

**DEEP CREEK HYDROELECTRIC STATION
MARYLAND DEPARTMENT of the ENVIRONMENT
WATER APPROPRIATION PERMIT NO. GA92S009 (03)
GARRETT COUNTY, MARYLAND**

ANNUAL REPORT for 2001

January 2002

BY

RELIANT ENERGY MARYLAND HOLDINGS, LLC

**DEEP CREEK HYDROELECTRIC STATION
MDE WATER APPROPRIATION PERMIT NO. GA92S009 (03)
ANNUAL REPORT for 2001**

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**DEEP CREEK HYDROELECTRIC STATION
MDE WATER APPROPRIATION PERMIT NO. GA92S009 (03)
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1.0 SUMMARY

Reliant Energy Maryland Holdings, LLC (Permittee) holds Water Appropriation Permit GA92S009(03) issued by the Maryland Department of the Environment (Department). Permit GA92S009(03) provides for the continued operation of the Deep Creek Hydroelectric Station.

Permit Condition 23 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

Appendix A contains daily water level data for 2001. Lake levels exceeded the desired end of the month Upper Rule Band by 0.2 feet in February, 0.4 feet in March, 0.1 feet in April and 0.3 feet in May. The maximum desirable reservoir levels at the end of each month were attained in January and June through December. Water levels in the reservoir were maintained above the Lower Rule Band for the entire year.

The reservoir levels were above or near the Upper Rule Band for much of May and June. Over 3.5 inches of rain fell during the last half of the May, resulting in higher than normal reservoir levels. The highest reservoir level in May was 2461.5 feet, 0.5 feet above the Upper Rule Band. The highest water elevation during the year was 2461.7 feet on June 8, 0.7 feet above the rule band. The reservoir received over 2.5 inches of rain between June 1 and June 7. Water levels in the reservoir were within the rule bands from July 11 through the end of the year.

1.2 Temperature Monitoring

The Permittee monitored water temperature in the Youghiogheny River in accordance with "Deep Creek Station, Water Temperature Enhancement Plan" (approved June 8, 1996, revised September 2001). The Plan was designed to maintain river water temperatures below 25°C in the Youghiogheny River. The Permittee released water in accordance with the Water Temperature Enhancement Plan on twelve days in 2001. River water temperatures exceeded 25°C on June 19, 26, 28 and 30; July 1; and August 7, 8, 9, 11 and 15.

The temperature enhancement protocol was not required on June 19 and 28 and August 7 and 15 since river flows at Oakland exceeded 100 cfs. Both units were loaded for a 2-hour release on June 30, but Unit-1 tripped and could not be restarted for about 40 minutes. The resultant release was not enough to prevent the temperatures from exceeding 25°C. The protocol required a 1-hour release by 1430 hours on July 1. However, the remote dispatch capabilities between the Houston Dispatch Center and Deep Creek Power Plant malfunctioned and the release did not occur until nearly 1730 hours. The late release failed to maintain river temperatures below 25°C. Deep Creek Power Plant generated for six hours starting at 1225 on August 8 and over 6½ hours starting at 1148 on August 9. Neither release prevented water temperatures from exceeding 25°C. A release was not required per the protocol on June 26 and August 11.

Days when temperatures exceeded 25°C and days when temperature enhancement releases were made are summarized in Appendix B. Log sheets for each of these dates also are enclosed in Appendix B.

1.3 Minimum Flow Release Monitoring

The Permittee operated the flow bypass in accordance with the "Deep Creek Station Flow Bypass Operation Protocol" (May 1995, revised September 2001). Minimum bypass flows were required on 20 dates between September 15 and November 19, 2001. Flows required by the protocol ranged from 2-cfs on several dates to 11-cfs on October 14. Appendix C provides a summary of flow bypass data for 2001. A record of the U.S. Geological Survey data from the Oakland gaging station also is presented in Appendix C.

1.4 Dissolved Oxygen (DO) Monitoring

The Permittee operated the dissolved oxygen enhancement weir during 2001 in accordance with the "Dissolved Oxygen (DO) Enhancement Operations and Monitoring Protocol" approved by the Department on January 6, 1995. Data obtained from monitoring DO in 2001 are included in Appendix D.

The DO levels in the tailrace first fell below 6.0 mg/l on July 19, when the Permittee measured DO levels of 5.54 mg/l. DO levels dropped to 4.34 mg/l on August 13 despite the gates set in the closed or near closed position. This is the first time since implementation of the Protocol that DO levels fell below 6.0 mg/l with the sluice gates nearly closed. The low DO levels measured on July 19 and August 13 both occurred with only one unit operating. Due to high natural flows, Permittee operated only one unit on both dates in accordance with the permit. DO levels were measured on one other date with single unit operation, July 6. DO values were low (6.05 mg/l) but above the standard of 6.0 mg/l. It is possible single unit operation does not provide enough turbulence to raise DO levels as water spills over the weir. This will be monitored closely in future years to determine if alternative gate positioning is required.

Aside from July 19 and August 13, no other DO measurements were below 6.0 mg/l.

1.5 Releases Unsuitable for Whitewater Recreation

Permit Condition 19 outlines several operating rules designed to enhance whitewater boating opportunities in the Youghiogheny River. One operating rule restricts generation during certain times of the day unless flows suitable for whitewater boating also occur.

The specific criteria for this operating rule:

- apply only from April 15 through October 15,
- apply only when the lake is between the upper and lower rule bands,
- may be suspended during emergency conditions described in Condition 14, and
- prohibit releases between 1600 hours and 0800 hours of the following morning unless:
 1. a release providing 3 consecutive hours suitable for whitewater boating occurs during the 0800 to 1600 hour period immediately preceding the release.
 2. a release providing 3 consecutive hours suitable for whitewater boating occurs during the 0800 to 1600 hour period immediately following the release.

Condition 19 requires the Permittee to document "times and dates when generation releases not suitable for whitewater recreation occurred." Using the criteria above, generation releases not suitable for whitewater recreation did not occur during 2001.

1.6 Zebra Mussel Monitoring

Artificial substrates placed at the station intake area during 2001 showed no signs of the zebra mussel infestation.

