

## Response to AIR

## ADDITIONAL INFORMATION

### Water Resources

**Water Resources Item 1:** *Section E.2.4.7 summarizes results of a 2003 water temperature study that was conducted at the project. Please provide a copy of the 2003 study report and any water temperature modeling that may have been performed to allow a thorough assessment of the impacts of flow changes on critical water temperature issues. In addition, please provide electronic files of the temperature monitoring data.*

**RESPONSE – Water Resources Item 1:** Section E.2.4.7 of the License Surrender Application (LSA, PG&E 2009) summarizes the results of the water temperature monitoring conducted in 2003 as part of the relicensing studies. PG&E made its decision to decommission the Project instead of seeking a new license before a report was produced. No temperature model was developed.

Although no study report was developed, the temperature data collected in 2003 were analyzed and evaluated during the development of the LSA (PG&E 2009). LSA Section E.2.4.7 describes monitoring methods and evaluates results. Water temperature monitoring station locations are shown in Figure E.2.4-1 of the LSA and listed in Tables E.2.4-2 and E.2.4-3. Daily mean, maximum, and minimum temperatures, as well as the number of days the mean daily temperature exceeded 18°C and the maximum daily temperature exceeded 24°C at each monitoring station, are provided in Tables E.2.4-13 and E.2.4-14 of the LSA. Appendix I of the LSA provides monthly water quality data, including temperature.

The attachments listed below provide electronic files of the temperature monitoring data. Electronic files of the raw, *in-situ*, 20-minute temperature monitoring data for each station are provided in Attachment A. Daily mean, maximum, and minimum temperatures of the 20-minute data are provided in Attachment B. The electronic data files used to develop the analysis presented in the LSA are provided in Attachment C. These files include plots showing daily mean temperatures at monitoring stations in Old Cow Creek and South Cow Creek over the course of the 2003 monitoring period. Electronic files of meteorological data at Kilarc and Cow Creek powerhouses are provided in Attachment D. Detailed stream temperature data are provided in Attachment E. For each station, hourly temperature averages are listed for the duration of the monitoring period. Daily maximum, mean, and minimum of the hourly temperatures are also provided for each monitoring day.

**Water Resources Item 2:** *Section E.2.5.2 refers to personal communications with representatives of California Department of Fish and Game (CDFG) and National Marine Fisheries Service (NMFS) relative to natural barriers to fish passage on Old Cow Creek and South Cow Creek. Please provide any documentation of these communications and the scientific data supporting these determinations. Have the agencies indicated what the minimum high flow conditions are that would permit upstream fish passage at these barriers?*

**RESPONSE – Water Resources Item 2:** Section E.2.5.2 of the License Surrender Application (LSA, PG&E 2009) refers to communications with CDFG and NMFS regarding fish passage in Old Cow Creek. The specific communications are in regard to two barriers on Old Cow Creek; Whitmore Falls, located several miles downstream of the Kilarc Development, and an unnamed falls within the Kilarc Development bypass reach 2.7 miles upstream of Kilarc Powerhouse. Section E.2.5.2 also discusses other barriers on Old Cow Creek, which were documented during a barrier inventory conducted by PG&E in the bypass reach in 2003.<sup>1</sup>

Section E.2.5.3 of the LSA discusses barriers in the South Cow Creek bypass reach. PG&E's 2003 data on these barriers are presented in LSA Appendix J-2. No communications from CDFG and NMFS regarding these barriers were cited in the LSA, and therefore they are not discussed further in this response.

In Old Cow Creek, both Whitmore Falls and the unnamed falls were assessed visually by CDFG and NMFS to reach their determinations regarding the ability of fish to pass these barriers. PG&E provided technical data regarding the unnamed falls (designated OC-11) in Appendix J-2 of the LSA (page 3-5, Table 10 [page T-10] and Figure Appendix A-1). CDFG, NMFS and PG&E all believe the falls (OC-11) to be impassable for anadromous salmonids. PG&E did not conduct an independent assessment of Whitmore Falls, as it is not within the project boundaries. No specific measurements or other technical information were developed for Whitmore Falls by CDFG or NMFS, but both agencies indicated this barrier is passable in most winters (see consultation summary below). No estimate of the minimum passable flows has been made for Whitmore Falls.

Discussions and correspondence with NMFS and CDFG regarding the ability of anadromous fish to pass Whitmore Falls and the unnamed falls within the Kilarc Bypass Reach are summarized below.

### **Whitmore Falls**

In its response to the First Stage Consultation Package dated October 3, 2002, CDFG asserts that Whitmore Falls “is not an absolute barrier to anadromous fish” (Attachment F, top of page 3) and expressed that it would manage the project area as restorable for steelhead.

In a meeting on January 30, 2003, CDFG indicated that it did not consider Whitmore Falls to be an impassable barrier to anadromous fish. This is documented at the bottom of page 23 of the meeting notes (Attachment G).

During a meeting on December 5, 2003, representatives of both CDFG and NMFS described Whitmore Falls as being passable during most years. Meeting notes documenting this discussion are included as Attachment H. The discussion begins at the bottom of page 17 and is highlighted in green. The technical basis for this determination was not discussed at the December 5<sup>th</sup>

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<sup>1</sup> PG&E conducted a passage barrier inventory in the Project bypass reaches of Old Cow and South Cow creeks in 2003. A description of the methods used to assess barriers on Old Cow and South Cow creeks is provided in the *Aquatic Habitat and Fisheries Resources Report* (Appendix J-2 of PG&E 2009). Tables 10 and 21 of that report provide a description of the physical characteristics of these barriers for Old Cow Creek and South Cow Creek, respectively (Appendix J-2 of PG&E 2009). Appendix A of that report provides photos of each barrier identified.

meeting. CDFG reiterated that Whitmore Falls was passable in most winters in letters to PG&E dated October 17, 2007 (Attachment I) and October 30, 2008 (Attachment J).

