

DEEP CREEK HYDROELECTRIC STATION  
MDNR WATER APPROPRIATION PERMIT NO. GA92S009 (01)  
GARRETT COUNTY, MARYLAND

ANNUAL REPORT for 1996

February 1997

BY

PENNSYLVANIA ELECTRIC COMPANY  
JOHNSTOWN, PA

**DEEP CREEK HYDROELECTRIC STATION  
MDNR WATER APPROPRIATION PERMIT NO. GA92S009 (01)  
ANNUAL REPORT PER PERMIT CONDITION NO. 23**

**TABLE OF CONTENTS**

<b>SECTION</b>	<b>PAGE</b>
1.0 SUMMARY.....	1
1.1 Lake Level Monitoring.....	1
1.2 Temperature Monitoring.....	1
1.3 Minimum Flow Release Monitoring .....	2
1.4 Dissolved Oxygen (DO) Monitoring .....	2
1.5 Releases Unsuitable For Whitewater Recreation .....	3
1.6 Zebra Mussel Monitoring .....	3

**APPENDICES**

Appendix A - Lake Level Data and Plot

Appendix B - Temperature Monitoring and Release Reports

Appendix C - Flow Bypass Operation Record

Appendix D - Record of Dissolved Oxygen Monitoring

Appendix E - Report on Releases Unsuitable For Whitewater Recreation

Appendix F - Zebra Mussel Monitoring Report

**DEEP CREEK HYDROELECTRIC STATION  
MDNR WATER APPROPRIATION PERMIT NO. GA92S009 (01)  
ANNUAL REPORT PER PERMIT CONDITION NO. 23**

**1.0 SUMMARY**

The Pennsylvania Electric Company (Permittee) holds Water Appropriation Permit GA92S009(01) issued by the Maryland Department of Natural Resources (MDNR) and now administered by the Maryland Department of the Environment (Department). This report is submitted in accordance with Permit Condition 23, which requires the Permittee to submit an annual report to the Department, including data and information as specified in Permit Conditions 15-19 and 21.

**1.1 Lake Level Monitoring**

Permit Condition 15 requires the Permittee to report the results of water-level monitoring at Deep Creek Lake. Appendix A contains daily water-level data and a plot depicting lake levels for 1996.

**1.2 Temperature Monitoring**

Permit Condition 16 requires the Permittee to report the results of temperature monitoring. A "Water Temperature Enhancement Plan" was approved by the Department by letter dated June 8, 1996. In accordance with the Plan, the Permittee monitored river water temperature at the Sang Run Bridge and made temperature enhancement releases on 8 days in 1996. The Permittee provided Mr. S. P. Schreiner of Versar ESM, Inc., consultant to the MDNR, temperature monitoring data by letter dated November 6, 1996 and temperature enhancement summary data by letter dated December 16, 1996. Copies of these letters are included in Appendix

B. Also included in Appendix B are daily maximum water temperatures for 1996 as monitored by the Permittee and Versar and compiled by Versar.

### **1.3 Minimum Flow Release Monitoring**

Permit Condition 17 requires the Permittee to report flow measurements and the occurrence of bypass releases. In 1996, the Permittee did not operate the flow bypass except for test purposes. Natural river flows in the Youghiogheny River did not trigger bypass releases from Deep Creek Station. A record of the river flows at the Oakland gaging station provided by the U.S. Geological Survey is presented in Appendix C.

### **1.4 Dissolved Oxygen (DO) Monitoring**

Permit Condition 18 requires the Permittee to report the results of dissolved oxygen monitoring. The weir was operated and tested in 1996, in accordance with the "Dissolved Oxygen (DO) Enhancement Operations and Monitoring Protocol" approved by the Department on January 6, 1995.

Appendix D is the record of data obtained from monitoring DO and testing the weir in 1996.

The lowest DO measured in the tailrace downstream of the weir during generation (startup excluded) was 4.9 mg/l, on August 30. On the that day, DO in the tailrace prior to generation was 3.18 mg/l. The lowest winter DO measured in the tailrace downstream of the weir during generation (excluding startup) was 9.66 mg/l, on February 16.

In accordance with the protocol, all 17 DO startup tests were performed during the summer months. The maximum DO improvement measured during the tests was

2.11 mg/l. DO improvement ranged from +2.11 to -0.53 mg/l. DO variation generally showed a positive correlation with temperature variation. Temperature and DO tended to decrease after the initial startup of generation. Gradually, both the temperature and the DO increased, eventually exceeding the values at the start of the test period

#### **1.5 Releases Unsuitable For Whitewater Recreation**

Permit Condition 19 requires Permittee to document the "times and dates when generation releases not suitable for whitewater recreation occurred." Such times and dates are presented in Appendix E. Appendix E also presents information on releases made on Fridays, Mondays and designated Saturdays, as required by Condition 19, and special releases made at the request of the whitewater boaters. The Permittee continued to announce scheduled and temperature enhancement releases in advance on a telephone recording.

#### **1.6 Zebra Mussel Monitoring**

Permit Condition 21 requires the Permittee to submit the results of its zebra mussel monitoring program. Appendix F is a memorandum report presenting the results of zebra mussel monitoring at Deep Creek Lake. Artificial substrates placed at the station intake area have shown no signs of the zebra mussel to date.

APPENDIX A

LAKE LEVEL DATA AND PLOT

## Deep Creek Lake Level 1996

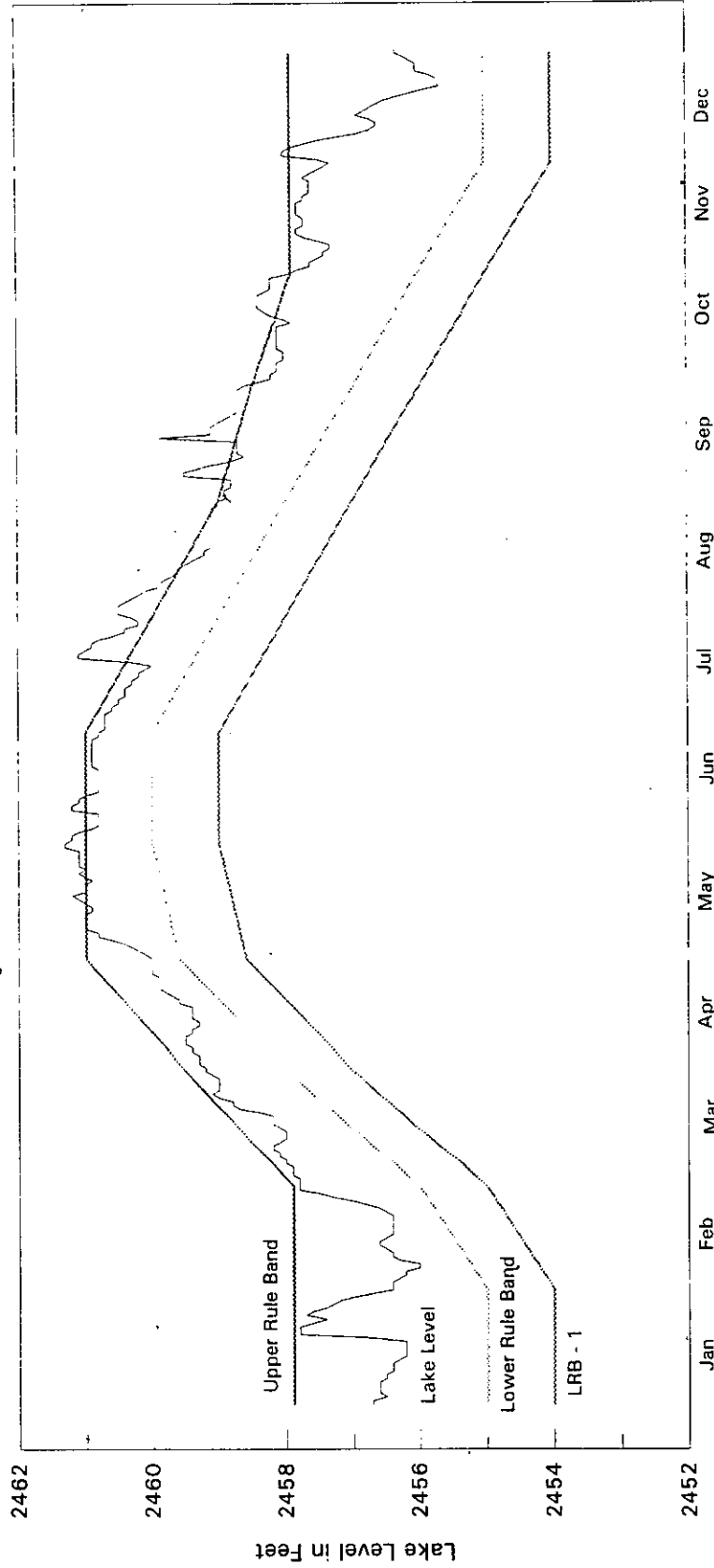
Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall
Jan	1	2456.7	0.03	Feb	1	2456.4	0.07	Mar	1	2457.8	0.00
	2	2456.7	0.22		2	2456.4	0.08		2	2457.8	0.17
	3	2456.5	0.75		3	2456.4	0.10		3	2457.9	0.00
	4	2456.6	0.05		4	2456.3	0.00		4	2457.9	0.00
	5	2456.6	0.00		5	2456.2	0.00		5	2457.9	1.00
	6	2456.6	0.20		6	2456.2	0.00		6	2458.0	0.55
	7	2456.6	0.50		7	2456.0	0.30		7	2458.0	0.58
	8	2456.5	0.05		8	2456.0	0.78		8	2458.1	0.17
	9	2456.5	0.05		9	2456.3	0.14		9	2458.1	0.15
	10	2456.4	0.15		10	2456.4	0.00		10	2458.2	0.00
	11	2456.4	0.00		11	2456.4	0.15		11	2458.2	0.00
	12	2456.4	0.25		12	2456.5	0.10		12	2458.1	0.00
	13	2456.3	0.05		13	2456.6	0.12		13	2458.0	0.00
	14	2456.2	0.00		14	2456.6	0.20		14	2458.0	0.00
	15	2456.2	0.00		15	2456.5	0.05		15	2458.0	1.05
	16	2456.2	0.00		16	2456.4	0.00		16	2458.1	0.00
	17	2456.2	0.25		17	2456.4	0.00		17	2458.2	0.10
	18	2456.2	0.00		18	2456.4	0.10		18	2458.2	0.04
	19	2456.7	1.65		19	2456.4	0.00		19	2458.2	1.30
	20	2457.8	0.00		20	2456.4	0.47		20	2458.4	0.15
	21	2457.8	0.00		21	2456.4	0.00		21	2458.7	0.25
	22	2457.8	0.00		22	2456.5	0.05		22	2458.8	0.22
	23	2457.6	0.10		23	2456.6	0.00		23	2458.8	0.03
	24	2457.4	1.50		24	2456.8	0.22		24	2459.0	0.00
	25	2457.7	0.10		25	2457.0	0.00		25	2459.1	0.30
	26	2457.6	0.25		26	2457.3	0.38		26	2459.0	0.00
	27	2457.4	0.45		27	2457.5	1.17		27	2459.0	0.02
	28	2457.3	0.00		28	2457.8	0.35		28	2459.0	0.42
	29	2457.2	0.00		29	2457.8	0.00		29	2459.0	0.07
	30	2457.0	0.00						30	2459.1	0.00
	31	2456.7	0.08						31	2459.2	0.00
Total			6.68				4.83				6.57
Apr	1	2459.2	0.70	May	1	2460.1	0.42	Jun	1	2461.2	0.00
	2	2459.3	0.00		2	2460.2	0.17		2	2461.2	0.00
	3	2459.3	0.00		3	2460.3	0.16		3	2461.1	0.00
	4	2459.3	0.25		4	2460.4	0.84		4	2460.9	0.30
	5	2459.4	0.10		5	2460.6	0.24		5	2460.8	0.00
	6	2459.4	0.05		6	2460.8	0.00		6	2460.8	0.00
	7	2459.5	0.10		7	2460.8	0.45		7	2460.8	0.00
	8	2459.5	0.07		8	2461.0	0.70		8	2460.8	0.65
	9	2459.5	0.12		9	2461.0	0.25		9	2461.2	0.25
	10	2459.4	0.15		10	2461.0	0.00		10	2461.2	0.10
	11	2459.4	0.00		11	2461.0	1.15		11	2461.1	0.18
	12	2459.3	0.00		12	2461.0	0.08		12	2461.1	0.12
	13	2459.3	0.10		13	2460.9	0.00		13	2461.0	0.03
	14	2459.4	0.07		14	2460.9	0.00		14	2460.8	0.20
	15	2459.4	0.75		15	2461.0	0.82		15	2460.8	0.00
	16	2459.4	0.50		16	2461.1	0.70		16	2460.8	0.00
	17	2459.4	0.20		17	2461.2	0.87		17	2460.8	0.00
	18	2459.6	0.00		18	2461.0	0.00		18	2460.8	0.02
	19	2459.6	0.29		19	2461.0	0.00		19	2460.8	0.47
	20	2459.7	0.00		20	2461.0	0.00		20	2460.8	0.00
	21	2459.8	0.05		21	2460.9	1.07		21	2460.9	0.00
	22	2459.9	0.00		22	2461.0	0.00		22	2460.9	0.00
	23	2459.9	0.55		23	2461.1	0.00		23	2460.9	0.00
	24	2459.9	0.02		24	2461.0	0.45		24	2460.9	1.00
	25	2459.9	0.00		25	2461.1	0.00		25	2460.9	0.10
	26	2460.0	0.00		26	2461.1	0.30		26	2460.9	0.00
	27	2460.0	0.05		27	2461.1	1.60		27	2460.9	0.00
	28	2460.0	0.00		28	2461.1	0.05		28	2460.9	0.00
	29	2460.0	0.35		29	2461.1	0.80		29	2460.8	0.00
	30	2460.0	0.43		30	2461.3	0.00		30	2460.8	0.00
Total			4.9				11.12				3.42

