NO. 2-1010 SEMCO-GRAPH PAPER
10 X 10 PER HALF INCH

SPAULDING-MOSS COMPANY
BOSTON 10, MASS.
MADE IN U. S. A.

TEST HEAD	$\frac{240}{H_t}$	$\left(\frac{240}{H_t}\right)^{1/2}$	$\left(\frac{240}{H_t}\right)^{3/2}$
240.0	1.000	1.000	1.000
241.5	0.994	0.997	0.991
242.5	0.990	0.995	0.985

242 TEST HEAD H_t

241

240 GROSS HEAD

K_W CORRECTION

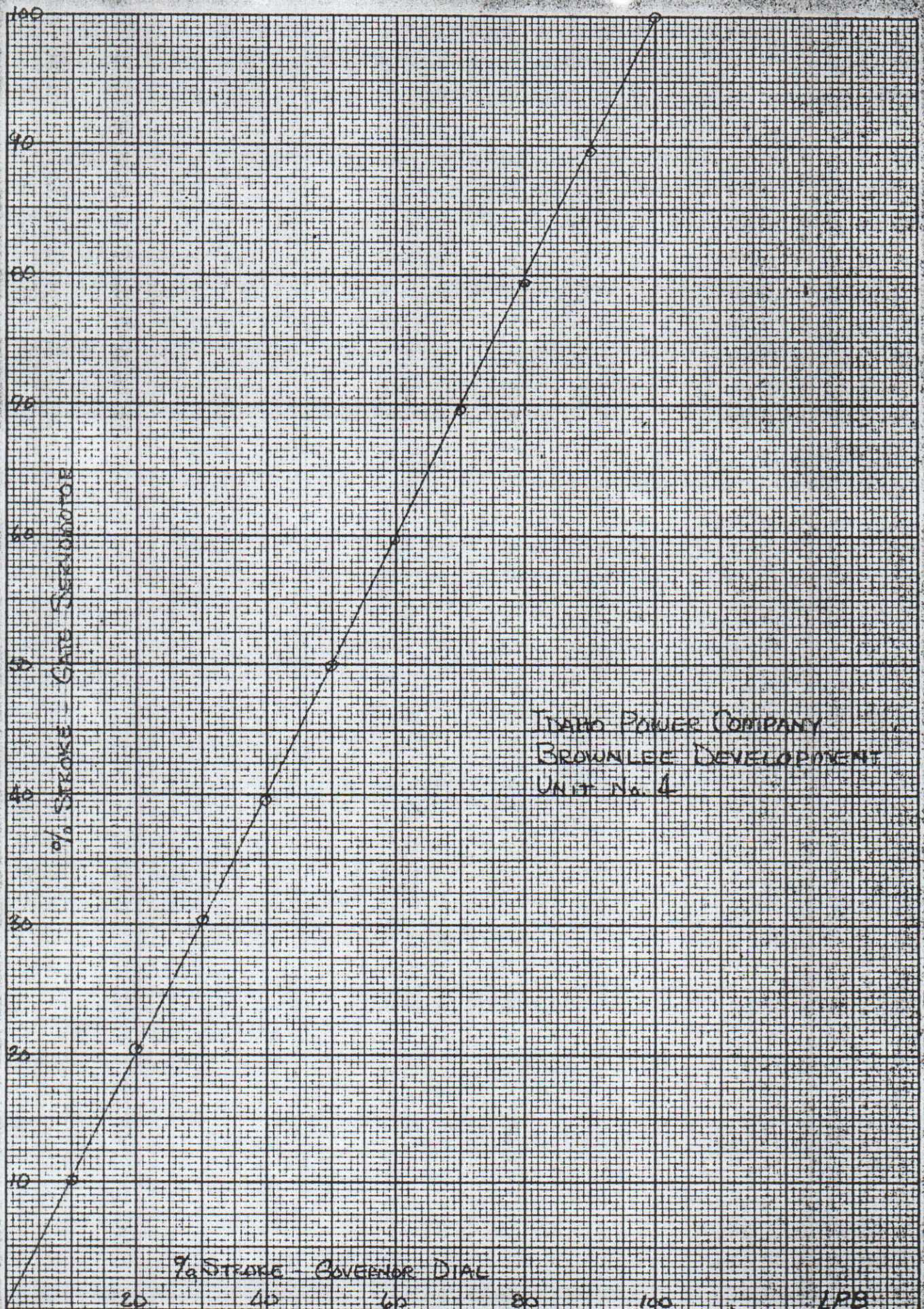
K_D CORRECTION

IDAHO POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT No. 4

LPB

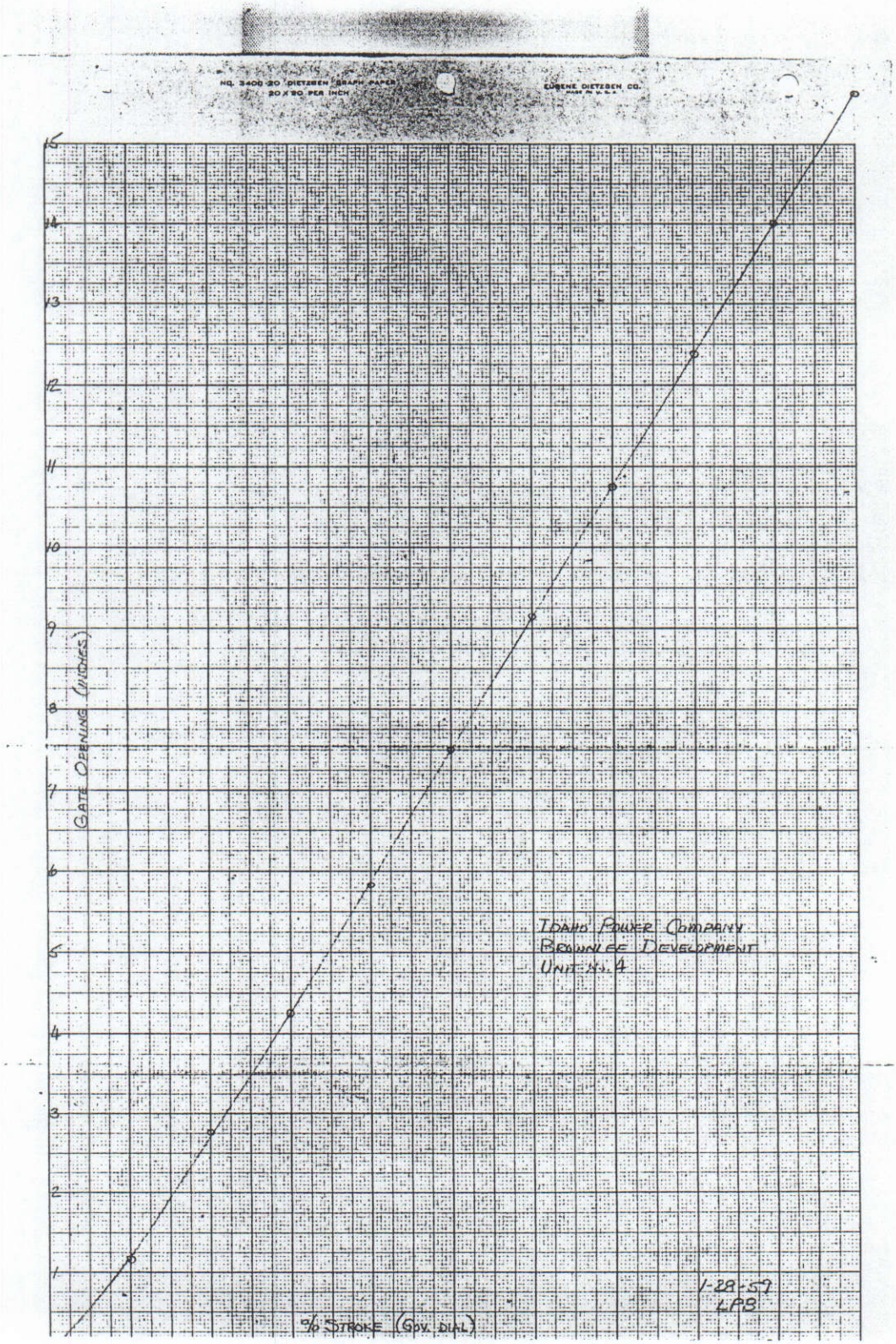
CORRECTION FACTOR

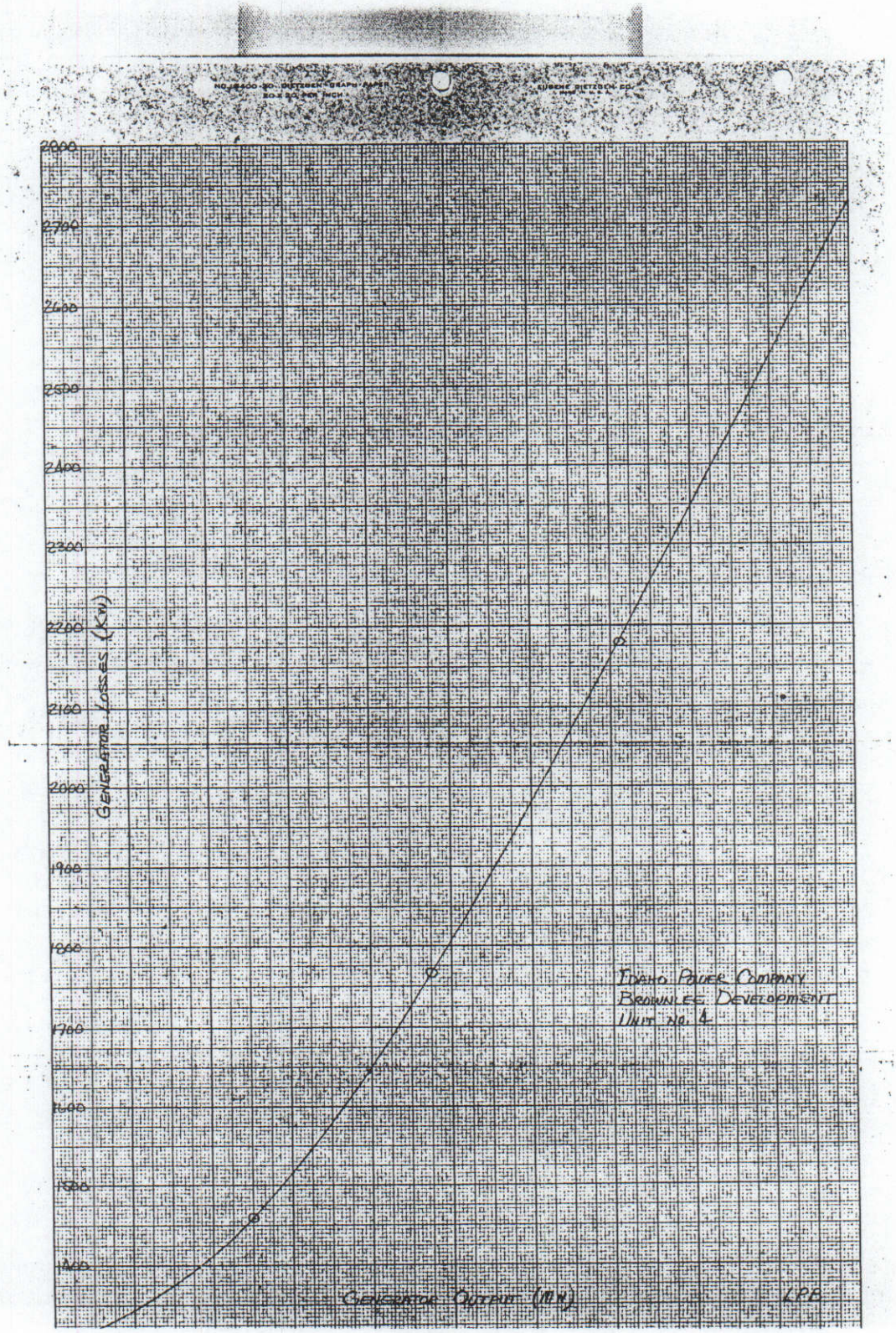
.980 .982 .984 .986 .988 .990 .992 .994 .996 .998 1.000



SPAULDING-MOSS COMPANY
BOSTON 10, MASS.
MADE IN U.S.A.

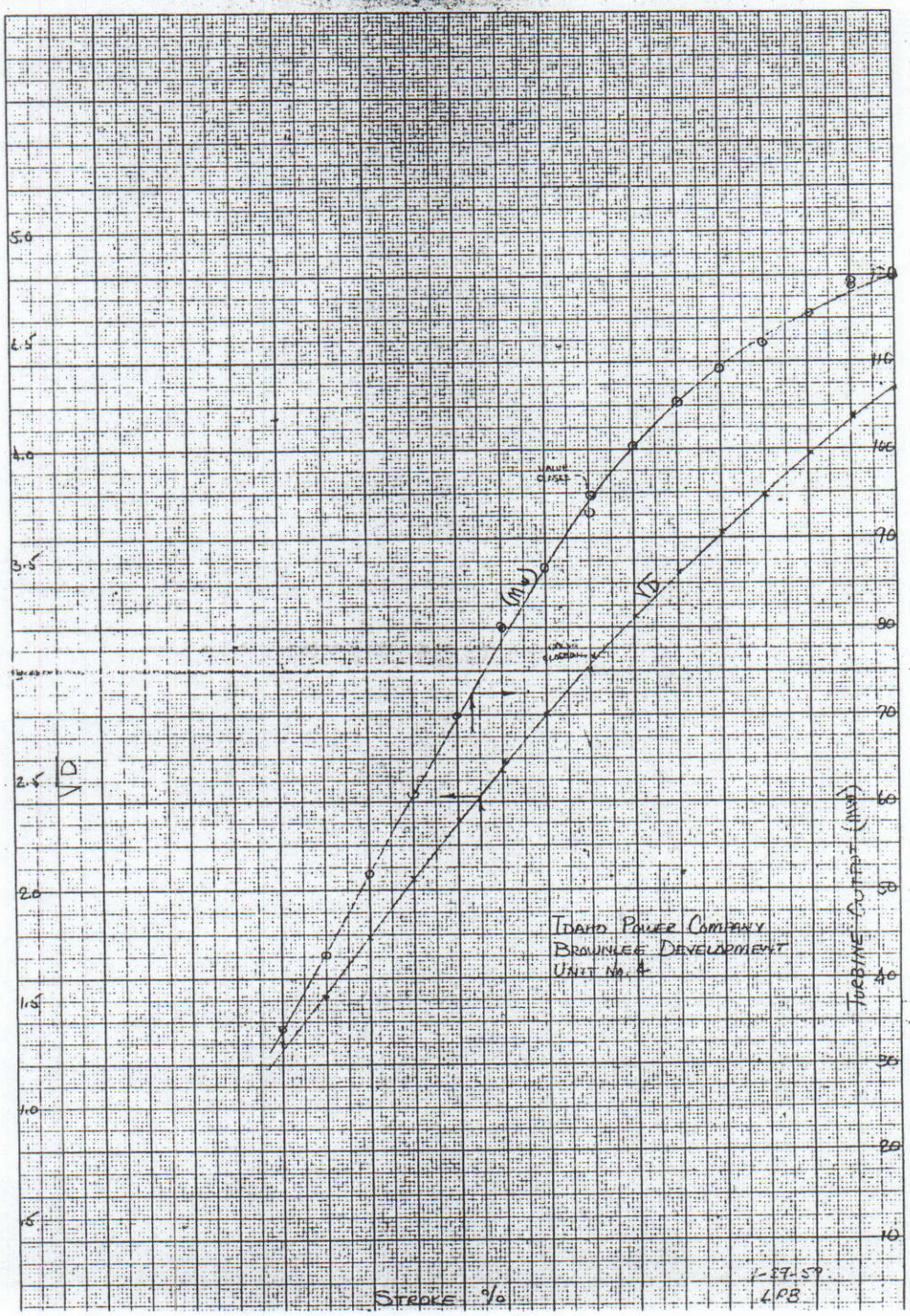
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10 X 10 PER HALF INCH

