, FERC No. 606
Project Area	The geographic area defined in the license issued by FERC for the Project as needed for Project operations and maintenance
Project Vicinity	The area extending to about five miles from the Project Boundary
pyroclastic	Any rock consisting of unreworked solid material ejected from a volcanic vent.
Q	



Term	Definition
R	
Richter Scale	A scale, ranging from 1 to 10, for indicating the intensity of an earthquake
rip-rap	Loose stones and boulders used to control erosion of banks
riparian	The banks of a river or stream
RM	river mile
roadbed	The material of which a road or railroad is composed
rpm	revolutions per minute
RPS	Renewables Portfolio Standard
RS	river station
RWQCB	Regional Water Quality Control Board
RxF	Rockland unit
S	
salmonids	Of the salmon species
SCO	Shasta County Ordinance
SdD2	Sehorn very stony silty clay
sedimentation	The settling of material (such as dust or other particles) into water and eventual deposition on the bottoms of streams and rivers
seismic	Subject to or caused by an earthquake or earth vibration
siphon	To convey, draw, or pass through
spill	Water passed over a spillway without going through turbines to produce electricity. Spill can be forced, when there is no storage capability and flows exceed turbine capacity, or planned, for example, when water is spilled to enhance juvenile fish passage
spillway	A passageway through which surplus water escapes from a reservoir, lake or dam
stakeholders	Resource agency personnel and anyone with an interest in the Project
Stewardship Council	Pacific Forest and Watershed Lands Stewardship Council
streamflow	The water that flows in a specific stream site, esp. its volume and rate of flow.
study area	The Study Area includes all of the area within the Project Boundary and also extends beyond the Project Boundary
swale	A shallow trough like depression that carries water mainly during rainstorms or snow melts
SWDU	Statements of Water Diversion and Use
switchyard	A location where electrical current is moved from one conductor to another
SWPPP	Stormwater Pollution Prevention Plan



Term	Definition
SWRCB	State Water Resources Control Board
Synergics	Synergics Energy Developments, Inc
T	
tailrace	The channel for conducting tailings or refuse away in water
TcE	Toomes very rocky loam
TEL	Threshold Effects Level
turbidity	A measure of the optical clarity of water, which depends on the light scattering and absorption characteristics of suspended and dissolved material in the water
turbine	Machinery that converts kinetic energy of a moving fluid, such as falling water, to mechanical or electrical power
U	
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	
VAOT	vehicles-at-one-time
VELB	Valley Elderberry Longhorn Beetle
velocity	Speed; the rate of linear motion in a given direction
W	
WfG	Windy and McCarthy very stony sandy loams
X	
Y	
Z	