SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

February 28, 2001

Mr. Art Gaffrey
Forest Supervisor
USFS, Sequoia National Forest
900 West Grand Avenue
Porterville CA 93257-2035

Mr. James Canaday
State Water Resources Control Board
P.O. Box 2000
Sacramento CA 95812-2000

Mr. William Loudermilk
Regional Manager, Region 4
California Department of Fish and Game
1234 East Shaw Avenue
Fresno CA 93710

Mr. Wayne White
US Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento CA 95825

Subject: Kern River No. 3 Hydroelectric Project (FERC No. 2290)
Third Year Water Temperature Monitoring Report

Dear Agency Representatives:

The license for the subject project was issued by the Federal Energy Regulatory Commission (Commission) on December 24, 1996 to Southern California Edison Company (SCE). Article 408 of the license requires SCE to conduct hourly water temperature monitoring in the project area of the North Fork Kern River for a five-year period.

In compliance with the requirements of Article 408, the third year's monitoring was conducted from June through September of 2000. The enclosed document contains the results of that monitoring period. The report was submitted to the US Forest Service, US Fish and Wildlife Service, California Department of Fish and Game, and the State Water Resources Control Board for review and comment. SCE expects to receive agency comments and, when received, those comments will be responded to and an addendum filed with the Commission and agencies to be attached to the enclosed annual report.

Please contact Candace Irelan at (909) 394-8714 if you have any questions regarding this filing.

Sincerely,

Daryl Fryer

Enclosure

cc: James Goris, FERC, San Francisco
Erik Ostly, FS, Porterville
Dale Mitchell, CDFG, Fresno
Judy Schutza, FS, Kernville

300 N. Lone Hill Ave.
San Dimas, CA 91773

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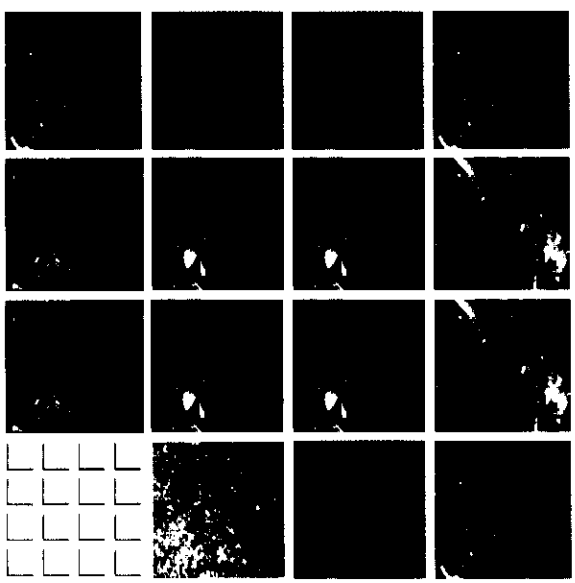
E N T R I X

KERN RIVER NO. 3 HYDROELECTRIC PROJECT 2000 TEMPERATURE MONITORING REPORT

Prepared for:

SOUTHERN CALIFORNIA EDISON
Rosemead, CA

Prepared by:



ENTRIX, INC.
Walnut Creek, CA

Project No. 306643

February 27, 2001

KERN RIVER NO. 3 HYDROELECTRIC PROJECT
2000 TEMPERATURE MONITORING REPORT

Prepared for:

SOUTHERN CALIFORNIA EDISON
2244 Walnut Grove Avenue
Rosemead, California 91770

Prepared by:

ENTRIX, INC.
590 Ygnacio Valley Road, Suite 200
Walnut Creek, California 94596

Project No. 306643

February 27, 2001

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1.0 INTRODUCTION

Southern California Edison (SCE) is required to conduct a five-year water temperature monitoring study to confirm compliance with Federal Energy Regulatory Commission (FERC) license and State Water Resources Control Board (SWRCB) 401 Certification conditions. The first year of monitoring, 1998, was reported in a prior report. This report presents the results of the third year of monitoring, 2000.