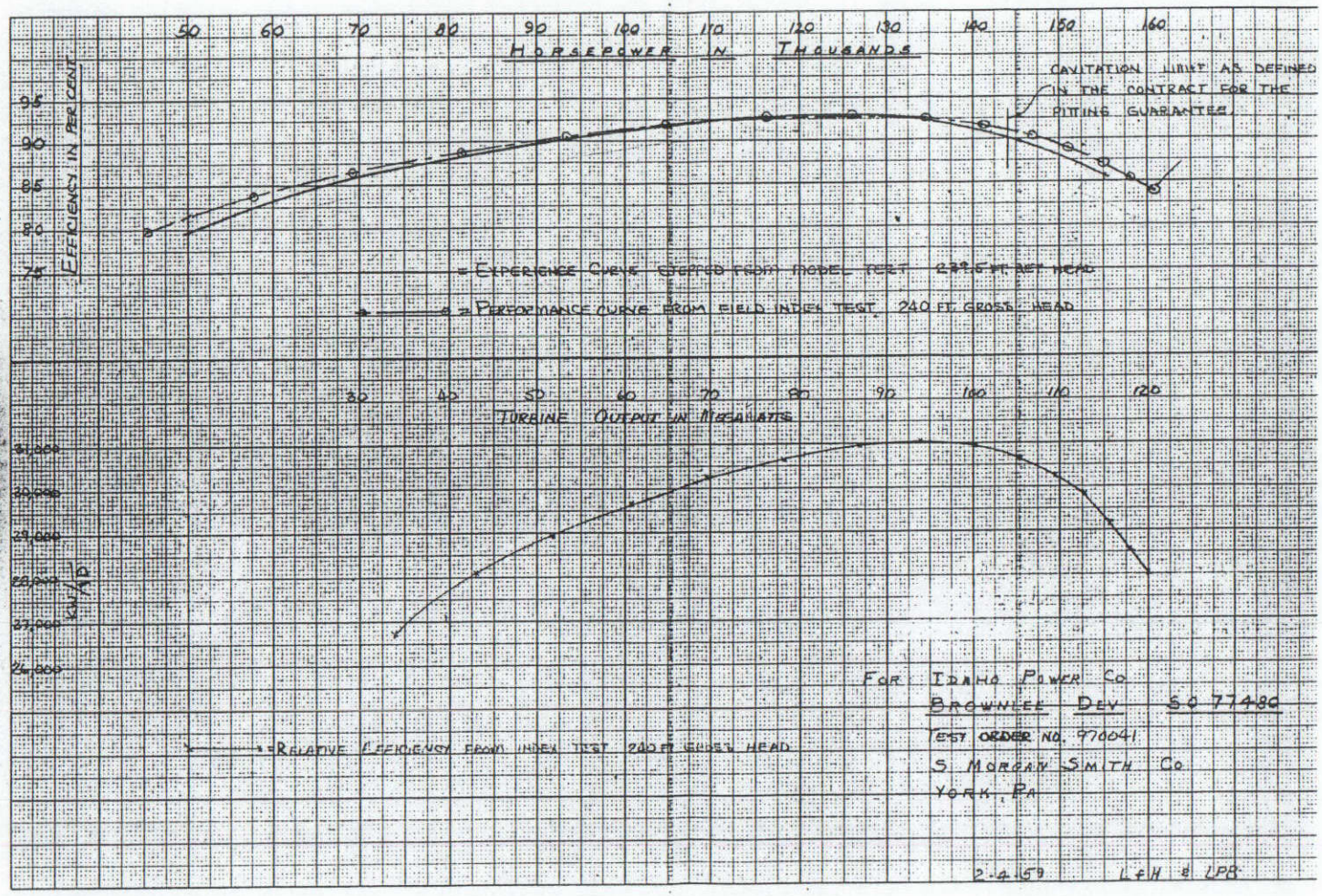

NO. 3408-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH
EUGENE DIETZGEN CO.
GATE OPENING (INCHES)
% STROKE (GOV. DIAL)
IDAHO POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT NO. 4
1-28-57
LPS


2000
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
Generator Losses (KW)
Idaho Power Company
Brownlee Development
Unit No. 4
Generator Output (MW)
LPB

NO. 3400-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

EUGENE DIETZGEN CO.
MADE IN U.S.A.



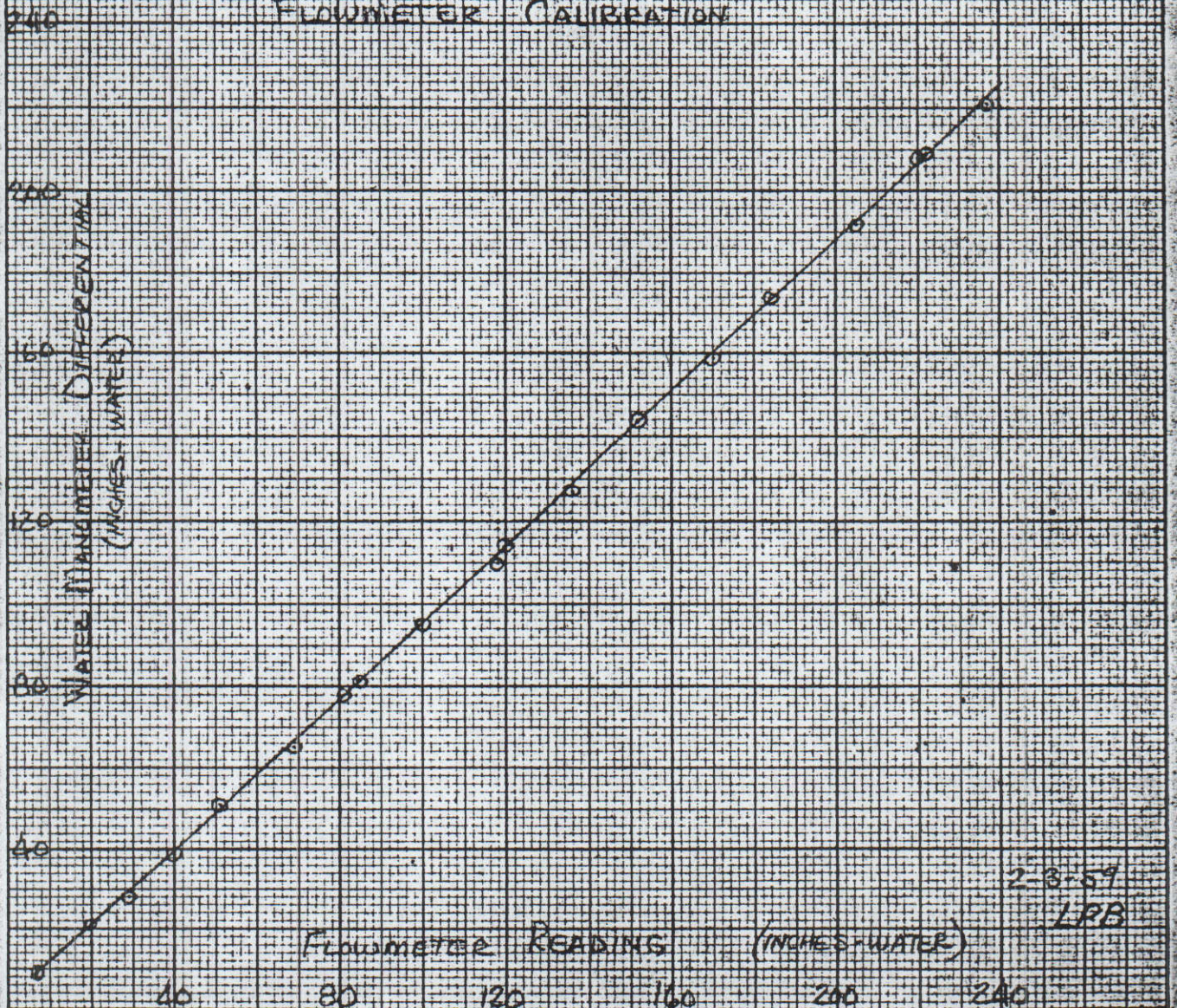

50 60 70 80 90 100 110 120 130 140 150 160
HORSEPOWER IN THOUSANDS
EFFICIENCY IN PER CENT
95
90
85
80
75
CAVITATION LIMIT AS DEFINED IN THE CONTRACT FOR THE PITTING GUARANTEE.
= EXPERIENCE CURVE STEPPED FROM MODEL TEST 239.6 FT. NET HEAD
= PERFORMANCE CURVE FROM FIELD INDEX TEST 240 FT. GROSS HEAD
30 40 50 60 70 80 90 100 110 120
TURBINE OUTPUT IN MEGAWATTS
KW/AD
31,000
30,000
29,000
28,000
27,000
26,000
= RELATIVE EFFICIENCY FROM INDEX TEST 240 FT GROSS HEAD
FOR IDAHO POWER CO
BROWNLEE DEV SO 77486
TEST ORDER NO. 970041
S MORGAN SMITH CO
YORK, PA
2-4-59 L F H & L P B

SPAULDING-MOSS COMPANY
BOSTON 10, MASS.
MADE IN U.S.A.

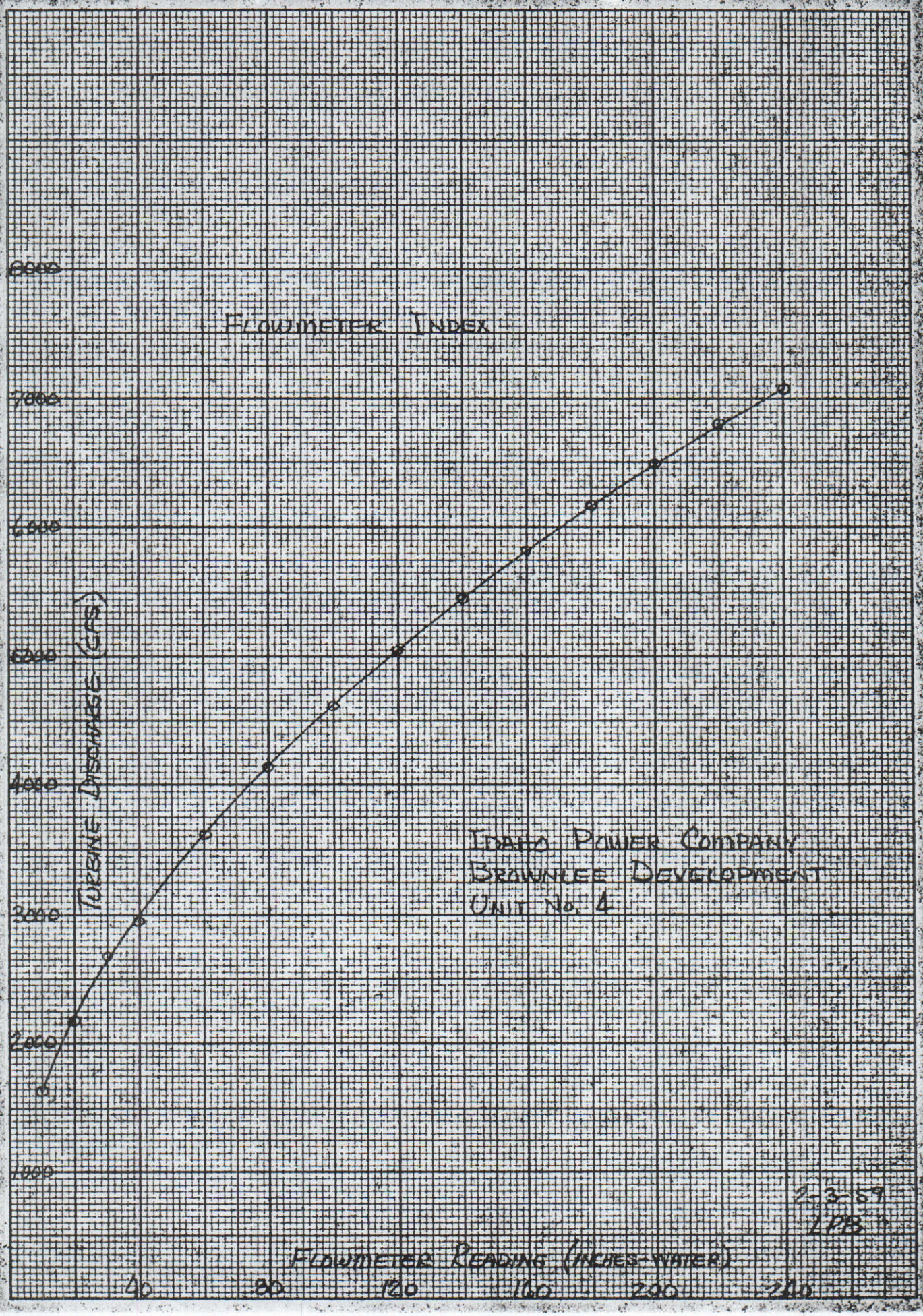
NO. 2-1010 SEMCO-GRAPH PAPER
10 X 10 PER HALF INCH

IDAHO POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT No. 4

FLOWMETER CALIBRATION



2-3-59
LPB



SPAULDING-MOSS COMPANY
BOSTON 10, MASS.
MADE IN U. S. A.
NO. 2-1010 - SEMCO-GRAPH PAPER
10 X 10 PER HALF INCH

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF

INDEX TEST—FORM 2— HEADWATER and/or [redacted] ELEVATIONS

Operating Company IDAHO POWER

Plant BROWNLEE Unit No. H 4

Observer Richard Bailey MAINTENANCE Date 1-29-57

Time							
1:00 PM	2044.2	3.20	2044.2				
1:05	2044.2	3.25	2044.2				
1:10	2044.2	3.30	2044.2				
1:15	2044.2	3.35	2044.2				
1:20	2044.2	3.40	2044.2				
1:25	2044.2	3.45	2044.2				
1:30	2044.2	3.50	2044.2				
1:35	2044.2	3.55	2044.2				
1:40	2044.2	4.00	2044.2				
1:45	2044.2						
1:50	2044.2	4.05	2044.2				
1:55	2044.2	4.10	2044.2				
2:00	2044.2	4:15	2044.2				
2:05	2044.2	4:20	2044.2				
2:10	2044.2	4:25	2044.2				
2:15	2044.2	4:30	2044.2				
2:20	2044.2	4:35	2044.2				
2:25	2044.2	4:40	2044.2				
2:30	2044.2	4:45	2044.2				
2:35	2044.2	4:50					
2:40	2044.2	4:55					
2:45	2044.2	5:00					
2:50	2044.2						
2:55	2044.2						
3:00	2044.2						
3:05	2044.2						
3:10	2044.2						
3:15	2044.1						

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF 2

INDEX TEST—FORM 2— [redacted] and/or TAILWATER ELEVATIONS

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4

Observer Verne C. Miller Associate Engineer Date Jan. 29, 1959

Time			Time			Time	
1:11	1801.3		2:01	1801.4		3:17	1801.5
1:12	1801.2		2:02	1801.6		3:18	1801.7
1:12.5	1801.3	1801.3	2:02.5	1801.6	1801.5	Av.	1801.6
1:13	1801.3		2:03.5	1801.6			
1:14	1801.4		2:04.5	1801.5		3:21	1801.7
1:22	1801.3		2:24	1801.4		3:22	1801.6
1:23	1801.5		2:24.5	1801.7		3:23	1801.7
1:23.5	1801.4	1801.4	2:25	1801.4	1801.5	Av	1801.7
1:24	1801.5		2:26	1801.5			
1:24.5	1801.4		2:27	1801.5		3:30.5	1801.4
1:25	1801.4		2:35	1801.5		3:31	1801.5
1:35	1801.4		2:37	1801.5		3:32	1801.5
1:35.5	1801.3		2:38	1801.5	1801.5	3:33	1801.5
1:36	1801.4	1801.4	2:39	1801.4	75%	Estimate	1801.7
1:37	1801.4		2:40	1801.5			
1:37.5	1801.5		2:46	1801.6		3:47	1801.5
1:38	1801.5		2:47	1801.4		3:48	1801.4
1:47	1801.4		2:47.5	1801.5	1801.5	3:48.5	1801.4
1:48	1801.4		2:48	1801.6		3:49	1801.5
1:48.5	1801.5	1801.5	2:49	1801.5		3:50	1801.5
1:49	1801.5		2:57	1801.6		Av	1801.5
1:50	1801.6		2:58	1801.6	1801.6		
1:59	1801.5		2:59	1801.6		3:56	1801.5
2:00	1801.4		3:09.5	1801.5		3:57	1801.6
2:00.5	1801.5	1801.5	3:10.5	1801.6	1801.6	3:58	1801.6
2:01	1801.5		3:12	1801.6		3:59	1801.5
2:02	1801.5						

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 2

INDEX TEST—FORM 2— [redacted] and/or TAILWATER ELEVATIONS

OF 2

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4

Observer Verne C. Miller : Associate Engineer Date Jan. 29, 1959

Time							
4:05.5	1801.6						
4:06.5	1801.6						
4:07	1801.5	1801.5					
4:08	1801.4						
4:09	1801.5						
4:15	1801.6						
4:16	1801.5	1801.5					
4:16.5	1801.4						
4:18	1801.5						
4:24	1801.6						
4:25	1801.6						
4:26	1801.7	1801.6					
4:27	1801.5						
4:27.5	1801.6						
4:35	1801.6						
4:36	1801.5	1801.6					
4:37	1801.6						
4:37.5	1801.8						
4:38.5	1801.7						