APPENDIX A

LAKE LEVEL DATA

Deep Creek Lake Level 2001

Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall
Jan	1	2455.6	0.05	Feb	1	2456.5	0.00	Mar	1	2458.2	0.00
	2	2455.6	0.00		2	2456.5	0.15		2	2458.2	0.00
	3	2455.6	0.05		3	2456.5	0.00		3	2458.2	0.00
	4	2455.8	0.00		4	2456.5	0.00		4	2458.3	0.50
	5	2455.8	0.25		5	2456.6	0.00		5	2458.4	0.65
	6	2455.8	0.15		6	2456.6	0.05		6	2458.4	0.30
	7	2455.8	0.00		7	2456.6	0.00		7	2458.3	0.05
	8	2455.9	0.03		8	2456.8	0.00		8	2458.2	0.05
	9	2455.9	0.05		9	2456.9	0.00		9	2458.3	0.05
	10	2455.8	0.00		10	2457.0	0.00		10	2458.3	0.00
	11	2455.7	0.00		11	2457.2	0.00		11	2458.3	0.00
	12	2455.7	0.00		12	2457.3	0.00		12	2458.3	0.40
	13	2455.7	0.00		13	2457.3	0.00		13	2458.4	0.50
	14	2455.7	0.00		14	2457.3	0.60		14	2458.6	0.00
	15	2455.7	0.00		15	2457.8	0.80		15	2458.9	0.00
	16	2455.6	0.00		16	2458.1	0.55		16	2459.0	0.55
	17	2455.6	0.00		17	2458.2	0.00		17	2459.0	0.27
	18	2455.6	0.05		18	2458.2	0.00		18	2459.0	0.00
	19	2455.7	0.70		19	2458.1	0.00		19	2459.3	0.00
	20	2455.7	0.40		20	2458.1	0.00		20	2459.3	0.00
	21	2455.7	0.10		21	2458.2	0.00		21	2459.4	0.70
	22	2455.7	0.00		22	2458.2	0.00		22	2459.5	0.10
	23	2455.8	0.00		23	2457.9	0.50		23	2459.7	0.00
	24	2455.7	0.05		24	2457.9	0.00		24	2459.7	0.25
	25	2455.7	1.00		25	2457.9	0.00		25	2459.7	0.00
	26	2455.7	1.00		26	2458.0	0.00		26	2459.9	0.10
	27	2455.8	0.00		27	2458.0	0.00		27	2459.9	0.00
	28	2455.8	0.05		28	2458.1	0.10		28	2459.8	0.00
	29	2455.9	0.00		29				29	2459.8	0.15
	30	2456.0							30	2459.8	0.50
	31	2456.5							31	2459.8	0.03
Total			3.93				2.75				5.15

Deep Creek Lake Level 2001

Month	Day	Level	Change	Month	Day	Level	Change	Month	Day	Level	Change
Apr	1	2459.8	0.15	May	1	2461.1	0.00	Jun	1	2461.2	0.50
	2	2459.9	0.00		2	2461.0	0.00		2	2461.2	0.20
	3	2459.9	0.00		3	2461.1	0.00		3	2461.3	0.10
	4	2459.9	0.00		4	2461.1	0.20		4	2461.2	0.12
	5	2459.9	0.00		5	2461.1	0.00		5	2461.2	0.08
	6	2459.9			6	2461.0	0.00		6	2461.1	0.85
	7	2459.9			7	2461.0	0.00		7	2461.4	0.70
	8	2460.1			8	2461.0	0.02		8	2461.7	0.00
	9	2460.3	0.35		9	2461.0	0.00		9	2461.6	0.00
	10	2460.4	0.10		10	2461.0	0.00		10	2461.4	0.00
	11	2460.4	0.85		11	2461.0	0.00		11	2461.2	0.00
	12	2460.6	0.00		12	2461.0	0.00		12	2461.2	0.03
	13	2460.6	0.00		13	2461.0	0.25		13	2461.2	0.00
	14	2460.6	0.05		14	2460.9	0.00		14	2461.2	0.00
	15	2460.6	0.25		15	2460.8	0.05		15	2461.2	0.00
	16	2460.6	0.45		16	2460.9	0.43		16	2461.2	0.10
	17	2461.0	0.05		17	2460.9	0.00		17	2461.1	0.00
	18	2461.1	0.15		18	2460.9	0.62		18	2461.1	0.00
	19	2461.1	0.00		19	2460.9	0.08		19	2461.1	0.00
	20	2461.1	0.00		20	2460.9	0.00		20	2461.1	0.00
	21	2461.1	0.00		21	2461.1	0.35		21	2461.1	0.00
	22	2461.1	0.00		22	2461.0	0.60		22	2461.0	0.10
	23	2461.1	0.00		23	2461.0	0.20		23	2460.9	0.50
	24	2461.0	0.10		24	2461.1	0.35		24	2461.0	0.65
	25	2461.0	0.00		25	2461.2	0.45		25	2461.0	0.00
	26	2461.1	0.00		26	2461.4	0.10		26	2461.0	0.00
	27	2461.1	0.00		27	2461.5	0.10		27	2461.0	0.00
	28	2461.1	0.00		28	2461.5	0.00		28	2461.0	0.00
	29	2461.1	0.00		29	2461.5	0.00		29	2460.9	0.00
	30	2461.1	0.00		30	2461.5	0.08		30	2460.9	0.07
				31	2461.3	0.00					
Total			2.5				3.88				4

Deep Creek Lake Level 2001

Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall	Month	Day	Lake Level	Rain Fall
Jul	1	2460.9	0.75	Aug	1	2460.0	0.00	Sep	1	2458.7	0.05
	2	2460.9	0.00		2	2459.9	0.00		2	2458.7	0.05
	3	2460.9	0.00		3	2459.9	0.00		3	2458.6	0.00
	4	2460.9	0.60		4	2459.8	0.15		4	2458.5	0.50
	5	2460.9	1.55		5	2459.8	0.00		5	2458.5	0.00
	6	2461.1	0.00		6	2459.8	0.00		6	2458.4	0.00
	7	2461.1	0.05		7	2459.6	0.00		7	2458.4	0.00
	8	2461.1	0.75		8	2459.5	0.00		8	2458.2	0.00
	9	2461.2	0.00		9	2459.4	0.00		9	2458.1	0.00
	10	2461.2	0.75		10	2459.3	0.25		10	2458.0	0.15
	11	2461.0	0.00		11	2459.3	0.00		11	2458.0	0.00
	12	2460.9	0.00		12	2459.3	1.50		12	2458.0	0.00
	13	2460.8	0.00		13	2459.4	0.00		13	2458.0	0.00
	14	2460.8	0.00		14	2459.4	0.00		14	2458.0	0.00
	15	2460.8	0.00		15	2459.4	0.00		15	2457.9	0.15
	16	2460.8	0.00		16	2459.4	0.20		16	2457.8	0.00
	17	2460.7	0.00		17	2459.3	0.25		17	2457.8	0.00
	18	2460.7	0.80		18	2459.2	0.00		18	2457.7	0.00
	19	2460.7	0.00		19	2459.2	0.00		19	2457.7	0.00
	20	2460.7	0.00		20	2459.2	0.05		20	2457.7	0.48
	21	2460.6	0.00		21	2459.2	0.00		21	2457.7	0.00
	22	2460.6	0.00		22	2459.2	0.05		22	2457.6	0.00
	23	2460.5	0.00		23	2459.2	0.50		23	2457.6	0.35
	24	2460.2	0.00		24	2459.2	0.00		24	2457.5	0.70
	25	2460.1	0.55		25	2459.1	0.00		25	2457.5	0.70
	26	2460.1	0.55		26	2459.1	0.47		26	2457.5	0.00
	27	2460.2	0.00		27	2459.1	0.00		27	2457.5	0.00
	28	2460.1	0.00		28	2459.0	0.05		28	2457.5	0.00
	29	2460.1	1.35		29	2458.9	0.00		29	2457.4	0.00
	30	2460.1	0.00		30	2458.8	0.00		30	2457.4	0.00
	31	2460.0	0.00		31	2458.8	0.00				
Total			7.7				3.47				3.13