1.1 REGULATORY BACKGROUND

SCE operates the Kern River No. 3 Project (KR3) on the North Fork Kern River near Kernville, California. On December 24, 1996 the FERC issued new license for the Kern River No. 3 Hydroelectric Project (FERC 2290-006). Under the conditions of the new license, the FERC included Article 408 requiring monitoring of water temperatures in the North Fork Kern River. The Article describes the conditions as follows.

> Article 408. Within one year from the date of issuance of this license, the Licensee shall implement a water temperature monitoring program which requires hourly water temperature monitoring of the North Fork Kern River at two locations within the project area for a five-year period.
>
> At least 90 days prior to commencing the monitoring program, the Licensee shall file with the Commission, for approval, a plan to monitor water temperature of the North Fork Kern River immediately above Fairview Dam and at a point six kilometers below Fairview Dam from June 1 through September 30 of each year.
>
> The monitoring plan shall include, but not be limited to: (1) a schedule for implementation of the program; (2) the method for consultation with the appropriate federal and state agencies concerning the results of the monitoring; (3) a schedule for filing the result, agency comments, and Licensee's response to agency comments with the Commission; and (4) the method for providing daily recorded data to the U.S. Fish and Wildlife Service and the California Department of Fish and Game (Cal Fish and Game).
>
> The Licensee shall prepare the plan after consultation with the U.S. Forest Service, the U.S. Fish and Wildlife Service, the California State Water Resources Control Board (Cal Water Resources Board), and Cal Fish and Game. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. If the Licensee does not adopt a

recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The monitoring program shall not begin until the Licensee is notified by the Commission that the plan is approved. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Within six months from the end of the 5-year period, the Licensee shall, after consultation with the U.S. Forest Service, the Fish and Wildlife Service, Cal Water Resources Board, and Cal Fish and Game, prepare and file with the Commission for approval an evaluation of the project's effect on existing water quality standards in the river segment, including and recommendations to maintain existing water quality standards. These agencies shall review the evaluation and, if necessary, make recommendations to maintain existing water quality standards of the river pursuant to the Settlement Agreement and the Memorandum of Understanding. The Commission reserves the right to require changes to project facilities and operations based upon the evaluation and recommendations.

The license article was based on the *terms and conditions* of the SWRCB Water Quality Certification Conditions. The relevant *terms and conditions* are as follows.

In order to meet water temperature objectives as defined in Part 1, page 1-2-5, Table 2-2 in the Regional Board's Tulare Lake Basin Plan (5D), SCE shall develop and implement a five year water quality monitoring program that includes the following:

a. Hourly monitoring of water temperatures immediately above the influence of the project at the Fairview Diversion Dam from June 1 through September 30 of each year.

b. Records for daily maximums, minimums and mean water temperature for each gage for the previous water year shall be submitted to the Executive Director of the SWRCB by November 15 of each year.

The purpose of the monitoring program specified in condition 2 is to establish whether project operations will maintain COLD beneficial uses in the 6 KM river segment downstream of the Fairview Diversion Dam. This river segment is designated as both "warm" and "cold" in the Regional Board's Tulare Lake Basin Plan (5D). After five years of monitoring, SCE shall, in consultation with the SWRCB, the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service (USFS), and the Federal Energy Regulatory Commission (FERC), prepare and submit to these agencies an evaluation of the project's effect on water temperatures in the river segment, including any additional recommendations to maintain COLD water quality

standards. These agencies shall review the evaluations, and, if necessary, make recommendations to maintain water quality standards of the river pursuant to the Agreement and MOU. After review of SCE's evaluation and recommendations, and reviewing any comments submitted on the evaluation and recommendations, the SWRCB may modify the terms, conditions, limitations and monitoring requirements of the 6 KM review segment downstream of the Fairview Diversion Dam.

According to the FERC order, SCE conducted the required monitoring based on the approved study plan. This report presents the results of the third year of monitoring.

1.2 ORGANIZATION OF THIS REPORT

The remainder of this proposal is divided into three sections. These are:

- Approach,
- Results, and
- Summary and Conclusions.

