

Attachment J

PG&E's Comments on the Bear River Listing for Copper

WATER SEGMENT: Bear River (Amador Co, Lower Bear River Reservoir to Mokelumne River, North Fork)

POLLUTANT: Copper

SOURCE: Resource Extraction

**STATUS of Proposed
2008 303(d) LISTING:** Listed

SWRCB STAFF BASIS: After review of the available data and information, Central Valley Regional Water Quality Control Board (CVRWQCB) staff concluded that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards were exceeded and a pollutant contributes to or causes the problem.

**PG&E's
RECOMMENDATION:** List (based upon data from 2005 to the present only)

Pacific Gas & Electric Company (PG&E) believes the CVRWQCB proposed 2008 303(d) listing (CVRWQCB 2009) of the Bear River (Amador Co, Lower Bear River Reservoir [LBRR] to the North Fork Mokelumne River [NFMR]) for copper is based on faulty data that do not meet the listing requirements outlined in the State Water Resources Control Board's (SWRCB), *Water Quality Control Policy (Listing Policy) for developing California's Clean Water Act Section 303(d) List* (SWRCB 2004).

The CVRWQCB based their listing on one line of evidence. The data that the SWRCB used for the proposed 2008 listing was acquired by PG&E under an Annual Water Quality Monitoring Program required as part of the relicensing process required by the Federal Energy Regulatory Commission (FERC). The data were collected during a Supplemental Water Quality Monitoring Program that was conducted from March 2002-September 2003 (PG&E 2004a).

First, all analytical monitoring results for total or dissolved copper analyses that were obtained by PG&E as part of the Mokelumne Annual Monitoring Program or the Supplemental Monitoring Program from the 2000 through January 2003 were below the analytical methods reliability reportable limits (i.e., insufficient analytical detection limits required for comparison to the relevant water quality criteria). Therefore, 50% of the data that the CVRWQCB used for their proposed 2008 listing decision does not meet the

SWRCB's Listing Policy requirements that are described in Section 6.1.4 of the Listing Policy (SWRCB 2004).

Second, these samples were collected before the FERC required flow conditions for the Bear River had been fully implemented, therefore the sample results are obsolete and do not accurately represent the ambient water quality conditions under the new FERC flow requirements. The new FERC required flow releases had not been fully implemented until early 2005 (i.e., water quality monitoring results from 2005 represent Year 1 under the FERC required flow conditions).

PG&E's COMMENTS:

Mokelumne River Project Background

An Ecological Resources Committee (ERC) was established by the Mokelumne Relicensing Settlement Agreement (Settlement Agreement) FERC No. 137 (Project) to facilitate stakeholder involvement in the development and implementation of Project monitoring programs (PG&E 2000). Members of the Mokelumne ERC include the U. S. Forest Service, U. S. Bureau of Land Management, U. S. Fish and Wildlife Service, California Department of Fish and Game, California Department of Boating and Waterways, the Foothill Conservancy, American Whitewater Affiliation (MT), Friends of the River, and the Natural Heritage Institute.

Water quality data have been collected as part of the Mokelumne River Project's (FERC No. 137) license compliance annual water quality monitoring program since 2000. The water quality samples were initially analyzed for total copper content in 2000-01 (PG&E 2002a and 2002b, respectively) due to the historic use of a copper based aquatic pesticide in the Project's diversion canal to control growth of algae from Salt Springs Reservoir to the Tiger Creek Regulator (PG&E 2004b).

After the presence of total copper was identified, dissolved copper was also analyzed in order to compare the concentrations detected with the ambient water quality criteria. Through the analysis of the water samples, elevated copper concentrations were identified below the LBRR in the Bear River (sample station BR1). The identification of these elevated copper concentrations led to the implementation of the Supplemental Water Quality Monitoring Program to identify the source of the copper in the Bear River below the LBRR. Results of this study were given to the ERC the U.S. Forest Service, and to the SWRCB in a report titled, *Supplemental Water Quality Monitoring Program March 2002 through September 2003*, Technical and Ecological Services Report Number 026.11.04.7 (PG&E 2004b).