Form Eng. 021

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF 1

INDEX TEST—FORM 3—GENERATOR OUTPUT DATA

Operating Company IDAHO POWER COMPANY

P.T. Ratio 14400/120 C.T. Ratio 5000/5 Plant Brownlee

Meter Constant (K) 0.6 Test 72000 pri Unit No. 4

$KW = \frac{P.T. \times C.T. \times K \times 3600 \times Rev.}{1000 \times Sec.} = 25920 \times \frac{Rev.}{Sec.}$

Observer Gailen Soule Sr. Engr

Meter No 30 769 545

Date 29 January

Time	Run No.	No. of Revs.	Time Secs.	Output KW	Time	Run No.	No. of Revs.	Time Secs.	Output KW
1:10	1	10	14.5	17,880	3:17	12	20	43.8	118,356
1:12		3	43.2		3:20	13	20	44.8	? —
1:23	2	10	62	41,800	3:23	13	20	43.8	118,356
1:24	2	5	31		3:24	13	10	21.9	
1:35	3	10	43	60,250	3:29	14	20	43.2	120,000
1:36	3	5	21.6		3:31	14	10	21.8	118,899
1:47	4	10	32.6	79,500	3:32	14	20	43.6	
1:49	4	5	17		3:46	15	10	77.4	33,466
1:52	4	10	33.2	78,200	3:49	15	5	38.6	
1:59	5	10	30.4	85,300	3:55	16	10	50.8	51,023
2:01	5	20	60.2	86,100	3:58	16	10	50.6	
2:11	6	20	56.0	92,600	4:05	17	10	37.6	69,120
2:12	6	10	28.1		4:07	17	5	19.2	
2:14	6	10	27.9		4:14	18	20	55.2	93,913
2:24	7	10	26.0	99,600	4:24	19	10	32.8	79,024
2:25	7	20	52.1		4:25	19	10	32.8	
2:34	8	20	49.6	104,516	4:35	20	20	44	117,818
2:36	8	10	24.8			20	10	22	
2:45	9	20	47.8	108,452					
2:46	9	10	23.6						
2:47	9	20	47.8						
2:56	10	20	46.6	111,244					
2:57	10	20	46.6						
3:08	11	20	45.1	114,690					
3:09	11	10	22.6						

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF 3

INDEX TEST—FORM 4—ELECTRICAL DATA

Operating Company IDAHO Power Co. Plant Brownlee Unit No. 4

Observer GENE C. ADSMOND - operator Date Thurs. Jan. 29, 1959

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
1:10.43	14.0	700	17,000		1.0		160	565		
	14.0	700	17,000		1.0		160	570		
	14.0	700	17,000		1.0		165	565		
AVG.	14.0	700	17,000		1.0	1293	162	567	92	1385
1:22.33	14.0	1725	43,000		1.0		165	595		
	14.0	1725	43,000		1.0		168	595		
	14.0	1725	43,000		1.0		168	595		
AVG.	14.0	1725	43,000		1.0	1428	167	595	99	1527
1:35.02	14.0	2475	62,000		1.0		175	625		
	14.0	2475	62,000		1.0		175	625		
	14.0	2475	62,000		1.0		175	625		
AVG	14.0	2475	62,000		1.0	1651	175	625	109	1760
1:46.33	14.0	3175	80,000		1.0		185	665		
	14.0	3175	80,000		1.0		185	665		
	14.0	3175	80,000		1.0		185	665		
AVG.	14.0	3175	80,000		1.0	1970	185	665	125	2095
1:54.01	13.8	3575	88,000		1.0		191	680		
	13.8	3550	88,000		1.0		191	680		
	13.8	3550	88000		1.0		192	680		
AVG.	13.8	3558	88000		1.0	2090	191	680	130	2220
2:10.51	13.8	3850	94,500		1.0		193	695		
	13.8	3850	94,500		1.0		193	695		
	13.8	3850	94,500		1.0		193	695		
AVG.	13.8	3850	94,500		1.0	2210	193	695	138	2348
2:23.46	13.75	4095	101,000		1.0		202	715		
	13.75	4095	101,000		1.0		203	715		
	13.75	4095	101,000		1.0		204	715		
						2343		715	145	2488

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

SHEET 2 OF 3

INDEX TEST—FORM 4—ELECTRICAL DATA

Operating Company IDAHO POWER CO. Plant BROWNLEE Unit No. 4

Observer GENE C. ADSMOND - OPERATOR Date Oct. 29, 1959 - THURS.

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
2:34:22	13.75	4325	107,000		1.0		211	740		
	13.75	4325	107,000		1.0		211	740		
	13.75	4325	107,000		1.0		210	735		
Ave.	13.75	4325	107,000		1.0	2434	211	738	156	2590
2:45:13	13.8	4500	110,500		1.0		215	750		
	13.8	4500	110,500		1.0		215	750		
	13.8	4500	110,500		1.0		215	750		
Ave.	13.8	4500	110,500		1.0	2509	215	750	161	2670
3:36:43	13.8	4675	113,500		1.0		220	760		
	13.8	4650	113,500		1.0		220	760		
	13.8	4650	113,500		1.0		220	760		
Ave.	13.8	4658	113,500		1.0	2563	220	760	167	2730
3:08:45	13.8	4825	117,500		1.0		226	775		
	13.8	4825	117,500		1.0		226	775		
	13.8	4825	117,500		1.0		226	775		
Ave.	13.8	4825	117,500		1.0	2628	226	775	175	2803
3:16:07	13.75	4925	119,000		1.0		229	780		
	13.75	4925	119,000		1.0		229	780		
	13.75	4925	119,000		1.0		229	780		
Ave.	13.75	4925	119,000		1.0	2698	229	780	179	2877
5:30:08	13.75	5000	121,000		1.0		232	790		
	13.75	5000	121,000		1.0		233	790		
	13.75	5000	121,000		1.0		232	790		
Ave.	13.75	5000	121,000		1.0	2708	232	790	183	2891
3:46:35	13.9	1375	34,000		1.0		169	580		
	13.9	1375	34,000		1.0		168	580		
	13.9	1375	34,000		1.0		168	580		
Ave.	13.9	1375	34,000		1.0	1365	168	580	97	1462

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

INDEX TEST—FORM 4—ELECTRICAL DATA

SHEET 3 OF 3

Operating Company IDAHO POWER CO. Plant BROWNLEE Unit No. 4

Observer GENE C. ADSHOND - OPERATOR Date THURS. Jan 29, 1952

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
3:55:45	13.9	2125	53,000		1.0		172	605		
	13.9	2125	53,000		1.0		172	605		
	13.9	2125	53000		1.0		171	605		
Ave.	13.9	2125	53,000		1.0	1526	172	605	104	1630
4:05:13	13.9	2875	71,000		1.0		181	640		
	13.9	2875	71,000		1.0		181	640		
	13.9	2875	71,000		1.0		181	640		
Ave	13.9	2875	71,000		1.0	1792	181	640	116	1908
4:14:45	13.8	3900	95,500		1.0		201	705		
	13.8	3900	95,500		1.0		201	705		
	13.8	3900	95500		1.0		201	705		
Ave.	13.8	3900	95,500		1.0	2233	201	705	142	2375
4:23:47	13.8	3275	81,000		1.0		189	660		
	13.8	3275	81,000		1.0		189	660		
	13.8	3275	81,000		1.0		189	660		
Ave.	13.8	3275	81,000		1.0	1963	189	660	125	2088
4:34:44	13.7	4915	119,500		1.0		225	780		
	13.7	4950	119,500		1.0		224	780		
	13.7	4950	119500		1.0		225	780		
Ave	13.7	4958	119,500		1.0	2687	225	780	176	2863

Form Eng. 019

Reading assy 15-216

S. MORGAN SMITH CO., YORK, PA.

SHEET 1

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

OF 3

Operating Company Idaho Power Co.

Plant Brownlee Dam Unit No. 4 Date Jan. 29 59

Observers: R_1 _____ R_2 Charles Kistler Melvin Riley Leslie

	Run No. 1		Time 1:10 PM	Run No. 2		Time 1:22 PM	Run No. 3		Time 1:33 PM
	R_1	R_2		R_1	R_2		R_1	R_2	
		20.05			21.98			21.80	
		20.05			21.97			21.80	
		20.10			21.97			21.87	
		20.10			22.10			21.80	
		20.11/2			22.10			21.90	
		20.11/2			22.10			21.90	
		20.20			22.10			21.92	
		20.20			22.10			21.93	
		20.21/2			22.10			21.93	
		20.21/2			22.10			21.94	
Averages		20.11/2		19.72	22.05		17.66	21.88	
Differential		.73			2.33			4.22	

	Run No. 4		Time 1:46 P	Run No. 5		Time 1:58 P	Run No. 6		Time 2:10 P
	R_1	R_2		R_1	R_2		R_1	R_2	
		17.20			19.25			21.13	
		17.24			19.25			21.15	
		17.25			19.27			21.17	
		17.30			19.29			21.18	
		17.30			19.31			21.20	
		17.30			19.35			21.20	
		17.34			19.41			21.23	
		17.35			19.43			21.25	
		17.40			19.44			21.28	
		17.45			19.46			21.32	
Averages	10.78	17.31		11.43	19.36		12.06	21.21	
Differential		6.53			7.93			9.15	

	Run No. 7		Time 2:23 P	Run No. 8		Time 2:34 P	Run No. 9		Time 2:45
	R_1	R_2		R_1	R_2		R_1	R_2	
		19.98			21.85			19.67	
		19.99			21.86			19.67	
		20.00			21.89			19.70	
		20.00			21.90			19.75	
		20.01			21.92			19.78	
		20.07			21.96			19.79	
		20.11			21.98			19.82	
		20.15			22.04			19.84	
		20.18			22.06			19.88	
		20.22			22.12			19.93	
Averages	9.45	20.07		9.92	21.92		6.54	19.79	
Differential									

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET 2 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Idaho Power Co.

Plant Brownlee Dam Unit No. 4 Date Jan 29, 59

Observers: R_1 _____ R_2 Charles Rutlin mtr. & Rel. Tech.

Run No. 10	Time 2:56 P		Run No. 11	Time 3:08 P		Run No. 13	Time 3:20 P	
R_1	R_2		R_1	R_2		R_1	R_2	
	21.08			20.85			22.15	
	21.15			21.15			22.32	
	21.24			21.31			22.34	
	21.55			21.54			22.42	
	21.75			21.70			22.58	
	21.94			21.85			22.74	
	22.08			22.05			22.86	
	22.28			22.22			22.93	
	22.50			22.42			23.05	
	22.65			22.57			23.08	
Averages 7.33	21.82		4.76	21.77		5.30	22.63	
Differential	14.49			16.01			17.35	

Run No. 14	Time 3:30 P		Run No. 15	Time 3:46 P		Run No. 16	Time 3:55 P	
R_1	R_2		R_1	R_2		R_1	R_2	
	20.45			21.35			21.45	
	20.58			21.37			21.46	
	20.60			21.38			21.53	
	20.67			21.41			21.62	
	20.88			21.43			21.67	
	21.00			21.47			21.71	
	21.15			21.48			21.75	
	21.21			21.50			21.78	
	21.21			21.52			21.84	
	21.30			21.55			21.88	
Averages 2.46	20.90		19.73	21.46		18.46	21.67	
Differential	18.44			1.73			3.21	

Run No. 17F	Time 4:05 P		Run No. 18	Time 4:14P		Run No. 19	Time 4:23	
R_1	R_2		R_1	R_2		R_1	R_2	
	17.18			19.35			18.68	
	17.21			19.37			18.72	
	17.25			19.46			18.78	
	17.28			19.50			18.85	
	17.34			19.57			18.93	
	17.38			19.59			18.98	
	17.44			19.66			19.06	
	17.53			19.78			19.10	
	17.58			19.80			19.15	
	17.70			19.85			19.20	
Averages 11.98	12.39		10.21	19.69		12.20	18.94	
Differential								

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET 3 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Idaho Power Co.

Plant Brownlee Dam Unit No. 4 Date Jan 29, 59

Observers: R_1 _____ R_2 Charles Butler, Walter & Vida Pike

	Run No. 20	Time 4:35 P	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
		21.05				
		21.07				
		21.07				
		21.10				
		21.10				
		21.10				
		21.10				
		21.09				
		21.07				
		21.10				
Averages	3.64	21.08				
Differential		17.44				

	Run No.	Time	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
Averages						
Differential						

	Run No.	Time	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
Averages						
Differential						

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET # 1

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

OF 3

Operating Company: Idaho Power Co.

Plant: Brownlee Unit No. 4 Date: 1/29/59

Observers: R_1 Carroll Y. Thompson - Aux. Equipment Operator

	Run No. 1	Time 1:10		Run No. 2	Time 1:22		Run No. 3	Time 1:35	
	R_1	R_2		R_1	R_2		R_1	R_2	
	19.35			19.55			17.50		
	19.35			19.55			17.55		
	19.40			19.55			17.60		
	19.40			19.60			17.65		
	19.40			19.60			17.70		
	19.40			19.65			17.70		
	19.45			19.65			17.70		
	19.45			19.70			17.70		
	19.45			19.75			17.75		
	19.50			19.80			17.75		
Averages	19.42			19.72	22.05		17.66	21.88	
Differential	.73				2.33			4.22	

	Run No. 4	Time 1:46		Run No. 5	Time 1:59		Run No. 6	Time 2:10	
	R_1	R_2		R_1	R_2		R_1	R_2	
	10.65			11.30			11.90		
	10.70			11.30			11.95		
	10.70			11.35			12.00		
	10.75			11.40			12.00		
	10.75			11.45			12.05		
	10.80			11.45			12.10		
	10.85			11.50			12.10		
	10.85			11.50			12.15		
	10.85			11.50			12.15		
	10.90			11.55			12.20		
Averages	10.78	17.31		11.43	19.36		12.06	21.21	
Differential		6.53			7.93			9.15	

	Run No. 7	Time 2:23		Run No. 8	Time 2:34		Run No. 9	Time 2:45	
	R_1	R_2		R_1	R_2		R_1	R_2	
	9.30			9.80			6.40		
	9.35			9.80			6.45		
	9.40			9.85			6.45		
	9.45			9.85			6.50		
	9.45			9.90			6.55		
	9.45			9.95			6.60		
	9.50			9.95			6.60		
	9.50			10.00			6.60		
	9.55			10.05			6.60		
	9.55			10.05			6.65		
Averages	9.45	20.07		9.92	21.92		6.54	19.17	
Differential		10.62			12.00			13.23	

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET No. 2 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company: Idaho Power Co.

Plant: Brownlee Unit No. 4 Date: 1/29/59

Observers: R_1 Carroll D. Thompson - Aux. Equipment Operator

	Run No. 10	Time 2:56		Run No. 11	Time 3:08		Run No. 13	Time 3:20	
	R_1	R_2		R_1	R_2		R_1	R_2	
	6.50			5.00			4.70		
	6.60			5.05			4.90		
	6.90			5.20			5.00		
	7.05			5.45			5.15		
	7.25			5.65			5.20		
	7.40			5.85			5.35		
	7.60			6.10			5.50		
	7.80			6.25			5.60		
	8.00			6.40			5.70		
	8.20			6.65			5.85		
Averages	7.33	21.82		5.76	21.77		5.30	22.65	
Differential		14.49			16.01			17.35	

	Run No. 14	Time 3:30		Run No. 15	Time 3:46		Run No. 16	Time 3:55	
	R_1	R_2		R_1	R_2		R_1	R_2	
	1.95			19.65			18.20		
	2.05			19.65			18.25		
	2.20			19.65			18.30		
	2.30			19.70			18.35		
	2.40			19.70			18.40		
	2.50			19.75			18.50		
	2.60			19.75			18.60		
	2.70			19.80			18.60		
	2.85			19.80			18.65		
	3.00			19.80			18.75		
Averages	2.46	20.90		19.73	21.46		18.46	21.67	
Differential		18.44			1.73			3.21	

	Run No. 17	Time 4:05		Run No. 18	Time 4:14		Run No. 19	Time 4:23	
	R_1	R_2		R_1	R_2		R_1	R_2	
	11.70			9.90			11.90		
	11.75			10.00			11.95		
	11.80			10.00			12.05		
	11.90			10.10			12.15		
	12.00			10.20			12.20		
	12.05			10.30			12.25		
	12.10			10.35			12.30		
	12.10			10.35			12.35		
	12.20			10.40			12.40		
	12.30			10.50			12.45		
Averages	11.98	17.39		10.21	19.69		12.20	18.94	
Differential		5.41			9.48			1.74	

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET #3 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company: Idaho Power Co.