2.0 APPROACH

2.1 OBJECTIVES

The objective of this study is to report the results of monitoring water temperatures in the segment of the North Fork Kern River (NFKR) between Fairview Diversion Dam and a site six kilometers downstream. The monitoring objective provides an opportunity to evaluate whether water temperatures in the study reach correspond to those predicted in analyses prepared for SCE in Exhibit E of the Application for New License.

2.2 METHODS

Water temperature monitoring is required on an hourly basis for the period of June 1 through September 30, each year for five years. Figure 2-1 shows the locations of the temperature monitoring stations. As part of the collection of those data, appropriate meteorological and flow data associated with those water temperatures were included in the monitoring program.

Stream temperature data were collected using electronic temperature recorders. Onset Instruments Optic StowAway recorders were used. The instruments were fully automated and capable of functioning unattended for long periods of time. These instruments were operated and maintained by SCE. On Thursday, May 25, two water temperature instruments, units numbers 124284 and 124285, were installed 6 km downstream of Fairview Dam. The location of this area was verified in 1998 by means of a global positioning system (GPS) receiver. At this location, a series of campsites are present. Based on the potential for vandalism and the concern of the USFS for minimal visual impact, we continued to use self-contained submersible temperature recorders. The recorders were installed separately in somewhat different locations and camouflaged to the extent feasible. Each recorder was installed in a steel submersible housing that protected the recorder from mechanical damage and provided a point of attachment. The recorder housings were attached to submerged bedrock outcrops or large boulders by case-hardened steel chains and locks. The second (redundant) recorder was used to provide a hedge against data loss due to vandalism or high flows. In this way, the loss of one of the two downstream recorders would not result in data loss for the site. Unfortunately, both units were the victims of vandalism again, this year. Unit number 124284 was removed from the water from July 1 to July 5 and from July 23 to July 28. Unit number 124285 was removed from the water from June 8 to June 13, July 1 to July 5, and from July 17 to July 18.

The specific location of the sites and the period of data collection were chosen to provide adequate data to verify the predictions of stream temperature model. Each recorder was