In response to FERC's Additional Information Request (AIR) (FERC letter dated September 3, 2009), Mr. Larry Wise of ENTRIX called Mr. David White of NMFS and Mr. Mike Berry of CDFG on September 10, 2009, to see if any quantitative assessment of Whitmore Falls had been conducted. In a voice message left on September 11, 2009, Mr. White indicated that the conclusion was reached based on a visual assessment and comparison with other passage impediments that steelhead are known to pass. Mr. Berry returned the call along with Mr. Matt Meyers, also from CDFG. Mr. Berry indicated that when the falls were examined by qualified fisheries biologists at high flows, they were clearly passable (photo provided by Mr. Berry, Attachment K), with a substantial plunge pool and vertical drop of about eight feet. Flows of a magnitude sufficient to allow upstream passage occur in most years during rain events, according to Mr. Berry. He indicated that these flows are likely associated with rainfall events, and so would provide episodic passage. The minimum flows that would provide passage have not been assessed as the falls are on private property to which CDFG does not have access, and because these falls were deemed to be readily passable by CDFG.

#### **Unnamed Falls, Located 2.7 Miles Upstream of Kilarc Powerhouse**

In a meeting on January 30, 2003, CDFG stated they had identified a falls within the Project bypass reach that they considered to be impassable. This is documented at the top of page 22 of the January 30 meeting notes (Attachment G).

Following-up on the January 30, 2003 meeting, Annie Manji of CDFG sent Larry Wise at ENTRIX an email on February 25, 2003 describing the unnamed falls within the project reach. This email is included as Attachment L. This email provides the coordinates of the falls and indicates that the falls are "probably a barrier to all species at all flows". Photos of the falls are included in Appendix A of the *Aquatic Habitat and Fisheries Resources Report*, which was provided as Appendix J-2 of the License Surrender Application (PG&E 2009). The impassability of these falls was later confirmed with David White at NMFS during informal discussions (December 2008).

***Water Resources Item 3:*** Please provide a map of the Old Cow Creek and South Cow Creek basins indicating the location of other diversions and licensed or exempt hydro projects above and below the Cow Creek and Kilarc developments.

**RESPONSE – Water Resources Item 3:** Attachment M contains the diversion maps from the 1969 Adjudication of Old Cow Creek, South Cow Creek, and Lower Cow Creek. See "In the Matter of the Determination of the Rights of the Various Claimants to the Water of Cow Creek Stream System Excepting Clover Creek, Oak Run Creek and North Cow Creek in Shasta County, California", Case No. 38577 (Shasta Cty. Sup. Ct., August 25, 1969). The Adjudication remains the operative document codifying water rights for the Cow Creek system.

A map that shows other licensed and exempt hydro projects above and below the Cow Creek and Kilarc Developments is included as Attachment N.

***Water Resources Item 4:*** Please provide information, including any available data, regarding the hydrogeology and groundwater resources in the project area that might be reasonably influenced by the Kilarc forebay. Please discuss the potential impacts of dewatering the Kilarc forebay on local groundwater resources.

**RESPONSE – Water Resources Item 4:** Hydrogeology and groundwater resources in the vicinity of the Kilarc Forebay are described below followed by discussion of potential impacts of dewatering the Kilarc Forebay on local groundwater resources.

### **Regional Hydrogeology**

The regional groundwater basin consists of 39,715 acres that range from approximately 2,000 feet to 5,200 feet above mean sea level (MSL) as shown on Figure 1. The aerial extent of the regional groundwater basin boundaries were determined by delineating the topographic divides between adjacent watersheds. The groundwater basin was assumed to be coincident with the topographic drainage basin.

The Old Cow Creek watershed lies within the transition zone between the southern end of the volcanic rocks of the Cascade Range and the eastern extent of sedimentary rocks of the northern Sacramento Valley (See also LSA Exhibit E, Geology and Soils, Section E.2.1). Most of the surficial rocks in the study area are volcanic in origin and generally dip gently to the west-northwest (MacDonald and Lydon 1972). The volcanic rock units within the study area are Quaternary-aged basalt flow (Qb), Tertiary-aged andesite flow (Ta), and the Tertiary-aged lahar deposit - Tuscan Formation (Tt). The only sedimentary rock unit within the Old Cow Creek watershed is the Tertiary-aged Montgomery Creek Formation (Tm), which is arkosic sandstone with lenses of conglomerate (See Figure 2).

Within the groundwater basin, erosion through the massive volcanic layers has exposed the underlying, less consolidated Montgomery Creek Formation in the valley bottoms of Old Cow Creek, resulting in the instability of the valley walls of the Old Cow Creek drainage system (MacDonald and Lydon 1972). Examples of this instability are the large-scale landslide deposits within the upper Old Cow Creek watershed northwest of the Kilarc Powerhouse, and an array of slump-style normal faults that occur below the west flank of Kilarc Forebay to the east and above Old Cow Creek.

Locally, at higher elevations, fracture flow may play a significant role in groundwater discharge (DWR 1984). The Tertiary-aged andesite flows are the uppermost rock units in the Kilarc Development and are moderately permeable, most likely due to fracture flow within the massive unit. The primary aquifer in the study area is the Tuscan Formation (Figure 2). Lenses of more permeable material (paleo stream channels and fractures) cause perched aquifers within the Tuscan Formation (DWR 1984). The Tuscan Formation's water capacity occurs in structural weaknesses between bed contacts or in lenses of conglomerate. The Tuscan Formation is underlain by the Montgomery Creek Formation. The Montgomery Creek Formation is only slightly permeable and forms a semi-impervious barrier to the downward movement of groundwater (DWR 1984), even though it is most likely the discharge unit for groundwater entering Old Cow Creek. Due to the difference in permeability, groundwater discharge (e.g., creek baseflow and springs) is expected at or near the contact of the Tuscan and Montgomery

Creek Formations (DWR 1984; Figure 2). Field reconnaissance confirms this contact as a groundwater discharge area, with observations of springs and perennial wetlands directly above and below this contact north, west, and south of the Kilarc Development.