Plant: Brownlee Unit No. 4 Date 1/29/59

Observers: R_1 Carroll L. Thompson - Aux. Equipment Operator R_2

	Run No. 20	Time 4:35		Run No.	Time		Run No.	Time	
	R_1	R_2		R_1	R_2		R_1	R_2	
	3.55								
	3.65								
	3.60								
	3.60								
	3.60								
	3.65								
	3.70								
	3.70								
	3.65								
	3.65								
Averages	3.64	21.08							
Differential		17.44							

	Run No.	Time		Run No.	Time		Run No.	Time	
	R_1	R_2		R_1	R_2		R_1	R_2	
Averages									
Differential									

	Run No.	Time		Run No.	Time		Run No.	Time	
	R_1	R_2		R_1	R_2		R_1	R_2	
Averages									
Differential									

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1

INDEX TEST—FORM 2— HEADWATER and/or ~~PRESSURE SURVEYS~~ GENERAL DATA

OF 4

Operating Company Idaho Power Company

Plant Brownlee HE Unit No. 4

Observer Frank E Myers, Operating Supt. Date 29 January 1958

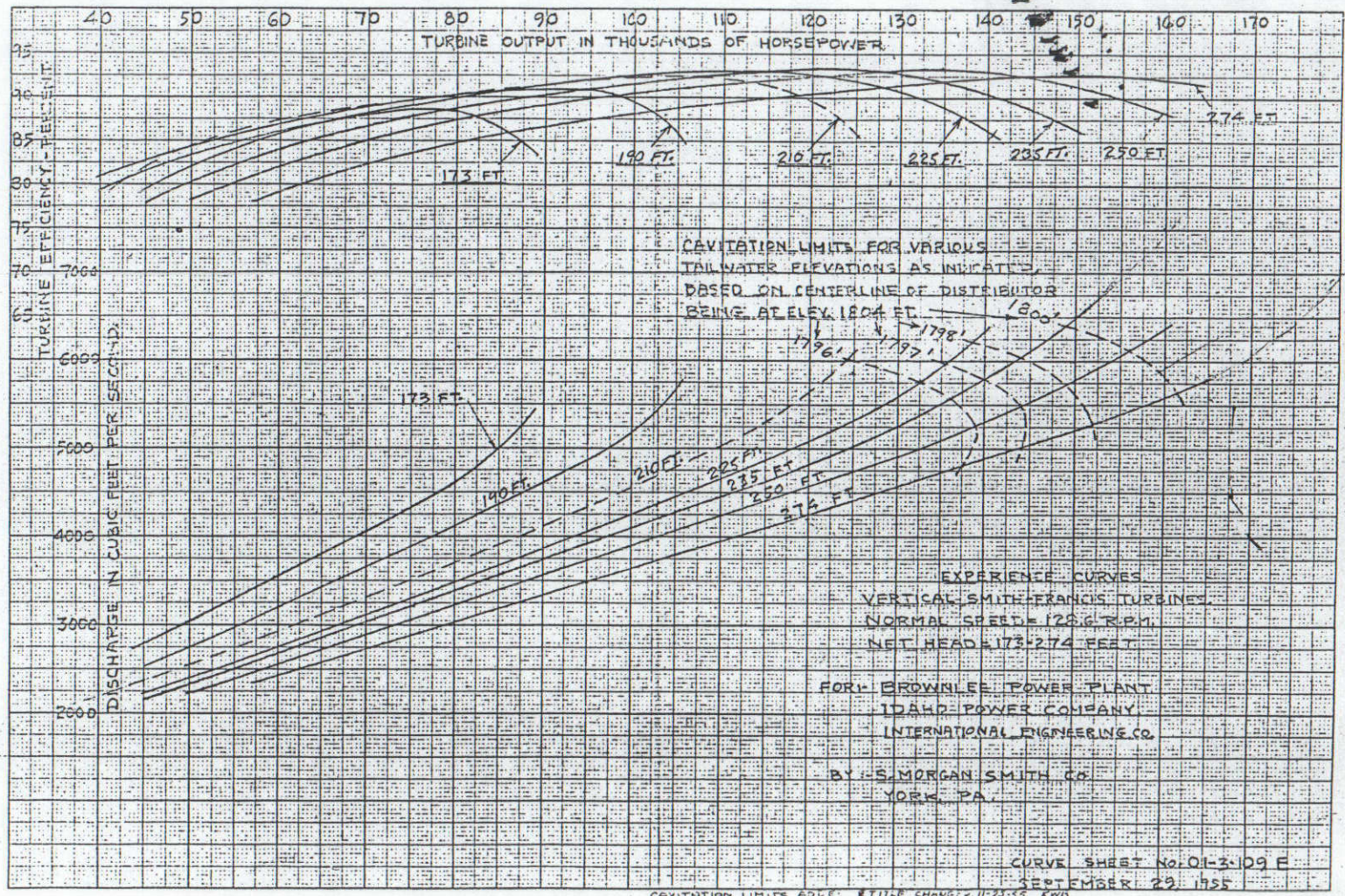
Time	(A) Gov. Set	(B) Stroke	(C) Foxboro	(D) Pressure Gg.			
1 11 PM	2.01	6 3/32"	7	243			
1 23	3.50	8 15/16"	29	241			
1 35	4.50	10 31/32"	51	240			
1 47	5.49	12 29/32	81	240			
1 59	6.0	13 27/32	100	238			
2 11	6.5	14 27/32	118	237			
2 24	7.0	15 7/8	136	236			
2 35	7.52	16 15/16	152	235			
2 45	8.0	17 27/32	170	235			
2 57	8.49	18 27/32	184	234			
3 09	9.01	19 31/32	205	232			
3 16	9.51	20 15/16	220	231			
3 21	9.51	20 15/16	220	231			
3 30	10.0	21 31/32	237	230			
3 47	2.79	7 31/32	20	242			
3 56	4.0	10 1/32	40	241			
4 05	5.0	11 31/32	67	240			
4 15	6.52	15 0	120	237			
4 24	5.51	13 1/32	85	239			
4 35	9.52	20 31/32	222	231			

A = GOVERNOR GATE LIMIT INDICATOR IN TEN PERCENT.

B = GATE SERVOMOTOR STROKE IN INCHES.

C = FLOW METER DIFFERENTIAL IN INCHES OF WATER.

D = PRESSURE AT NET HEAD PIEZOMETERS IN FEET OF WATER.


TURBINE OUTPUT IN THOUSANDS OF HORSEPOWER
40 50 60 70 80 90 100 110 120 130 140 150 160 170
TURBINE EFFICIENCY - PERCENT
DISCHARGE IN CUBIC FEET PER SECOND
7000
6000
5000
4000
3000
2000
173 FT.
190 FT.
210 FT.
225 FT.
235 FT.
250 FT.
274 FT.
CAVITATION LIMITS FOR VARIOUS TAILWATER ELEVATIONS AS INDICATED, BASED ON CENTERLINE OF DISTRIBUTOR BEING AT ELEV. 1804 FT.
1804
1798
1796
1797
140 FT.
210 FT.
225 FT.
235 FT.
250 FT.
274 FT.
EXPERIENCE CURVES
VERTICAL SMITH-FRANCIS TURBINES
NORMAL SPEED = 128.6 R.P.M.
NET HEAD = 173-274 FEET
FOR: BROWNLEE POWER PLANT
IDAHO POWER COMPANY
INTERNATIONAL ENGINEERING CO.
BY: S. MORGAN SMITH CO.
YORK, PA.
CURVE SHEET No. 01-3-109 E
SEPTEMBER 29, 1955
CAVITATION LIMITS ADDED, TITLE CHANGED 11-23-55. KWB
ADDED 255, 210, 2195 FT. HEAD CURVES, 12-16-55 WJM
K.W.B.

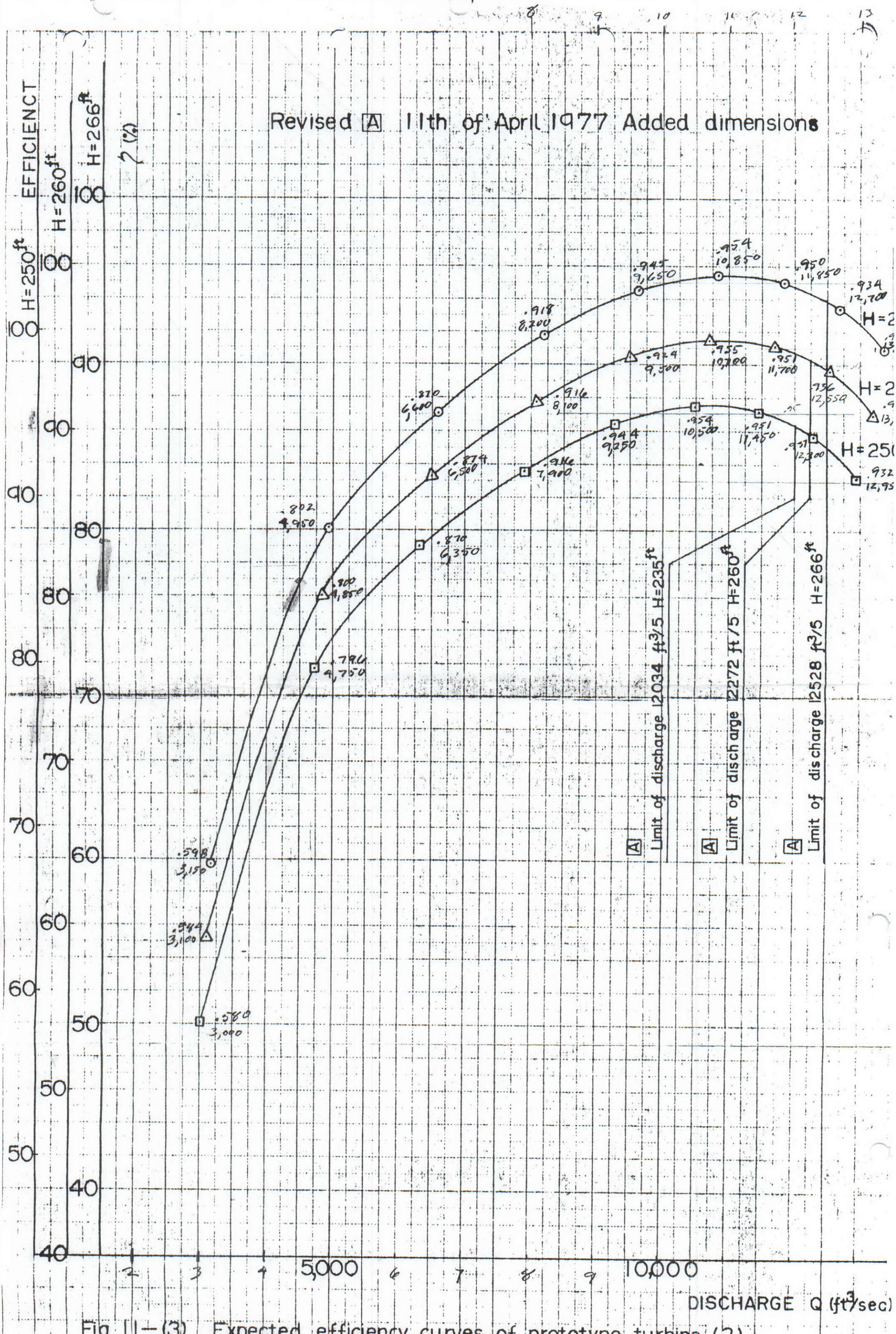
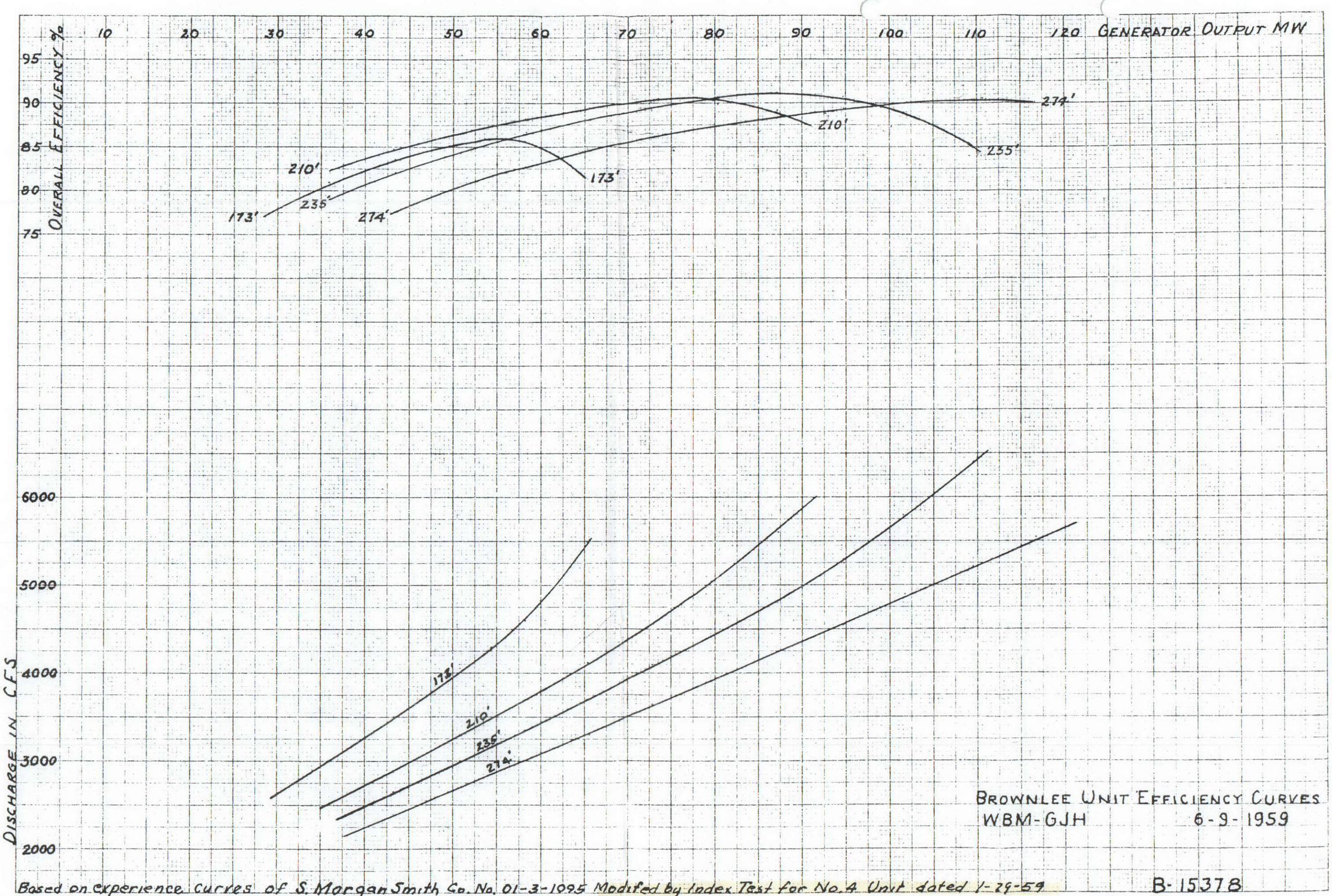


Fig II—(3) Expected efficiency curves of prototype turbine (3)

File



BROWNLEE UNIT EFFICIENCY CURVES
WBM-GJH 6-9-1959

Based on experience curves of S. Morgan Smith Co. No. 01-3-1095 Modified by Index Test for No. 4 Unit dated 1-29-59

B-15378

359-11L
10 X 10 TO THE 1/2 INCH
KEUFFEL & ESSER CO.
JUN 1 1 1959

Revised [A] 11th of April 1977 Added dimensions

EFFICIENCY η (%)

H=235 ft
H=180 ft

.954 10,450
.950 11,100
.944 8,950
.938 11,900
.928 9,600
.924 10,350
.914 12,600
.910 7,650
.918 8,700
.898 10,850
.888 7,450
.870 6,150
.850 6,500
.790 4,400
.802 5,200
.664 3,850
.562 2,900
.292 1,350