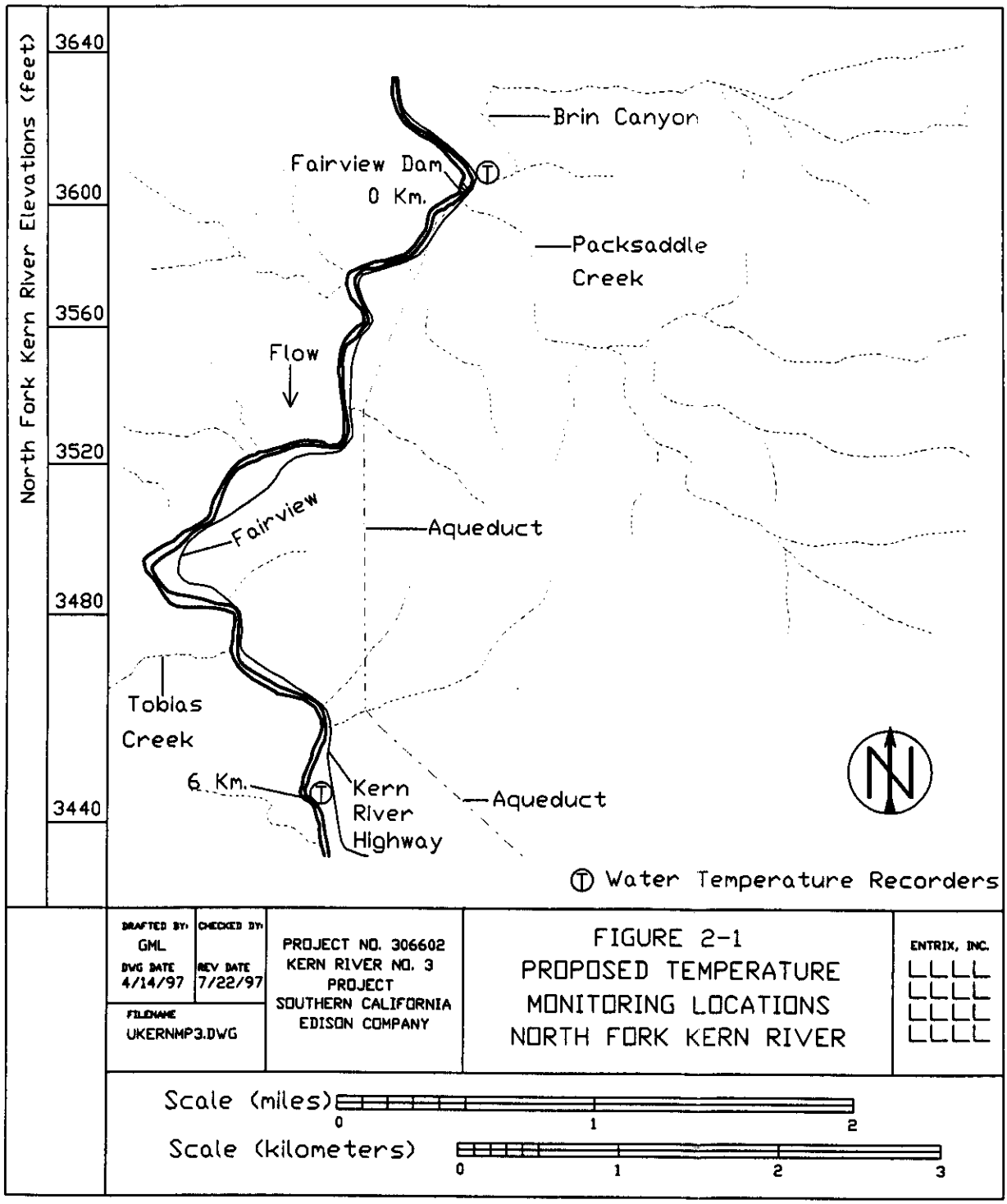

Figure 2-1. Temperature Monitoring Locations in the North Fork Kern River.

checked for proper function within seven days of being placed in operation or upon having been reset and a calibration hack (check) was made. The calibration hacks consisted of measurements of water temperature at the location of the instrument transducer with a calibrated thermometer whose calibration is traceable known standard; the date, time, and temperature was recorded in each case. After the initial check of operation, units were checked on a two-week interval.

The Onset recorders were set to a 10-minute recording interval. This met the requirement of having a no more than hourly data interval and helped to reduce the potential for data loss if a unit was briefly removed from the water for service, download, relocation, or by swimmers. In this way, if a unit was removed from the water for a short period, that portion of the record could be identified. Only the portion of the record when the unit was in the water during that hour would be included in the monitoring record. This reduced the potential for any data gaps from these units. Data were reduced to hourly averages for reporting in Appendices B and C. Daily mean, minimum, and maximum temperatures were based on the 10-minute readings.

Units were inspected on a no less than biweekly basis. This helped to decrease the extent of data loss, as occurred during June and July. Data were retrieved from the submersible recorders during the biweekly visits. Data were off-loaded to computer for summarization.

At the upstream site, above Fairview Diversion Dam, Onset recorder, unit 124287 was placed in the impoundment near the intake at Fairview Dam. There was no gap in the data record for this site.

Since heating of river water between Fairview Dam and the downstream site (six kilometers) is primarily dependent upon air temperature, a meteorological station was installed to monitor air temperature and relative humidity at Fairview Dam. Air temperature provides an excellent indicator of heating conditions and can be used in conjunction with the water temperature data to refine model predictions, if needed. Comparisons of monthly air temperatures with the historical record can be used to indicate the percent exceedance of the air temperatures and subsequently how warm each month of monitoring is in historical context, if needed. Air temperatures and relative humidity were monitored in a standard meteorological housing at the intake at Fairview Dam. This area is fenced-off from the public to prevent access. Hourly air temperatures and relative humidities were recorded. These instruments were checked on a monthly or more frequent basis.

The study plan (SCE 1998) describes the contents and schedule for the yearly reports. Five yearly reports are required as part of this work. This is the third of those reports. Daily stream temperature data are to be reported in tabular format by station. Daily mean, maximum, and minimum temperatures are provided, as well as the average and extreme monthly values. The occurrence and frequency of daily average water temperatures that exceed 20°C, if they occur, is required for each sampling location by month. An appendix to this report includes the hourly water temperature data, required by the SWRCB and the FERC, as well as provisional flow data, and meteorological information.