Deep Creek Lake Level 2001

Month	Day	Level	Change	Month	Day	Level	Change	Month	Day	Level	Change
Oct	1	2457.4	0.00	Nov	1	2456.4	0.00	Dec	1	2455.8	0.00
	2	2457.3	0.00		2	2456.4	0.00		2	2455.8	0.00
	3	2457.2	0.00		3	2456.3	0.40		3	2455.8	0.00
	4	2457.2	0.00		4	2456.3	0.00		4	2455.8	0.00
	5	2457.2			5	2456.3	0.00		5	2455.8	0.00
	6	2457.1	0.30		6	2456.3	0.00		6	2455.8	0.25
	7	2457.1	0.00		7	2456.3	0.00		7	2455.8	0.15
	8	2457.0	0.00		8	2456.3	0.10		8	2455.8	0.85
	9	2456.9	0.00		9	2456.3			9	2455.8	0.00
	10	2456.9	0.00		10	2456.3			10	2455.8	0.00
	11	2456.9	0.00		11	2456.3			11	2455.8	0.10
	12	2456.9	0.00		12	2456.3	0.00		12	2455.8	0.05
	13	2456.8	0.00		13	2456.0	0.00		13	2455.8	0.00
	14	2456.8	0.45		14	2456.0	0.00		14	2455.8	
	15	2456.8	0.00		15	2456.0	0.00		15	2455.8	
	16	2456.7	0.20		16	2455.9	0.00		16	2455.8	0.25
	17	2456.8	0.20		17	2455.9	0.00		17	2455.8	0.50
	18	2456.8	0.00		18	2455.9	0.00		18	2455.8	0.70
	19	2456.8	0.00		19	2455.8	0.35		19	2455.9	0.05
	20	2456.7	0.00		20	2455.8	0.10		20	2456.0	0.00
	21	2456.7	0.00		21	2455.8	0.00		21	2456.0	0.00
	22	2456.7	0.00		22	2455.8	0.00		22	2456.0	0.25
	23	2456.7	0.00		23	2455.8	0.00		23	2456.0	0.05
	24	2456.7	1.50		24	2455.8	0.00		24	2456.0	0.00
	25	2456.7	0.00		25	2455.8	1.05		25	2456.0	0.00
	26	2456.7	0.05		26	2455.9	0.00		26	2456.0	0.00
	27	2456.6	0.15		27	2455.8	0.45		27	2455.9	0.05
	28	2456.6	0.00		28	2455.8	0.00		28	2455.9	0.10
	29	2456.5	0.00		29	2455.8	0.00		29	2455.9	0.00
	30	2456.4	0.00		30	2455.9	0.10		30	2455.9	0.00
	31	2456.3	0.00						31	2455.8	0.00
Total			2.85				2.55	Year Total			45.26

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 tables. 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.

Days when temperatures exceeded 25°C and days when temperature enhancement releases were made are summarized in the following tables. Log sheets for each of these dates also are enclosed.

Exceedance Of 25°C At Sang Run Temperature Probe

DATE	DURATION	MAXIMUM
June 19	15:40 – 19:50	26.2 @ 18:10
June 26	15:50 – 19:20	25.9 @ 17:50
June 28	14:50 – 20:50	26.9 @ 17:20
June 30	14:20 – 15:30	26.3 @ 15:20
July 1	15:20 – 16:10	25.3 @ 15:50
August 7	14:10 – 15:20	25.9 @ 15:00
August 8	14:00 – 14:40	25.6 @ 1430
August 9	13:20 – 14:00	25.3 @ 1340
August 11	16:40 – 19:50	25.6 @ 1840
August 15	16:50 – 18:10	25.2 @ 1710

Dates & Times of Temperature Enhancement Releases

Date	Start Time	Stop Time	River Flow (cfs)
June 20	1240	1346	Unknown
June 21	1104	1500	79
June 27	1230	1440	69
June 30	1230	1435	67
July 1	1730	1830	53
July 24	1227	1802	30
July 25	1100	1300	82
August 8	1230	1824	99
August 9	1150	1824	88
August 25	1230	1429	56
August 26	1230	1434	45
August 30	1130	1729	53

**Deep Creek Station
Youghiogeny River Temperature Data - 2001**

June	Smax	PenSmax	July	Smax	PenSmax	August	Smax	PenSmax
1		15.1	1	25.1	25.3	1	19.4	19.7
2		16.5	2	20.8	22.0	2	22.0	22.0
3		15.1	3	22.7	23.4	3	20.0	20.0
4		16.2	4	21.4	21.5	4	20.7	21.0
5		16.7	5	19.4	19.8	5	23.2	22.6
6		17.8	6	19.0	20.1	6	22.5	23.0
7		17.1	7	19.6	21.1	7	25.9	25.9
8		15.6	8	20.3	20.7	8	25.7	25.6
9		16.0	9	20.7	20.8	9	25.6	25.3
10		16.3	10	20.0	19.8	10	23.1	23.4
11		19.7	11	20.2	20.0	11	25.1	25.6
12		22.5	12	20.0	20.1	12	22.7	22.8
13		22.6	13	18.9	20.2	13	21.8	22.5
14		21.9	14	20.9	21.3	14	23.6	24.2
15		19.6	15	23.1	23.6	15	24.3	25.2
16		19.8	16	20.9	22.1	16	23.1	22.9
17		23.5	17	22.1	21.7	17	20.4	21.2
18		23.0	18	22.5	22.1	18	22.5	23.0
19		26.2	19	20.3	20.6	19	24.5	24.7
20		24.0	20	20.7	21.4	20	21.0	21.3
21	23.1	22.4	21	23.6	24.2	21	21.8	22.5
22	20.9	21.3	22	24.4	24.0	22	23.1	23.5
23	20.2	20.8	23	21.3	20.6	23	21.2	21.3
24	22.3	22.7	24	25.2	24.7	24	22.1	21.5
25	20.8	21.9	25	24.7	23.7	25	22.7	22.3
26	25.6	25.9	26	22.0	22.5	26	23.6	23.1
27	24.8	24.0	27	19.4	19.9	27	20.1	20.3
28	26.4	26.9	28	18.6	19.1	28	21.2	21.4
29	23.7	23.3	29	17.7	18.4	29	22.8	22.7
30	26.0	26.3	30	17.7	18.4	30	22.6	22.2
			31	18.4	18.4	31	20.0	20.2

Youghiogheny River Water Temperature Enhancement Plan

101 = CFS River Flow at Oakland June 19, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	23.27	Temperature Plan not required today
	< =30	26.11	Temperature Plan not required today
0900	> 30	1.38	Temperature Plan not required today
	< =30	4.22	Temperature Plan not required today
1100	All	13.19	Temperature Plan not required today
1200	All	11.64	Temperature Plan not required today
1400	All	6.48	Temperature Plan not required today
1500	All	4.47	Temperature Plan not required today

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

Tair	28.33	Air Temp, Elkins WV - Degree C
CCF	1.00	Cloud Cover Factor, Elkins WV
T7	17.98	River Temp Sang Run @700
T9	0.00	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	101.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

UA = CFS River Flow at Oakland June 20, 2001

Print info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	#VALUE!	#VALUE!
	< =30	#VALUE!	#VALUE!
0900	> 30	#VALUE!	#VALUE!
	< =30	#VALUE!	#VALUE!
1100	All	#VALUE!	#VALUE!
1200	All	#VALUE!	#VALUE!
1400	All	#VALUE!	#VALUE!
1500	All	#VALUE!	#VALUE!