## Deep Creek Lake Level 1996

Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall
Jul	1	2460.7	0.00	Aug	1	2460.5	0.00	Sep	1	2458.9	0.00
	2	2460.7	0.45		2	2460.5	0.00		2	2458.9	0.00
	3	2460.7	0.30		3	2460.5	0.00		3	2458.9	0.00
	4	2460.7	0.00		4	2460.4	0.00		4	2458.8	0.28
	5	2460.7	0.00		5	2460.3	0.00		5	2458.8	0.05
	6	2460.6	0.00		6	2460.2	0.00		6	2458.8	4.10
	7	2460.6	0.00		7	2460.1	0.00		7	2459.5	0.20
	8	2460.5	0.25		8	2459.9	0.00		8	2459.5	0.00
	9	2460.5	0.00		9	2459.9	0.17		9	2459.3	0.00
	10	2460.4	0.00		10	2459.8	0.00		10	2459.1	0.00
	11	2460.4	0.00		11	2459.7	0.00		11	2458.8	0.00
	12	2460.4	0.00		12	2459.6	1.10		12	2458.6	0.25
	13	2460.3	0.00		13	2459.6	0.00		13	2458.7	0.35
	14	2460.3	0.00		14	2459.5	0.00		14	2458.7	0.02
	15	2460.2	0.55		15	2459.4	0.00		15	2458.7	0.00
	16	2460.2	0.00		16	2459.3	0.30		16	2458.7	1.50
	17	2460.1	0.00		17	2459.2	0.00		17	2459.9	0.80
	18	2460.0	2.05		18	2459.2	0.00		18	2459.1	0.05
	19	2460.3	5.35		19	2459.1	0.00		19	2459.1	0.00
	20	2461.1	0.00		20	2459.1	0.00		20	2459.1	0.00
	21	2461.1	0.00		21	2459.1	0.53		21	2459.0	0.00
	22	2461.0	0.35		22	2459.1	0.00		22	2458.9	0.47
	23	2460.9	0.05		23	2459.1	0.40		23	2458.8	0.23
	24	2460.9	0.00		24	2459.1	0.15		24	2458.7	0.17
	25	2460.8	0.05		25	2459.1	0.00		25	2458.7	0.00
	26	2460.6	0.23		26	2459.1	0.00		26	2458.7	0.00
	27	2460.4	0.00		27	2459.1	0.98		27	2458.7	0.05
	28	2460.4	0.00		28	2459.1	0.05		28	2458.7	0.57
	29	2460.2	0.20		29	2459.1	0.00		29	2458.7	0.00
	30	2460.2	0.90		30	2459.0	0.00		30	2458.7	0.00
	31	2460.3	1.25		31	2459.0	0.00				
<b>Total</b>			<b>11.98</b>				<b>3.68</b>				<b>9.09</b>
Oct	1	2458.6	0.00	Nov	1	2457.8	0.05	Dec	1	2457.5	1.25
	2	2458.4	0.00		2	2457.6	0.02		2	2458.0	0.00
	3	2458.2	0.10		3	2457.6	0.02		3	2458.0	0.00
	4	2458.2	0.00		4	2457.5	0.00		4	2457.9	0.02
	5	2458.1	0.00		5	2457.4	0.00		5	2457.7	0.52
	6	2458.1	0.00		6	2457.4	0.02		6	2457.5	0.08
	7	2458.1	0.00		7	2457.3	0.05		7	2457.2	0.00
	8	2458.0	0.32		8	2457.3	1.75		8	2456.9	0.20
	9	2458.0	0.70		9	2457.5	0.20		9	2456.7	0.33
	10	2458.0	0.15		10	2457.7	0.10		10	2456.6	0.00
	11	2458.1	0.00		11	2457.8	0.20		11	2456.6	0.30
	12	2458.1	0.00		12	2457.8	0.10		12	2456.7	1.05
	13	2458.1	0.00		13	2457.7	0.00		13	2456.9	0.60
	14	2458.1	0.00		14	2457.7	0.05		14	2456.8	0.00
	15	2458.1	0.00		15	2457.7	0.00		15	2456.7	0.00
	16	2458.1	0.00		16	2457.8	0.00		16	2456.6	0.00
	17	2458.1	0.00		17	2457.8	0.00		17	2456.5	0.20
	18	2457.9	1.00		18	2457.8	0.07		18	2456.3	0.05
	19	2458.0	0.75		19	2457.8	0.00		19	2456.1	0.18
	20	2458.2	0.75		20	2457.7	0.05		20	2455.9	0.10
	21	2458.3	0.50		21	2457.7	0.00		21	2455.7	0.00
	22	2458.4	0.03		22	2457.6	0.03		22	2455.7	0.02
	23	2458.4	0.02		23	2457.6	0.00		23	2455.7	0.12
	24	2458.4	0.00		24	2457.6	0.00		24	2455.8	0.50
	25	2458.4	0.00		25	2457.6	0.95		25	2456.0	0.00
	26	2458.3	0.20		26	2457.7	0.55		26	2456.0	0.00
	27	2458.2	0.05		27	2457.6	0.03		27	2456.0	0.02
	28	2458.2	0.50		28	2457.5	0.00		28	2456.1	0.25
	29	2458.2	0.00		29	2457.4	0.00		29	2456.2	0.67
	30	2458.2	0.00		30	2457.3	0.87		30	2456.3	0.00
	31	2457.9	0.00						31	2456.3	0.05
<b>Total</b>			<b>5.07</b>				<b>5.11</b>				<b>6.51</b>
								<b>Year Total</b>			<b>38.82</b>



# Deep Creek Lake Level - 1996



APPENDIX B

TEMPERATURE MONITORING AND RELEASE REPORTS

## MAXIMUM DAILY RIVER WATER TEMPERATURES

Daily maximum river water temperatures in the Youghiogheny River at Sang Run are presented on the following table. The data were collated and provided by Versar, Inc., consultant to the MDNR Power Plant Assessment Division (PPAD).

The column labeled "SMAX" lists the arithmetic means of the daily maximum water temperatures, in degrees C, measured by two "Tempmentors" placed in the river by the MDNR. The column labeled "PenMAX" lists the maximum water temperatures, in degrees C, measured by the Permittee's temperature monitor at the Sang Run Bridge. PPAD and Versar analyze the data to evaluate the Water Temperature Enhancement Plan used by the Permittee to determine the need and timing of daily temperature releases.



GPU Generation, Inc.  
Post Office Box 15152  
Reading, PA 19612-5152  
Tel 610-375-5000

Writer's Direct Dial:  
(610) 375-5827  
(610) 921-6601 (facsimile)

November 6, 1996

Mr. Steve Schreiner  
Versar Inc.  
ESM Operations  
9200 Rumsey Road  
Columbia, MD 21045-1934

Subject: Deep Creek Data

Dear Steve:

In response to your telephone request of several days ago, please find enclosed herewith:

(1) A printout of the Deep Creek Station operating log for April 15-October 15 (whitewater boating season); and

(2) Diskettes ("JUN96.DAT", "JUL96.DAT" and "AUG96.DAT") of the temperature data (recorded every two minutes) downloaded from the temperature monitor at the Sang Run bridge for June 1-August 31.

You also requested a copy of the tape recorded messages announcing operating times; unfortunately, no log is kept of the tape recordings.

If you have any question about this information, please call me.

Very truly yours,

A handwritten signature in cursive script, appearing to read "J. C. Phillips".

J. C. Phillips

Enclosure

cc: T. N. Atherton (w/o encl.)  
H. B. Bernard  
R. W. Thomas (w/o encl.)

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
4/15/96	1000	Deep Creek	Units loaded to cond @ 1300
4/16/96	0900	Deep Creek	Units loaded on cost will stay on for scheduled run 1000-1300
4/16/96	1300	Deep Creek	Units to cond
4/19/96	1000	Deep Creek	#2 Unit loaded, Cond. @ 1300 (1 unit generation at request of Roger from Precision rafting due to high water)
4/22/96	1000	Deep Creek	#1 & #2 Units loaded
4/22/96	1300	Deep Creek	#1 & #2 Units left loaded on cost (78 mil)
4/22/96	1600	Deep Creek	# 1 & 2 units to condenser.
4/23/96	1000	Deep Creek	#1 & #2 Units loaded. (45 mil cost), cond @ 1015 (20 mil cost)
4/23/96	1430	Deep Creek	#1 & #2 Units loaded on cost (72 mil)
4/23/96	1900	Deep Creek	# 1 & 2 units to condenser.
4/26/96	1000	Deep Creek	Units loaded, Cond. @ 1300
4/28/96	2011	Deep Creek	#1 & #2 loaded.
4/28/96	2020	Deep Creek	#1 & #2 units to cond.
4/29/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser @ 1300.
5/ 4/96	0900	Deep Creek	#1 unit only loaded at full load per Rodger Zbel 's request because of too much water.
5/ 4/96	1200	Deep Creek	#1 unit to cond.
5/ 6/96	1800	Deep Creek	Units loaded
5/ 7/96	0001	Deep Creek	#1 & #2 generators back as condenser.
5/ 8/96	0800	Deep Creek	Units loaded, level 2461.0'
5/ 9/96	0800	Deep Creek	Units loaded
5/10/96	0001	Deep Creek	#1 & #2 generators back as condenser.
5/10/96	0800	Deep Creek	Units loaded, still on URB
5/10/96	2359	Deep Creek	#1 & #2 Generators back as condenser.
5/11/96	0820	Deep Creek	Units loaded, at Upper Rule Band
5/12/96	001	Deep Creek	#1 & #2 generators back as condenser.
5/12/96	0800	Deep Creek	Units loaded, at Upper Rule Band of 2061 feet
5/13/96	0001	Deep Creek	#1 & #2 generators back as condenser.
5/13/96	1100	Deep Creek	Units loaded cond. @ 1400, due to high river flow and 2460.9 feet
5/13/96	1900	Deep Creek	Units loaded to cond @ 2200
5/14/96	1120	Deep Creek	Units loaded on cost, "60.0", back to cond. @ 1200
5/15/96	0815	Deep Creek	Units loaded, at upper rule band of 2461.0 feet
5/15/96	0823	Deep Creek	Units back to cond., K.Christensen called and said it is National River cleanup day and RWT OKed the shutdown.
5/15/96	1600	Deep Creek	Units loaded due to high water
5/16/96	0703	Deep Creek	Units loaded, due to above Upper Rule Band, level of 2461.1 feet
5/16/96	2300	Deep Creek	# 1 & 2 units to condenser.
5/17/96	0500	Deep Creek	# 1 & 2 units loaded.
5/17/96	1000	Deep Creek	Units to Cond. for rafters, Roger Zbel
5/17/96	1050	Deep Creek	Units loaded, rafters cancelled per Roger Zbel
5/18/96	0050	Deep Creek	# 1 & 2 units to condenser.
5/18/96	0800	Deep Creek	Units loaded to hold lake. Level 2461.16
5/19/96	1000	Deep Creek	Units loaded to control lake level to cond @ 1300
5/19/96	1730	Deep Creek	#1 & #2 generators loaded on cost, 40Mil.
5/19/96	2310	Deep Creek	# 1 & 2 units to condenser.
5/20/96	0710	Deep Creek	Units loaded cost @ 55.0 to cond @ 0805
5/20/96	0900	Deep Creek	Units loaded on cost 55.0
5/20/96	2300	Deep Creek	To cond. Cost 38.0.
5/21/96	0730	Deep Creek	Units loaded cost 69.0
5/21/96	0815	Deep Creek	Units to cond
5/21/96	0915	Deep Creek	Units loaded on cost 69.0
5/21/96	1845	Deep Creek	Units to cond
5/21/96	2247	Deep Creek	Loaded. Cond at 2253
5/23/96	0800	Deep Creek	Units loaded high water level
5/24/96	1000	Deep Creek	Units loaded.
5/25/96	1000	Deep Creek	Units loaded cond. @ 1400