3.1 DAILY STREAM TEMPERATURE RESULTS

Daily mean, maximum, and minimum water temperatures for the two monitoring locations are reported by month in Tables 3-1 through 3-4. The records presented for the downstream location (6 km below Fairview Diversion) are reported for the single unit, 124284, that had the least data loss throughout the monitoring period. Data from unit 124285 was used to fill in a gap from July 23 to 28. Unit 124284 averaged about 0.1°C warmer than the other unit in at this site. Daily mean water temperatures for both units are plotted in Figure 3-1. It is clear from this figure that there was little difference between the units. The differences are not considered to be significant for the purpose of this analysis. However, the fact that both units reported results within 0.1°C provides confidence in the accuracy of the data collected. The hourly results for the units are presented in Appendix B of this report.

Water temperatures during the 2000 monitoring period were warmer for June, July and August than 1998 or 1999. September 2000 temperatures were cooler than those of 1999. The daily mean temperature at the 6 km location reached 20°C on seven days during July. During each of these days, water temperatures upstream of the dam were near to or above 19°C (one day had an average temperature of 18.9°C). On two occasions in August temperatures exceeded 20°C. During the period of data loss in early July, there was a cooling trend and the daily water temperatures at both locations were below 20°C. Water temperature modeling performed for the Application for New License indicated that water temperatures at the 6 km location may be expected to approach 20°C when water temperatures upstream of the Dam were 18° to 19°C and air temperatures are hot (SCE 1991, 1992).

Daily mean water temperatures for the intake location and the 6 km downstream site are presented in Figure 3-2. Differences between temperatures at the two locations are

Table 3-1. June 2000 Water Temperatures (Daily Mean Temperatures Rounded to Nearest 0.1°C).

	Dam Intake Temperature Recorder			6km Downstream of Fairview Dam Temperature Recorder		
Date	Mean (°C)	Maximum	Minimum	Mean (°C)	Maximum	Minimum
06/01/00	12.0	12.9	11.0	12.5	13.6	11.7
06/02/00	12.2	13.2	11.2	12.7	13.9	11.9
06/03/00	12.7	13.8	11.6	13.1	14.3	12.3
06/04/00	13.6	14.6	12.7	13.9	15.0	13.2
06/05/00	13.3	14.1	12.5	13.8	14.6	13.4
06/06/00	13.0	14.1	12.1	13.5	14.8	12.6
06/07/00	13.3	14.2	12.5	13.8	15.0	12.9
06/08/00	11.8	13.0	10.5	12.8	13.4	11.9
06/09/00	10.9	12.4	9.6	11.9	12.8	11.1
06/10/00	11.9	13.5	10.5	12.5	14.0	11.1
06/11/00	12.5	14.1	10.7	13.2	15.1	11.1
06/12/00	13.9	15.2	12.5	14.4	15.9	12.8
06/13/00	15.1	16.8	13.6	15.7	17.5	13.7
06/14/00	16.1	17.4	15.2	16.6	17.8	15.1
06/15/00	16.6	18.0	15.7	16.9	18.0	15.7
06/16/00	17.2	18.4	16.5	17.7	19.1	16.5
06/17/00	16.7	17.4	15.7	17.3	18.1	16.7
06/18/00	16.4	17.6	15.7	16.9	17.6	16.2
06/19/00	15.9	17.1	14.7	16.5	17.5	15.4
06/20/00	16.2	17.7	14.9	16.8	18.1	15.4
06/21/00	17.1	18.5	15.8	17.8	19.4	15.9
06/22/00	16.6	17.6	15.5	17.7	18.9	16.4
06/23/00	15.8	17.6	14.2	16.7	18.6	14.8
06/24/00	16.3	17.9	14.6	17.3	19.7	15.3
06/25/00	16.3	17.7	14.4	17.4	19.7	15.3
06/26/00	16.6	18.2	14.9	17.8	20.1	15.7
06/27/00	16.4	17.9	14.2	18.0	20.4	15.9
06/28/00	17.1	19.0	15.2	18.8	21.9	16.4
06/29/00	17.5	19.3	15.7	19.2	22.2	16.9
06/30/00	17.6	19.3	15.8	19.2	22.2	16.7

Table 3-2. July 2000 Water Temperatures (Daily Mean Temperatures Rounded to Nearest 0.1°C).