### **Local Hydrogeology**

The groundwater basins in the vicinity of the Kilarc Forebay encompass an area of 2,297 acres, which are subdivided into three study basins (Figures 2 and 3). All known springs, ponds and supply wells are shown on Figure 3.

Basin #1 was delineated using local topography, rock type, and structure representing the approximate recharge area north of the Kilarc canal and forebay (Figure 4). Basin #2 was delineated as the approximate recharge area for the privately owned perennial ponds/wetlands to the southwest and below Kilarc forebay. Basin #3 was delineated as the approximate recharge area for a spring and a domestic well site to the south of the Kilarc forebay (Figure 3).

All the major geologic units of the upland areas are present in Basin #1 with the addition of a welded tuff member of the Tuscan Formation. The areas are capped with Tertiary andesite flows that are slightly permeable. This suggests that the storage and transport of groundwater occurs predominantly in the underlying units. The Tuscan Formation is the primary conduit for groundwater transport and storage due to its relatively greater permeability, while the Montgomery Creek Formation provides a more limited amount of groundwater transport and storage due to relatively lower permeabilities. The contact between the Tuscan Formation and underlying Montgomery Creek formation is inferred to dip towards the west-northwest (Figures 2 and 4), which suggests that both units also dip towards the west-northwest. The orientation of the formations suggests that local groundwater flows towards the west-northwest within Basin #1.

Basin #2 contains 167 acres of the estimated recharge area for the privately owned perennial ponds/wetlands to the southwest and downslope of the Kilarc Development (Figure 5). Tertiary Andesite flows, the Tuscan Formation, and the Montgomery Creek Formation are present in the basin. The basin drops steeply to the west from the andesite flow in the uplands, which exposes the westward dipping Tuscan and Montgomery Creek Formations. The dip of these two units, along with the presence of groundwater discharge areas along Old Cow Creek, results in groundwater flow to the west-northwest towards the flank of the basin. However, no significant groundwater discharge areas were field-identified on the west-facing slope of the basin. There is one small swale supporting maples that are suggestive of shallow groundwater levels most of the year (Figure 3). The absence of groundwater discharge in this area suggests that, locally, groundwater is also conducted through the Montgomery Creek Formation. Two slump-style normal faults occur within the basin, which have resulted in a block of Montgomery Creek Formation moving downward relative to the adjacent layer of Tertiary andesite flow. A large spring-fed perennial wetland (Figure 2) (two ponds fed by Diversion #15 [SWRCB 1969]) is located along this westernmost fault boundary adjacent to the uplifted andesite block. In addition, there are several springs and ponds within the high-density fault region to the west of Basin #2 (Figure 2) (spring Potential Diversion #15a [SWRCB 1969]).

Basin #3 contains 156 acres of the estimated recharge area for a domestic well and a spring. This basin is underlain by Tertiary andesite flows and the Tuscan Formation, and both units dip to the west-northwest away from intermittent stream course within Miller Valley to the east (Figures 3 and 6). The spring is located at the top of the Tuscan Formation at the approximate contact with the overlying Tertiary andesite unit. This spring results from either groundwater flows along the contact between the units until they reach an impervious boundary, or from groundwater flows through a highly permeable fracture in the andesite until they reach the less permeable layer of the Tuscan Formation. One domestic well (Kamp Property) is located at the bottom of Basin #3 in an area where the Tuscan Formation outcrops (Figures 3 and 6). However, the contact with the Montgomery Creek Formation may become shallow at this location, and the water produced by this domestic well may originate from the underlying Montgomery Creek Formation. The geologic unit that represents the source of the groundwater pumped from this domestic well is uncertain because the thickness and dip of the formations at depth is unknown, and well log data were unavailable at the time of this analysis.

Groundwater recharge in the Old Cow Creek watershed is mainly from infiltration of rainfall (DWR 1984). Based on an annual average rainfall of 44 inches, the study area receives a mean annual precipitation volume of 145,622 acre-feet. Regionally, groundwater discharge occurs along stream valleys and flat low-gradient meadows to the west and northwest of the groundwater basin.

### **Evaluation of Hydrologic Impacts to Groundwater Resources**

Local water supply wells, stock ponds, and wetlands might be reasonably influenced by the loss of Kilarc Forebay. To evaluate the potential for impacts, available climatic, hydrologic, and geologic data were reviewed to determine if sufficient data exist to develop a water budget for the regional groundwater flow system, as well as the localized smaller groundwater basins. A water budget is a balance of inflow to the aquifer system (recharge from precipitation, seepage from the Forebay, etc...) and outflow (baseflow of streams; pumping from supply wells, etc...). The water balance approach would allow for an assessment of the relative importance of Kilarc Forebay to overall groundwater resources. Knowledge of well construction and use could enable an assessment of the use of groundwater resources for domestic or agricultural purposes.

Important parameters that need to be estimated to develop a water budget are:

- Areal extent of groundwater basin(s)
- Recharge rate to groundwater basin from infiltration of precipitation
- Well construction, pumping rates, and time of use of supply wells of concern
- Groundwater discharge rate to streams, also called baseflow
- Leakage rate of the Kilarc Main Canal
- Infiltration rate of Kilarc Forebay

Topographic maps, meteorological data, and literature values are available to estimate the first two bulleted items above (See Figures 2 and 3).

Well construction and usage information is available through the California Department of Water Resources, with owner permission. In 2008, 11 well owners within the area were contacted by PG&E to receive authorization to obtain available information from the California Department of Water Resources. The letter from PG&E and the list of persons contacted are provided in Attachment O. Of these 11, only one form was returned in October 2008.