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

Tair	ERR	Air Temp, Elkins WV - Degree C
CCF	ERR	Cloud Cover Factor, Elkins WV
T7	18.37	River Temp Sang Run @700
T9	0.00	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	UA	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

79 = CFS River Flow at Oakland June 21, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	23.89	Check again at 0900
	< =30	25.85	Check again at 0900
0900	> 30	24.38	Check again at 1100
	< =30	26.34	Release at 1100 for 2 hours
1100	All	24.69	Check again at 1200
1200	All	26.15	Release ASAP - not later than 1230 for 1 hour
1400	All	17.11	No further predictions necessary today
1500	All	-2.49	No further predictions necessary today

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

Tair	28.33	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	19.17	River Temp Sang Run @700
T9	19.69	River Temp Sang Run @900
T11	20.21	River Temp Sang Run @1100
T12	22.30	River Temp Sang Run @1200
T14	17.71	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	79.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

82 = CFS River Flow at Oakland June 26, 2001

Print info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	17.77	No further predictions necessary today
	< =30	19.85	No further predictions necessary today
0900	> 30	-3.37	No further predictions necessary today
	< =30	-1.29	No further predictions necessary today
1100	All	8.58	No further predictions necessary today
1200	All	7.67	No further predictions necessary today
1400	All	4.70	No further predictions necessary today
1500	All	3.62	No further predictions necessary today

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

Tair	11.11	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	17.83	River Temp Sang Run @700
T9	0.00	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	82.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

69 = CFS River Flow at Oakland June 27, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	23.52 25.08	Check again at 0900 Check again at 0900
0900	> 30 < =30	23.54 25.10	Check again at 1100 Check again at 1100
1100	All	25.71	Release at 1230 for 2 hours
1200	All	2.66	No further predictions necessary today
1400	All	6.31	No further predictions necessary today
1500	All	4.39	No further predictions necessary today

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

Tair	26.67	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	18.48	River Temp Sang Run @700
T9	18.61	River Temp Sang Run @900
T11	20.60	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	69.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

147 = CFS River Flow at Oakland June 28, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	21.49	Temperature Plan not required today
	< =30	26.17	Temperature Plan not required today
0900	> 30	-2.29	Temperature Plan not required today
	< =30	2.39	Temperature Plan not required today
1100	All	12.98	Temperature Plan not required today
1200	All	11.47	Temperature Plan not required today
1400	All	6.54	Temperature Plan not required today
1500	All	4.50	Temperature Plan not required today

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

Tair	28.89	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	19.59	River Temp Sang Run @700
T9	0.00	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	147.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

67 = CFS River Flow at Oakland June 30, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	25.75	Check again at 0900
	< =30	27.23	Release at 1100 for 2 hours
0900	> 30	25.76	Check again at 1100
	< =30	27.24	Release at 1100 for 2 hours
1100	All	27.09	Release at 1230 for 2 hours
1200	All	2.47	No further predictions necessary today
1400	All	6.54	No further predictions necessary today
1500	All	4.50	No further predictions necessary today

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

Tair	28.89	Air Temp, Elkins WV - Degree C
CCF	1.00	Cloud Cover Factor, Elkins WV
T7	20.76	River Temp Sang Run @700
T9	20.72	River Temp Sang Run @900
T11	22.20	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	67.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

53 = CFS River Flow at Oakland July 1, 2001

Print info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	23.35 24.27	Check again at 0900 Check again at 0900
0900	> 30 < =30	23.41 24.33	Check again at 1100 Check again at 1100
1100	All	24.05	Check again at 1200
1200	All	23.62	Check again at 1400
1400	All	25.65	Release ASAP - not later than 1430 for 1 hour
1500	All	25.98	Release ASAP - not later than 1530 for 1 hour

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

Tair	25.56	Air Temp, Elkins WV - Degree C
CCF	100.00	Cloud Cover Factor, Elkins WV
T7	20.75	River Temp Sang Run @700
T9	20.81	River Temp Sang Run @900
T11	21.37	River Temp Sang Run @1100
T12	21.43	River Temp Sang Run @1200
T14	23.83	River Temp Sang Run @1400
T15	24.85	River Temp Sang Run @1500
Q	53.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

30 = CFS River Flow at Oakland July 24, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	26.10 26.10	Check again at 0900 Check again at 0900
0900	> 30 < =30	3.11 3.11	No further predictions necessary today No further predictions necessary today
1100	All	39.82	Release at 1230 for 2 hours
1200	All	11.59	No further predictions necessary today
1400	All	6.59	No further predictions necessary today
1500	All	4.52	No further predictions necessary today

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

Tair	29.44	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	18.86	River Temp Sang Run @700
T9	0.00	River Temp Sang Run @900
T11	19.17	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	30.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

82 = CFS River Flow at Oakland July 25, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	25.00	Check again at 0900
	< =30	27.08	Release at 1100 for 2 hours
0900	> 30	0.49	No further predictions necessary today
	< =30	2.57	No further predictions necessary today
1100	All	13.52	No further predictions necessary today
1200	All	11.95	No further predictions necessary today
1400	All	6.76	No further predictions necessary today
1500	All	4.60	No further predictions necessary today

Tair	31.11	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	20.17	River Temp Sang Run @700
T9	0.00	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	82.00	River Flow at Oakland

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

Youghiogheny River Water Temperature Enhancement Plan

112 = CFS River Flow at Oakland August 7, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	21.71	Temperature Plan not required today
	< =30	24.99	Temperature Plan not required today
0900	> 30	-3.46	Temperature Plan not required today
	< =30	-0.18	Temperature Plan not required today
1100	All	12.06	Temperature Plan not required today
1200	All	10.72	Temperature Plan not required today
1400	All	6.42	Temperature Plan not required today
1500	All	4.44	Temperature Plan not required today

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

Tair	27.78	Air Temp, Elkins WV - Degree C
CCF	100.00	Cloud Cover Factor, Elkins WV
T7	20.76	River Temp Sang Run @700
T9	0.00	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	112.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