The data used in the CVRWQCB factsheet does not meet SWRCB 303(d) Listing Policy

Pursuant to California Water Code section 13191.3(a), the State policy for water quality control (Policy) describes the process by which the SWRCB and Regional Water Quality Control Boards (RWQCBs) will comply with the

listing requirements of section 303(d) of the federal CWA. The Policy objective is to establish a standardized approach for developing California's section 303(d) list in order to achieve the overall goal of achieving water quality standards and maintaining beneficial uses in all of California's surface waters (SWRCB 2004).

A binomial distribution is used to determine whether waters shall be placed on the section 303(d) list. If the number of measured exceedances (exceedance of the CTR) supports rejection of the null hypothesis as presented in Table 3.1 of the SWRCB Listing Policy a water segment will be placed on the section 303(d) list (SWRCB 2004). The minimum sample size for this binomial distribution is 16. In the case of the Bear River below LBRR, the SWRCB specifies that 69 samples collected monthly between 2002 and 2003 were used to compare to the CTR criteria for dissolved copper. According to the SWRCB, 67 of the samples exceeded the CTR criteria and according to Table 3.1 of the Listing Policy, that suggests listing on the section 303(d) list. Upon review of the data that the SWRCB sites in their listing, it is unclear where the 69 samples come from. A total of 59 samples were collected on the Bear River (from station BR1 below the LBRR outlet to the Mokelumne River, North Fork). Of these samples, approximately 50% were collected using inadequate sampling techniques and faulty laboratory methods (samples from 2002 through January 2003).

It should be noted that a majority of the samples collected between 2002 and January 2003 were "J" flagged or estimated values and should not be used in this evaluation of the data for listing due to the amount of uncertainty associated with this estimate (60% error). In addition, not all of the reasonably available and relevant information has been considered in regard to placement on the 303(d) list (e.g., inadequate sampling techniques and analytical laboratory methods may have resulted in sample contamination rendering the 2000 through 2003 samples not representative of the true water quality conditions in the water segments; and required FERC instream flow releases had not been fully implemented.

Unreliable Analytical Results

The data collected from March 2000 to January 2003 is unreliable because the total and dissolved copper samples were analyzed by Severn Trent Laboratories (STL) in Pleasanton, California using USEPA Method 220.0. The associated reporting limit (RL) and method detection limit (MDL) for this method are 5 ug/L and 0.3 ug/L, respectively. The MDL is rigorously defined (40 CFR 136) and represents the minimum concentration that can be reported with 95% confidence as different from zero. The RL is generally defined as the minimum concentration of a constituent that, under normal operating conditions, can be reported with relatively good certainty that the result is valid. The RL is set by the analytical laboratory and is generally three to ten times the MDL. Concentrations reported at the MDL can be subject to considerable variability. STL provided estimated (J) values for the sample results with concentrations that fell below the RL but that were above

the MDL. These estimated “J” values had an approximate error of 60%. The percentage of samples that were reported as “J” flag values for total copper during March 2000 to January 2003 by STL was 80 percent.

Concurrent with the initiation of the water quality monitoring program required under the Project license for the Mokelumne Project, the US Environmental Protection Agency (US EPA) published their *40 CFR Part 131, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; California Toxic Rule (CTR)* (US EPA 2000). The US EPA stated that they were aware that the criteria promulgated in 2000 for some priority toxic pollutants were at concentrations less than many of the US EPA’s available analytical detection limits that were being used by most analytical laboratories (US EPA 2000). This was the case for a majority of samples collected as part of the Mokelumne Project from March 2000 through January 2003 (detection limits for STL were not sufficient for comparison to the new US EPA CTR criteria).

As a result, PG&E began using the Department of Fish and Game’s Water Pollution Control Laboratory (WPCL) in Rancho Cordova, California in order to be able to measure dissolved copper concentrations at lower levels compared to STL. Both STL and WPCL were used to analyze samples from March 2002 to January 2003 for comparison purposes. The method used by WPCL was American Public Health Association (APHA) Method 3113 (Standard Methods for the Examination of Water and Wastewater, 18th Ed. 1992) which had a RL of 1.0 ug/L. The percentage of dissolved copper samples that were reported as “J” flag values between March 2002 and January 2003 by both STL and WPCL was 61 percent.