[A] Limit of discharge 10283 ft³/s H=180 ft

[A] Limit of discharge 11620 ft³/s H=235 ft

2,000 3,000 4,000 5,000 10,000

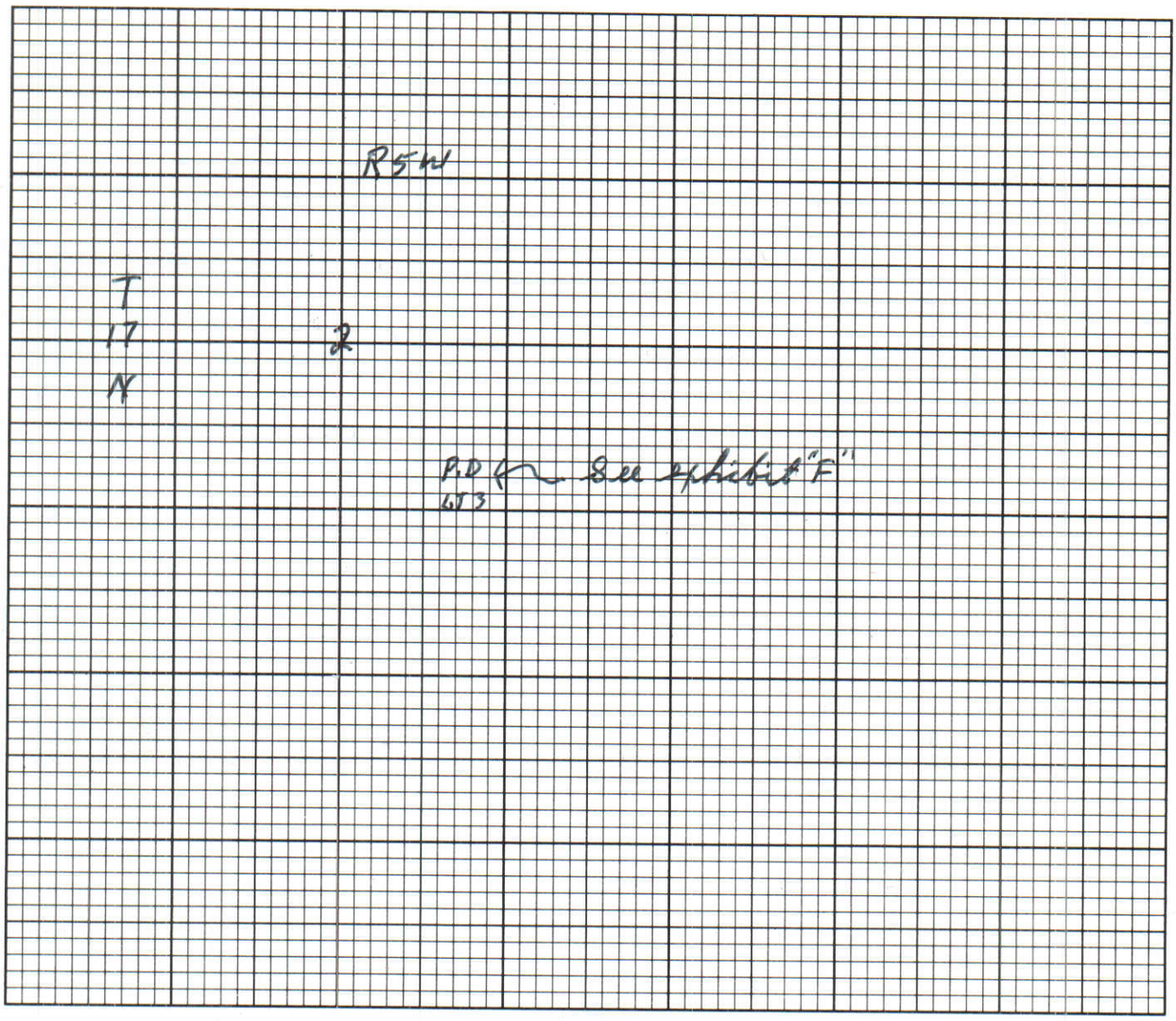
DISCHARGE Q (ft³/se

Fig 1 – (4) Expected efficiency curve of prototype turbine (4)

10. Other water rights on these lands _____

11. Other water right diverted from same p.d. 03-2023 & 03-2024

12. **Diversion and Delivery System Diagram**: Indicate all major components and distances between components. Indicate ditch size/pipe i.d. as applicable. Indicate on systems with measurement port the distance between the port and the nearest component/pipe bend/restriction both upstream and downstream, and the inside pipe diameter at the measurement port. On multiple diversion systems indicate how diversion systems are connected.



13. ☐ **Photo of Diversion & System Attached** ☐ **Aerial Photo of Place of Use Attached or Map of Irrigated Acreage Attached**

14. Remarks Exhibits A thru F. for supporting data.

15. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☑ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

16. Examiner's/Consultant's Signature John K. Noyes Date 10/8/95

Consultant's License Number _____

IDWR Director's Authorization to Conduct

Beneficial Use Examination _____

Date

CONSULTANT SEAL

Exhibit A

Revised [A] 11th of Apr. 1977 Added Dimension

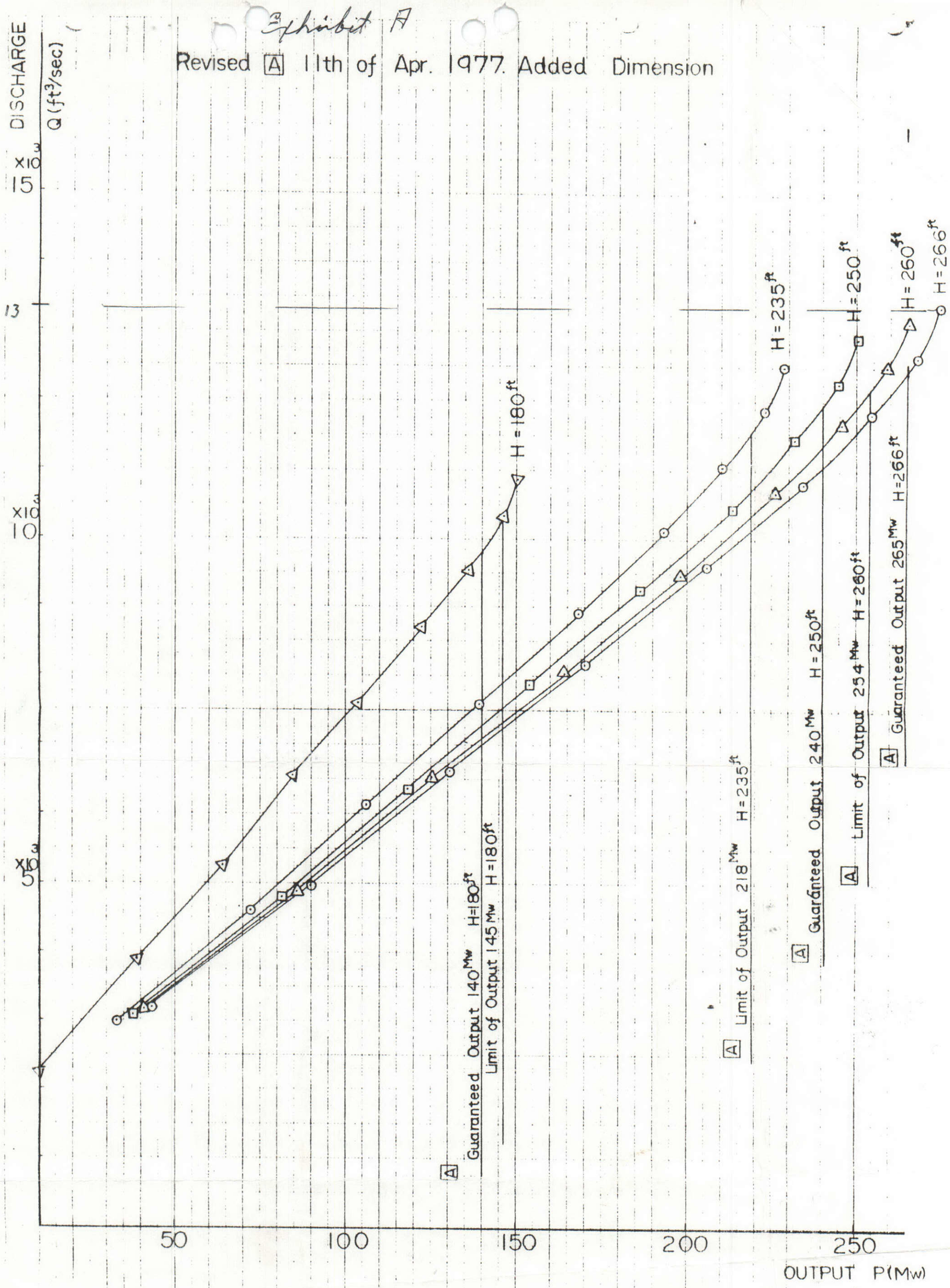


Fig 11-(5) Expected performance curve of prototype Turbine (1)

BROWNLEE #5 unit

Exhibit B

359-11L
10 X 10 TO THE ½ INCH
KEUFFEL & ESSER CO.

OVERALL EFFICIENCY %

95
90
85
80
75

10 20 30 40 50 60 70 80 90 100 110 120 GENERATOR OUTPUT MW

173'
235'
274'
210'
173'
210'
235'
274'

DISCHARGE IN CFS

6000
5000
4000
3000
2000

K-FACTOR
11.5 — 12.0 — 12.5 — 13.0 — 13.6

HEAD
173.0 — 179.2 — 185.5 — 191.5 — 197.7 — 203.8

ELEV.
1976 — 1982.2 — 1988.3 — 1994.5 — 2000.7 — 2006.8

14' HEAD

K-FACTOR
14.6 — 15.0 — 15.4 — 15.9 — 16.3 — 16.7 — 17.1 — 17.4 — 18.0 — 18.7 — 19.4 — 20.0

ELEV.
2013' — 2018' — 2023' — 2028' — 2033' — 2038' — 2045.8 — 2053.6 — 2061.4 — 2069.2 — 2077

210'
215'
220'
225'
230'
235'
242.8
250.6
258.4
266.2
274.0

173'
210'
235'
274'

BROWNLEE UNIT EFFICIENCY CURVES
WBM-GJH 6-9-1959
UNITS 1-4

Based on experience curves of S. Morgan Smith Co. No. 01-3-109E Modified by Index Test for No. 4 Unit dated 1-29-59

20 B-15378
7-2

Idaho Power

BROWNLEE STATION RECORD No. 1

Exhibit C

DAY TUESDAY DATE JUN 4 1985 — TUESDAY JUN 4 1985

	HOUR OF DAY	GENERATOR NO. 1 MWH READING		GENERATOR NO. 2 MWH READING		GENERATOR NO. 3 MWH READING		GENERATOR NO. 4 MWH READING		GENERATOR NO. 5 MWH READING		TOTAL GEN. MWH	SPILL CFS
AF 142 1120	2400	10398	89	7938	90	15177	89	14020	89	536700	230	567	
	2300	10309	108	7848	109	15088	109	14631	108	536470	240	674	
10394	2200	10201	111	7739	112	14979	112	14523	113	536230	260	708	
NO. 1 16677	2100	10090	108	7627	108	14867	108	14410	107	535970	260	691	
8731	2000	9982	103	7519	105	14759	104	14303	104	535710	260	676	
	1900	9879	99	7414	100	14655	100	14199	99	535450	260	658	
	1800	9780	106	7314	108	14555	107	14100	106	535190	260	687	
7938	1700	9674	105	7206	106	14448	105	13995	105	534930	260	681	
NO. 2 09228	1600	9569	108	7100	109	14343	109	13889	108	534670	260	694	
7110	1500	9461	108	6991	109	14234	109	13781	108	534410	260	694	
	1400	9353	117	6882	115	14126	116	13673	114	534150	260	722	
	1300	9236	117	6767	114	14009	115	13559	113	533890	250	708	
15177	1200	9119	114	6653	111	13894	113	13447	111	533640	260	704	
NO.3 7194	1100	9005	117	6542	118	13781	117	13336	115	533380	260	727	
7983	1000	8888	110	6424	110	13664	110	13221	110	533120	260	700	
	0900	8778	113	6314	113	13554	113	13111	112	532860	260	711	
	0800	8665	97	6201	100	13441	93	12999	98	532600	250	638	
14720	0700	8568	98	6101	24	13343		12901	99	532350	220	451	
NO. 4 5605	0600	8470	70	6077		13348		12802	71	532130	120	261	
9115	0500	8400	50	6067		13348		12731	38	532010		108	
	0400	8350		6067		13348		12673	69	532010		69	
	0300	8350		6067		13348		12604	85	532010		85	
536700	0200	8350		6067		13348		12519	84	531910		81	
NO.5 570940	0100	8350		6067		13348	58	12435	63	531840		121	
15740	2400	8350		6067		13290		12372		532010			
TOTAL	TOTAL	2048		1871		1887		2348		4690		12844	
48699	PREV	6683		5239		6096		6767		11070		35855	
	MONTH	8731		7110		7983		9115		15760		48699	

UNIT AVAILIBILITY

UNIT STATUS	UNIT 1 TODAY	UNIT 1 PREV	UNIT 1 MONTH	UNIT 2 TODAY	UNIT 2 PREV	UNIT 2 MONTH	UNIT 3 TODAY	UNIT 3 PREV	UNIT 3 MONTH	UNIT 4 TODAY	UNIT 4 PREV	UNIT 4 MONTH	UNIT 5 TODAY	UNIT 5 PREV
OPERATION	20:00	71.20	91:20	18:30	52.50	70:20	18:00	63.50	81:50	24:00	72.00	96:00	18:40	50.10
DEP. TIME	4:00	40	4:40	6:30	19.10	25:40	6:00	8.10	14:10				5:20	21.50
RESERVE OUT														
PLANNED OUT														
MAINT. OUT														
FORCED OUT														
TOTAL TODAY	24:00			24:00			24:00			24:00			24:00	
TOTAL MONTH		72:00	96:00		72:00	96:00		72:00	96:00		72:00	96:00		72:00

DEP. KWH

UNIT #1	
DAY	
MONTH 00236	
TOTAL	
UNIT #2	
DAY	
MONTH 00423	
TOTAL	
UNIT #3	
DAY	
MONTH 00369	
TOTAL	
UNIT #4	
DAY	
MONTH 00067	
TOTAL	
UNIT #5	
DAY	
MONTH 00992	
TOTAL	

REMARKS

TIME	
	All units in oper. Bn on load control
Mdt	No 4 5 unit depressed
0000	#2 depressed
0100	#3 depressed.
0400	#1 to gen
0520	#5 To gen
0630	#2 To gen
0700	#3 To gen

CHECKED BY:

BROWN ELEV.	VOLTS 230KV	GENERATOR MVAR BN	GENERATOR MVAR OX-HC	GENERATOR MVAR BN OX-HC
1800	234	-70		
HW 1776	234	-48	-25	-73
TW 1600	234	-58	-25	-83
HD 1742	234	-58	-25	-83
1600	234	-65	-25	-90
HW 1777	234	-70	-25	-95
TW 1605	235	-20	0	-20
HD 1749	235	-14	0	-14
2400	235	-14	0	-14
HW 1787	235	-15	0	-15
TW 1604	235	-10	0	-10
HD 1773	235	-10	0	-10
	235	-5	0	-5
	235	-5	0	-5
	236	+14	0	+14
	234	-54	-20	-74
	234	-50	-20	-70
	233	-110	-10	-120
	233	-130	-10	-140
	233	-130	-10	-140
	233	-130	-10	-140
	233	-130	-10	-140
	233	-140	-10	-150

HYDRAULIC DATA	BROWNLEE ELEVATIONS H.W.	T.W.	EFF. HD.	TURB FLO CFS	SPILL CFS	TOTAL BY-PASS CFS	
	7689	2490	27195	28545		28545	
	7688	0565	27123	32.700		32.700	
	7690	0595	270.95	34.460		34.460	
	7697	0575	271.22	33.550		33.550	
	7703	0560	271.43	32.800		32800	
	7705	0545	271.60	31.980		31.980	
	7710	0560	271.50	33.330		33.330	
	7710	0552	271.58	33.040		33.040	
	7717	0548	271.69	33.700		33.700	
	7720	0541	27179	33.700		33700	
	7723	0560	271.63	35380		35380	
	7730	0555	271.75	34630		34630	
	7732	0550	271.82	34500		34500	
	7736	0548	271.88	35725		35725	
	7742	0528	272.14	34000		34000	
	7742	0530	272.12	34575		34575	
	7746	0500	272.46	31000		31000	
	7745	0405	273.49	21755		21755	
	7740	0150	275.90	13400		13400	
	7735	9910	27925	5670		5670	
	7720	9840	27880	3480		3480	
	7710	9900	27810	4140		4140	
	7698	0040	27658	4100		4100	
	7685	0150	27535	4180		4180	
				26405		26405	AVG.