99 = CFS River Flow at Oakland August 8, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	25.59 28.35	Check again at 0900 Release at 1100 for 2 hours
0900	> 30 < =30	25.88 28.64	Check again at 1100 Release at 1100 for 2 hours
1100	All	27.09	Release at 1230 for 2 hours
1200	All	2.98	No further predictions necessary today
1400	All	6.88	No further predictions necessary today
1500	All	4.66	No further predictions necessary today

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

Tair	32.22	Air Temp, Elkins WV - Degree C
CCF	1.00	Cloud Cover Factor, Elkins WV
T7	20.89	River Temp Sang Run @700
T9	21.18	River Temp Sang Run @900
T11	21.88	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	99.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

88 = CFS River Flow at Oakland August 9, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	25.18	Check again at 0900
	< =30	27.50	Release at 1100 for 2 hours
0900	> 30	25.27	Check again at 1100
	< =30	27.59	Release at 1100 for 2 hours
1100	All	27.33	Release at 1230 for 2 hours
1200	All	2.31	No further predictions necessary today
1400	All	6.76	No further predictions necessary today
1500	All	4.60	No further predictions necessary today

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

Tair	31.11	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	21.42	River Temp Sang Run @700
T9	21.52	River Temp Sang Run @900
T11	22.70	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	88.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

88 = CFS River Flow at Oakland August 11, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	22.21 24.53	No further predictions necessary today Check again at 0900
0900	> 30 < =30	-3.71 -1.39	No further predictions necessary today No further predictions necessary today
1100	All	11.51	No further predictions necessary today
1200	All	10.25	No further predictions necessary today
1400	All	6.19	No further predictions necessary today
1500	All	4.33	No further predictions necessary today

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

Tair	25.56	Air Temp, Elkins WV - Degree C
CCF	100.00	Cloud Cover Factor, Elkins WV
T7	21.50	River Temp Sang Run @700
T9	0.00	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	88.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

132 = CFS River Flow at Oakland August 15, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	21.93	Temperature Plan not required today
	< =30	26.01	Temperature Plan not required today
0900	> 30	-0.19	Temperature Plan not required today
	< =30	3.89	Temperature Plan not required today
1100	All	13.05	Temperature Plan not required today
1200	All	11.52	Temperature Plan not required today
1400	All	6.42	Temperature Plan not required today
1500	All	4.44	Temperature Plan not required today

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

Tair	27.78	Air Temp, Elkins WV - Degree C
CCF	1.00	Cloud Cover Factor, Elkins WV
T7	18.20	River Temp Sang Run @700
T9	0.00	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	132.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

53 = CFS River Flow at Oakland August 30, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	24.27 25.19	Check again at 0900 Check again at 0900
0900	> 30 < =30	24.52 25.44	Check again at 1100 Check again at 1100
1100	All	24.47	Check again at 1200
1200	All	30.61	Release ASAP - not later than 1230 for 1 hour
1400	All	-9.65	No further predictions necessary today
1500	All	-3.91	No further predictions necessary today

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

Tair	26.67	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	18.80	River Temp Sang Run @700
T9	19.10	River Temp Sang Run @900
T11	20.00	River Temp Sang Run @1100
T12	26.60	River Temp Sang Run @1200
T14	0.00	River Temp Sang Run @1400
T15	0.00	River Temp Sang Run @1500
Q	53.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

56 = CFS River Flow at Oakland August 25, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30	25.62	Check again at 0900
	< =30	26.66	Release at 1100 for 2 hours
0900	> 30	25.16	Check again at 1100
	< =30	26.20	Release at 1100 for 2 hours
1100	All	26.36	Release at 1230 for 2 hours
1200	All	3.35	No further predictions necessary today
1400	All	6.54	No further predictions necessary today
1500	All	4.50	No further predictions necessary today

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

Tair	28.89	Air Temp, Elkins WV - Degree C
CCF	1.00	Cloud Cover Factor, Elkins WV
T7	19.06	River Temp Sang Run @700
T9	18.76	River Temp Sang Run @900
T11	20.51	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	56.00	River Flow at Oakland

Youghiogheny River Water Temperature Enhancement Plan

45 = CFS River Flow at Oakland August 26, 2001

Print Info for file

Time	Oakland Flow CFS	Predicted Maximum River Water Temperature Degree C	Deep Creek Action
0700	> 30 < =30	24.26 24.86	Check again at 0900 Check again at 0900
0900	> 30 < =30	24.11 24.71	Check again at 1100 Check again at 1100
1100	All	25.53	Release at 1230 for 2 hours
1200	All	2.33	No further predictions necessary today
1400	All	6.19	No further predictions necessary today
1500	All	4.33	No further predictions necessary today

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

Tair	25.56	Air Temp, Elkins WV - Degree C
CCF	36.00	Cloud Cover Factor, Elkins WV
T7	18.90	River Temp Sang Run @700
T9	18.82	River Temp Sang Run @900
T11	20.79	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	45.00	River Flow at Oakland

APPENDIX C

FLOW BYPASS OPERATION RECORD

FLOW BYPASS OPERATION

The flow bypass protocol requires the Permittee to maintain a minimum flow of 40 cfs in the Youghiogeny River immediately downstream of the tailrace. Starting June 1 and continuing through November 30, the Permittee monitors the river flows at the Oakland gage. When flows at the Oakland gage fall below 26 cfs, the Permittee may be required to open a bypass valve to release enough water to maintain 40 cfs in the river immediately below the tailrace.

The following table summarizes flow bypass data for June through November 2001, when flows in the Youghiogeny River were less than 26 cfs. Flow data were obtained from the USGS recording at the Oakland gage, direct readings from the USGS Oakland gage or from the tailrace gage at the station per guidance provided in the protocol. Valve opening was determined from Table 3 of the protocol based on station operating status.

Data from the USGS gaging station at Oakland also are provided. Data for the period of October 1, 2001 through the end of the year are provisional data. USGS data represent daily mean flows and may not agree with instantaneous data collected by the Permittee throughout the year.

**Deep Creek Station
Flow Bypass Operation - 2001**

			Bypass Operation	
Month	Day	Flow at Oakland	Bypass Flow	% Open
September	10	24	0	CLOSED
September	11	25	0	CLOSED
September	12	24	0	CLOSED
September	13	23	0	CLOSED
September	14	20	0	CLOSED
September	15	18	3	23
September	16	18	3	23
September	17	17	5	26
September	18	17	5	26
September	19	16	6	27
September	20	14	9	32
September	21	20	0	CLOSED
September	23	20	0	CLOSED
September	24	18	3	23
September	29	26	0	CLOSED
September	30	23	0	CLOSED
October	2	18	3	23
October	3	17	5	26
October	4	19	2	22
October	5	21	0	CLOSED
October	6	23	0	CLOSED
October	7	24	0	CLOSED
October	11	14	9	32
October	12	14	9	32
October	13	14	9	32
October	14	13	11	35
October	20	21	0	CLOSED
October	21	20	0	CLOSED
October	22	18	3	23
October	23	17	5	26
October	24	17	5	26
October	25	18	3	23
October	26	18	3	23
October	27	18	3	23