WPCL’s reporting limit still was not sufficient to analyze water samples in relation to the CTR criteria so PG&E altered the sampling and analytical techniques and began using the Department of Fish and Game’s Marine Pollution Studies Laboratory (MPSL) in Moss Landing, California in February 2003 in order to have lower concentrations reported with greater confidence. MPSL is a state certified “Clean Lab” that uses USEPA Method 1638 (*Determination of Trace Elements in Ambient Waters by Inductively Coupled Plasma-Mass Spectrometry*) to analyze the copper samples (USEPA 1996a). The water samples were also collected using method USEPA Method 1669 for Ultra Clean sampling (*Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*) (USEPA 1996b). MPSL’s MDL for copper is 0.01 ug/L and the RL for copper is 0.03 ug/L, these values are well below the concentrations required for adequate comparison to the USEPA CTR ambient water quality criteria. There was no longer a need for estimated (J) values because a majority of the water sample concentrations for copper were above the lower RL achievable by MPSL.

Revised FERC Flow Conditions

As part of the Mokelumne Settlement Agreement, and the Forest Service 4(e) Conditions, minimum streamflows by month and water year type are specified for each stream reach of the Project (PG&E 2000). The minimum streamflow schedules have been separated into five water year types: Wet, Above Normal (AN), Below Normal (BN), Dry, and Critically Dry (CD). Minimum streamflows are required to be maintained in the Bear River below LBRR Dam. The streamflows up to 20 cfs are measured at PG&E gage M49, located about 200 feet downstream from the LBRR Dam. Streamflows above 20 cfs shall be measured at PG&E gage M32, about 3.75 miles downstream from the LBRR Dam.

The new FERC flow requirements for the Mokelumne River Project (FERC No. 137) had not been implemented prior to 2005. The equipment and tools necessary to make the new flows had not been modified/installed prior to 2005 and therefore the water quality data for the Bear River below LBRR prior to 2005 is considered obsolete due to the change in required flows. Water quality data collected in 2005 represent Year 1 under the FERC required new minimum streamflows.

Existing water quality data from March 2002 to April 2004 for dissolved copper concentrations at the Bear River from station BR1 were used to estimate dissolved copper concentrations under the new FERC flow requirements (PG&E 2003, 2004c, and 2005). The study found that in general the dissolved copper concentrations were reduced under the new flow requirements. Water quality data, including dissolved copper concentration measurements, have been collected as part of the Mokelumne River Project Annual Water Quality Monitoring Program in Year 1 (2005), Year 2 (2006), and Year 4 (2008) (PG&E 2006, Stillwater 2007a and 2007b, and Devine Tarbell & Associates [DTA] 2008, respectively). No dissolved copper concentrations were collected as part of the Annual Monitoring Program during Year 3 (2007). Data will continue to be collected as part of the licensed required Mokelumne Annual Water Quality Monitoring Program, and will be provided to the ERC for ongoing review and consultation.

Additional water quality monitoring data were collected during 2006 and 2007 as part of a monitoring program to collect additional information needed to characterize the the Bear River (conducted by CH2M HILL [2007] for PG&E). The purpose of the study was to collect general water chemistry data to evaluate any significant variations in water chemistry between the intake water (reservoir) and the receiving water (river); and to evaluate the potential presence of colloidal solids that may affect dissolved metals concentrations present in the Bear River (CH2M HILL 2007).

Therefore, the water quality results collected from 2000 through 2004 for the Mokelumne Annual Water Quality Monitoring Program are considered obsolete and not representative of the ambient water quality conditions under the new FERC flow requirements because the new flow releases had not been

fully implemented. Full implementation of the flows occurred in 2005 (Year 1).

PG&E Conclusion

Water quality data collected in Year 1 (2005 data), Year 2 (2006 data) and Year 4 (2008 data) from the Mokelumne Annual Monitoring Program do meet the SWRCB's Listing Policy requirements, and these data may be used to make a determination regarding the health or impairment of the Bear River for copper. No analytical data were collected in Year 3 (2007) for the Annual Monitoring Program; however, data are available (2006-2007) from the study conducted by CH2M HILL in 2007 for PG&E (CH2M HILL 2007) and these data also meeting the Listing Policy requirements and may be used to make a listing determination.

All of the known available data that meets the SWRCB Listing Policy are shown in the tables below. Table J-1 shows that a total of 18 samples have been collected in the Bear River below LBRR as part of PG&E's Mokelumne Annual Monitoring Program. Thirteen of the 18 samples exceeded the hardness based - CTR for dissolved copper (all calculations of the criteria are based on the individual sample's hardness).