Operational data for the Kilarc Powerhouse and the associated water supply system were reviewed to determine if the last three items listed above could be reliably estimated.

PG&E operates several streamflow gages in the basin. Streamflow gages used for FERC compliance are operated to United States Geological Survey (USGS) standards. PG&E also has several operational gage stations that are not used for compliance and are not typically operated to USGS standards.

The review found that the available streamflow data is insufficient for evaluating flow rates needed to develop a water budget to accurately analyze the impacts on groundwater resources of decommissioning the Kilarc Main Canal and Forebay.

### **Cultural Resources**

***Cultural Resources Item 1:*** Please provide the State Historic Preservation Officer (SHPO) concurrence letter for the Cultural Resources Inventory and evaluation for the Kilarc-Cow Creek Hydroelectric Decommissioning Project, FERC No. 606, Shasta County, California.

**RESPONSE – Cultural Resources Item 1:** The concurrence letter from the California State Historic Preservation Officer concerning the *Cultural Resources Inventory and Evaluation for the Kilarc-Cow Creek Hydroelectric Decommissioning Project, FERC No. 606, Shasta County, California* and the Determination of Eligibility and Finding of Effect for the Kilarc-Cow Creek Hydroelectric Decommissioning Project is provided in Attachment P.

***Cultural Resources Item 2:*** Your surrender application provides information on contact with various tribes in the area of the project. Please provide documentation of any comments or response received from the tribes regarding consultation.

**RESPONSE – Cultural Resources Item 2:** By letter dated March 19th, 2009, PG&E requested that the Redding Rancheria, other Shasta County tribes, and the Bureau of Indian Affairs (BIA), participate as consulting parties to the Memorandum of Agreement (MOA) process for the Decommissioning of the Kilarc-Cow Creek Hydroelectric Project (FERC License No. 606) and the License Surrender Application. On March 25th, 2009, PG&E sent a follow up letter to the Redding Rancheria, other Shasta County tribes, and BIA, enclosing the MOA, and requesting their review and comment on the MOA. On June 3, 2009, PG&E sent an additional letter to the Redding Rancheria, other Shasta County tribes, and BIA, requesting their participation in the MOA process.

The BIA sent a letter to PG&E on July 10, 2009 regarding the MOA for the Decommissioning of the Kilarc-Cow Creek Hydroelectric Project (FERC License No. 606) and the License Surrender Application (Attachment Q). The BIA noted its concerns that the MOA does not clearly define



the exterior structure and the final disposition of the Cow Creek penstock that crosses Indian trust land. With clarification of these issues, BIA stated that it would be more inclined to become a party to the MOA. PG&E will continue to work with BIA in an effort to address its concerns.

The Redding Rancheria Tribe of Redding, California is the only Project area tribe to consult with PG&E concerning the License Surrender Application. James Hayward, Sr., Cultural Resources Specialist of the Redding Rancheria contacted James Nelson, PG&E Cultural Resources Specialist, in the spring of 2009 requesting a tour of the Kilarc-Cow Creek Project to review its important cultural resources. Since then, Mr. Nelson has contacted Mr. Hayward several times via both voicemail and email to schedule the tour but no date was set. The most recent exchange was on September 17, 2009 when Mr. Hayward contacted Mr. Nelson re-confirming his desire to tour the facility. Mr. Nelson will continue to work with Mr. Hayward to confirm a site tour date.

### **Recreation**

***Recreation Item 1:** Please provide information on any possible mitigation concepts which would possibly help offset impacts to public recreation at the project that will result from the proposed decommissioning. In particular, we are interested in understanding any mitigation proposals or ideas that have been discussed with stakeholders or considered by PG&E to compensate for the loss of water-based public recreation opportunities that are currently available at the project.*

**RESPONSE – Recreation Item 1:** The Kilarc Forebay and Day Use Area is the only location in the Project Area where developed formal facilities have been established. As documented in LSA Exhibit E.2.10 and E.3.10, the impact on recreational facilities would be limited within the context of other regional recreational opportunities. Therefore no PM&E measures have been recommended.

In response to public input, on March 10, 2008, PG&E issued solicitations of interest to all Interested Parties to determine if there were entities potentially interested in operating the Kilarc Forebay and/or Kilarc Powerhouse and adjacent land for a recreational or historical public use (Attachment R). The solicitation did not include re-operation of the project for power production purposes. In addition, PG&E developed a guidance document to assist any organizations potentially interested in owning, managing and operating the facilities as a recreational resource that described the requirements, obligations and opportunities associated with the undertaking and the issues that would need to be addressed by a prospective owner/operator (Attachment S). No completed applications were received by PG&E. One interested party did submit a general letter, but expressed its interest in the Project facilities for generation purposes, not solely for a recreational and historical public use.

In addition, PG&E contacted a local landowner to explore whether a local lake (Buckhorn Lake), currently closed to public recreation, could be made available for future public recreation use. The private landowner indicated that it would not be made available for future public use.

### Land Use

**Land Use Item 1:** *In light of Mr. Albrecht's comment letter dated 30 April 2009, (a) explain the difference between "Deeded Easement" and "Prescriptive rights"; (b) will these properties be treated differently upon completion of project decommissioning; and, if so (c) approximately how much property (in acres) does PG&E possess in each category for the project.*

**RESPONSE – Land Use Item 1:** The term "deeded easement" refers to an express, written easement that was granted to PG&E. The reference to "prescriptive rights" refers to the rights that are established as a matter of law. The statutory procedure for acquiring an easement by prescription is set forth in California Civil Code section 1007, which provides that "Occupancy for the period prescribed by the Code of Civil Procedure as sufficient to bar any action for the recovery of the property confers a title thereto, denominated a title by prescription, which is sufficient against all ...." The party claiming such a prescriptive right must show use of the property which has been open, notorious, continuous and adverse for an uninterrupted period of five years. (*Warsaw v. Chicago Metallic Ceilings, Inc.* [1984] 35 Cal.3d 564, 570.)