**Deep Creek Station
Flow Bypass Operation - 2001**

			Bypass Operation	
Month	Day	Flow at Oakland	Bypass Flow	% Open
October	28	19	2	22
October	29	19	2	22
October	30	19	2	22
October	31	19	2	22
November	1	20	0	CLOSED
November	2	20	0	CLOSED
November	3	21	0	CLOSED
November	4	25	0	CLOSED
November	7	25	0	CLOSED
November	8	21	0	CLOSED
November	9	23	0	CLOSED
November	10	23	0	CLOSED
November	11	21	0	CLOSED
November	12	21	0	CLOSED
November	13	19	2	22
November	14	19	2	22
November	15	19	2	22
November	16	19	2	22
November	17	19	2	22
November	18	19	2	22
November	19	19	2	22
November	20	20	0	CLOSED
November	21	21	0	CLOSED
November	22	25	0	CLOSED
November	23	24	0	CLOSED
November	24	23	0	CLOSED
November	25	21	0	CLOSED

STATION NUMBER 03075500 YOUGHIOGHENY RIVER NEAR OAKLAND, MD STREAM SOURCE AGENCY USGS
 LATITUDE 392518 LONGITUDE 0792530 DRAINAGE AREA 134.00 DATUM 2353.61 STATE 24 COUNTY 023

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001
 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	92	29	215	e94	1030	216	458	87	183	67	354	142
2	77	30	188	88	676	198	432	81	246	418	249	70
3	67	29	157	83	456	184	374	76	225	147	194	49
4	59	29	e140	e80	344	216	316	71	193	246	167	46
5	61	28	e125	e78	286	339	272	71	180	494	177	51
6	58	27	e115	e76	249	255	587	63	229	687	125	42
7	46	26	107	e74	227	242	626	56	1890	303	102	35
8	38	27	e98	e72	239	229	560	52	1270	359	87	31
9	36	31	e90	e70	486	213	445	53	686	254	77	25
10	37	128	83	69	2040	191	980	50	402	186	71	23
11	35	190	90	71	1230	186	1530	51	274	574	88	24
12	33	119	e100	72	730	292	1420	45	211	267	307	22
13	30	96	e125	71	549	1610	866	45	227	194	387	20
14	28	91	998	73	591	1510	583	38	419	149	168	19
15	27	87	913	75	2220	926	448	36	201	120	120	17
16	26	74	607	90	1670	774	452	40	154	98	95	16
17	26	69	875	98	1560	1010	400	62	141	82	91	16
18	134	63	744	95	1010	877	344	84	105	450	76	15
19	106	57	528	152	687	681	338	226	85	457	64	14
20	63	53	382	413	495	508	285	149	73	223	57	16
21	50	e51	350	277	415	712	255	105	67	155	51	23
22	43	e50	230	238	305	1020	226	204	63	120	46	22
23	41	e48	181	197	278	765	199	784	190	95	45	18
24	38	47	e160	e170	222	640	181	419	138	79	53	19
25	39	51	e140	e150	303	530	165	605	82	70	44	72
26	38	125	131	142	375	435	144	781	63	1890	38	69
27	36	369	e120	e135	265	338	131	495	55	1870	45	38
28	35	294	e115	132	241	280	122	553	118	506	55	28
29	34	222	e107	131	---	262	106	338	66	1050	49	24
30	31	278	e100	967	---	595	94	263	50	1130	41	23
31	30	---	e96	1980	---	531	---	206	---	593	39	---
TOTAL	1494	2818	8410	6513	19179	16765	13539	6189	8286	13333	3562	1029
MEAN	46.2	93.9	271	210	685	541	451	200	276	430	115	34.3
MAX	134	369	998	1980	2220	1610	1530	784	1890	1890	387	142
MIN	26	26	83	69	222	184	94	36	50	67	38	14
CFSM	.36	.70	2.02	1.57	5.11	4.04	3.37	1.49	2.06	3.21	.86	.26
IN.	.41	.78	2.33	1.81	5.32	4.65	3.76	1.72	2.30	3.70	.99	.29

STATION NUMBER 03075500 YOUGHIOGHENY RIVER NEAR OAKLAND, MD STREAM SOURCE AGENCY USGS
 LATITUDE 392517.9 LONGITUDE 0792529.6 DRAINAGE AREA 134.00 DATUM 2353.61 STATE 24 COUNTY 023
 PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
 SAT-DISCHARGE
 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	17	32	68	---	---	---	---	---	---	---	---
2	17	19	29	59	---	---	---	---	---	---	---	---
3	19	20	25	58	---	---	---	---	---	---	---	---
4	20	25	24	55	---	---	---	---	---	---	---	---
5	22	26	23	52	---	---	---	---	---	---	---	---
6	23	24	21	55	---	---	---	---	---	---	---	---
7	27	22	28	64	---	---	---	---	---	---	---	---
8	30	21	48	65	---	---	---	---	---	---	---	---
9	30	20	257	61	---	---	---	---	---	---	---	---
10	23	20	137	---	---	---	---	---	---	---	---	---
11	14	19	100	---	---	---	---	---	---	---	---	---
12	14	19	85	---	---	---	---	---	---	---	---	---
13	13	18	72	---	---	---	---	---	---	---	---	---
14	16	17	87	---	---	---	---	---	---	---	---	---
15	43	17	120	---	---	---	---	---	---	---	---	---
16	35	17	87	---	---	---	---	---	---	---	---	---
17	31	17	90	---	---	---	---	---	---	---	---	---
18	31	17	633	---	---	---	---	---	---	---	---	---
19	25	17	463	---	---	---	---	---	---	---	---	---
20	21	18	306	---	---	---	---	---	---	---	---	---
21	19	20	220	---	---	---	---	---	---	---	---	---
22	18	22	163	---	---	---	---	---	---	---	---	---
23	18	21	143	---	---	---	---	---	---	---	---	---
24	18	20	186	---	---	---	---	---	---	---	---	---
25	19	28	148	---	---	---	---	---	---	---	---	---
26	18	94	136	---	---	---	---	---	---	---	---	---
27	18	53	103	---	---	---	---	---	---	---	---	---
28	19	52	101	---	---	---	---	---	---	---	---	---
29	19	42	94	---	---	---	---	---	---	---	---	---
30	19	35	75	---	---	---	---	---	---	---	---	---
31	19	---	76	---	---	---	---	---	---	---	---	---
TOTAL	680	777	4112	---	---	---	---	---	---	---	---	---
MEAN	21.9	25.9	133	---	---	---	---	---	---	---	---	---
MAX	43	94	633	---	---	---	---	---	---	---	---	---
MIN	13	17	21	---	---	---	---	---	---	---	---	---
AC-FT	1350	1540	8160	---	---	---	---	---	---	---	---	---
CFSM	.16	.19	.99	---	---	---	---	---	---	---	---	---
IN.	.19	.22	1.14	---	---	---	---	---	---	---	---	---