SUMMARY OF OPERATIONS BROWNLEE

MONTH	TOTAL GENERATED FOR DAY	12844	MWH
68:50	PREVIOUSLY REPORTED	35855	MWH
28:10	TOTAL FOR MONTH	48699	MWH
	TOTAL LOCAL SERVICE	31600	MWH
	AVERAGE HOURLY OUTPUT	535.16	MWH
	MAXIMUM HOURLY OUTPUT	727	MWH
	MINIMUM HOURLY OUTPUT	69	MWH
96.00			
L SERV.	RESERVOIR STORAGE	1433140	AF
0 MWH	24-HOUR NET CHANGE	+ 6440	AF
20 MWH	NET CHANGE TO DATE	+ 12,020	AF
20 MWH	TOTAL HEADWATER	4984.13	ELEV.
0 MWH	AVERAGE HEADWATER	2077.17	ELEV.
.00 MWH	MAXIMUM HEADWATER	2077.46	ELEV.
RGIZED	MINIMUM HEADWATER	2076.85	ELEV.
OM	MAXIMUM TAILWATER	1805.60	ELEV.
LINE	MINIMUM TAILWATER	1798.10	ELEV.
440	AVERAGE EFFECTIVE HEAD	274.00	ELEV.
2540	WEISER FLOW 25398	WILDHORSE FLOW	
1410	OPERATORS	ON	OFF
	Henderson	MDT	0800
	Kirtley	0800	1600
2710	Clark	1600	MDT

TOTAL LOC

BL #1	24
BL #2	78
BL #3	182
BL #4	32
BL #5	
	31

TRANSF. EN

BNK	FR
	GEN
1	9120
2	7020
3	8150
4	9660
5	6850

SWITCHYARD READINGS

	IN	OUT
LAGRANDE PRESENT	93278	1-03770
LAGRANDE PREVIOUS	93278	1-01089
DIFFERENCE	- 0	2681
OXBOW PRESENT	11473	45926
OXBOW PREVIOUS	09797	45926
DIFFERENCES	1976	- 0

LOCAL SERVICE

NO. 1		
MDT	80190	
MDT	79950	
TOTAL	240	
NO. 2		
MDT	22900	
MDT	21200	
TOTAL	780	
NO. 3		
MDT	8806	
MDT	8624	
TOTAL	182	
NO. 4		
MDT	6495	
MDT	6463	
TOTAL	32	
NO. 5		
MDT	80440	
MDT	80442	
TOTAL		
STANDBY		
MDT	2020	
MDT	2020	
TOTAL		
TOTAL:	3160	
PREV:	2320	
TODAY:	840	

CHECK TOTAL

0600:	728
1400:	6094
2200:	11583
RS:440	

TIME	REMARKS
Mdt	Swyd Battery Ground
	Gov air comp #2 has bad pop off valve. Tobele
	Spillgate #4 indicator meter has no power
	Gen #1 Transf bank #3 out of service - bad oil p
	R.S. 32 Osc. out of service
	Station air comp #1 out of service - Not loading
	A-bouy is in the intake.
0830	John Bergh repaired station air comp #1
1030	Simpson reports Swyd battery grd is no longer present

Exhibit D

IDAHO

OREGON

SNAKE RIVER

Access Road

VALVE STRUCTURE
12-102" Howell-Bunger Valves

EL. 1790.0

POWER HOUSE

POWER HOUSE INTAKE

EL. 1931.0

DRAWDOWN INTAKE

EL. 1865.0

DIVERSION INTAKE
60,000 c.f.s.

EL. 1800.0

Cofferdam EL. 1830.0

Cofferdam EL. 1890.0

Top of dam El. 2090.0

Slope Lon 4

Slope Lon 2.5

SPILLWAY
5-Gates
42' wide by 5' high

EL. 2000.0

(70,000 cfs
03-2023
03-2024
10,000 cfs

GENERAL PLAN

SCALE 1" = 100'-0"

100 0 100 200 300 400 500

THIS DRAWING IS FILED PURSUANT TO ARTICLE 29 OF LICENSE FOR PROJECT 1971 ISSUED AUGUST 4, 1955

IDAHO POWER COMPANY
BY _____
VICE PRESIDENT
DATED September 1 1955

PROJECT 1971 EXHIBIT L

BROWNLEE H.E. DEVELOPMENT

GENERAL PLAN

IDAHO POWER COMPANY
BOISE, IDAHO
SCALE AS SHOWN SHEET 1 OF 5

REVISED AUG. 1955

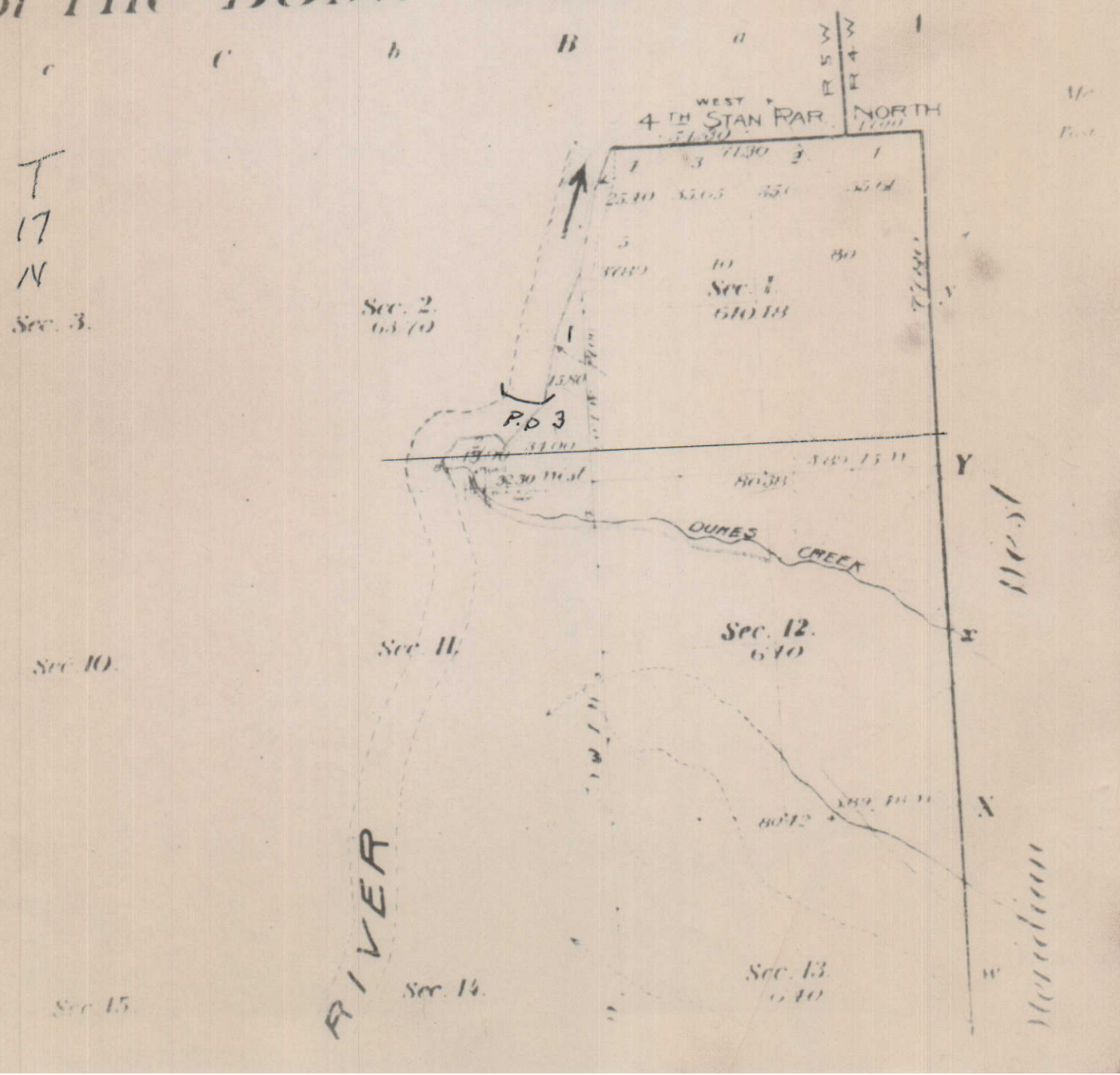
23925

F-140647

Exhibit F

R 5 W

...of the Boise Meridian, Idaho.



State of Idaho
License and Certificate of Water Right

Water License No. R-905 Amount 1,400,000 acre feet

Water District No. Priority October 17, 1952

THIS IS TO CERTIFY that IDAHO POWER COMPANY

of Boise, Idaho , made application for a permit to appropriate the public waters of the State of Idaho, dated October 17 , 19 52 ; that Permit No. R-905 was issued under said application; that Certificate of Completion of works, with a ~~carrying~~ holding capacity of 1,400,000 ~~second~~ acre feet, was issued thereunder on July 29 , 19 59 , showing that said works were completed on the 17 day of June , 1959 ; and that on the 17 day of June , 19 59 ,

IDAHO POWER COMPANY

of Boise , State of Idaho , made proof to the satisfaction of the State Reclamation Engineer of Idaho, of the right to use the waters of Snake River , a tributary of Columbia River , for the purpose of electric power generation , under Use Permit No. R-905 of the Department of Reclamation and that said right to the use of said waters has been perfected in accordance with the laws of Idaho, and is hereby confirmed by the State Reclamation Engineer of Idaho and entered of record in Volume 11 of Licenses at page 6707 , on the 29 day of July , 19 59 ;

The right hereby confirmed dates from October 17 , 19 52 ;

The Point of Diversion is located Lot 3

in the ¼ ¼, Sec. 2 , Tp. 17 N , R. 5 W. , B. M. County Washington

That the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually needed and beneficially used for said purposes, and shall not exceed 1,400,000 ~~cubic~~ acre feet per ~~second~~ annum.

Description and location of use:

Twp.	Range	Sec.	Forty-acre Tract	No. Acres Described in Permit	No. Acres Actually Irrigated
17 N	5 W.	2	Lot 3 for Electric Power Generation		

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, as provided by the laws of Idaho.

WITNESS the seal and signature of the State Reclamation Engineer, affixed at Boise, Idaho, this 29 day of July , 19 59 .

GEO. N. CARTER
State Reclamation Engineer.

(SEAL)

Exhibits

✓A Theoretical Use
Per Licensing Report

✓B Ethering Curves Units 1-4

✓C Brownlee Station Record
Per Beneficial Use Field Report
P-1

✓D Showing generating Units on
Per Beneficial Use Field Report
P-1

✓E Calculations
Per Beneficial Use Field Report
P-1

✓F Map of power plant location
Per Beneficial Use Field Report
P-2

BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE

STATE OF IDAHO

IN THE MATTER OF EXTENDING THE PROOF DUE DATE IN CONNECTION WITH PERMIT NO. 03-7018 IN THE NAME OF IDAHO POWER COMPANY	ORDER

WHEREAS, on December 24, 1975, the Idaho Power Company applied to the Department of Water Resources for a permit to appropriate 5000 cubic feet per second of water from the Snake River tributary to the Columbia River, to be diverted within Lot 3, Sec. 2, Twp. 17N, Rge. 5W B.M., Washington County, to be used for hydro-electric generation purposes; and,

WHEREAS, on January 29, 1976, the Department approved said application and issued Permit No. 03-7018 with the condition that proof of construction of works and application of water to beneficial use be submitted on or before February 1, 1980; and,

WHEREAS, on December 12, 1979, the permit holder submitted a request for an extension of time; and,

WHEREAS, it appears that under the circumstances, the permit holder has been proceeding with reasonable diligence and has given good cause for delay;

IT IS, THEREFORE, HEREBY ORDERED that the time within which to submit proof of beneficial use of water under Permit No. 03-7018 be extended to February 1, 1985.

Dated this 22nd day of February, 1980.

L. Glen Saxton

L. GLEN SAXTON

Chief, Operations Bureau

Identification No. _____

Application No. 63 - 7018

STATE OF IDAHO

DEPARTMENT OF WATER ADMINISTRATION

APPROVED

APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Idaho

(TYPE OR PRINT IN INK)

1. Name of applicant Idaho Power Company

   post office address P O Box 70, Boise, Idaho 83721

2. Source of water supply Snake River which is a tributary of Columbia River

3. a. Location of point of diversion is Lot 3 ~~NW¼ SW¼~~ ~~¼ of~~ Section 2 Township 17N Range 5W B.M. Washington County; additional points of diversion if any: _____

   b. If water is not consumed, it will be discharged into Snake River at a point in Lot 1 ~~NW¼ SW¼~~ ~~¼ of~~ Section 2 Township 17N Range 5W B.M. Adams County

4. Water will be used for the following purposes:

   Amount 5000 cfs (cfs or acre-feet per annum) for hydroelectric generation purpose from Jan 1 to Dec 31 (both dates inclusive)

   Amount _____ (cfs or acre-feet per annum) for _____ purpose from _____ to _____ (both dates inclusive)

   Amount _____ (cfs or acre-feet per annum) for _____ purpose from _____ to _____ (both dates inclusive)

5. Total quantity to be appropriated:

   a. 5000 cubic feet per second and/or

   b. _____ acre feet per annum.

6. Proposed diverting works:

   a. Description of ditches, flumes, pumps, headgates, etc. Existing gated intake structure located in Brownlee Dam into a 24-foot diameter penstock to be constructed

   b. Height of storage dam the Brownlee approx/ 395 feet, active reservoir capacity 480,250 acre feet; total reservoir capacity 1,426,700 acre feet, materials used in storage dam: Rock fill with clay core

   Period of year during which storage will occur _____ (Mo. Day) to _____ (Mo. Day) inclusive.

   c. Proposed well diameter is _____ inches; proposed depth of well is _____ feet.

7. a. Time required for the completion of the works and application of the water to the proposed beneficial use is 3 to 4 years.

   b. Estimated construction cost is $ 39,418,000 (power plant including penstock)

8. Description of proposed uses:

   a. If water is **not** for irrigation:

      (1) Give the place of use of water: NE ¼ of SE ¼ of Section 2 Township 17N Range 5W B.M.

      (2) Amount of power to be generated: 225 MW ~~HP~~ under 260 feet of head.

      (3) List number of each kind of livestock to be watered _____

      (4) Name of municipality to be served _____, or number of families to be supplied with domestic water _____.