As stated in the License Surrender Application, where PG&E holds easements over private lands for Project facilities, upon completion of decommissioning PG&E proposes to provide a quitclaim deed to the private landowner. A quitclaim deed is a term used to describe the document by which PG&E as the easement holder conveys any right, title or interest it may have in the burdened property to the property owner. The quitclaim deed therefore serves to allow the private landowner to clear the encumbrance from record title. Where PG&E holds prescriptive rights on private lands, those rights will be extinguished automatically by operation of law after PG&E abandons use of the property. Consequently, it will not be necessary to quitclaim those properties.

The total Patented area (lands not owned by the Federal Government or PG&E) for this project is approximately 75 acres. Of these lands, PG&E has written easement deeds for approximately 65 acres and prescriptive rights for approximately 10 acres. The approximate area for which PG&E does not have a written right affects portions of Section 6, Township 31 North, Range 1 West (shown on G-2, Exhibit G, LSA ) and Section 33, Township 32 North, Range 1 West MDM (shown on G-4, Exhibit G, LSA). Determination as to precisely how much acreage falls on any given property would not be possible given existing data.

**Land Use Item 2:** *(a) What is the status of the Land Conservation and Conveyance Plan (LCCP) being prepared by the Pacific Forest and Watershed Land Stewardship Council (Stewardship Council); and (b) if the LCCP exists, what provisions does it contain for land preservation?*

**RESPONSE – Land Use Item 2:** The Pacific Forest and Watershed Lands Stewardship Council (SC), an independent nonprofit organization, is charged with overseeing implementation of PG&E's Land Conservation Commitment. The SC does not have a set date for developing a Land Conservation and Conveyance Plan, which would contain recommendations of future fee donees and/or conservation easement holders, for PG&E's watershed lands associated with the Kilarc-Cow Creek Project. Implementation of PG&E's Land Conservation Commitment will not

and cannot interfere with PG&E's hydroelectric operations, including compliance with any order from FERC (license orders, decommissioning, or other). As such, the SC will reassess the Kilarc and Cow Creek planning units to make recommendations based on the outcome of the decommissioning process or the status at that time.

**References:**

- California Department of Water Resources (DWR). 1984. Eastern Shasta Ground Water Study. State of California, The Resources Agency, Department of Water Resources, Northern District.
- MacDonald, G.A. and Lydon, P.A. 1972. Geologic map of the Whitmore quadrangle, California: U.S. Geological Survey Geologic Quadrangle Map GQ-993, scale 1:62,500.
- Pacific Gas & Electric Company (PG&E). 2009. Kilarc-Cow Creek Hydroelectric Project, FERC Project No. 606 Final License Surrender Application. March 2009.
- Shasta County Superior Court. 1969. In the Matter of the Determination of the Rights of the Various Claimants to the Water of Cow Creek Stream System Excepting Clover Creek, Oak Run Creek and North Cow Creek in Shasta County, California, Case No. 38577. August 25, 1969.
- State Water Resources Control Board (SWRCB). 1969. Cow Creek Stream System Excepting Clover Creek, Oak Run Creek, and North Cow Creek Showing Diversions and Irrigated Lands, Sheet 1 of Book 1[map]. [Scale not given.] In State of California, The Resources Agency, State Water Resources Control Board, Cow Creek Stream System Excepting Clover Creek, Oak Run Creek, and North Cow Creek Showing Diversions and Irrigated Lands, Shasta County. State of California, The Resources Agency.
- Warsaw et al. v. Chicago Metallic Ceilings, Inc.*, 35 Cal. 3d 564, 199 Cal. Rptr. 773, 676 P.2d 584.