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
5/26/96	0800	Deep Creek	Units loaded, due to level above Upper Rule Band of 2461.0
5/26/96	2359	Deep Creek	To cond.
5/27/96	0800	Deep Creek	Units loaded
5/27/96	2359	Deep Creek	Units back to cond.
5/28/96	0800	Deep Creek	Units loaded
5/28/96	2359	Deep Creek	Units back to cond.
5/29/96	0800	Deep Creek	Units loaded to control high water levels
5/29/96	2359	Deep Creek	Units back to cond.
5/30/96	0800	Deep Creek	Units loaded to control high water levels
5/30/96	0930	Deep Creek	By-Pass valve operational and under supervisory control
5/31/96	0001	Deep Creek	Units loaded, above Upper Rule Band at 2061.4
5/31/96	1130	Deep Creek	# 1 & 2 units to condenser, safety factor per Roger Zabell.
5/31/96	1400	Deep Creek	# 1 & 2 units loaded.
5/31/96	2359	Deep Creek	Units back to cond.
6/ 1/96	0900	Deep Creek	# 1 & 2 units loaded.
6/ 1/96	2359	Deep Creek	Units back to cond.
6/ 2/96	0800	Deep Creek	# 1 & 2 units loaded.
6/ 2/96	2359	Deep Creek	Units back to cond.
6/ 3/96	0800	Deep Creek	# 1 & 2 units loaded.
6/ 4/96	0330	Deep Creek	Units to cond
6/ 4/96	0800	Deep Creek	# 1 & 2 units loaded.
6/ 4/96	2359	Deep Creek	Units to cond
6/ 6/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser @ 1300.
6/ 6/96	1422	Deep Creek	Units on line on cost
6/ 6/96	1730	Deep Creek	Units back to cond.
6/ 7/96	1000	Deep Creek	Units loaded. Cond 1300.
6/ 7/96	1442	Deep Creek	Loaded.
6/ 7/96	1745	Deep Creek	Units back to cond.
6/ 8/96	0835	Deep Creek	Loaded.
6/ 8/96	0851	Deep Creek	To cond.
6/ 8/96	0918	Deep Creek	Units loaded. Cost 45.0.
6/ 8/96	1432	Deep Creek	Units to cond. 11 unit hours have been used for today. GPU notified. 1 unit hour left for emergency run if necessary.
6/ 8/96	2050	Deep Creek	Units loaded, cost 50 Mills and level of 2461.1 feet
6/ 8/96	2200	Deep Creek	Units back to cond.
6/ 9/96	0800	Deep Creek	Units loaded due to high lake level 2461.27 feet. Will run till 2400. Tape revised.
6/ 9/96	2359	Deep Creek	Units to cond
6/10/96	0800	Deep Creek	Units loaded due to high lake level. 2461.2 feet. Will run till 2400.
6/10/96	1300	Deep Creek	Will be running load verification test till 1400.
6/10/96	2359	Deep Creek	Units to Cond.
6/11/96	0600	Deep Creek	Units loaded due to high lake level
6/11/96	2359	Deep Creek	Units on and loaded (24 hour operation per RWT)
6/12/96	0001	Deep Creek	Units on and loaded (24 hour operation per RWT)
6/12/96	2359	Deep Creek	Units loaded (24 hour operation per RWT)
6/13/96	0001	Deep Creek	Units loaded (24 hour operation per RWT)
6/13/96	2359	Deep Creek	Units to Cond.
6/14/96	1000	Deep Creek	Units loaded cond. @ 1300
6/14/96	1400	Deep Creek	Units loaded on cost, 50 mills
6/14/96	1700	Deep Creek	Units to cond
6/15/96	1230	Deep Creek	Units loaded, for cost of 49 Mills.
6/15/96	1815	Deep Creek	Units to cond cost 39.0
6/16/96	1117	Deep Creek	Units remained loaded due to cost of 42 Mills. back to cond. @ 1230 cost 30 Mills
6/17/96	1000	Deep Creek	Units loaded
6/17/96	1300	Deep Creek	Units remained loaded due to cost. 54 Mills.
6/17/96	1600	Deep Creek	Units to cond

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
6/18/96	1000	Deep Creek	Units loaded cond. (@) 1300
6/21/96	1100	Deep Creek	Units loaded
6/21/96	1300	Deep Creek	Units to cond
6/24/96	1000	Deep Creek	Units loaded
6/24/96	1300	Deep Creek	Units to cond
6/25/96	1415	Deep Creek	Units loaded on cost 61.5
6/25/96	1700	Deep Creek	Units to Cond on cost
6/25/96	2042	Deep Creek	Units loaded, Cond. (@) 2100
6/26/96	1155	Deep Creek	# 2 unit tripped low oil press on (@) 1216
6/26/96	2115	Deep Creek	Units loaded, Cond. (@) 2130
6/28/96	1000	Deep Creek	Units loaded full gate at Zbel's request. Cond. (@) 1300
6/29/96	1230	Deep Creek	Units loaded full gate for a 2 hour temperature enhancement release. Cond. (@) 1430
6/30/96	1100	Deep Creek	Units loaded full gate for water temp. enhancement, Cond. (@) 1300
7/ 1/96	1000	Deep Creek	Units loaded full gate for scheduled release, flow below 80 cfs
7/ 2/96	1410	Deep Creek	Units loaded full gate for temperature enhancement release, Cond. (@) 1510
7/ 2/96	1515	Deep Creek	# 1 & 2 units to condenser
7/ 4/96	1000	Deep Creek	Units loaded for Designated Release, Cond. (@) 1300
7/ 5/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser (@) 1300.
7/ 6/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser (@) 1300.
7/ 7/96	1200	Deep Creek	# 1 & 2 units loaded. temperature release unable to access Deep Creek spreadsheet.
7/ 8/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser (@) 1300.
7/ 9/96	1230	Deep Creek	# 1 & 2 units loaded, temperature release. Condenser (@) 1430.
7/ 9/96	1500	Deep Creek	Loaded on cost. 47.5 Cost loading not full gate. Oakland is 92cfs.
7/ 9/96	1700	Deep Creek	Units to cond. Cost is 38.0.
7/10/96	1210	Deep Creek	# 1 & 2 units loaded. Condenser (@) 1230.
7/12/96	1000	Deep Creek	Units loaded at full gate due to low river flow at Oakland. (This was a scheduled release). Flow at Oakland is 34cfs.
7/12/96	1300	Deep Creek	units to cond.
7/13/96	0700	Deep Creek	Spread-sheet unavailable due to L drive server problem.
7/13/96	1100	Deep Creek	Units fully loaded for temp release.
7/13/96	1300	Deep Creek	Units to cond.
7/14/96	0715	Deep Creek	No spreadsheet again. L drive is down.
7/14/96	1033	Deep Creek	Loaded. Full load.
7/14/96	1111	Deep Creek	Units left loaded for temp release. Also high cost.
7/14/96	1300	Deep Creek	Units left loaded.
7/14/96	1630	Deep Creek	Units back to cond.
7/15/96	0700	Deep Creek	Loaded due to high cost.
7/15/96	0800	Deep Creek	Will remain loaded till 1300 due to upper rule band & already scheduled run for today of 1000-1300.
7/15/96	1300	Deep Creek	To cond. Limited to 12 unit hours.
7/16/96	1320	Deep Creek	Units loaded on cost.
7/16/96	1920	Deep Creek	Units back to cond.
7/17/96	1100	Deep Creek	Units loaded for temperature release
7/17/96	1700	Deep Creek	Units back to cond.
7/19/96	1000	Deep Creek	Units loaded. operator reports (@) 5 inches of rain has fallen, dam level at 2460.5 feet
7/19/96	1518	Deep Creek	Plants reports 6 inches of since Thursday and dam level 2460.6 feet
7/19/96	2359	Deep Creek	Units to cond
7/20/96	0600	Deep Creek	Units loaded due to heavy rains
7/20/96	2200	Deep Creek	Units to cond
7/21/96	0730	Deep Creek	Units loaded, due to above upper rule band
7/22/96	0800	Deep Creek	Units loaded, above upper rule band
7/22/96	2359	Deep Creek	# 1 & 2 units to condenser.
7/23/96	0700	Deep Creek	Units loaded, above upper rule band
7/23/96	1650	Deep Creek	Units reduced to 6MW each due to loading on Garrett Tap

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
7/23/96	2000	Deep Creek	Units to cond
7/24/96	0800	Deep Creek	Units loaded, above upper rule band
7/24/96	2000	Deep Creek	Units to cond
7/25/96	0250	Deep Creek	# 1 unit loaded. Condenser @ 0255.
7/25/96	2220	Deep Creek	#1 & #2 generators loaded for 100% spinning.
7/25/96	2240	Deep Creek	#1 & #2 generators back as condenser.
7/26/96	0800	Deep Creek	Units loaded
7/26/96	2000	Deep Creek	#1 & #2 generators back as condenser.
7/27/96	0800	Deep Creek	Units loaded to control high water level
7/27/96	2000	Deep Creek	#1 & #2 generators back as condenser.
7/28/96	0800	Deep Creek	Units loaded to control high water level
7/28/96	2000	Deep Creek	#1 & #2 generators back as condenser.
7/29/96	0800	Deep Creek	Units loaded to control high water level
7/29/96	2000	Deep Creek	#1 & #2 generators back as condenser.
7/30/96	0800	Deep Creek	Units loaded to control high water level
7/30/96	2000	Deep Creek	#1 & #2 generators back as condenser.
7/31/96	0730	Deep Creek	Units loaded to control high water
7/31/96	2359	Deep Creek	Left loaded due to upper rule band level.
8/ 1/96	2000	Deep Creek	Units to cond
8/ 2/96	0700	Deep Creek	#1 & #2 generators loaded.
8/ 2/96	1100	Deep Creek	#1 & #2 generators back as condenser.
8/ 2/96	1349	Deep Creek	#1 generator temperature high alarm, normal @ 1350.
8/ 2/96	1400	Deep Creek	#1, & #2 generators loaded.
8/ 2/96	2100	Deep Creek	# 1 & 2 units to condenser.
8/ 3/96	0800	Deep Creek	#1 & #2 generators loaded.
8/ 3/96	2000	Deep Creek	# 1 & 2 units to condenser.
8/ 4/96	0845	Deep Creek	#1 & #2 generators loaded.
8/ 4/96	1615	Deep Creek	Reduced to relieve Garrett tie of 100% loading.
8/ 4/96	1828	Deep Creek	Units @ normal loading.
8/ 4/96	2100	Deep Creek	# 1 & 2 units to condenser.
8/ 5/96	0800	Deep Creek	#1 & #2 generators loaded.
8/ 5/96	2000	Deep Creek	# 1 & 2 units to condenser.
8/ 6/96	0800	Deep Creek	#1 & #2 generators loaded.
8/ 6/96	2000	Deep Creek	# 1 & 2 units to condenser.
8/ 7/96	0800	Deep Creek	#1 & #2 generators loaded.
8/ 7/96	2034	Deep Creek	# 1 & 2 units loaded. Condenser @ 2054.
8/ 8/96	0800	Deep Creek	#1 & #2 generators loaded.
8/ 8/96	2000	Deep Creek	To cond.
8/ 9/96	0800	Deep Creek	# 1 & 2 units loaded.
8/ 9/96	2000	Deep Creek	To cond.
8/10/96	0800	Deep Creek	# 1 & 2 units loaded.
8/10/96	2000	Deep Creek	Units to cond.
8/11/96	0800	Deep Creek	# 1 & 2 units loaded.
8/11/96	2000	Deep Creek	Units to cond.
8/12/96	0830	Deep Creek	# 1 & 2 units loaded.
8/12/96	2010	Deep Creek	To cond.
8/13/96	0800	Deep Creek	# 1 & 2 units loaded.
8/13/96	2000	Deep Creek	Units to cond.
8/14/96	0800	Deep Creek	# 1 & 2 units on line.
8/14/96	2000	Deep Creek	Units to cond.
8/15/96	0800	Deep Creek	# 1 & 2 units loaded.
8/15/96	2000	Deep Creek	Units back to cond.
8/16/96	1000	Deep Creek	Units loaded.
8/16/96	1600	Deep Creek	Units back to cond.
8/17/96	1000	Deep Creek	Loaded.
8/17/96	1600	Deep Creek	Units back to cond.
8/18/96	1000	Deep Creek	Units loaded.