	Dam Intake Temperature Recorder			6km Downstream of Fairview Dam Temperature Recorder		
Date	Mean (°C)	Maximum	Minimum	Mean (°C)	Maximum	Minimum
7/1/00	17.5	19.0	15.8	*	*	*
7/2/00	16.5	18.4	14.7	*	*	*
7/3/00	16.2	17.9	14.6	*	*	*
7/4/00	15.7	17.4	13.9	*	*	*
7/5/00	15.8	17.6	13.9	*	*	*
7/6/00	16.1	17.9	14.4	17.4	20.2	14.9
7/7/00	16.2	17.7	14.6	17.5	20.4	14.9
7/8/00	16.0	17.6	14.2	17.4	20.2	14.9
7/9/00	16.3	17.9	14.6	17.6	20.5	14.9
7/10/00	17.3	19.2	15.7	18.5	21.5	16.0
7/11/00	17.7	19.0	16.1	18.9	21.7	16.5
7/12/00	18.0	19.3	16.5	19.2	22.2	16.8
7/13/00	18.0	19.7	16.3	19.3	22.2	16.7
7/14/00	18.0	19.5	16.5	19.2	22.0	16.7
7/15/00	18.3	20.2	16.6	19.3	22.2	16.7
7/16/00	19.1	20.8	17.7	20.1	23.0	17.9
7/17/00	18.5	20.2	16.8	19.7	22.5	17.0
7/18/00	17.9	19.5	16.1	19.2	22.0	16.5
7/19/00	17.6	19.3	15.7	18.7	21.5	15.9
7/20/00	17.8	20.2	15.8	18.9	21.7	16.2
7/21/00	18.2	20.5	16.0	19.2	22.0	16.2
7/22/00	18.4	20.6	16.3	19.4	22.2	16.5
7/23/00	18.4	20.5	16.5	19.4	21.8	16.9
7/24/00	19.2	21.6	17.2	20.0	22.4	17.5
7/25/00	19.6	21.8	17.7	20.4	22.9	18.0
7/26/00	19.6	21.6	17.7	20.4	22.8	17.9
7/27/00	19.6	21.8	17.6	20.4	22.8	18.0
7/28/00	18.9	21.0	16.9	19.8	22.1	17.2
7/29/00	18.8	21.1	16.8	19.8	22.0	17.3
7/30/00	19.5	21.8	17.4	20.4	22.7	18.1
7/31/00	18.9	20.2	18.0	20.2	21.2	18.9

***Instrument malfunction resulted in data loss.**

Table 3-3. August 2000 Water Temperatures (Daily Mean Temperatures Rounded to Nearest 0.1°C).