FIGURES

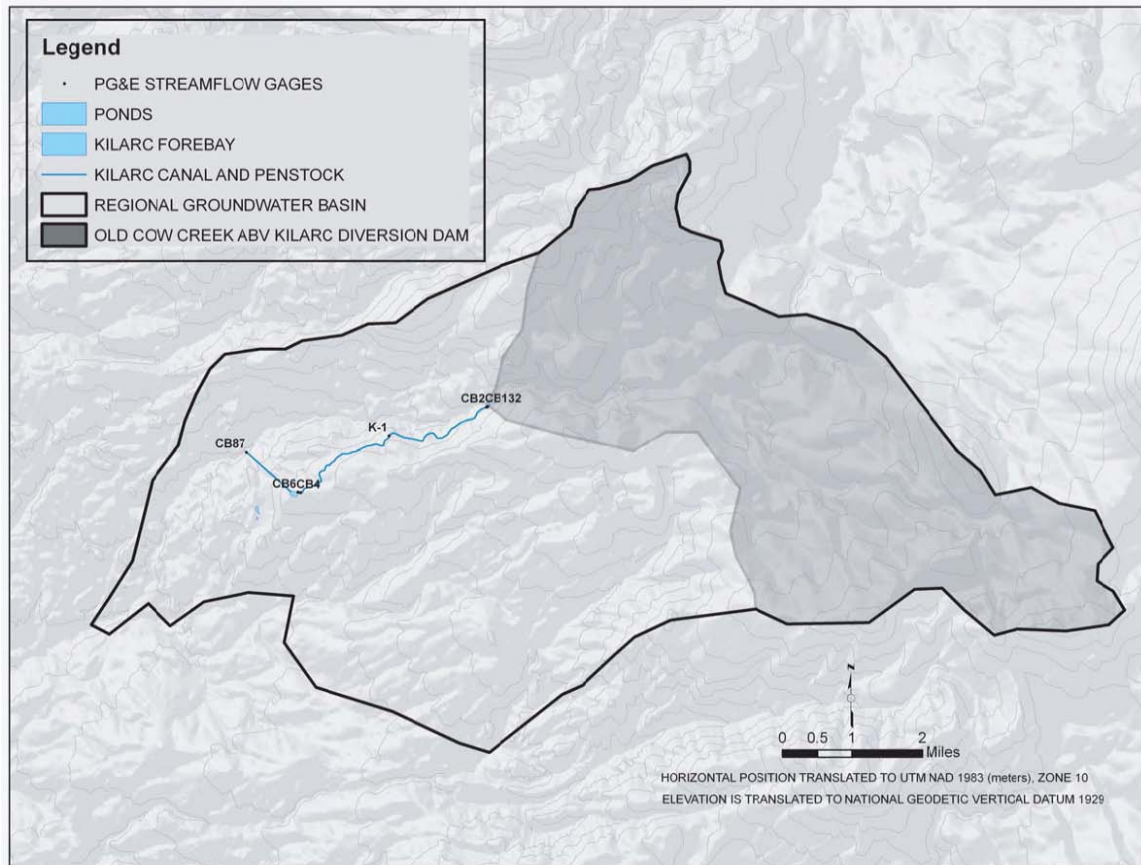


Figure 1. Regional Groundwater Basin and Old Cow Creek above the Kilarc Diversion Dam Watershed

Pacific Gas and Electric Company  
Kilarc-Cow Creek Hydroelectric Project, FERC Project No. 606

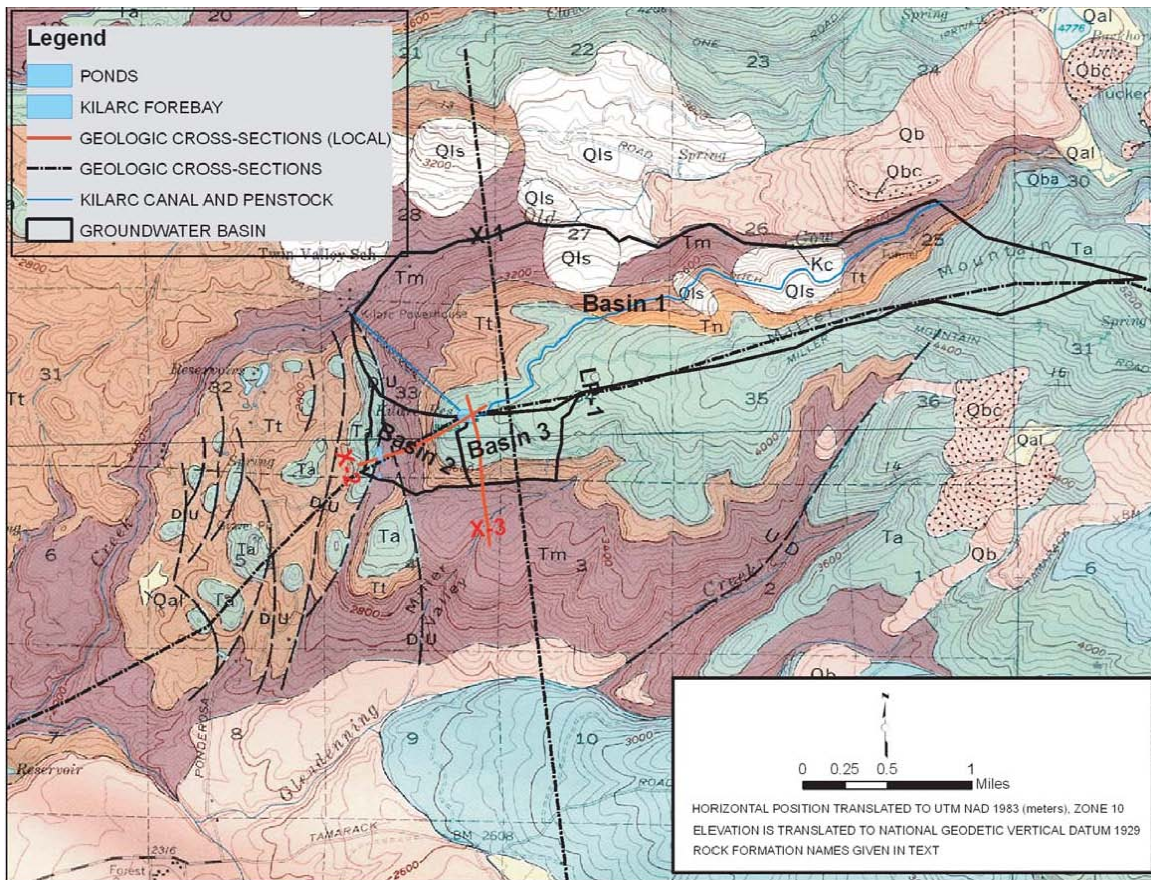


Figure 2. U.S. Geological Survey Geologic Map Showing Cross-Section Locations and Local Groundwater Basins

Pacific Gas and Electric Company  
Kilarc-Cow Creek Hydroelectric Project, FERC Project No. 606