Table J-2 shows that a total of 12 samples have been collected in the Bear River as part of the additional monitoring study conducted by CH2M HILL during 2006 and 2007. Eleven of the 12 samples exceeded the hardness based-CTR for dissolved copper (all calculations of the criteria are based on the individual sample's hardness).

In summary, a total of 24 of 30 dissolved copper concentrations exceeded the CTR hardness based criteria. This does exceed the allowable frequency in Table 3.1 of the Listing Policy (SWRCB 2004).

Table J-1: PG&E's Annual Monitoring Program Results

Mokelumne River Annual Water Quality Monitoring Results for Dissolved Copper at Station BR1 (Bear River below LBRR) for Year 1 (2005), Year 2 (2006), and Year 4 (2008)

Year	Date	Hardness (mg/L)	Dissolved Copper (ug/L)	Hardness based criteria for CTR and USEPA	
				WPCL & MPSL, Department of Fish and Game (continuous conc, 4-day avg)	CCC CMC (maximum conc, 1-hr avg)
Year 1	3/23/05	6.2	2.40	0.83	0.98
	5/24/05	9.0	1.20	1.14	1.39
	6/22/05	4.5	0.49	0.63	0.72
	7/21/05	8.9	7.39	1.13	1.38
	8/10/05	5.0	5.80	0.69	0.80
	9/28/05	10.1	1.90	1.26	1.55
	12/7/05	5.9	3.25	0.80	0.93
Year 2	3/21/06	8.2	0.64	1.06	1.27
	5/10/06	18.5	0.65	2.12	2.74
	6/19/06	6.1	0.39	0.82	0.96
	7/18/06	6.6	1.09	0.88	1.04
	8/16/06	5.5	1.02	0.75	0.87
	9/20/06	5.2	0.70	0.72	0.83
	12/18/06	6.5	2.54	0.87	1.02
Year 4	2/14/07	19.0	3.98	2.17	2.81
	3/18/08	9.0	4.46	1.14	1.39
	6/24/08	6.9	4.24	0.91	1.08
	9/24/08	6.2	1.63	0.83	0.98

highlighted cells are above one or both criteria

MDL 0.01 ug/L
RL 0.03 ug/L

CTR = USEPA 40 CFR Part 131, Water Quality Standards; Establishment on Numeric
Criteria for Priority Toxic Pollutants for the State of California, California Toxics Rule (CTR)
USEPA = US Environmental Protection Agency National Ambient Water Quality Criteria, Freshwater Aquatic Life Protection Recommended Criteria.
CCC = Continuous concentration (4-day average)
CMC = Maximum concentration (1-hour average)

Table J-2: Results of the study conducted by CH2M HILL for PG&E during 2006 and 2007

Date	Hardness (mg/L)	Dissolved Copper (ug/L, filter 0.45 um)	Hardness based criteria for CTR and USEPA	
			CCC (continuous conc, 4-day avg)	CMC (maximum conc, 1-hr avg)
8/17/2006	4.95	1.04	0.69	0.79
9/13/2006	4.37	0.85	0.62	0.70
10/18/2006	4.73	0.81	0.66	0.76
11/15/2006	5.11	1.53	0.71	0.82
12/19/2006	5.01	2.23	0.69	0.80
1/18/2007	4.93	0.61	0.68	0.79
2/13/2007	6.41	3.79	0.86	1.01
3/22/2007	5.14	7.09	0.71	0.82
4/12/2007	4.95	2.6	0.69	0.79
4/25/2007	4.66	4.32	0.65	0.75
5/17/2007	4.35	3.38	0.61	0.70
5/23/2007	4.23	2.78	0.60	0.68

highlighted cells are above one or both criteria

MDL 0.01 ug/L
RL 0.03 ug/L

CTR = USEPA 40 CFR Part 131, Water Quality Standards; Establishment on Numeric
Criteria for Priority Toxic Pollutants for the State of California, California Toxics Rule (CTR)
USEPA = US Environmental Protection Agency National Ambient Water Quality Criteria, Freshwater Aquatic Life Protection Recommended Criteria.
CCC = Continuous concentration (4-day average)
CMC = Maximum concentration (1-hour average)

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