APPENDIX D

RECORD OF
DISSOLVED OXYGEN MONITORING



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	NON-OPERATING TAILRACE ELEV	OPERAT TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME	TEMP °C	DO (mg/l)					
6-1-01	10:25	21.1	8.19	10:30	14.0	9.44	2 @ 100%	10:00 - 13:00	open	2022.4	2028.1
6-2-01			STATION	UN-ATTENDED			2 @ 100%	20:00 - 07:00	open		2028.1
6-3-01			STATION	UNATTENDED			2 @ 100%	20:00 - 23:00	open		2028.1
6-4-01	10:25	20.9	8.30	10:30	13.7	9.61	2 @ 100%	20:45 - 22:20	open		2028.1
6-5-01			unscheduled				2 @ 100%	10:02 - 13:05	open	2022.6	2028.1
6-6-01			unscheduled				2 @ 100%	10:30 - 18:00	open	2022.3	2028.1
6-7-01			unscheduled				2 @ 100%	21:00 21:45	open	2022.3	2028.1
6-8-01	08:10	17.5	8.31	08:20	14.1	9.42	2 @ 100%	12:15 - 16:00	open	2022.3	2028.1
6-9-01			STATION	UNATTENDED			2 @ 100%	07:00 - 24:00	open	2023.8	2028.1
6-10-01			STATION	UNATTENDED			2 @ 100%	06:00 - 24:00	open		2028.1
6-11-01	09:25	22.6	7.70	09:40	14.6	8.94	2 @ 100%	24:00 - 03:55	open		2028.1
6-12-01			no	Generation			2 @ 100%	09:50 - 24:00	open	2022.8	2028.1
6-13-01			unscheduled				2 @ 100%	00:00 - 13:05	open	2022.5	2028.1
6-14-01			STATION	UNATTENDED			2 @ 100%	20:52 - 21:47	open		2028.1
6-15-01	10:25	25.4	7.58	10:30	15.0	9.81	2 @ 100%	20:04 - 22:04	open		2028.1
6-16-01			STATION	UNATTENDED			2 @ 100%	07:55 - 10:10	open		2028.1
6-17-01			STATION	UNATTENDED			2 @ 100%	10:00 - 19:10	open	2022.5	2028.1
6-18-01	10:25	20.2	8.38	10:30	14.7	9.39	2 @ 100%	03:24 - 08:37	open		2028.1
6-19-01			unscheduled				2 @ 100%	10:02 - 13:02	open	2022.1	2028.1
6-20-01			unscheduled				2 @ 100%	11:40 - 13:46	open	2022.1	2028.1

2001

DEEP CREEK STATION
DISSOLVED OXYGEN MONITORING LOG

(Instrument Calibrated to 2000 ft. MSL)

DATE	INSTRUMENT CALIBRATION		DO MEASUREMENTS DOWNSTREAM FROM WEIR		NO. UNITS GENERATING	TIMES OF GENERATION	SLUICE GATE POSITION	NON-OPERATING TAILRACE ELEV	OPERATI TAILRAC ELEV
	TIME	TEMP °C	DO (mg/l)	TEMP °C					
1-21-01			unscheduled						
1-22-01	10:25	26.3	7.46	15.7	2 @ 100%	11:05 - 15:00	open	2021.9	2028.1
1-23-01			STATION UNATTENDED						
1-24-01			STATION UNATTENDED						
1-25-01	10:30	26.8	7.44	15.4	2 - 100%	10:00 - 13:00	open	2022.0	2028.1
1-26-01									
1-27-01			unscheduled						
1-28-01					2 @ 100%	12:30 - 14:00	open	2021.9	2028.1
1-29-01	10:25	23.3	7.89	14.6	2 @ 100%	10:00 - 13:00	open	2021.9	2028.1
1-30-01			STATION UNATTENDED		1 @ 100%	12:30 - 14:35	open		
1-31-01			STATION UNATTENDED		1 @ 100%	13:45 - 14:35	open		
1-2-01	10:35	22.5	8.04	14.7	2 @ 100%	17:30 - 19:24	open		
1-3-01					2 @ 100%	10:00 - 13:00	open	2022.7	2028.1
1-4-01			STATION UNATTENDED						
1-5-01									
1-6-01	10:40	20.5	8.23	14.1	1 @ 100%	10:10 - 13:00	open	2023.3	2028.1
1-7-01			STATION UNATTENDED		2 @ 100%	10:00 - 13:07	open		
1-8-01			STATION UNATTENDED		2 @ 100%	17:20 - 20:10	open		
1-9-01	10:35	21.2	8.14	15.7	2 @ 100%	10:00 - 15:00	open	2022.6	2028.1
1-10-01			unscheduled		2 @ 100%	07:04 - 18:01	open	2022.3	2028.1

2001

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	NON-OPERATING TAILRACE ELEV	OPERATING TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM FROM WEIR TIME					
7-11-01			unscheduled		2 @ 100%	08:00 - 18:11	open	2022.3	2028.1
7-12-01			unscheduled		2 @ 100%	14:10 - 18:00	open	2022.6	2028.1
7-13-01	10:30	24.7	7.57	10:35	2 @ 100%	10:00 - 14:00	open	2022.4	2028.1
7-14-01		STATION UNATTENDED					open		
7-15-01		STATION UNATTENDED					open		
7-16-01	10:30	22.9	7.76	10:35	2 @ 100%	10:00 - 15:45	open	2022.1	2028.1
7-17-01			unscheduled		2 @ 100%	14:15 - 16:00	open	2022.0	2028.1
7-18-01			unscheduled		2 @ 100%	13:20 - 19:00	open	2022.0	2028.1
7-19-01	10:30	22.6	7.90	10:35	1 @ 100%	09:00 - 16:30	open	2022.0	2028.1
7-20-01	10:40	22.8	8.00	10:46	2 @ 100%	10:00 - 13:00	open	2022.5	2028.1
7-21-01		STATION UNATTENDED					open		
7-22-01		STATION UNATTENDED					open		
7-23-01	10:40	24.2	7.69	10:50	2 @ 100%	13:50 - 19:52	open	2022.0	2028.1
7-24-01			unscheduled		2 @ 100%	20:45 - 21:30	open	2022.0	2028.1
7-25-01			unscheduled		2 @ 100%	09:28 - 20:12	open	2022.0	2028.1
7-26-01			unscheduled		2 @ 100%	20:30 - 21:42	open	2022.0	2028.1
7-27-01			unscheduled		2 @ 100%	07:10 - 08:00	open	2022.0	2028.1
7-28-01			unscheduled		2 @ 100%	12:27 - 18:00	open	2022.0	2028.1
7-29-01			unscheduled		2 @ 100%	11:00 - 13:00	open	2022.0	2028.1
7-30-01			unscheduled		2 @ 100%	13:10 - 20:30	open	2025.1	2028.1
7-31-01			unscheduled		2 @ 100%	10:04 - 12:04	open		
7-32-01			unscheduled		2 @ 100%	13:20 - 15:20	open		
7-33-01			unscheduled		2 @ 100%	10:32 - 13:58	open		
7-34-01			unscheduled		2 @ 100%	14:15 - 22:30	open		
7-35-01			unscheduled		2 @ 100%	13:05 - 18:05	open	2023.5	2028.1