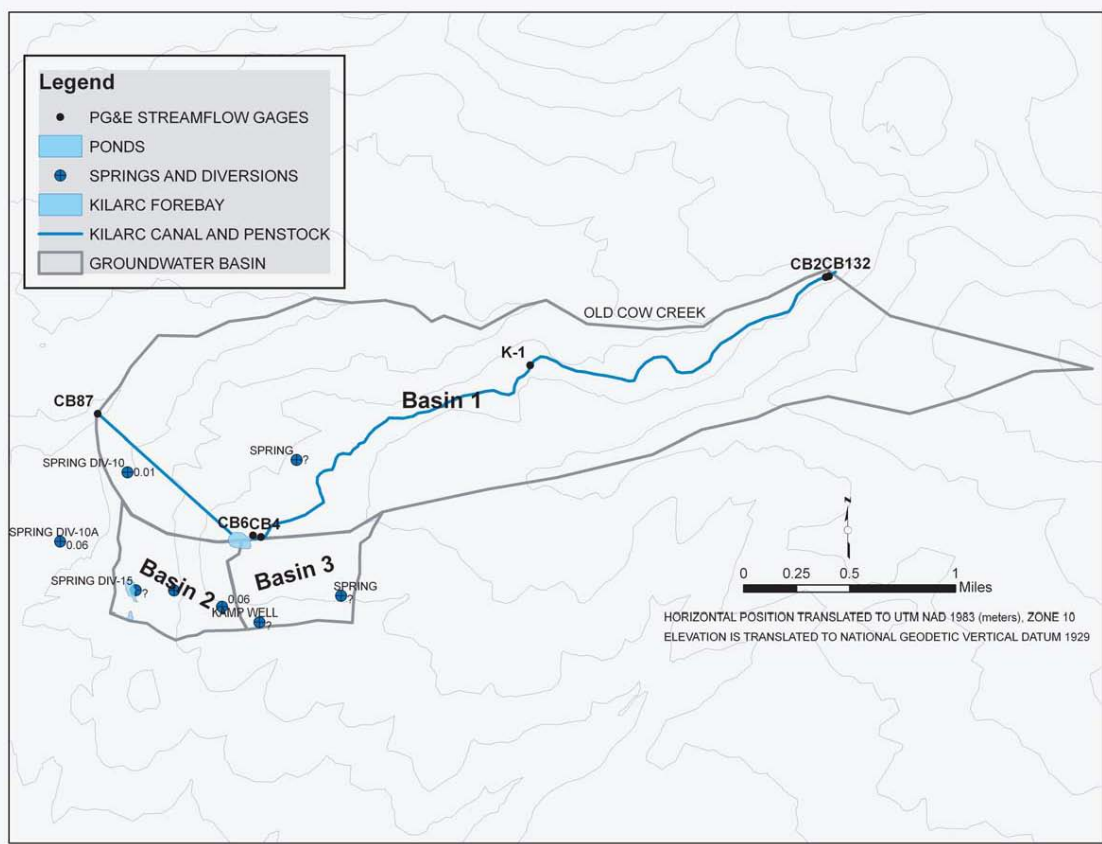


Figure 3. Local Groundwater Basins, Streamflow Gages, Springs and Diversion Points in Vicinity of Kilarc Forebay