<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
8/18/96	1630	Deep Creek	Units back to cond.
8/19/96	1000	Deep Creek	Units loaded.
8/19/96	1300	Deep Creek	Units to cond.
8/19/96	1418	Deep Creek	#1 unit loaded for plant test. Cond 1420.
8/19/96	1530	Deep Creek	#1 unit unavailable, due to a bad servo motor
8/22/96	1321	Deep Creek	Units loaded. To cond @ 1334 loaded in error (ELR)
8/23/96	1000	Deep Creek	#2 unit loaded cond. @ 1400
8/24/96	1000	Deep Creek	#2 unit loaded cond. @ 1400
8/24/96	1039	Deep Creek	#1 unit available
8/26/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser @ 1300.
8/29/96	1000	Deep Creek	Units loaded, scheduled for rafters
8/29/96	1600	Deep Creek	#2 generator back as condenser. #1 generator will not unload by EMS control, C. Rosenberry notified.
8/29/96	1700	Deep Creek	#1 generator back as condenser.
8/30/96	1000	Deep Creek	Units loaded to cond @ 1315
8/31/96	1000	Deep Creek	Units loaded to cond @ 1300
9/ 2/96	1000	Deep Creek	Units loaded to cond @ 1300
9/ 2/96	2050	Deep Creek	#1 & #2 generators loaded on cost 55.4Mils.
9/ 2/96	2140	Deep Creek	#1 & #2 generators back as condenser.
9/ 3/96	1000	Deep Creek	Units loaded
9/ 4/96	1000	Deep Creek	Units loaded to cond @ 1300
9/ 5/96	1000	Deep Creek	Units loaded to cond @ 1300
9/ 5/96	1545	Deep Creek	# 1 & 2 units loaded. cost 62.7. mils. Condenser @ 1745.
9/ 6/96	0730	Deep Creek	#1 & #2 generators loaded in anticipation of heavy rain in the area.
9/ 6/96	2215	Deep Creek	Reports lake level @ 2459.3 with 4.03 inches of rain recorded for the day to this point.
9/10/96	0001	Deep Creek	Units loaded, due to high water level
9/11/96	0001	Deep Creek	Units loaded, due to high water level
9/11/96	2359	Deep Creek	Units back to cond.
9/13/96	1000	Deep Creek	# 1 & 2 units loaded.
9/13/96	1600	Deep Creek	Units to cond.
9/14/96	0810	Deep Creek	# 1 & 2 units loaded. Condenser @ 0820.
9/14/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser @ 1300.
9/17/96	0800	Deep Creek	# 1 & 2 units loaded.
9/17/96	2000	Deep Creek	To cond.
9/18/96	0800	Deep Creek	# 1 & 2 units loaded.
9/18/96	2000	Deep Creek	Units to cond.
9/19/96	0800	Deep Creek	# 1 & 2 units loaded.
9/19/96	2000	Deep Creek	Units back to cond.
9/20/96	0800	Deep Creek	Units loaded.
9/20/96	1100	Deep Creek	#2 unit to cond., this was at request of rafters. due to high river flow naturally
9/20/96	1300	Deep Creek	#2 unit loaded.
9/20/96	2100	Deep Creek	Units back to cond.
9/21/96	0115	Deep Creek	Units loaded to cond @ 0125
9/21/96	0800	Deep Creek	Units loaded.
9/21/96	2000	Deep Creek	Units back to cond.
9/22/96	0800	Deep Creek	Units loaded.
9/22/96	2000	Deep Creek	Units back to cond.
9/23/96	0800	Deep Creek	Units loaded.
9/23/96	2000	Deep Creek	Units back to cond.
9/24/96	1000	Deep Creek	Units loaded.
9/24/96	1300	Deep Creek	Units to cond.
9/25/96	1000	Deep Creek	Units loaded.
9/26/96	1000	Deep Creek	Units loaded.
9/27/96	1000	Deep Creek	# 1 & 2 units loaded. Condenser @ 1300.
9/28/96	1000	Deep Creek	Units loaded cond. @ 1300

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Data</u>
9/30/96	1000	Deep Creek	Units loaded
9/30/96	2200	Deep Creek	Units to cond
10/ 1/96	1000	Deep Creek	Units loaded
10/ 1/96	2200	Deep Creek	Units to cond
10/ 2/96	1000	Deep Creek	Units loaded.
10/ 2/96	2200	Deep Creek	Units back to cond.
10/ 3/96	1000	Deep Creek	Units loaded cond. @ 1300
10/ 4/96	1000	Deep Creek	Units loaded to cond @ 1300
10/ 5/96	1000	Deep Creek	Units loaded to cond @ 1300
10/ 6/96	0300	Deep Creek	# 1 & 2 units loaded. Condenser @ 0315.
10/ 7/96	0700	Deep Creek	Units loaded
10/ 7/96	0710	Deep Creek	Units left loaded on cost to cond @ 0745
10/14/96	1000	Deep Creek	#1 & #2 generators loaded.
10/14/96	1300	Deep Creek	#1 & #2 generators back as condenser.



GPU Generation, Inc.  
Post Office Box 15152  
Reading, PA 19612-5152  
Tel 610-375-5000

Writer's Direct Dial:  
(610) 375-5827  
(610) 921-6601 (facsimile)

December 16, 1996

Mr. Steve Schreiner  
Versar Inc.  
ESM Operations  
9200 Rumsey Road  
Columbia, MD 21045-1934

Subject: Deep Creek Data

Dear Steve:

In response to your recent telephone request, please find enclosed printouts of the temperature enhancement release software program screen for the eight days in 1996 on which temperature enhancement releases were made. On six of the eight days, the temperature enhancement releases were made in strict accordance with the Water Temperature Enhancement Protocol (WTEP). The two exceptions were:

- July 7 - the operators were unable to access the spreadsheet beginning some time after 0900 hrs. and made a release 1200-1400 hrs.; application of the Contingency Protocol would have resulted in a release 1100-1300 hrs.
- July 13 - a release was made 1100-1300 hrs.; the WTEP would have required only a one-hour release (not later than 1230 hrs.).

If you have any question about this information, please call me.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'J. C. Phillips', written over the typed name.

J. C. Phillips

Enclosure

cc: T. N. Atherton  
H. B. Bernard  
R. I. McLean  
R. W. Thomas/R. D. Berkhimer (w/o encl.)

# Youghiogheny River Water Temperature Enhancement Plan

29-Jun-96

77.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700 > 30 25.03 Check again at 0900  
~~< 30 26.91 Release at 1100 for 2 hours~~

0900 > 30 25.13 Check again at 1100  
~~< 30 27.01 Release at 1100 for 2 hours~~

1100 All 26.33 Release at 1230 for 2 hours

~~1200 All 3.36 No further predictions necessary today~~

~~1400 All 6.82 No further predictions necessary today~~

~~1500 All 4.63 No further predictions necessary today~~

*Confirmed*

Tair	31.7	Air Temp, Elkins WV - Degree C
CCF	36	Cloud Cover Factor, Elkins WV
T7	19.13	River Temp Sang Run @700
T9	19.44	River Temp Sang Run @900
T11	20.65	River Temp Sang Run @1100
T12	0.00	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	77.0	River Flow at Oakland

89 Air Temp, Elkins WV - Degree F  
 PTCLDY Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

30-Jun-96

71.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700	> 30 <del>&lt;=30</del>	26.37 <del>28.01</del>	Check again at 0900 <del>Release at 1100 for 2 hours</del>
0900	> 30 <del>&lt;=30</del>	26.20 <del>27.84</del>	Release at 1100 for 2 hours <del>Release at 1100 for 2 hours</del>
1100	All	-3.12	No further predictions necessary today
1200	All	3.09	No further predictions necessary today
1400	All	6.88	No further predictions necessary today
1500	All	4.66	No further predictions necessary today

*Confirmed*

Tair	32.2	Air Temp, Elkins WV - Degree C
CCF	16	Cloud Cover Factor, Elkins WV
T7	20.73	River Temp Sang Run @700
T9	20.67	River Temp Sang Run @900
T11	0.00	River Temp Sang Run @1100
T12	0.00	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	71.0	River Flow at Oakland

90 Air Temp, Elkins WV - Degree F  
FAIR Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

02-Jul-96

## 58.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700 > 30 23.71 Check again at 0900  
~~< 30 24.83 Check again at 0900~~

0900 > 30 23.84 Check again at 1100  
~~< 30 24.96 Check again at 1100~~

1100 All 25.37 Check again at 1200

1200 All 25.08 Check again at 1400

1400 All 25.58 Release ASAP - not later than 1430 for 1 hour *confirmed*

~~1500 All 2.37 No further predictions necessary today~~

Tair	28.3	Air Temp, Elkins WV - Degree C
CCF	100	Cloud Cover Factor, Elkins WV
T7	19.74	River Temp Sang Run @700
T9	20.03	River Temp Sang Run @900
T11	21.36	River Temp Sang Run @1100
T12	21.92	River Temp Sang Run @1200
T14	23.78	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	58.0	River Flow at Oakland

83 Air Temp, Elkins WV - Degree F  
 TSTRMS Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

07-Jul-96

51.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700 > 30 24.86 Check again at 0900  
~~< 30 25.70 Check again at 0900~~

0900 > 30 25.50 Check again at 1100  
~~< 30 26.34 Release at 1100 for 2 hours~~

*unable to access spreadsheet  
 - Temperature enhancement  
 Release made 1200-1400 hrs.*

1100 All 1.08 No further predictions necessary today

1200 All 3.97 No further predictions necessary today

1400 All 6.59 No further predictions necessary today

1500 All 4.52 No further predictions necessary today

Tair	29.4	Air Temp, Elkins WV - Degree C
CCF	16	Cloud Cover Factor, Elkins WV
T7	16.54	River Temp Sang Run @700
T9	17.38	River Temp Sang Run @900
T11	0.00	River Temp Sang Run @1100
T12	0.00	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	51.0	River Flow at Oakland

85 Air Temp, Elkins WV - Degree F  
 Fair Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

09-Jul-96

92.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700 > 30 23.04 Check again at 0900  
~~< 30 25.52 Check again at 0900~~

0900 > 30 23.80 Check again at 1100  
~~< 30 26.28 Release at 1100 for 2 hours~~

1100 All 25.49 Release at 1230 for 2 hours

~~1200 All 1.85 No further predictions necessary today~~

~~1400 All 6.31 No further predictions necessary today~~

~~1500 All 4.39 No further predictions necessary today~~

*confirmed*

Tair	26.7	Air Temp, Elkins WV - Degree C
CCF	36	Cloud Cover Factor, Elkins WV
T7	19.78	River Temp Sang Run @700
T9	20.42	River Temp Sang Run @900
T11	21.51	River Temp Sang Run @1100
T12	0.00	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	92.0	River Flow at Oakland

80 Air Temp, Elkins WV - Degree F  
 PTCLDY Cloud Cover, Elkins WV



# Youghiogeny River Water Temperature Enhancement Plan

13-Jul-96

## 29.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
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0700 → ~~30~~ ~~25.19~~ ~~Check again at 0900~~  
 < = 30 25.15 Check again at 0900

0900 → ~~30~~ ~~25.14~~ ~~Check again at 1100~~  
 < = 30 25.10 Check again at 1100

*Release 1100-1300 confirmed*

1100 All 25.26 Check again at 1200

1200 All 26.20 Release ASAP - not later than 1230 for 1 hour

~~1400 All 7.07 No further predictions necessary today~~

~~1500 All 2.57 No further predictions necessary today~~

Tair	26.7	Air Temp, Elkins WV - Degree C
CCF	36	Cloud Cover Factor, Elkins WV
T7	18.70	River Temp Sang Run @700
T9	18.75	River Temp Sang Run @900
T11	20.36	River Temp Sang Run @1100
T12	22.29	River Temp Sang Run @1200
T14	0.00	<del>River Temp Sang Run @1400</del>
T15	0.00	<del>River Temp Sang Run @1500</del>
Q	29.0	River Flow at Oakland

80 Air Temp, Elkins WV - Degree F  
 PTCLDY Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

14-Jul-96

29.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	26.36	Check again at 0900
	< = 30	26.32	Check again at 0900
0900	> 30	26.47	Release at 1100 for 2 hours
	< = 30	26.43	Release at 1100 for 2 hours
1100	All	26.56	Release at 1230 for 2 hours
1200	All	2.76	<del>No further predictions necessary today</del>
1400	All	6.59	<del>No further predictions necessary today</del>
1500	All	4.52	<del>No further predictions necessary today</del>

*Confirmed*

Tair	29.4	Air Temp, Elkins WV - Degree C
CCF	36	Cloud Cover Factor, Elkins WV
T7	19.49	River Temp Sang Run @700
T9	19.71	River Temp Sang Run @900
T11	21.37	River Temp Sang Run @1100
T12	0.00	<del>River Temp Sang Run @1200</del>
T14	0.00	<del>River Temp Sang Run @1400</del>
T15	0.00	<del>River Temp Sang Run @1500</del>
Q	29.0	River Flow at Oakland

85 Air Temp, Elkins WV - Degree F  
HAZE Cloud Cover, Elkins WV

# Youghiogheny River Water Temperature Enhancement Plan

17-Jul-96

49.0 = CFS River Flow at Oakland

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
------	------------------	--	-------------------

0700	> 30	25.81	Check again at 0900
	< 30	26.57	Release at 1100 for 2 hours
0900	> 30	26.68	Release at 1100 for 2 hours
	< 30	27.44	Release at 1100 for 2 hours
1100	All	1.87	No further predictions necessary today
1200	All	3.62	No further predictions necessary today
1400	All	6.65	No further predictions necessary today
1500	All	4.55	No further predictions necessary today

*Confirmed*

Tair	30.0	Air Temp, Elkins WV - Degree C
CCF	1	Cloud Cover Factor, Elkins WV
T7	17.76	River Temp Sang Run @700
T9	18.68	River Temp Sang Run @900
T11	0.00	River Temp Sang Run @1100
T12	0.00	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	49.0	River Flow at Oakland

86 Air Temp, Elkins WV - Degree F  
SUNNY Cloud Cover, Elkins WV

DATE	SMAX	PenSMAX
01-Jun-96		15.1
02-Jun-96		15.7
03-Jun-96		15.2
04-Jun-96		15.2
05-Jun-96		17.3
06-Jun-96		17.6
07-Jun-96		19.2
08-Jun-96		19.0
09-Jun-96		18.3
10-Jun-96		16.9
11-Jun-96		16.7
12-Jun-96		15.9
13-Jun-96		16.3
14-Jun-96		19.1
15-Jun-96		20.5
16-Jun-96		21.6
17-Jun-96		20.5
18-Jun-96		22.4
19-Jun-96	23.3	23.0
20-Jun-96	23.4	23.2
21-Jun-96	22.1	22.5
22-Jun-96	24.7	24.4
23-Jun-96	26.1	26.4
24-Jun-96	22.7	21.7
25-Jun-96	23.2	23.2
26-Jun-96	24.3	24.6
27-Jun-96	25.0	24.8
28-Jun-96	21.2	21.6
29-Jun-96	25.4	24.1
30-Jun-96	24.3	23.5
01-Jul-96	24.6	23.7
02-Jul-96	25.8	26.0
03-Jul-96	19.7	19.9
04-Jul-96	18.6	19.1
05-Jul-96	20.9	21.7
06-Jul-96	21.8	22.4
07-Jul-96	22.5	22.0
08-Jul-96	21.8	21.6
09-Jul-96	24.4	24.2
10-Jul-96	22.6	22.6
11-Jul-96	23.8	23.9
12-Jul-96	21.0	21.3
13-Jul-96	22.4	22.2