      (5) If water is to be used for other purposes describe: _____

b. If water is for irrigation, indicate acreage in each subdivision in the tabulation below:

TWP.	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTALS
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	

Total number of acres to be irrigated _____

c. Describe any other water rights used for the same purposes as described above. See Item 10 below

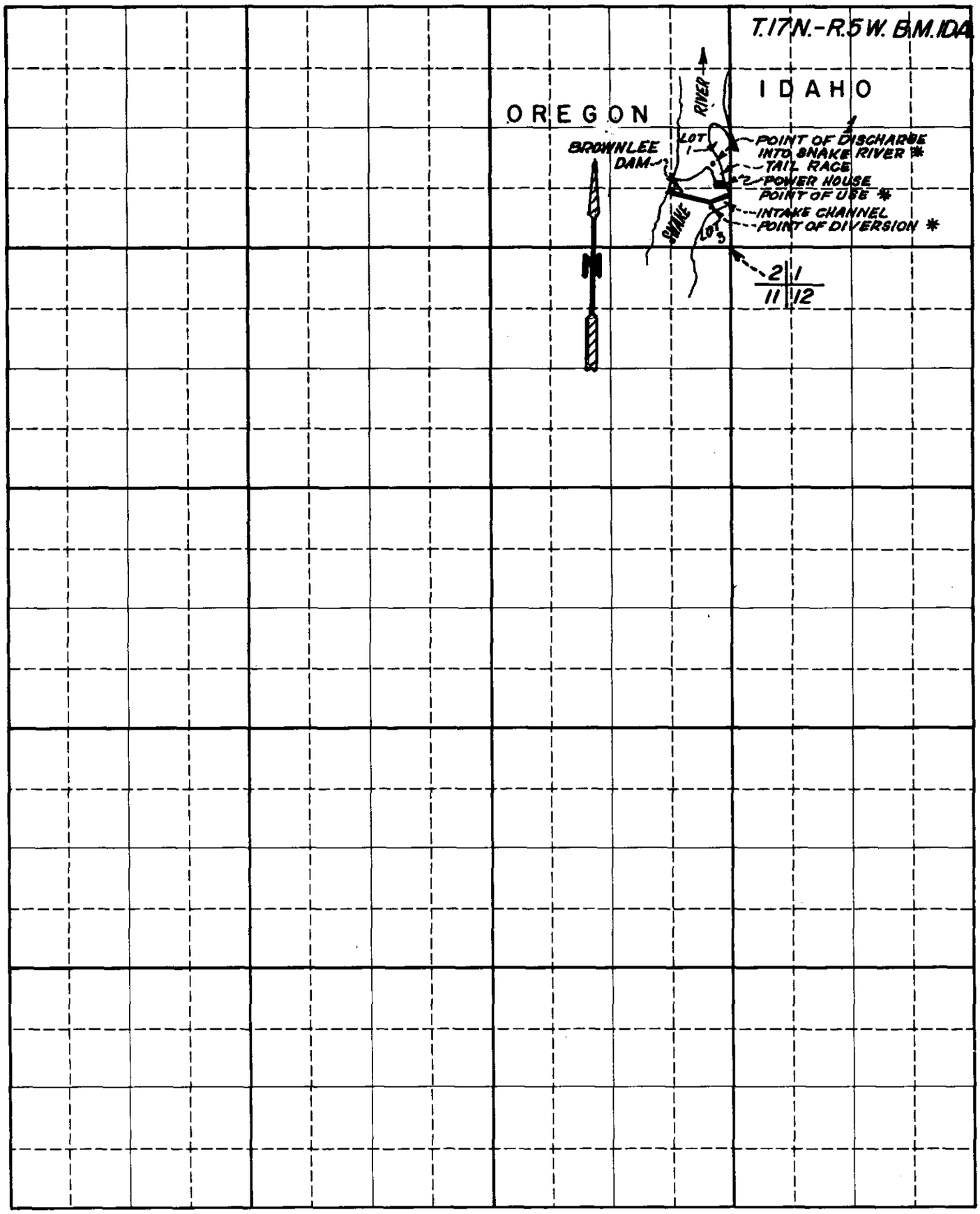
9. a. Who owns the property at the point of diversion Applicant (Idaho Power Company)

b. Who owns the land to be irrigated or place of use Applicant (Idaho Power Company)

c. If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing

10. Remarks Water is to be utilized in generation of electric power at the Brownlee Hydroelectric Development. Development is to be expanded by the installation and construction of a 5th generating unit. Applicant now holds Water License No 23925 (03-2023) for 20,000 cfs and Water License No 31786 for 10,000 cfs for generation of electric power at the Brownlee Hydroelectric Development (03-2024) together with Water License No R-905 for 1,400,000 acre-feet. 03-2018

11. Map of proposed project: show clearly the proposed point of diversion, place of use, section number, township and range number.



Scale: 2 inches equal 1 mile

* Approximate

BE IT KNOWN that the undersigned hereby makes application for permit to appropriate the public waters of the State of Idaho as herein set forth.

IDAHO POWER COMPANY

By W. J. Armstrong

(Applicant) Vice President

Proposed Priority 12-24-1975 !

Received by RLH Date 12-24-1975 Time 11:00AM,

Preliminary check by RLH Fee $ 1465.00

Receipted by RLH Date 12-24-75 # 3603

Publication prepared by C/S Date 12-31-75

Published in Upper County News Reporter

Publication dates Jan. 8 & 15

Publication approved C/S Date 1-16-76

Priority reduced to _____ Reason _____

Protests filed by: _____

Copies of protests forwarded by _____

Hearing held by _____ Date _____

Recommended for (approval) denial by RLH

ACTION OF THE DIRECTOR, DEPARTMENT OF WATER ADMINISTRATION

This is to certify that I have examined Application for Permit to appropriate the public waters of the State of Idaho No. 03-7018, and said application is hereby APPROVED.

1. Approval of said application is subject to the following limitations and conditions:

   a. SUBJECT TO ALL PRIOR WATER RIGHTS.

   b. Proof of construction of works and application of water to beneficial use shall be submitted on or before February 1, 19 80.

   c. Other: 1. The rights for the use of the waters under this permit shall be subordinate to and not prevent or interfere with any future upstream diversion and use of the waters of the Snake River and its tributaries for the irrigation of lands or other consumptive beneficial uses in the Snake River watershed.

   2. This permit has been issued subject to Section 42-207, Idaho Code. In the event of its sale, transfer, assignment, or its being mortgaged, without a compliance with the provisions of this section, it shall be cancelled and revoked by the Director of the Department of Water Resources.

Witness my hand this 29 day of January 19 76.

Director

NOTICE OF APPLICATION FOR WATER PERMIT

Notice is hereby given that IDAHO POWER COMPANY, P.O. Box 70, Boise, ID., has on Dec. 24, 1975, submitted Application No. 03-7018 for a permit to appropriate 5000 cubic feet per second of water from the Snake River, trib. to Columbia River by means of existing gated intake structure and penstock within Lot 3, Sec. 2, T. 17 N, R. 5 W, B. M., Washington County to be used from Jan. 1 to Dec. 31 for hydroelectric generation within the NE¼SE¼, Sec. 2, T 17 N, R. 5 W. B.M.

If issued, this permit will be subject to all prior water rights. Protests against the granting of the permit must be filed with the Idaho Department of Water Resources, Statehouse, at Boise, Idaho 83720, on or before Jan. 26, 1976.

R. KEITH HIGGINSON
Director

Published in the Upper Country News-Reporter, Cambridge, ID., on Jan. 8, 1976 and Jan. 15, 1976.

DW
CLS
1-16-76

AFFIDAVIT OF PUBLICATION

State of Idaho }
County of Washington } ss.

Alan ~~Stuart~~ Dopf, being first duly sworn, deposes and says that he is the publisher, foreman, principal clerk, of THE NEWS-REPORTER, a weekly newspaper published at Cambridge, Washington County, Idaho, and that said paper has been published continuously for more than 78 weeks immediately preceding the first publication of the attached notice; that said paper is in general circulation in the county aforesaid and in the vicinity of Cambridge, Idaho; that the notice, a copy of which is attached hereto, was published in said newspaper once a week for two consecutive weeks in the regular and entire issue of every number thereof during the period and time of publication, and was published in the newspaper proper and not in a supplement thereto; that the publication of said notice began with the issue of January 8, 1976, and ended with the issue of January 15, 1976.

Alan V. Dopf

Subscribed and sworn to before me this 15th day of January, 19 76.

Notary Public for Idaho, residing at Cambridge, Idaho

JOHN C. REHENKA
NOTARY PUBLIC
STATE OF IDAHO

RECEIVED
JAN 16 1976
Department of Water Resources

RECEIVED
JAN 16 1976

To Ralph M. 991

Date 5/20 Time 4:20 ☐ AM ☐ PM

WHILE YOU WERE OUT

M Scott Grandis

of Idaho Power

Phone Numbers

Office Area Code 388 Number 2484 Ext.

Voicemail

FAX

Pager

Mobile

e-mail

- ☑ Telephoned
- ☑ Please call
- ☑ Returned your call
- ☐ Called to see you
- ☐ Wants to see you
- ☐ Will call again
- ☐ URGENT

Message

Chart B. 2-6 has an assumption of Consultant Head water. Any other questions will be out of the office Thurs, & Fri call back Mon

AMPAD EFFICIENCY® Operator JLS

Reorder #23-000

360
225
585

Turbine Evaluation - w Envr
& Energy Generation Report
w/ operating Hill diagram
Turbine efficiency w/ cavitation limits
Generator efficiency
Head loss through Turbine

2. Generation data - hourly ?
Flow data of H.W, T.W elev. 15 min ?

Spring 1994

Roger Fe
John

Disk Mailer

Pull Tab to Open

8/12/00

Tim Burke

These are materials I received from Idaho Power Co, generally Scott Sorondo, to assist me in locating the last 5,000 cfs permit at Brownlee. This was to assist Jim Johnson, however, I never got back to this task. Ralph

Item Number 18-274

MADE IN USA

Office Products
Diamond Bar, CA

BROWNLEE PROJECT GENERATION 1/1/97-12/31/97 (from Lisa Dunlap 1/28/98)

Date	MW FOR HOUR ENDING																							
	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
1/1/1997	695	657	527	528	519	521	648	630	598	647	654	669	666	585	565	629	647	630	699	677	617	601	444	661
1/2/1997	612	597	669	623	603	586	647	661	584	626	632	642	659	661	613	576	622	598	528	538	572	548	531	533
1/3/1997	601	555	556	604	620	570	435	475	669	656	669	649	616	542	410	386	487	654	646	565	552	552	551	554
1/4/1997	598	580	652	658	678	635	596	517	582	654	583	525	488	540	545	558	621	661	514	616	641	625	592	494
1/5/1997	575	567	584	645	628	671	642	545	617	603	488	555	634	579	488	526	408	522	464	566	676	557	611	630
1/6/1997	620	673	697	648	612	580	507	584	654	473	541	587	686	632	608	656	630	532	514	601	516	510	582	565
1/7/1997	638	610	648	582	621	537	475	591	619	555	545	647	657	655	655	646	619	515	518	524	484	548	556	531
1/8/1997	561	619	637	655	633	562	504	576	630	613	587	526	587	592	451	426	543	563	656	545	622	530	471	557
1/9/1997	585	565	619	629	559	510	488	393	643	616	625	524	554	472	554	597	579	563	578	621	593	674	654	648
1/10/1997	593	554	599	672	631	448	453	613	552	583	626	634	601	551	548	461	503	597	694	630	630	594	630	669
1/11/1997	610	666	645	654	658	654	607	565	637	701	683	617	612	675	648	646	633	587	679	608	621	610	537	558
1/12/1997	650	638	639	672	686	637	577	482	593	622	560	637	629	607	644	609	580	669	628	650	683	579	598	564
1/13/1997	547	654	656	580	568	564	586	628	628	584	568	611	529	659	598	624	630	631	702	665	581	549	480	575
1/14/1997	655	669	669	604	591	627	622	638	650	612	625	597	539	543	356	456	537	628	671	637	682	627	635	631
1/15/1997	631	675	669	632	625	597	551	661	680	664	618	578	526	527	551	580	604	484	581	671	673	621	631	653
1/16/1997	588	648	650	651	686	687	540	600	674	640	611	632	639	642	531	599	592	385	666	674	625	617	584	625
1/17/1997	651	608	639	681	563	521	500	649	635	617	633	579	598	555	631	602	547	504	479	399	676	668	594	633
1/18/1997	614	635	680	687	564	645	605	614	588	573	581	541	566	562	594	554	567	540	631	641	630	609	619	598
1/19/1997	525	514	610	658	612	549	636	611	582	606	600	592	561	564	544	610	639	629	682	654	658	662	624	559
1/20/1997	629	637	586	664	651	587	550	587	688	592	590	621	617	662	636	671	657	572	650	618	677	587	590	648
1/21/1997	642	653	672	600	633	621	574	541	659	613	548	515	627	640	656	632	567	596	657	657	613	587	564	580
1/22/1997	580	628	622	624	644	550	550	547	603	564	525	551	561	589	616	639	612	608	702	661	652	608	584	513
1/23/1997	618	647	601	665	668	590	657	659	588	585	566	560	610	630	580	612	536	423	577	663	659	619	640	528
1/24/1997	485	650	582	609	553	502	569	603	653	532	624	539	521	587	579	654	656	628	589	545	565	619	597	640
1/25/1997	616	627	650	651	627	593	505	621	540	682	663	612	590	573	576	605	613	548	631	573	574	576	636	615
1/26/1997	629	628	606	640	641	588	620	580	576	642	667	663	646	681	650	650	612	574	661	682	673	620	600	575
1/27/1997	685	677	660	638	549	397	619	618	522	575	588	596	571	594	595	628	655	626	684	620	669	594	437	605
1/28/1997	626	612	661	652	546	503	487	564	669	622	629	578	617	598	580	601	593	484	592	615	613	649	555	585
1/29/1997	422	656	679	656	664	509	586	634	645	445	601	594	624	656	650	637	583	493	658	643	609	596	635	653
1/30/1997	657	666	635	670	643	604	564	615	661	615	666	659	616	541	626	657	580	596	623	626	641	567	572	482
1/31/1997	629	608	625	624	625	579	502	569	614	497	579	635	624	673	651	581	601	514	436	559	624	620	619	516
2/1/1997	578	584	612	618	647	644	642	617	608	625	598	584	594	615	607	666	660	596	645	640	605	625	613	584
2/2/1997	592	622	648	669	661	655	617	642	614	621	609	549	593	659	593	629	686	567	681	652	646	620	588	570
2/3/1997	592	640	692	660	634	601	581	622	634	644	611	594	632	613	516	526	615	626	659	686	655	594	605	624
2/4/1997	645	640	660	676	641	597	620	657	579	618	603	648	563	548	580	645	618	558	687	678	597	644	602	660
2/5/1997	666	644	623	668	587	567	531	656	622	529	599	656	669	659	591	607	610	570	656	652	635	635	619	626

Generation

2/6/1997	648	562	592	610	650	534	622	649	558	563	609	630	615	630	620	605	598	564	667	554	613	549	662	540
2/7/1997	652	636	594	645	659	584	571	552	597	605	633	678	679	630	548	535	648	558	616	572	615	666	635	515
2/8/1997	650	581	611	637	650	587	653	603	640	671	627	643	532	533	618	650	677	636	624	626	628	646	640	611
2/9/1997	629	572	580	656	570	604	580	523	608	667	645	584	613	621	605	614	566	582	590	626	596	560	554	540
2/10/1997	638	657	652	603	587	525	473	545	574	550	540	640	585	628	646	589	599	538	510	612	621	593	496	560
2/11/1997	614	641	593	631	583	500	584	542	634	586	639	580	602	558	641	620	638	594	601	643	602	511	579	575
2/12/1997	542	544	603	635	637	531	496	499	584	575	636	649	511	618	609	542	595	546	592	624	643	651	602	566
2/13/1997	575	648	650	666	610	563	550	550	533	552	577	563	570	559	605	578	566	577	620	623	629	602	520	593
2/14/1997	571	609	615	604	571	585	569	430	595	531	601	529	561	565	558	555	549	488	503	523	567	632	522	471
2/15/1997	539	541	593	606	591	556	506	484	567	536	621	517	560	549	557	595	624	586	622	619	582	576	563	497
2/16/1997	540	571	576	583	580	601	600	614	543	530	571	573	589	592	506	520	472	603	573	645	586	513	562	545
2/17/1997	553	443	609	612	592	538	456	327	564	618	552	577	638	541	573	614	623	535	613	674	608	582	541	611
2/18/1997	587	574	642	652	593	518	492	608	570	519	583	572	662	593	540	533	520	546	596	599	612	571	540	512
2/19/1997	549	618	655	540	478	523	570	541	574	550	612	557	397	438	513	523	560	534	541	556	559	565	562	540
2/20/1997	512	557	590	654	556	447	525	638	585	494	516	567	561	577	599	589	559	527	553	597	599	596	592	552
2/21/1997	587	660	600	600	593	464	456	584	490	540	634	512	519	593	595	608	578	652	569	593	632	595	605	546
2/22/1997	414	564	599	571	549	563	553	616	580	574	569	547	609	560	562	545	614	556	532	556	546	560	566	587
2/23/1997	606	577	569	587	533	540	526	559	563	587	544	599	575	598	563	566	612	579	609	615	565	525	522	546
2/24/1997	553	584	591	573	538	495	548	533	485	468	525	520	503	526	511	505	560	332	491	570	531	492	489	517
2/25/1997	526	518	516	518	407	414	363	445	432	475	471	523	546	547	483	570	568	500	485	456	616	573	564	431
2/26/1997	531	582	587	576	533	460	553	440	463	513	459	512	607	622	562	478	563	488	439	499	567	524	555	521
2/27/1997	545	587	584	585	569	516	577	573	524	475	515	578	592	558	552	572	535	515	590	607	588	543	544	554
2/28/1997	541	543	550	548	522	518	559	499	499	527	545	544	520	514	488	519	560	491	474	550	568	528	515	510
3/1/1997	571	513	497	487	524	523	496	417	487	540	533	496	560	489	437	514	496	430	395	413	429	518	452	463
3/2/1997	439	501	518	521	541	531	505	440	469	545	525	496	483	480	498	493	518	476	473	548	513	540	488	501
3/3/1997	444	518	472	517	555	464	487	581	550	554	580	563	485	563	483	541	574	554	546	529	480	505	459	466
3/4/1997	525	528	520	499	478	441	471	566	494	389	561	415	306	551	553	510	552	450	428	556	504	497	449	431
3/5/1997	453	465	494	505	449	423	408	455	365	387	381	347	399	373	444	394	401	476	435	425	486	466	430	474
3/6/1997	420	488	473	466	477	461	420	441	431	421	387	320	333	403	354	427	430	347	343	456	484	502	451	461
3/7/1997	536	544	543	509	506	494	461	515	450	410	487	445	281	321	531	497	497	459	392	497	478	502	313	394
3/8/1997	432	519	455	543	516	496	495	392	483	443	512	544	528	489	548	450	514	514	404	547	498	433	535	513
3/9/1997	435	537	552	524	522	510	504	507	430	455	467	515	547	505	476	490	390	372	378	428	479	412	345	332
3/10/1997	389	455	427	449	458	369	391	328	410	408	456	413	425	452	456	417	464	407	453	502	432	402	425	429
3/11/1997	417	457	441	502	459	436	415	375	455	424	476	407	494	466	469	433	446	455	453	531	460	435	454	518
3/12/1997	483	484	452	360	489	458	445	484	430	404	491	450	441	503	463	464	431	512	449	510	508	512	450	460
3/13/1997	477	435	494	498	441	372	451	505	434	420	502	422	454	478	497	429	502	453	406	488	503	475	484	449
3/14/1997	486	494	486	489	460	413	318	415	490	504	456	410	335	348	366	391	453	446	402	417	397	421	460	435
3/15/1997	373	426	476	482	510	444	394	433	423	519	488	470	391	401	350	419	476	460	423	430	430	432	440	433
3/16/1997	440	476	447	479	473	480	450	412	390	439	449	416	408	443	413	412	402	479	403	450	414	467	392	385
3/17/1997	494	494	482	477	464	427	410	441	358	314	335	290	335	345	282	325	331	342	391	434	383	318	303	328