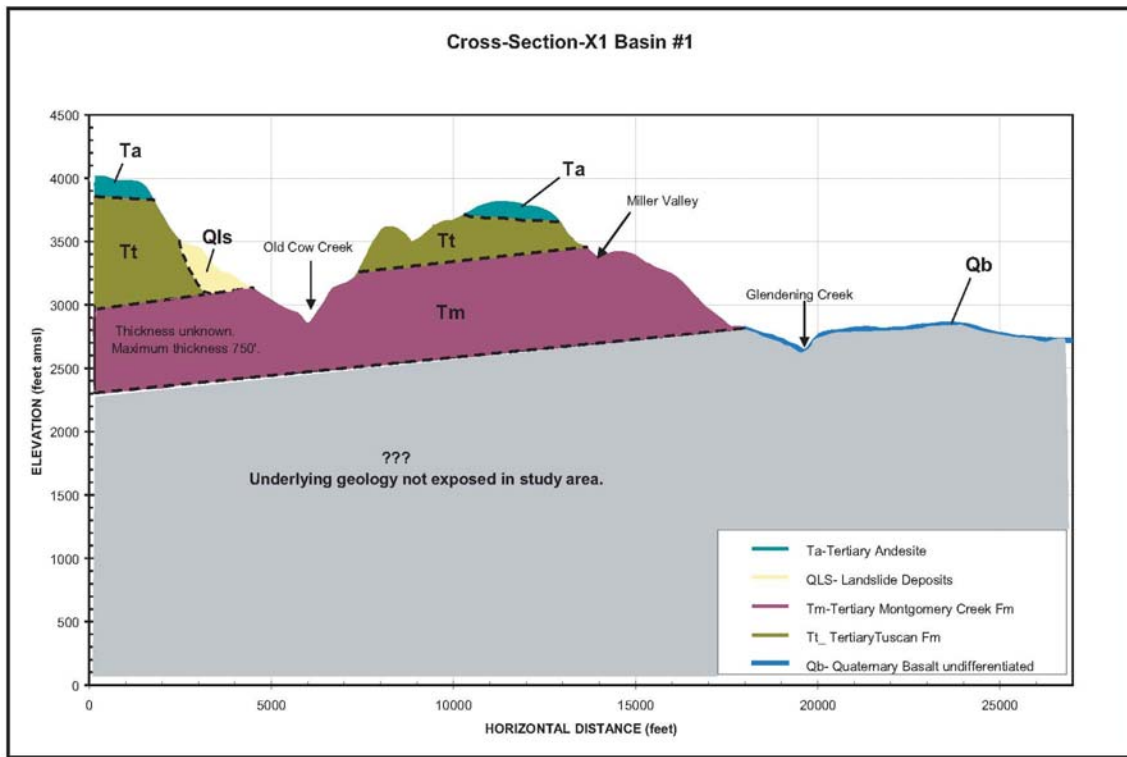


Figure 4. Cross-Section X-1 Perpendicular to Basin #1, #2, and Old Cow Creek

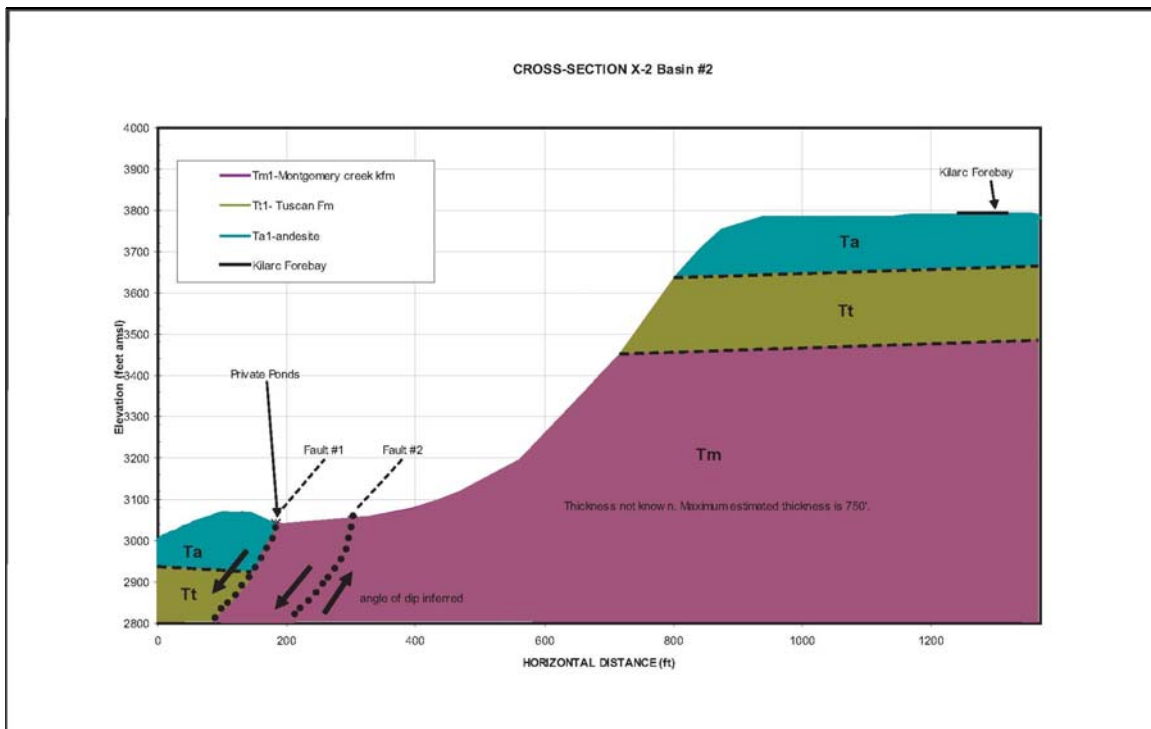


Figure 5. Cross-section X-2 Perpendicular to Basin #2 and the Kilarc Forebay

Pacific Gas and Electric Company  
Kilarc-Cow Creek Hydroelectric Project, FERC Project No. 606

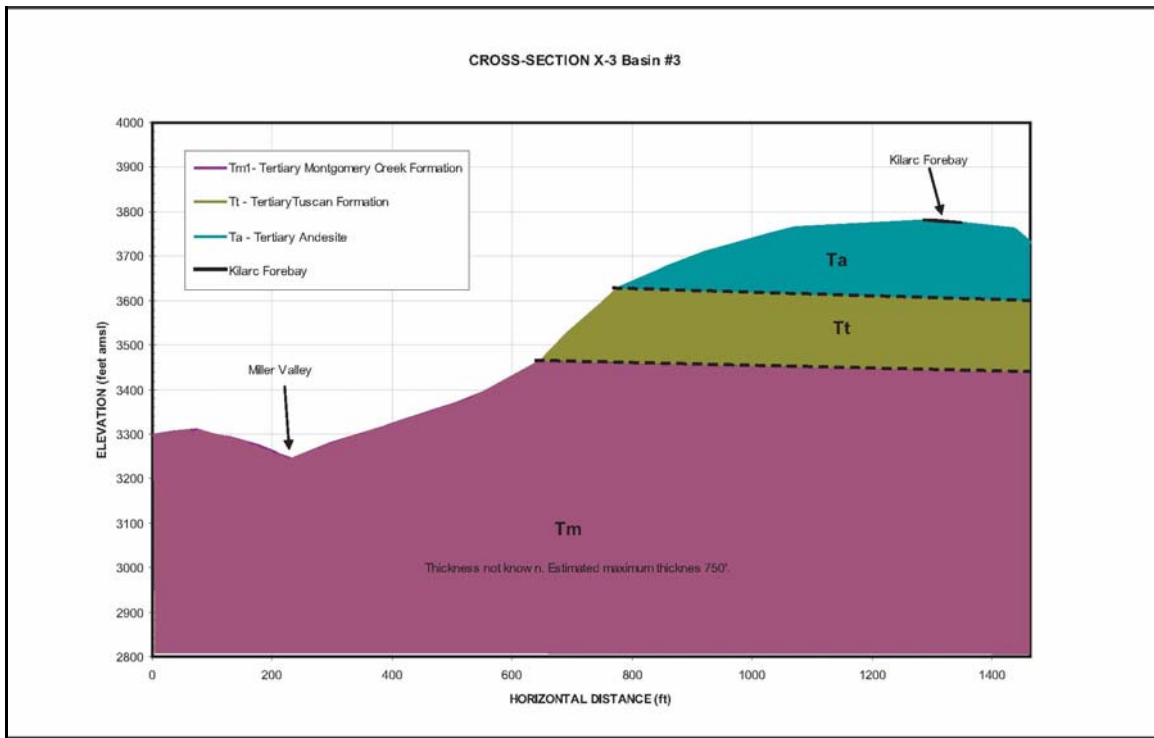


Figure 6. Cross-Section X-3 Cross-Section X-3 Perpendicular to Basin #3 and the Kilarc Forebay