14-Jul-96	23.1	23.2
15-Jul-96	19.5	19.6
16-Jul-96	24.7	24.2
17-Jul-96	22.0	21.8
18-Jul-96	20.2	20.2
19-Jul-96	20.3	20.4
20-Jul-96	18.6	18.8
21-Jul-96	17.7	17.7
22-Jul-96	17.3	17.5
23-Jul-96	17.4	17.6
24-Jul-96	18.4	18.3
25-Jul-96	18.4	18.5
26-Jul-96	18.6	18.3
27-Jul-96	18.6	18.6
28-Jul-96	19.0	18.6
29-Jul-96	19.6	19.4
30-Jul-96	19.9	19.4
31-Jul-96	19.1	18.9
01-Aug-96	17.3	17.5
02-Aug-96	17.4	17.8
03-Aug-96	18.4	18.7
04-Aug-96	19.0	19.3
05-Aug-96	19.7	19.7
06-Aug-96	19.8	19.5
07-Aug-96	20.5	20.0
08-Aug-96	20.7	20.3
09-Aug-96	20.8	19.8
10-Aug-96	19.9	19.6
11-Aug-96	19.2	19.2
12-Aug-96	18.7	19.3
13-Aug-96	17.4	18.4
14-Aug-96	18.5	19.3
15-Aug-96	19.5	19.9
16-Aug-96	19.3	19.3
17-Aug-96	19.2	19.5
18-Aug-96	20.0	20.2
19-Aug-96	21.4	22.2
20-Aug-96	23.9	24.2
21-Aug-96	23.4	24.0
22-Aug-96	23.1	23.6
23-Aug-96	21.7	22.1
24-Aug-96	20.8	21.4
25-Aug-96	23.0	23.6
26-Aug-96	22.2	23.4
27-Aug-96	22.5	22.6
28-Aug-96	21.2	21.4

29-Aug-96	19.8	19.9
30-Aug-96	21.6	22.4
31-Aug-96	21.4	21.8

APPENDIX C

FLOW BYPASS OPERATION RECORD

MONONGAHELA RIVER BASIN

03025600 YOUNGHOUGH RIVER NEAR OAKLAND, MD

LOCATION.--Lat 39°25'19", long 79°25'32", Garrett County, Hydrologic Unit 04020006, on left bank 200 ft downstream from Baltimore and Ohio Railroad bridge, 250 ft downstream from Little Younghoough River, 1.2 mi northwest of Oakland, and 1.5 mi upstream from Sunzard Lick Run.

DRAINAGE AREA.--134 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1941 to current year.

REVISED RECORDS.--wsp 1113: 1947(N).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 2,353.61 ft above sea level. Prior to Aug. 1, 1946, nonrecording gage at bridge 200 ft upstream at same datum.

REMARKS.--Records good except those for estimated daily discharges (ice effect), which are fair. Town of Oakland diverted an average of 0.4 ft<sup>3</sup>/s for water supply. The diversion is returned upstream from station as sewage. U.S. Army Corps of Engineers satellite telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1936 reached a stage of 15.3 ft. from 1100marks.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 19	1515	24,100	13.06	May 9	1030	2,850	6.16
Jan. 24	1800	3,240	6.45	May 29	1630	2,970	6.24
Feb. 9	0630	2,720	6.00	July 19	2345	6,800	9.27
Mar. 7	1700	2,110	5.99	Aug. 13	0445	2,350	5.63
May 6	0645	2,180	5.45	Sept. 7	0515	2,980	6.15

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
MEAN DAILY VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	76	336	151	2203	824	483	278	604	50	2150	51
2	13	70	605	762	2220	579	507	461	422	44	903	47
3	12	83	467	651	2180	435	463	467	372	110	552	48
4	11	94	597	577	2170	321	388	315	381	98	371	71
5	12	70	457	449	2150	348	389	1400	247	62	265	157
6	40	60	350	230	2140	1460	522	1900	191	46	203	741
7	33	72	310	2180	2195	1770	282	1100	151	38	153	2380
8	21	199	251	2160	620	1400	249	1060	386	60	135	1340
9	17	162	225	2155	2290	826	241	2350	1090	61	275	970
10	15	137	2180	2160	1100	2550	244	1430	526	40	157	819
11	13	184	2150	2150	1230	427	245	1200	328	32	117	726
12	13	354	148	2150	912	375	231	1490	318	27	430	327
13	12	240	140	2145	613	333	226	968	261	25	1850	407
14	41	214	160	2140	285	287	215	655	230	25	549	373
15	141	233	377	2150	384	1050	198	560	325	36	339	249
16	79	233	637	2160	291	1130	791	1360	198	49	298	251
17	44	219	685	2220	2220	759	761	1540	154	34	337	1510
18	31	226	542	2150	2200	619	600	1100	137	216	201	1510
19	27	350	827	2140	2190	693	531	730	208	3630	168	1070
20	28	344	629	4140	234	1590	442	509	233	4310	179	807
21	72	394	449	1270	560	983	345	656	171	1060	114	643
22	70	358	348	782	914	682	282	1060	128	1070	196	590
23	46	323	285	548	963	517	247	584	106	973	120	579
24	33	395	240	2050	1080	451	269	435	111	539	154	372
25	29	324	216	1990	792	611	204	353	174	360	180	337
26	29	285	187	1000	622	1030	188	296	113	276	109	296
27	28	409	177	1340	1550	689	202	574	86	206	92	267
28	44	1460	161	1090	2190	587	162	1050	70	164	86	267
29	157	1090	149	711	1320	607	150	2000	61	150	83	294
30	187	558	132	517	---	531	230	1900	54	410	69	416
31	104	---	134	401	---	441	---	955	---	3090	58	---
TOTAL	1440	9316	10827	30159	20035	22915	10187	30846	7691	17301	10871	18015
MEAN	46.5	311	349	973	691	739	340	985	256	558	351	600
MAX	187	1460	827	6740	2290	1770	791	2350	1090	4310	2150	2380
MIN	11	60	132	140	135	287	150	278	54	25	58	47
CFSM	.35	2.32	2.41	7.26	5.16	5.52	2.53	7.43	1.91	4.16	2.62	4.48
IM.	.40	2.59	3.01	8.37	5.56	6.36	2.83	8.56	2.14	4.80	3.02	5.00

a Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 1996, BY WATER YEAR (WY)

YEAR	113	239	409	434	498	607	451	337	201	164	134	89.3
MAX	608	1152	1027	973	1100	1477	879	995	730	629	586	600
(WY)	1955	1986	1973	1996	1986	1973	1996	1981	1978	1956	1996	
MIN	4.45	7.09	62.2	63.2	127	168	121	74.0	24.0	10.3	10.5	5.99
(WY)	1954	1954	1944	1977	1978	1990	1946	1982	1965	1953	1944	1953



UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - TOWSON PRIME 02/05/97

STATION NUMBER 03075500 YOUNGHOVENY R WR INKLAND, MD STREAM SOURCE AGENCY USGS  
 LATITUDE 392319 LONGITUDE 0792532 DRAINAGE AREA 134.00 DATUM 2553.41 STATE 24 COUNTY 02X  
 PROVISIONAL DATA DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997 SUBJECT TO REVISION  
 BAT-DISCHARGE  
 DAILY MEAN VALUES

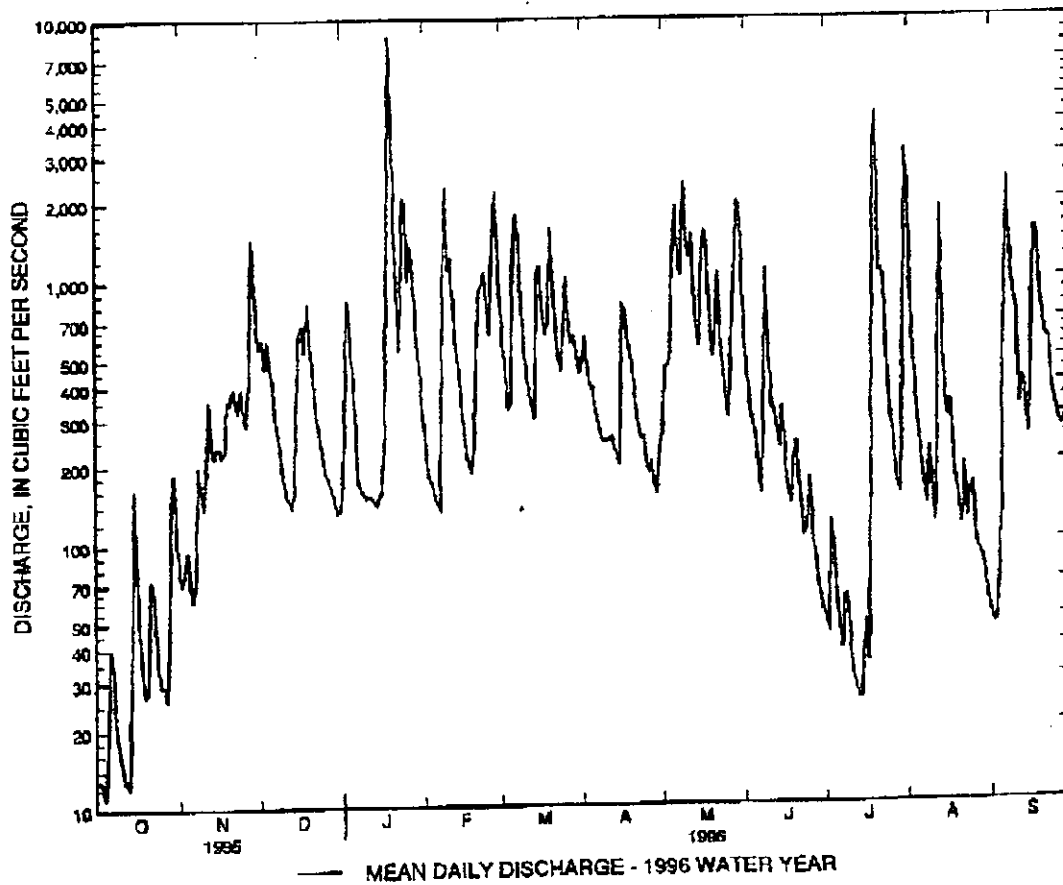
DAY	OCY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	143	233	1450	233	342							
2	129	208	2390	222	276							
3	124	181	1250	216	260							
4	110	161	773	206	328							
5	90	149	549	207	1230							
6	90	137	455	206								
7	86	131	376	174								
8	92	866	148	153								
9	127	1470	300	159								
10	204	900	262	163								
11	309	418	537	128								
12	164	466	1030	134								
13	145	360	1170									
14	141	313	943									
15	122	207	659	111								
16	112	276	510									
17			410									
18			329									
19	293		277									
20	1120			156								
21	1370		205	124								
22	1340	214	185	129								
23	875	172	262	510								
24	592	186	454	312								
25	427	180	269	770								
26	137	1380	808	517								
27	341	980	274	377								
28	374	625	292	1240								
29	386	453	293	713								
30	315	486	306	493								
31	270		253	380								
TOTAL												
MEAN												
MAX												
MIN												
AC-FT												
CFRM												
IN.												

MONONGAHELA RIVER BASIN

03076500 YOUGHIOGHEMY RIVER NEAR OAKLAND, MD--Continued

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR		FOR 1996 WATER YEAR		WATER YEARS 1941 - 1996	
ANNUAL TOTAL	83226.0		189603		306	
ANNUAL MEAN	228		518		518	
HIGHEST ANNUAL MEAN					193	
LOWEST ANNUAL MEAN					1947	
HIGHEST DAILY MEAN	1530	Feb 16	8740	Jan 19	8740	Jan 19 1996
LOWEST DAILY MEAN	9.5	Sep 11	11	Oct 4	2.5	Oct 4 1953
ANNUAL SEVEN-DAY MINIMUM	11	Sep 7	18	Oct 7	2.7	Oct 2 1953
INSTANTANEOUS PEAK FLOW			14100	JAN 19	(a)14100	JAN 19 1996
INSTANTANEOUS PEAK STAGE			13.06	JAN 19	13.06	JAN 19 1996
INSTANTANEOUS LOW FLOW			8.7	OCT 4	UNKNOWN	
ANNUAL RUNOFF (CFDM)	1.70		3.47		2.28	
ANNUAL RUNOFF (INCHES)	23.10		52.64		31.00	
10 PERCENT EXCEEDS	599		1110		723	
50 PERCENT EXCEEDS	137		295		165	
90 PERCENT EXCEEDS	18		48		24	

a. From rating curve extended above 7,000 ft<sup>3</sup>/s.



APPENDIX D

RECORD OF  
DISSOLVED OXYGEN MONITORING

## TESTS of DISSOLVED OXYGEN DURING STARTUP

### Summary of Results

Seventeen startup dissolved oxygen (DO) tests were performed in 1996, all with two unit operation. Results are summarized in Table D-1. The measured DO values at the start of the 17 tests ranged from 7.44 to 4.41 mg/l. The change in DO over the 15 minute test periods ranged from -0.53 to +2.11 mg/l, averaging approximately +0.58 mg/l. All but one of the 17 tests showed a net increase in DO at the end of the 15 minute test period. Although not evident from Table D-1, DO variation generally showed a positive correlation with temperature variation. Temperature and DO tended to decrease after the initial startup of generation. Gradually, both the temperature and the DO increased, eventually exceeding the values at the start of the test period.