	Dam Intake Temperature Recorder			6km Downstream of Fairview Dam Temperature Recorder		
Date	Mean (°C)	Maximum	Minimum	Mean (°C)	Maximum	Minimum
8/1/00	19.8	22.0	17.9	20.5	22.9	18.4
8/2/00	20.4	22.3	18.5	21.6	23.7	19.9
8/3/00	20.2	21.8	18.5	21.4	23.5	19.6
8/4/00	19.4	20.6	17.9	20.8	22.7	18.9
8/5/00	19.5	21.5	17.7	20.5	23.0	18.1
8/6/00	19.9	22.0	18.2	21.0	23.4	18.7
8/7/00	19.7	21.6	17.9	20.7	23.0	18.3
8/8/00	19.2	21.5	17.1	20.1	22.2	17.8
8/9/00	18.5	20.6	16.5	19.4	21.5	17.1
8/10/00	17.8	20.2	15.5	18.7	20.9	16.0
8/11/00	17.8	20.3	15.5	18.7	21.0	16.3
8/12/00	17.8	20.2	15.3	18.6	20.9	16.2
8/13/00	18.1	20.3	15.7	18.9	21.2	16.5
8/14/00	18.5	20.8	16.1	19.4	21.5	17.1
8/15/00	18.8	21.0	16.6	19.7	21.9	17.5
8/16/00	19.4	21.5	17.1	20.1	22.2	18.1
8/17/00	19.5	21.6	17.4	20.3	22.4	18.1
8/18/00	18.7	20.6	16.6	19.5	21.5	17.3
8/19/00	17.7	19.7	15.5	18.5	20.5	16.2
8/20/00	16.9	19.0	14.6	17.8	19.9	15.4
8/21/00	17.0	19.0	14.6	17.8	19.9	15.7
8/22/00	17.1	18.9	14.9	17.9	20.0	15.9
8/23/00	17.6	19.3	15.5	18.3	20.5	16.2
8/24/00	17.9	19.8	15.5	18.7	20.9	16.5
8/25/00	18.4	19.5	16.9	19.2	20.5	17.9
8/26/00	19.1	21.0	17.1	20.0	22.0	18.3
8/27/00	19.4	21.1	17.4	20.1	21.9	18.3
8/28/00	19.1	20.3	17.4	19.7	20.9	18.3
8/29/00	18.3	19.5	17.7	19.2	19.7	18.4
8/30/00	17.9	19.7	16.1	18.8	20.7	17.0
8/31/00	17.8	19.2	16.1	18.6	20.2	17.0

Table 3-4. September 2000 Water Temperatures (Daily Mean Temperatures Rounded to Nearest 0.1°C).

	Dam Intake Temperature Recorder			6km Downstream of Fairview Dam Temperature Recorder		
Date	Mean (°C)	Maximum	Minimum	Mean (°C)	Maximum	Minimum
9/1/00	16.5	17.6	15.7	17.5	18.6	16.3
9/2/00	14.9	16.8	12.7	16.1	18.1	14.1
9/3/00	14.9	16.9	12.9	16.0	18.3	13.8
9/4/00	15.1	17.1	13.2	16.2	18.3	14.1
9/5/00	14.8	16.5	12.7	15.8	17.9	13.7
9/6/00	14.3	15.8	12.1	15.3	17.5	13.2
9/7/00	14.3	15.8	12.1	15.1	16.8	13.4
9/8/00	15.4	17.1	13.3	16.3	18.6	14.3
9/9/00	15.7	17.6	13.5	16.5	18.7	14.3
9/10/00	15.5	17.1	13.3	16.4	18.6	14.3
9/11/00	15.2	16.8	13.0	16.1	18.3	13.8
9/12/00	15.3	16.5	13.3	16.0	17.9	14.1
9/13/00	15.9	17.4	13.9	16.6	18.6	14.8
9/14/00	16.8	18.4	14.7	17.5	19.9	15.4
9/15/00	17.1	18.4	15.2	17.9	19.9	16.0
9/16/00	16.6	18.0	14.4	17.4	19.6	15.2
9/17/00	16.7	18.4	13.6	17.6	19.7	15.6
9/18/00	16.9	18.5	14.9	17.7	19.9	15.7
9/19/00	17.1	18.5	15.3	17.8	19.7	16.0
9/20/00	17.5	19.0	15.5	18.2	20.4	16.2
9/21/00	17.6	19.0	15.8	18.3	20.2	16.5
9/22/00	16.5	17.7	15.2	17.3	19.1	15.9
9/23/00	15.5	16.8	13.8	16.4	18.3	14.8
9/24/00	14.2	16.0	12.2	15.7	17.5	14.0
9/25/00	14.1	15.3	12.2	14.8	16.8	12.9
9/26/00	14.3	15.7	12.5	14.9	17.0	13.1
9/27/00	14.8	15.8	13.3	15.3	17.3	13.5
9/28/00	14.9	16.3	13.0	15.8	17.6	14.3
9/29/00	14.7	16.0	13.0	15.6	17.5	14.0
9/30/00	14.9	16.1	13.0	15.6	17.8	13.8