2001

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	NON-OPERATING TAILRACE ELEV	OPERAT. TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	TIME					
7-31-01				unscheduled	2 @ 100%	09:40 - 15:20	open	2023.0	2028.1
8-1-01				unscheduled	2 @ 100%	10:35 - 16:45	closed		
8-2-01				unscheduled	2 @ 100%	13:17 - 18:17	reopen 1FT	2023.7	2028.5
8-3-01	10:30	21.7	8.14	10:35	2 @ 100%	20:50 - 21:15	11	2022.5	2028.5
8-4-01					2 @ 100%	10:00 - 16:29	11	2022.3	2028.5
8-5-01					2 @ 100%	10:03 - 15:23	11		2028.5
8-6-01	10:45	24.1	7.77	10:50	2 @ 100%	12:10 - 17:54	11		2028.5
8-7-01	10:35				2 @ 100%	10:00 - 13:00	11	2022.2	2028.5
8-8-01					2 @ 100%	14:30 - 17:30	11	2022.0	2028.5
8-9-01					2 @ 100%	13:00 - 16:00	11		
8-10-01	10:35	25.5	7.59	10:40	2 @ 100%	17:30 - 20:36	11	2021.9	2028.5
8-11-01						10:00 - 16:15	11	2021.9	2028.5
8-12-01							11		
8-13-01	10:40	23.4	7.87	10:45	1 @ 100%	12:30 - 18:30	11	2022.0	2028.5
8-14-01					2 @ 100%	11:50 - 18:34	11		
8-15-01					2 @ 100%	10:00 - 16:15	11	2023.2	2028.5
8-16-01					2 @ 100%	15:45 - 16:00	11	2023.5	2028.5
8-17-01	10:50	22.3	8.04	10:57	2 @ 100%		11	2022.3	2028.5
8-18-01					2 @ 100%	12:40 - 18:45	11	2022.1	2028.5
8-19-01							11	2023.0	2028.5
							11		

FDX ZC

2001

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	NON-OPERATING TAILRACE ELEV.	OPERAT. TAILRACE ELEV.		
	TIME	TEMP °C	DO (mg/l)	TIME						TEMP °C	DO (mg/l)
8-20-01	10:35	20.8	8.50	10:40	18.0	6.11	2 @ 100%	10:00 - 13:00	2 closed 2 open 1ft	2021.7	2028.5
8-21-01	-	-	-	-	-	-	-	-	-	2021.8	-
8-22-01	-	-	-	-	-	-	-	-	-	2021.8	-
8-23-01	-	-	-	-	-	-	-	-	-	2021.9	-
8-24-01	12:30	20.6	8.46	12:36	17.6	6.14	2 @ 100%	UNIT #1 11:44 - UNIT #2 10:00 -	11	2021.9	2028.5
8-25-01	-	-	-	-	-	-	-	-	-	2021.9	2028.5
8-26-01	-	-	-	-	-	-	-	-	-	2021.9	2028.5
8-27-01	10:15	20.7	8.48	10:20	17.4	6.27	2 @ 100%	12:30 - 14:30	11	2021.9	2028.5
8-28-01	-	-	-	-	-	-	-	08:24 - 14:30 06:10 - 06:40 10:45 - 14:05 18:47 - 20:00	11	2021.8	2028.5
8-29-01	-	-	-	-	-	-	-	13:04 - 17:12 + 18:11 - 20:05	11	2021.8	2028.5
8-30-01	-	-	-	-	-	-	-	11:30 - 17:39	11	2021.8	2028.5
8-31-01	10:30	25.1	7.60	10:36	18.9	6.34	2 @ 100%	09:00 - 15:00 10:00 - 13:00 16:24 - 17:17	11	2021.8	2028.5
9-1-01	-	-	-	-	-	-	-	-	11	2021.8	2028.5
9-2-01	-	-	-	-	-	-	-	-	11	2021.8	2028.5
9-3-01	-	-	-	-	-	-	-	-	11	2021.8	2028.5
9-4-01	-	-	-	-	-	-	-	10:00 - 13:00 22:08 - 22:16	11	2021.7	2028.5
9-5-01	-	-	-	-	-	-	-	11:55 - 16:55	11	2021.9	2028.5
9-6-01	-	-	-	-	-	-	-	13:00 - 18:00	11	2021.9	2028.5
9-7-01	10:30	17.9	7.73	10:35	18.8	6.67	2 @ 100%	19:47 - 21:20	11	2021.8	2028.5
9-8-01	-	-	-	-	-	-	-	10:18 - 16:04	11	2021.8	2028.5

2001

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	NON-OPERATING TAILRACE ELEV	OPERUT. TAILRACE ELEV
	TIME	TEMP °C	DO (mg/l)	DOWNSTREAM FROM WEIR					
9-9-01	← STATION	UNATTENDED	←	←	2 @ 100%	12:01 - 18:05	2 closed 2 open -1FT	—	2028.5
9-10-01	←	INSTRUMENT weather	←	←	2 @ 100%	08:30 - 13:30	11	2021.8	2028.5
9-11-01	←	←	←	←	—	—	11	2021.7	—
9-12-01	←	←	←	←	—	—	11	2021.7	—
9-13-01	←	UNscheduled	←	←	2 @ 100%	13:00 - 18:00	11	2021.7	2028.5
9-14-01	10:30	16.4	8.04	10:35	19.5	6.92	11	2021.8	2028.5
9-15-01	←	←	←	←	8-PV	10:00 - 13:00	11	—	—
9-16-01	←	←	←	←	BPV	—	11	—	—
9-17-01	10:30	19.1	8.53	10:35	19.2	7.20	11	2021.6	2028.5
9-18-01	←	←	←	←	BPV	10:15 - 13:34	11	2021.6	—
9-19-01	←	←	←	←	BPV	17	11	2021.6	—
9-19-01	←	←	←	←	2 @ 100%	13:42 - 15:43	11	2021.6	2028.5
9-20-01	←	←	←	←	BPV	09:55 - 11:15	11	2021.6	2028.5
9-21-01	10:30	16.9	8.27	10:35	19.0	7.27	11	2021.8	2028.5
9-22-01	←	←	←	←	BPV	09:35 - 15:55	11	—	—
9-23-01	←	←	←	←	BPV	—	11	—	—
9-24-01	10:30	16.9	8.06	10:35	19.2	7.32	11	2021.6	2028.5
9-25-01	←	←	←	←	2 @ 100%	10:00 - 13:00	11	2021.7	—
9-26-01	←	←	←	←	—	—	11	2021.8	—
9-27-01	←	←	←	←	—	—	11	2021.8	—
9-28-01	10:30	16.7	8.14	10:35	18.9	7.27	11	2021.8	2028.5