Complete DO monitoring data for 1996 are attached.

**TABLE D-1**  
**Dissolved Oxygen (mg/l) During Startup Tests**

<u>DATE</u>	<u>No.</u>	<u>%</u>	<u>SLUICE</u>	<u>D.O.</u>	<u>D.O.</u>	<u>CHANG</u>
3-Jun	2	85	Open	7.44	7.47	0.03
18-Jun	2	98	Open	6.49	7.17	0.68
5-Jul	2	80	Open	5.62	5.76	0.14
8-Jul	2	100	2 Closed, 2 Open	5.83	7.52	1.69
19-Jul	2	100	2 Closed, 2 Open	5.71	7.82	2.11
23-Jul	2	100	2 Closed, 2 Open	5.67	6.29	0.62
30-Jul	2	100	2 Closed, 2 Open	5.53	5.86	0.33
6-Aug	2	84	2 Closed, 2 Open	5.46	5.72	0.26
14-Aug	2	92	2 Closed, 2 Open	5.13	5.56	0.43
19-Aug	2	94	2 Closed, 2 Open	4.92	4.94	0.02
26-Aug	2	100	2 Closed, 2 Open	4.66	5.63	0.97
29-Aug	2	100	2 Closed, 2 Open	4.51	4.89	0.38
4-Sep	2	98	2 Closed, 2 Open	4.41	4.95	0.54
13-Sep	2	88	2 Closed, 2 Open	5.98	5.45	-0.53
18-Sep	2	97	2 Closed, 2 Open	5.95	6.09	0.14
24-Sep	2	99	2 Closed, 2 Open	5.45	6.46	1.01
30-Sep	2	100	2 Closed, 2 Open	5.87	6.99	1.12
<b>AVERAGE</b>						<b>0.58</b>

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV.
	TIME	TEMP °C	DO (mg/l)	TIME			TEMP °C	DO (mg/l)		
1-01-96		Holiday - No one at station								
1-02-96		No readings - Inclement weather				Open			2022.3	2027.8
1-03-96	0725	19.7	8.95	0735	1.2		12.6		2022.4	2027.8
1-04-96	0725	12.7	9.35	0735	1.3		12.5		2022.4	2027.5
1-05-96	0720	15.6	8.61	0730	1.3		12.4		2022.4	2027.3
1-06-96		Saturday - No one at Station								
1-07-96		Sunday - No one at Station								
1-08-96		No Reading - Inclement Weather							2022.2	2027.6
1-09-96		No Reading - Inclement Weather							2022.2	2024.7
1-10-96		No Reading - Inclement Weather							2022.2	2024.7
1-11-96		No Reading - Inclement Weather							2022.2	2024.7
1-12-96		No Reading - Inclement Weather							2022.2	2024.7
1-13-96		Saturday - No one at Station								
1-14-96		Sunday - No one at Station								
1-15-96	0820	14.9	9.46	0835	2.5		10.25		2022.3	2024.6
1-16-96	0805	10.4	9.35	0813	1.7		11.10		2022.3	2024.6
1-17-96	0820	20.0	8.35	0833	1.7		11.58		2022.3	2024.7
1-18-96	0820	12.4	9.63	0833	1.7		11.75		2023.6	2025.3
1-19-96		No Reading - Inclement Weather								2028.1
1-20-96		Saturday - No one at Station								



DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION			DO MEASUREMENTS			NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR			NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	CAL. READINGS		DO (mg/l)	DOWNSTREAM TIME	TEMP °C	DO (mg/l)				TEMP °C	DO (mg/l)			
	TIME	TEMP °C												
2-01-96	No readings	- generating	straight through					2400 - 1100	Open					
2-02-96	0725	15.0	8.98	0730	2.0	11.01	2 - 100%	1300 - 2100	"					2028.1
2-03-96	Saturday	- No one at Station					2 - 100%	0700 - 1100	"				2022.6	2028.1
2-04-96	Sunday	- No one at Station						1700 - 2100						
2-05-96	No Readings	- Implement	Weather				2 - 88%	0650 - 1100	"					
2-06-96	No Reading	- Implement	Weather				2 - 100%	0600 - 1100	"				2022.2	2027.9
2-07-96	No Reading	- Taking #2	Unit off for Outage				1 - 100%	0700 - 1100	"				2022.3	2028.1
2-08-96	No Reading	- Implement	Weather				1 - 100%	0700 - 1100	"				2022.3	2024.6
2-09-96	0720	13.2	9.19	0730	2.2	9.7	1 - 100%	1700 - 2100	"				2022.2	2024.6
2-10-96	Saturday	- No one at Station						0700 - 2100	"				2025.2	2026.5
2-11-96	Sunday	- No one at Station												
2-12-96	0840	16.4	8.85	0845	2.1	9.7	1 - 100%	0618 - 2300	"					
2-13-96	No Reading	- Implement	Weather				1 - 100%	0700 - 2300	"				2022.4	2025.2
2-14-96	0720	14.2	7.2	0735	2.3	9.7	1-100%	0700 - 2300	"				2022.4	2025.0
2-15-96	0725	15.0	8.58	0735	2.3	9.68	1 - 100%	0700 - 2300	"				2022.4	2025.0
2-16-96	0725	12.1	8.85	0735	2.3	9.66	1 - 100%	0700 - 2300	"				2022.4	2024.9
2-17-96	Saturday	- No one at Station											2022.3	2024.8
2-18-96	Sunday	- No one at Station												
2-19-96	Holiday	- No one at Station												
2-20-96	No Reading	- Implement	Weather				2 - 81%	0700 - 1100 1600 - 2100	"				2022.4	2027.3

FEBRUARY - 1996





DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

JUNE - 1996

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	NO ONE at Station				TIME	TEMP °C		
6-01-96	Saturday	-	No one at Station								
6-02-96	Sunday	-	No one at Station								
6-03-96	0750	22.9	7.00	0803	13.5	7.44	2 - 85%	0800 - 2400	Open		2022.7
				0804	13.4	7.45					
				0805	13.2	7.46					
				0806	13.1	7.47					
				0807	12.9	7.48					
				0808	12.9	7.51					
				0809	12.4	7.56					
				0810	12.0	7.49					
				0811	11.8	7.49					
				0812	11.7	7.47					
				0813	11.6	7.45					
				0814	11.6	7.45					
				0815	11.6	7.44					
				0816	11.8	7.42					
				0817	12.3	7.47					
				0833	14.5	7.76					
6-04-96	0825	16.4	7.64	0835	14.1	7.64	2 - 80%	0800 - 2400	Open	2022.6	2027.4
6-05-96	1020	19.0	8.32	1035	13.8	8.13	2 - 93%	1000 - 1300	Open	2022.6	2028.0





DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSI)

JULY - 1996

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM TIME				TEMP °C	DO (mg/l)		
7-01-96	1025	26.6	7.42	1035	14.5	8.67	2 - 85%	1000 - 1300	Open	2021.9	2027.8
7-02-96	No Generation										
7-03-96	No Generation										
7-04-96	Holiday - No One At Station										
7-05-96	0955	17.0	9.00	10 03	12.6	5.62	2 - 80%	1000 - 1300	"	2021.9	2028.5
				1004	12.1	4.96					
				1005	12.1	4.87					
				1006	12.4	5.30					
				1007	12.1	5.46					
				1008	12.1	5.59					
				1009	12.1	5.65					
				1010	11.9	5.66					
				1011	11.8	5.65					
				1012	11.9	5.70					
				1013	11.9	5.68					
				1014	12.0	5.73					
				1015	12.1	5.73					
				1016	12.1	5.74					
				1017	12.2	5.76					
				1033	14.7	6.65					



DEEP CREEK STATION  
DISSOLVED-OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

JULY - 1996

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM TIME				TEMP °C	DO (mg/l)		
7-10-96	No Generation										
7-11-96	No Generation										
7-12-96	0950	22.5	8.43	1030	15.4	8.17	2 - 100%	1000 - 1300	2 Closed 2 Open	2021.8	2028.5
7-13-96	Saturday	- No One At Station									
7-14-96	Sunday	- No One At Station									
7-15-96	0720	22.5	8.41	0730	15.3	8.15	2 - 100%	0700 - 1300	" "	2021.8	2028.5
7-16-96	No Generation										
7-17-96	1115	22.3	8.34	1130	15.5	8.18	2 - 100%	1100 - 1700	" "	2021.7	2028.5
7-18-96	No Generation										
7-19-96	0950	22.1	8.40	1003	12.2	5.71	2 - 100%	1000 - 2400	" "	2023.7	2028.5
				1004	12.2	5.82					
				1005	12.1	6.11					
				1006	12.1	6.32					
				1007	12.1	6.41					
				1008	12.2	6.56					
				1009	12.1	6.74					
				1010	12.2	7.02					
				1011	12.1	7.13					
				1012	12.2	7.16					
				1013	12.2	7.24					

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION			DO MEASUREMENTS			NO. UNITS GENERATING	TIMES OF GENERATION	SLICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME	TEMP °C	DO (mg/l)				TIME	TEMP °C		
7-19-96	(Continued)			1014	12.1	7.44							
				1015	12.1	7.63							
				1016	14.1	7.67							
				1017	15.2	7.82							
				1033	15.4	8.02							
7-20-96			Saturday - No One At Station										
7-21-96			Sunday - No One At Station										
7-22-96			No Reading - Inclement Weather										
7-23-96	0650	19.5	8.52	0702	18.1	5.67	2 - 100%	0700 - 1900	2 closed 2 open 1'		2023.3	2028.5	
				0703	17.9	5.70							
				0704	17.0	6.08							
				0705	16.1	6.20							
				0706	15.8	6.14							
				0707	15.6	5.97							
				0708	15.1	5.84							
				0709	14.7	5.72							
				0710	14.4	5.61							
				0711	14.1	5.52							
				0712	13.8	5.48							
				0713	13.7	5.41							

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

JULY - 1996

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION CAL. READINGS		DO MEASUREMENTS DOWNSTREAM FROM WEIR			NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV †
	TIME	TEMP °C	DO (mg/l)	TEMP °C	DO (mg/l)				TIME	TEMP °C		
7-23-96	(Continued)											
7-24-96	0820	19.0	8.60	16.5	6.25	2 - 100%	0800 - 2000	2 Closed 2 Open 1'			2023.2	2028.5
7-25-96	0825	18.2	8.75	15.3	5.61	2 - 100%	0800 - 2000	" "			2022.8	2028.5
7-26-96	0820	19.1	7.37	16.4	6.23	2 - 100%	0800 - 2000	" "			2022.6	2028.5
7-27-96	Saturday	- No One At Station										
7-28-96	Sunday	- No One At Station										
7-29-96	0825	20.2	8.30	17.7	7.15	2 - 81%	0800 - 2000	" "			2022.3	2028.5
7-30-96	0800	20.4	8.36	14.6	5.53	2 - 100%	0800 - 2000	" "			2022.6	2028.5
				0806	14.4	5.51						
				0807	14.2	5.44						
				0808	14.7	5.46						
				0809	14.5	5.50						
				0810	14.1	5.33						
				0811	13.9	5.31						
				0812	13.7	5.28						
				0813	13.6	5.25						





DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

AUGUST - 1996

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM TIME				TEMP °C	DO (mg/l)		
8-01-96	No Reading	-	Running 24 hrs./day			0001 - 2000	2 Closed				
8-02-96	0725	16.8	8.41	0735	2 - 100%	0700 - 1100 1400 - 2100	2 Open 1"	17.4	6.44	2023.8	2028.5
8-03-96	Saturday	- No (one At Station)					" "				
8-04-96	Sunday	- No (one At Station)					" "				
8-05-96	0825	18.2	8.55	0835	2 - 88%	0800 - 2000	" "	18.0	6.36	2022.5	2028.5
8-06-96	0755	19.1	8.45	0805	2 - 84%	0800 - 2000	" "	14.9	5.46	2022.5	2028.5
				0806				15.0	5.47		
				0807				14.8	5.46		
				0808				14.6	5.40		
				0809				14.3	5.30		
				0810				14.2	5.28		
				0811				14.0	5.25		
				0812				13.8	5.19		
				0813				13.7	5.18		
				0814				13.7	5.18		
				0815				13.6	5.15		
				0816				13.6	5.13		
				0817				13.7	5.16		
				0818				15.3	5.48		
				0819				16.4	5.72		

DEEP-CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION			DO MEASUREMENTS			NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME	TEMP °C	DO (mg/l)				TIME	TEMP °C		
8-06-96	(Continued)			0835	18.3	6.31			2 Closed 2 Open.1'				
8-07-96	0825	21.4	8.16	0832	17.3	6.18	2 - 100%	0800 - 2000	" "			2022.4	2028.5
8-08-96	0825	20.8	8.09	0830	17.9	6.11	2 - 90%	0800 - 2000	" "			2022.2	2028.4
8-09-96	No Reading	- Inclement Weather											
8-10-96	Saturday	- No One at Station											
8-11-96	Sunday	- No One at Station											
8-12-96	No Reading	- Inclement Weather											
8-13-96	0825	16.9	8.53	0835	19.6	6.45	2 - 97%	0800 - 2000	" "			2024.6	2028.5
8-14-96	0755	15.6	8.47	0804	14.9	5.13	2 - 92%	0800 - 2000	" "			2023.4	2028.5
				0805	14.8	5.10							
				0806	14.8	5.08							
				0807	14.7	5.04							
				0808	14.3	4.96							
				0809	14.2	4.93							
				0810	14.2	4.92							
				0811	14.0	4.89							
				0812	13.9	4.87							
				0813	13.8	4.82							
				0814	13.8	4.83							
				0815	14.2	5.07							