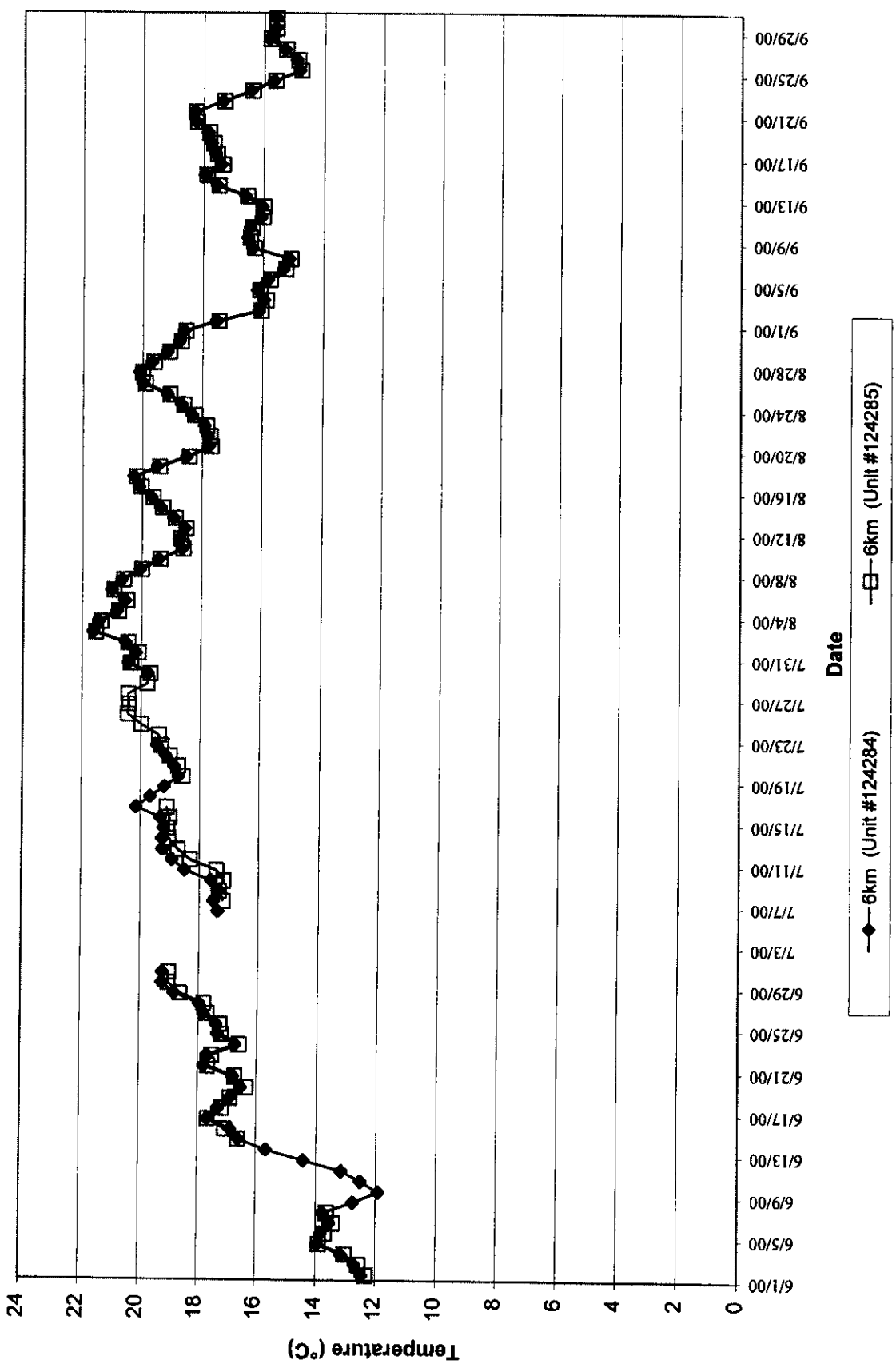

Figure 3-1. Comparison of Daily Mean Water Temperatures from Two Recorders Located 6 km Downstream of Fairview Diversion.

Document Accession #: 20010726-0436 Filed Date: 03/01/2001

Document Content(s)