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

AUGUST - 1996

(Instrument Calibrated to 2000-ft. - MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM FROM WEIR				TEMP °C	DO (mg/l)		
8-14-96	(Continued)			0816	15.4	5.19	2 Closed 2 Open 1"				
				0817	17.2	5.55					
				0818	17.3	5.56					
				0835	18.5	6.27					
8-15-96		16.6	8.20	0835	18.3	6.05	" "	0800 - 2000		2022.9	2028.5
8-16-96		19.8	8.11	1035	18.5	6.06	" "	1000 - 1600		2022.5	2028.5
8-17-96		Saturday - No One At Plant									
8-18-96		Sunday - No One At Plant									
8-19-96		17.1	8.65	1010	14.3	4.92	" "	1000 - 1600		2021.9	2028.5
				1013	14.8	4.99	2 Closed 2 Open 6"				
				1014	14.4	4.91					
				1015	14.1	4.75					
				1016	14.0	4.77					
				1017	14.0	4.68					
				1018	13.9	4.68					
				1019	13.9	4.69					
				1020	13.8	4.65					
				1021	13.8	4.67					
				1022	13.8	4.65					
				1023	14.5	4.83					

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

AUGUST - 1966

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM TIME				TEMP °C	DO (mg/l)		
8-19-96	(Continued)			1024	15.5	4.94	2 Closed 2 Open 6"				
8-20-96	No Generation			1038	18.8	5.81					
8-21-96	No Generation										
8-22-96	No Generation										
8-23-96	0830	8.23	19.8								
8-23-96	1025	7.60	20.8	1035	16.7	4.92	" "	0845	15.3	2.83	2022.2
8-24-96	Saturday	- No One At Station					" "				2022.2
8-25-96	Sunday	- No One At Station									2028.3
8-26-96	0930	15.4	9.04								
8-26-96	0955	17.0	7.98	1005	14.4	4.66	" "	0940	15.1	2.63	2022.3
				1006	14.7	4.62					2022.3
				1007	14.6	4.61					
				1008	14.3	4.68					
				1009	14.2	4.63					
				1010	14.1	4.61					
				1011	14.2	4.62					
				1012	14.2	4.60					
				1013	14.2	4.59					
				1014	14.2	4.57					

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS			NO. UNITS GENERATING	TIMES OF GENERATION	SLIICE GATE POSITION	DO MEASUREMENTS		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM TIME	TEMP °C				DO (mg/l)	UPSTREAM TIME		
8-26-96	(Continued)			1015	14.3	4.60		2 Closed 2 Open 6"				
				1016	15.2	4.79						
				1017	16.9	5.08						
				1018	17.8	5.21						
				1019	18.3	5.63						
				1035	19.3	5.72						
8-27-96	Kc Generation											
8-28-96	No Generation											
8-29-96	0930	18.3	8.44									
8-29-96	0950	17.7	7.80	1005	14.3	4.51			0935	14.9	2.52	2022.1
				1006	14.1	4.48						2022.1
				1007	14.5	4.49						
				1008	14.3	4.57						
				1009	14.0	4.54						
				1010	13.8	4.52						
				1011	13.8	4.51						
				1012	13.9	4.46						
				1013	13.9	4.48						
				1014	14.0	4.46						
				1015	13.9	4.45						



DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument-Calibrated to 2000-ft. MSL)

DATE	INSTRUMENT CALIBRATION CAL. READINGS		DO MEASUREMENTS DOWNSTREAM FROM WEIR		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV	
	TIME	TEMP °C	DO (mg/l)	TIME				TEMP °C	DO (mg/l)			TIME
9-01-96	Sunday	- No One At Station										
9-02-96	Holiday	- No One At Station										
9-03-96	1025	17.3	7.95	1035	18.9	5.23						
9-04-96	0925	19.7	7.43									
9-04-96	0955	19.1	7.45	1005	14.9	4.41				2022.0	2028.5	
				1006	15.0	4.52						
				1007	14.9	4.51						
				1008	14.7	4.50						
				1009	14.6	4.51						
				1010	14.6	4.51						
				1011	14.5	4.51						
				1012	14.5	4.46						
				1013	14.5	4.47						
				1014	14.5	4.47						
				1015	14.6	4.47						
				1016	14.6	4.45						
				1017	14.8	4.43						
				1018	16.5	4.60						
				1019	17.7	4.95						
				1035	19.9	5.27						

SEPTEMBER - 1996





DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

SEPTEMBER - 1966

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME				TEMP °C	DO (mg/l)		
9-13-96	(Continued)			1013	15.4	5.00	2 Closed 2 Open 6"				
				1014	15.4	5.02					
				1015	15.8	4.98					
				1016	16.5	5.16					
				1017	17.9	5.45					
				1035	19.5	6.11					
9-14-96		Saturday - No One At Station									
9-15-96		Sunday - No One At Station									
9-16-96		No Reading - Inclement weather									
9-17-96		No Reading - Inclement weather									
9-18-96	0755	17.7	8.67	8003	16.3	5.95	" "	0800 - 2000	2 ~ 97%	2024.6	2028.5
				8004	16.2	5.78					
				8005	16.0	5.62					
				8006	16.1	5.51					
				8007	16.1	5.50					
				8008	16.0	5.42					
				8009	15.8	5.31					
				8010	15.6	5.17					
				8011	15.5	5.09					
				8012	15.5	5.05					

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

(Instrument-Calibrated-to-2000-ft.-MSL)

DATE	INSTRUMENT CALIBRATION CAL. READINGS		DO MEASUREMENTS DOWNSTREAM FROM WEIR			NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME	TEMP °C				DO (mg/l)	TIME		
9-18-96	(Continued)			8013	15.5	5.04		2 Closed 2 Open 6'				
				8014	15.5	5.02						
				8015	15.8	5.13						
				8016	16.2	5.38						
				8017	17.1	6.09						
				8033	18.0	6.88						
9-19-96	8030	18.3	8.47	8040	17.9	6.80	2 - 9%	0800 - 2000	" "		2023.8	2028.5
9-20-96	8025	16.6	8.53	8035	17.8	6.68	2 - 100%	0800 - 2000	" "		2023.2	2028.5
9-21-96	Saturday	- No One At Station										
9-22-96	Sunday	- No One At Station										
9-23-96	0825	17.5	8.41	0835	17.3	6.69	2 - 98%	0800 - 2000	" "		2022.8	2028.5
9-24-96	0955	17.4	8.86	1003	16.4	5.45	2 - 99%	1000 - 2200	" "		2022.8	2028.5
				1004	16.4	5.57						
				1005	16.3	5.66						
				1006	16.2	5.68						
				1007	16.2	5.72						
				1008	16.1	5.71						
				1009	16.1	5.69						
				1010	16.1	5.66						
				1011	16.0	5.65						

DEEP CREEK STATION  
DISSOLVED OXYGEN MONITORING LOG

SEPTEMBER - 1996

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION CAL. READINGS		DO MEASUREMENTS DOWNSTREAM FROM WEIR		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	DO MEASUREMENTS UPSTREAM FROM WEIR		NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME				TEMP °C	DO (mg/l)		
9-24-96	(Continued)						2 closed 2 Open 6"				
				1012	16.0	5.65					
				1013	16.1	5.65					
				1014	16.1	5.66					
				1015	16.2	5.73					
				1016	16.4	5.85					
				1017	16.9	6.46					
				1033	17.5	7.39					
9-25-96	1025	16.7	8.49	1033	17.3	7.12	2 - 92%	1000 - 1300		2022.5	2028.5
9-26-96	1025	17.6	8.62	1033	17.2	7.43	2 - 97%	1000 - 1300		2022.4	2028.5
9-27-96	1025	18.2	8.69	1033	17.3	7.58	2 - 95%	1000 - 1300		2022.3	2028.5
9-28-96	Saturday - No One At Station										
9-29-96	Sunday - No One At Station										
9-30-96	0955	15.3	8.53	1003	16.4	5.87	2 - 100%	1000 - 2200		2022.2	2028.5
				1004	16.2	6.19					
				1005	16.3	6.50					
				1006	16.2	6.63					
				1007	16.2	6.64					
				1008	16.1	6.66					
				1009	16.1	6.69					
				1010	16.2	6.73					



APPENDIX E

REPORT ON RELEASES UNSUITABLE FOR  
WHITEWATER RECREATION

## Appendix E

### REPORT OF RELEASES UNSUITABLE FOR WHITEWATER RECREATION

Permit Condition 19 provides "When lake levels are between the upper and lower rule bands, no releases shall be made between the 1600 hours and 0800 hours of the following morning, unless the release also provides three consecutive hours of flows suitable for whitewater boating during the hours between 0800 hours and 1600 hours. The times and dates when generation releases not suitable for whitewater recreation occurred shall be documented in an annual report."

This Appendix documents the occurrence of all releases during the whitewater boating season that could be considered unsuitable for whitewater boating for one or more of the following reasons:

- The release was not announced in advance on the Permittee's regular telephone recording,
- The release was not at least three hours in length, or
- The release did not occur within the hours of 1000 - 1500 hours (May, September and October) or 1000 - 1600 hours (June, July and August).

The whitewater boating season is defined in Condition 19 as the period from April 15 through October 15. Information in this section is limited to this time period.

#### 1996 Scheduled Whitewater Releases

The lake level stayed at or near the Upper Rule Band for most of the 1996 whitewater boating season, occasionally exceeding the Upper Rule Band in all months. Scheduled water release commitments for whitewater boating were met with few exceptions. All releases were by two unit generation unless otherwise noted.

- Mondays: Condition 19 provides for releases between 1000 and 1300 hours on each Monday when the lake level is above the Lower Rule Band. All 1996 scheduled Monday releases were made with the exception of May 6, September 9 and 16 and October 7. However, high natural river flows on or proximal to May 6 (1900 cfs), September 9 (970 cfs, 1340 on September 8) and September 16 (351 cfs, 1510 on September 17) exceeded the criteria in Condition 19 requiring a reduction in generation. Releases were made from 1100 to 1400 hours instead of 1000 to 1300 hours on May 13.
- Fridays: Condition 19 provides for releases between 1000 and 1300 hours on each Friday when the lake level is above an elevation that is one foot below the Lower Rule Band. Scheduled 1996 Friday releases were made with the exception of May 3 and October 11. Only one unit generated on April 19 and September 20 at the request of the whitewater boaters. Generation was temporarily canceled on Friday, May 17 and 31 also at the request of the boaters. Releases began at 0700 hours on August 2 but were terminated at

## Appendix E

1100 hours due to high river conditions. Releases resumed at 1400 hours. On June 21, releases were made from 1100 - 1300 hours.

- **Designated Saturdays:** Scheduled Saturday releases were made on May 4, May 25 from 1000 - 1400 hours, June 1, July 6, July 20, August 3, and August 31. One unit generated from 0900 - 1200 hours on May 4 at the request of the whitewater boaters.
- **Special Releases:** A three hour special release was made on Thursday, July 4 for the holiday weekend boaters. A four hour release was scheduled for Wednesday, July 31 for the Slots o' Luck Race but actual releases ran from 0730 - 2359 hours due to high river conditions. A six hour special release was made on Thursday, August 29 for the Upper Yough Race. Additional special releases were made from Tuesday, October 1 through Thursday, October 3 to provide whitewater boating recreation for the entire week following the Gauley Festival.

### **Releases Unusable by Whitewater Boaters**

Tables 1 and 2 list all substantial releases from the Deep Creek Lake other than releases scheduled for the whitewater boaters. These releases include water discharged on days other than days scheduled with the boaters and water discharged on scheduled days but outside the time period scheduled with the whitewater boaters. Most of the releases listed on Tables 1 and 2 were announced on the telephone recording maintained by the Permittee and, therefore, were available for boating. However, since the Permittee does not track messages made on the recording, these announced releases are included on the tables. None of the releases listed on Tables 1 or 2 jeopardized releases previously scheduled for the whitewater boaters.

**Table 1**

### **Releases made on days with no scheduled whitewater boating releases**

<u>Day/Date</u>	<u>Hours</u>	<u>Comments</u>
Tue.-April 23	1000-1015 1430-1900	High System Cost High System Cost
Sun.-April 28	2011-2020	Emergency Orders - 100% Spinning
Wed.-May 8	0800-0001 (5/9)	High Lake Water Level
Thu.-May 9	0800-0001 (5/10)	High Lake Water Level
Sat.-May 11	0820-0001 (5/12)	High Lake Water Level
Sun.-May 12	0800-0001 (5/13)	High Lake Water Level
Tue.-May 14	1120-1200	High System Cost
Wed.-May 15	0815-0823 1600-?	High Lake Water Level High Lake Water Level
Thu.-May 16	0703-2300	High Lake Water Level
Sat.-May 18	0800-?	High Lake Water Level



## Appendix E

Sun.-May 19	1000-1300	High Lake Water Level
	1730-2310	High System Cost
Tue.-May 21	0730-0815	High System Cost
	0915-1845	High System Cost
	2247-2253	High System Cost
Thu.-May 23	0800-2359	High Lake Water Level
Sun.-May 26	0800-2359	High Lake Water Level
Tue.-May 28	0800-2359	High Lake Water Level
Wed.-May 29	0800-2359	High Lake Water Level
Thu.-May 30	0800-0930	High Lake Water Level
Sun.-June 2	0800-2359	High Lake Water Level
Tue.-June 4	0800-2359	High Lake Water Level
Thu.-June 6	1000-1300	High System Cost
	1422-1730	High System Cost
Sat.-June 8	0835-0851	Emergency Orders - 100% Spinning
	0918-1432	High System Cost
	2050-2200	High System Cost/High Lake Water Level
Sun.-June 9	0800-2359	High Lake Water Level
Tue.-June 11	0600-2359	High Lake Water Level
Wed.-June 12	0001-2359	High Lake Water Level
Thu.-June 13	0001-2359	High Lake Water Level
Sat.-June 15	1230-1815	High System Cost
Sun.-June 16	1117-1230	High System Cost
Tue.-June 18	1000-1300	Available Generation
Tue.-June 25	1415-1700	High System Cost
	2042-2100	Emergency Orders - 100% Spinning
Wed.-June 26	2115-2130	Emergency Orders - 100% Spinning
Sat.-June 29	1230-1430	Temperature Enhancement
Sun.-June 30	1100-1300	Temperature Enhancement
Tue.-July 2	1410-1515	Temperature Enhancement
Sun.-July 7	1200-1400	Temperature Enhancement
Tue.-July 9	1230-1430	Temperature Enhancement
	1500-1700	High System Cost
Wed.-July 10	1210-1230	Emergency Orders - 100% Spinning
Sat.-July 13	1100-1300	Temperature Enhancement
Sun.-July 14	1033-1630	Temperature Enhancement/High System Cost
Tue.-July 16	1320-1920	High System Cost
Wed.-July 17	1100-1700	Temperature Enhancement
Sun.-July 21	0730-2000	High Lake Water Level
Tue.-July 23	0700-2000	High Lake Water Level
Wed.-July 24	0800-2000	High Lake Water Level
Thu.-July 25	0250-0255	Emergency Orders - 100% Spinning
	2220-2240	Emergency Orders - 100% Spinning
Sat.-July 27	0800-2000	High Lake Water Level
Sun.-July 28	0800-2000	High Lake Water Level
Tue.-July 30	0800-2000	High Lake Water Level
Thu.-Aug. 1	0000-2000	High Lake Water Level

## Appendix E

Sun.-Aug 4	0845-2100	High Lake Water Level
Tue.-Aug 6	0800-2000	High Lake Water Level
Wed.-Aug 7	0800-2054	High Lake Water Level
Thu.-Aug 8	0800-2000	High Lake Water Level
Sat.-Aug 10	0800-2000	High Lake Water Level
Sun.-Aug 11	0800-2000	High Lake Water Level
Tue.-Aug 13	0800-2000	High Lake Water Level
Wed.-Aug 14	0800-2000	High Lake Water Level
Thu.-Aug 15	0800-2000	High Lake Water Level
Sat.-Aug 17	1000-1600	High Lake Water Level
Sun.-Aug 18	1000-1630	High Lake Water Level
Sat.-Aug 24	1000-1400	High Lake Water Level
Tue.-Sept. 3	1000-1300	High Lake Water Level
Wed.-Sept. 4	1000-1300	High Lake Water Level
Thu.-Sept. 5	1000-1300	High Lake Water Level
	1545-1745	High System Cost
Tue.-Sept 10	0001-2359	High Lake Water Level
Wed.-Sept 11	0001-2359	High Lake Water Level
Sat.-Sept 14	0810-0820	Emergency Orders - 100% Spinning
	1000-1300	High Lake Water Level
Tue.-Sept 17	0800-2000	High Lake Water Level
Wed.-Sept. 18	0800-2000	High Lake Water Level
Thu.-Sept. 19	0800-2000	High Lake Water Level
Sat.-Sept 21	0115-0125	Emergency Orders - 100% Spinning
	0800-2000	High Lake Water Level
Sun.-Sept. 22	0800-2000	High Lake Water Level
Tue.-Sept 24	1000-1300	High Lake Water Level
Wed.-Sept 25	1000-1300	High Lake Water Level
Thu.-Sept 26	1000-1300	High Lake Water Level
Sat.-Sept. 28	1000-1300	High Lake Water Level
Sat.-Oct. 5	1000-1300	High Lake Water Level
Sun.-Oct. 6	0300-0315	Emergency Orders - 100% Spinning

Appendix E

**Table 2**

**Releases made on scheduled release days but outside of the scheduled release period**

<u>Day/Date</u>	<u>Hours</u>	<u>Comments</u>
Tue.-April 16	0900-1000	High System Cost
Mon.-April 22	1300-1600	High System Cost
Mon.-May 6	1800-0001 (5/7)	High Lake Water Level
Fri.-May 10	0800-1000	High Lake Water Level
	1300-2359	High Lake Water Level
Mon.-May 13	1900-2200	High Lake Water Level
Fri.-May 17	0500-1000	High Lake Water Level
	1050-0050 (5/18)	High Lake Water Level
Mon.-May 20	0710-0805	High System Cost
	0900-1000	High System Cost
	1300-2300	High System Cost
Mon.-May 27	0800-1000	High Lake Water Level
	1300-2359	High Lake Water Level
Fri.-May 31	0001-1000	High Lake Water Level
	1400-2359	High Lake Water Level
Sat.-June 1	0900-1000	High Lake Water Level
	1300-2359	High Lake Water Level
Mon.-June 3	0800-1000	High Lake Water Level
	1300-0330 (6/4)	High Lake Water Level
Fri.-June 7	1442-1745	Emergency Orders - 100% Spinning
Mon.-June 10	0800-1000	High Lake Water Level
	1300-2359	High Lake Water Level
Fri.-June 14	1400-1700	High System Cost
Mon.-June 17	1300-1600	High System Cost
Mon.-July 15	0700-1000	High System Cost
Fri.-July 19	1300-2359	Heavy Rainfall/ High Lake Water Level
Sat.-July 20	0600-1000	Heavy Rainfall/ High Lake Water Level
	1300-2200	Heavy Rainfall/ High Lake Water Level
Mon.-July 22	0800-1000	High Lake Water Level
	1300-2359	High Lake Water Level
Fri.-July 26	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level
Mon.-July 29	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level
Wed.-July 31	0730-1000	High Lake Water Level
	1400-2359	High Lake Water Level
Fri.-Aug 2	0700-1100	High Lake Water Level
	1400-2100	High Lake Water Level
Sat.-Aug 3	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level
Mon.-Aug 5	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level

## Appendix E

Fri.-Aug 9	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level
Mon.-Aug 12	0830-1000	High Lake Water Level
	1300-2010	High Lake Water Level
Fri.-Aug 16	1300-1600	High Lake Water Level
Fri.-Aug 23	1300-1400	High Lake Water Level
Fri.-Aug 30	1300-1315	Emergency Orders - 100% Spinning
Mon.-Sept 2	2050-2140	High System Cost
Fri.-Sept 6	0730-1000	High System Cost
Fri.-Sept 13	1300-1600	High Lake Water Level
Fri.-Sept 20	0800-1000	High Lake Water Level
	1300-2100	High Lake Water Level
Mon.-Sept 23	0800-1000	High Lake Water Level
	1300-2000	High Lake Water Level
Mon.-Sept 30	1300-2200	High Lake Water Level
Tue.-Oct 1	1300-2200	High Lake Water Level
Wed.-Oct 2	1300-2200	High Lake Water Level
Mon.-Oct. 7	0700-0745	High System Cost

**APPENDIX F**

**ZEBRA MUSSEL MONITORING REPORT**

## Memorandum



**Subject:** GPU ZEBRA MUSSEL MONITORING PROGRAM - DEEP CREEK HYDROELECTRIC STATION      **Date:** January 21, 1997

**From:** R. L. Grove - Sr. Chemist, E&CS      **Location:** Reading  
E740-97-0003

**To:** T. R. Teitt - Water Resources, GENCO

This memo on the results of GPU's Zebra Mussel Monitoring Program at the Deep Creek Hydroelectric Station in 1996 is provided in accordance with Permit Condition 21 with the State of Maryland Department of Natural Resources.

GPU Nuclear Environmental & Chemistry Services (GPUN E&CS) began a Zebra Mussel Monitoring Program at Deep Creek in 1992. A star substrate has been placed at the Station intake area in Deep Creek Lake which is checked monthly (June through October) by Station personnel for the presence and/or attachment of zebra mussels. Water temperatures are recorded monthly for the substrate location as well as at the Station tailrace location. Attached are copies of the monthly "Field Collection Sheets" for the Zebra Mussel Monitoring Program as supplied by Station personnel for 1996.

GPUN E&CS conducted monthly zebra mussel veliger sampling via plankton net/microscopic identification from June through October 1996 at the Deep Creek Hydroelectric Station. Field observations have indicated no presence of zebra mussels at Deep Creek Lake.

Zebra mussels have been confirmed in western Pennsylvania in the Allegheny, Monongahela and Ohio Rivers, therefore the spread of the mussels into other fresh waters of Pennsylvania and Maryland appears inevitable. Projected activities for 1997 include monthly zebra mussel veliger sampling via plankton net/microscopic identification from June through October 1997 at the Deep Creek Hydroelectric Station. The substrate will continue to be monitored by Station personnel. Water samples will be collected and monitored for calcium as an indicator of zebra mussel colonization potential. During 1997 GPUN E&CS will develop an action plan for the Deep Creek Hydroelectric Station. This includes a review of the operational water uses at the facility and mitigation strategies for the control of zebra mussels at the Station.

Should you have any questions concerning the GPU Zebra Mussel Monitoring Program, please contact me at (610) 375-5046.

  
R. L. Grove

cc: R. C. Bosold

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: Deep Creek Dam

Date: 06/03/96

Sampled by: Charles A. Rosenberg

Time: 2<sup>00</sup> PM

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	1. Lake elev. 2461.1
			2. Outside air temperature - 68°F
			3. Lake surface water temperature 68°F
			4. Water temperature where device is 66°F
			5. Condition of star sampler - had a light coating of mud, clean up and put back in.
			6. Lake Calm - Cloudy Sky.

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: DEEP CREEK DAM

Date: 7-01-96

Sampled by: H. B. BERNARD

Time: 2<sup>15</sup> PM

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	Lake Elevation = 2460.70
			Ambient Temp. 85°F
			Lake Surface Water Temp. 75°F
			Water Temp. at Sampler Elev. 71°F
			Lake Calm - Clear Sky.

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)



GPU ZEBRA MUSSEL PROGRAM  
Field Collection

Facility Name: Deep Creek

Date: 7/16/96

Sampled by: Tom Grove

Time: 1100

SAMPLE DATA

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1.	3	0	Veliger Sampling

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

WATER QUALITY DATA

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: DEEP CREEK DAM

Date: 08/02/96

Sampled by: C. A. Rosenberry

Time: 9<sup>00</sup>AM

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	1. LAKE Elevation - 2460.5
			2. Ambient Temp. 60°F
			3. Lake Surface Water Temp. 73°F
			4. Water Temp. at Sampler Elev. 71°F
			5. Lake calm - Clear sky
			6. Condition of star sampler, had a light coating of mud, clean up and put back in

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: Deep Creek Dam

Date: September 3, 1996

Sampled by: Charles A. Rosenberry

Time: 10<sup>30</sup> AM

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	1. Lake elevation - 2458.9
			2. Ambient Temp. - 76°F
			3. Lake Surface Water Temp. - 77°F
			4. Water temp. at sampler elev. - 77°F
			5. Lake - Calm and Sunny
			6. Condition of star sampler - had a light coating of mud, clean up and reinstall.

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: Deep Creek Dam

Date: 10/01/96

Sampled by: Charles A. Rosenberry

Time: 12<sup>30</sup> Noon

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	1. Lake elev. 2458.6
			2. Ambient Temp. 68°F
			3. Lake surface Water Temp. 68°F
			4. Water temp. at sampler elev. 68°F
			5. Lake - small wave action, windy + sunny
			6. Condition of Star sampler - had a light coating of mud, cleanup and reinstall.

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)

**GPU ZEBRA MUSSEL PROGRAM**  
Field Collection

Facility Name: Deep Creek Dam

Date: 11-01-96

Sampled by: Harland B. Bernard

Time: 10<sup>30</sup> AM

**SAMPLE DATA**

Sampler Tag ID	Sampler Type	# Mussels Present	Comments
DC-1	Star	None	Lake Elev. 2457.80
			Ambient Temp. 38°F
			Lake Surface Water Temp. 49°F
			Water Temp. at Sampler Elev. 50°F
			Lake Rough - Overcast Skies.
			Pulled Sampler for Winter.

Sampler Type: 1 = Biobox, 2 = Plate sampler, 3 = Star sampler, 4 = Other

**WATER QUALITY DATA**

Station Tag ID	Temp.	Diss. Oxygen	pH	Other

Send completed sheet interoffice:

Tom Teitt  
TMI - NOB 1  
Environmental Affairs  
(Phone # 3-992-8177)