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3/18/1997	417	366	385	378	398	301	325	310	310	325	366	379	354	335	383	391	355	298	267	336	329	306	258	315
3/19/1997	317	357	367	365	295	325	262	155	381	356	355	328	254	348	353	342	355	271	257	332	355	375	280	367
3/20/1997	291	348	347	352	365	267	222	349	383	340	419	394	329	378	310	383	335	351	368	349	351	322	387	230
3/21/1997	355	294	347	414	342	114	281	309	313	260	294	323	334	393	326	335	335	283	351	329	420	323	383	285
3/22/1997	399	335	384	383	361	364	333	346	293	316	318	328	330	309	315	329	361	268	327	412	388	346	379	350
3/23/1997	301	355	375	392	345	370	360	369	267	249	348	324	372	356	327	363	352	332	350	340	379	343	264	259
3/24/1997	340	339	393	393	352	333	193	258	361	359	361	312	292	389	321	313	321	323	236	320	365	319	321	266
3/25/1997	358	353	394	398	366	297	305	377	290	276	302	287	326	324	333	261	362	336	243	396	367	338	333	353
3/26/1997	330	304	314	327	351	180	198	361	318	311	332	325	372	396	316	382	448	462	393	352	389	356	376	373
3/27/1997	382	388	455	432	427	401	329	436	428	462	463	480	462	472	445	394	417	425	390	446	466	375	378	313
3/28/1997	409	369	364	430	391	358	417	428	459	424	408	431	407	403	365	361	334	382	403	415	404	431	427	404
3/29/1997	392	431	443	423	426	410	329	313	370	447	398	413	409	426	439	427	434	415	439	432	458	432	374	333
3/30/1997	366	440	433	412	403	449	385	428	425	449	399	360	415	421	407	384	338	275	347	400	471	417	407	375
3/31/1997	376	439	432	470	450	401	378	405	485	419	408	394	328	373	406	424	437	440	449	474	402	387	393	399
4/1/1997	446	464	433	414	412	365	445	287	252	304	287	327	322	355	346	266	307	312	336	363	387	342	209	233
4/2/1997	358	342	304	311	280	171	337	316	340	304	336	291	276	316	355	359	296	306	346	380	335	254	228	333
4/3/1997	336	364	363	358	336	317	310	314	321	314	313	313	302	327	326	329	350	332	256	298	330	261	316	346
4/4/1997	305	266	370	342	336	301	271	361	379	380	342	364	364	350	354	340	351	362	294	254	241	282	277	363
4/5/1997	340	293	374	378	352	330	288	352	343	379	344	343	323	319	369	288	338	324	281	311	340	300	318	353
4/6/1997	378	0	339	377	350	281	291	317	353	355	341	383	352	334	320	356	299	323	305	338	309	258	231	0
4/7/1997	302	321	303	340	328	290	309	262	183	255	289	291	192	228	236	218	196	281	252	226	297	323	239	247
4/8/1997	296	299	332	372	322	282	308	273	254	214	287	259	101	229	318	355	331	242	267	278	335	376	359	284
4/9/1997	355	361	372	351	356	312	348	208	291	274	305	277	269	321	342	320	363	333	306	282	282	346	292	303
4/10/1997	291	347	337	347	328	298	279	266	285	325	298	345	288	360	296	295	271	342	369	337	335	345	267	301
4/11/1997	303	305	314	342	316	269	275	304	353	256	301	272	289	323	303	304	272	292	307	237	197	236	293	207
4/12/1997	244	291	306	326	312	307	247	338	286	306	311	281	310	273	301	319	321	344	328	301	269	254	267	305
4/13/1997	267	270	273	337	298	268	286	322	357	262	275	270	308	359	277	307	295	349	329	304	225	276	259	248
4/14/1997	260	334	314	320	325	274	316	301	287	333	332	294	347	211	266	327	341	334	316	345	303	315	289	281
4/15/1997	262	327	308	265	337	318	289	219	305	305	323	248	236	325	357	339	331	327	349	328	311	375	310	294
4/16/1997	300	324	384	358	338	332	306	398	366	376	411	417	394	409	346	386	433	364	393	353	331	321	285	322
4/17/1997	295	323	375	375	341	325	322	414	390	395	391	404	354	424	376	330	367	377	371	366	373	411	295	296
4/18/1997	335	369	361	362	379	338	347	281	405	316	324	318	319	363	301	288	341	339	381	351	382	397	318	340
4/19/1997	387	349	349	296	365	351	309	256	345	409	351	389	306	338	249	271	281	269	366	316	346	282	291	376
4/20/1997	338	349	356	375	350	359	347	313	398	310	385	347	368	362	296	342	382	365	362	347	404	405	345	280
4/21/1997	338	412	404	323	331	340	302	375	391	358	295	296	291	239	210	259	301	339	308	297	309	309	228	204
4/22/1997	254	220	279	268	258	255	238	339	274	189	198	292	329	228	192	190	234	237	246	263	232	302	263	214
4/23/1997	316	324	307	291	311	260	242	323	309	301	280	246	213	258	300	315	338	307	330	238	228	247	239	319
4/24/1997	276	295	296	306	316	303	254	284	251	269	269	218	238	239	329	337	349	343	345	304	287	285	320	229
4/25/1997	148	311	321	352	299	141	187	328	392	312	372	366	346	364	339	314	354	350	323	354	212	360	325	192
4/26/1997	196	363	318	325	355	329	308	237	266	317	298	303	297	376	354	286	336	369	345	323	271	326	324	315

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4/27/1997	288	318	296	342	292	283	252	229	290	348	333	356	352	328	345	324	332	338	350	356	299	323	278	270
4/28/1997	350	338	236	320	358	232	245	273	195	245	215	187	234	232	189	249	225	249	249	239	153	169	152	206
4/29/1997	261	194	236	242	240	94	120	207	197	120	140	186	188	155	232	210	215	218	203	163	135	242	181	203
4/30/1997	224	225	215	206	206	177	191	133	138	183	232	236	162	173	144	148	228	224	87	113	181	122	120	173
5/1/1997	204	180	214	190	210	162	196	206	87	124	143	147	82	175	103	85	96	151	140	160	133	208	194	142
5/2/1997	115	146	135	215	194	107	172	191	148	145	153	144	157	213	155	112	213	201	187	132	136	162	179	117
5/3/1997	103	153	138	182	164	187	194	128	195	168	164	207	174	177	150	153	167	221	180	192	142	138	170	159
5/4/1997	129	125	90	202	171	152	197	134	177	190	192	205	191	142	217	204	222	222	200	185	144	182	155	128
5/5/1997	100	143	150	176	108	96	76	169	172	183	193	212	217	218	222	207	151	159	203	133	189	209	81	95
5/6/1997	193	187	173	167	165	58	69	75	63	126	169	120	135	178	141	114	156	159	150	121	186	190	104	129
5/7/1997	185	185	178	212	197	147	153	219	161	170	194	170	159	155	213	225	156	85	75	132	197	175	111	183
5/8/1997	156	207	180	157	175	144	179	213	215	214	174	168	172	188	203	162	219	169	169	145	161	188	120	142
5/9/1997	164	151	172	136	131	103	160	208	172	202	210	184	212	171	129	190	126	148	107	130	99	113	164	129
5/10/1997	96	177	178	157	120	138	156	119	90	134	178	167	177	170	144	151	221	195	151	153	133	183	159	158
5/11/1997	144	138	114	111	92	135	138	145	135	92	106	140	134	147	150	181	178	159	124	152	183	206	146	139
5/12/1997	197	123	139	56	52	112	164	222	161	229	219	73	174	191	175	198	206	181	139	159	172	171	88	168
5/13/1997	225	162	129	154	180	147	178	124	168	179	170	194	244	181	189	212	219	217	192	146	133	212	126	153
5/14/1997	228	115	189	129	133	70	158	101	112	141	253	250	202	194	224	237	199	166	179	182	177	163	122	96
5/15/1997	185	122	214	131	193	114	73	150	132	87	102	118	220	203	130	182	231	138	129	69	53	43	193	170
5/16/1997	104	246	221	234	235	217	148	237	225	218	239	221	198	235	258	216	285	227	142	177	210	237	212	211
5/17/1997	153	214	250	223	233	187	166	118	266	227	260	224	255	235	235	251	172	216	206	160	225	240	193	151
5/18/1997	152	211	188	234	249	248	230	260	285	200	286	243	228	227	254	255	264	285	251	144	249	323	267	215
5/19/1997	223	232	237	264	296	287	285	232	179	201	224	307	279	203	305	314	310	280	298	272	242	274	268	274
5/20/1997	233	252	278	284	273	248	200	218	227	300	308	273	215	274	310	168	138	214	266	251	198	317	257	253
5/21/1997	255	326	301	273	257	294	295	289	104	186	201	308	199	286	274	220	268	309	312	310	309	332	249	186
5/22/1997	359	283	263	247	262	261	290	297	335	332	294	239	228	279	309	240	213	219	225	233	267	274	196	263
5/23/1997	291	283	280	208	215	261	254	287	329	284	276	279	313	309	297	279	254	240	236	290	226	173	231	249
5/24/1997	279	272	276	235	228	210	177	226	258	272	297	315	276	251	286	305	312	339	317	308	314	338	298	212
5/25/1997	271	143	307	304	309	313	274	154	326	273	363	325	331	344	345	330	316	326	258	293	376	360	393	353
5/26/1997	295	109	334	374	323	325	261	293	301	336	392	362	334	323	315	329	329	307	373	354	306	325	300	293
5/27/1997	294	308	342	296	371	270	211	219	287	376	364	334	310	371	292	240	305	309	303	254	310	367	311	279
5/28/1997	359	362	318	316	363	365	298	314	295	282	322	290	233	235	176	269	356	348	338	264	281	344	274	304
5/29/1997	275	239	298	228	146	249	259	258	340	422	450	515	499	490	541	599	588	525	484	449	413	458	486	489
5/30/1997	371	455	259	307	323	267	298	432	618	613	642	537	628	588	633	531	580	610	636	533	592	523	518	529
5/31/1997	517	236	211	173	177	176	208	433	583	660	619	563	549	582	603	590	639	618	613	540	464	549	483	520
6/1/1997	481	259	279	286	280	177	195	325	523	616	600	582	603	647	596	581	609	674	586	546	526	555	502	409
6/2/1997	311	222	264	334	255	189	259	410	450	599	542	564	602	626	576	639	628	650	635	607	563	621	539	552
6/3/1997	552	374	304	93	85	180	331	459	625	605	655	604	628	588	643	614	584	577	625	662	664	618	613	591
6/4/1997	605	391	304	254	225	263	408	566	611	556	608	615	608	575	526	511	593	564	629	589	603	630	601	478
6/5/1997	337	544	634	614	626	575	531	513	588	659	628	634	629	615	547	565	540	591	583	604	603	644	624	491

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6/6/1997	381	489	389	624	591	558	449	501	573	637	657	660	644	651	652	656	649	639	632	615	603	624	653	620
6/7/1997	615	649	643	660	523	515	492	607	630	620	586	585	613	642	632	652	679	661	688	639	556	652	621	559
6/8/1997	611	647	575	375	270	243	231	489	561	582	658	628	665	639	612	555	619	650	635	621	623	613	600	485
6/9/1997	352	565	494	344	433	528	526	539	627	606	588	521	598	608	593	586	583	560	625	616	602	556	577	560
6/10/1997	612	593	591	587	495	428	310	360	279	402	351	321	495	587	539	562	586	532	564	562	558	487	344	427
6/11/1997	499	544	490	297	295	388	588	479	339	624	649	627	598	576	660	580	627	615	645	602	542	480	497	497
6/12/1997	437	516	498	538	568	585	564	536	498	389	658	641	517	509	568	511	653	558	598	620	570	627	704	572
6/13/1997	588	664	595	562	629	583	504	561	669	619	646	668	578	595	693	545	553	536	555	533	585	631	645	625
6/14/1997	562	556	619	456	447	413	543	542	535	559	571	542	659	652	680	663	683	632	640	617	635	636	611	617
6/15/1997	599	596	464	210	217	110	117	139	600	591	630	608	699	674	630	672	701	678	682	651	639	641	654	622
6/16/1997	643	364	589	506	642	564	492	512	581	581	589	566	565	636	660	670	674	648	666	547	642	688	603	475
6/17/1997	545	653	633	594	660	610	586	635	598	605	684	680	583	592	638	639	631	557	528	458	558	564	547	349
6/18/1997	580	689	609	590	492	554	477	600	610	581	522	464	604	527	581	508	557	585	605	599	622	601	584	588
6/19/1997	679	675	626	577	571	596	505	447	595	625	639	565	483	570	571	587	652	616	642	608	591	617	645	573
6/20/1997	573	603	606	605	579	532	621	541	528	481	635	522	603	635	616	445	660	662	622	611	629	597	578	594
6/21/1997	597	654	692	627	639	581	520	540	550	611	649	642	570	681	664	699	669	668	687	625	554	628	577	607
6/22/1997	613	551	661	610	612	597	525	656	626	576	625	623	659	671	666	636	633	600	630	606	641	665	670	684
6/23/1997	644	675	642	670	680	599	500	608	496	553	662	576	551	596	586	537	482	622	683	621	583	647	623	608
6/24/1997	674	594	663	643	634	650	616	636	606	480	508	539	661	602	607	583	563	613	627	658	626	605	634	583
6/25/1997	671	690	637	656	554	532	528	452	443	527	674	602	592	675	652	630	631	625	622	647	599	589	590	533
6/26/1997	607	633	634	626	604	547	441	391	487	558	541	622	589	575	661	641	590	566	557	608	620	579	594	652
6/27/1997	555	549	612	639	597	590	502	533	640	614	683	541	628	545	601	666	682	682	654	631	612	646	574	563
6/28/1997	676	605	589	603	600	627	620	575	652	662	649	664	586	646	601	650	574	619	630	599	565	638	670	622
6/29/1997	682	597	606	563	482	432	376	569	638	689	699	645	668	683	671	655	663	682	675	653	692	695	658	607
6/30/1997	583	508	496	492	492	623	565	602	651	684	668	612	670	610	624	600	584	549	535	589	633	605	575	616
7/1/1997	645	632	622	598	577	607	605	493	548	612	655	541	642	549	514	600	603	596	686	663	671	679	612	664
7/2/1997	601	463	543	685	666	657	587	601	637	621	621	597	574	633	589	619	597	637	628	654	598	520	663	673
7/3/1997	664	653	592	609	639	630	626	629	670	646	505	633	668	678	620	671	659	627	624	650	598	601	680	620
7/4/1997	578	565	375	394	613	567	493	562	602	577	657	679	668	696	650	658	690	687	693	679	622	637	652	579
7/5/1997	691	602	622	601	606	610	629	579	564	540	593	620	615	624	593	570	595	610	587	599	560	590	606	638
7/6/1997	486	389	334	279	217	202	195	198	318	399	408	525	582	651	678	664	621	578	578	594	563	512	482	362
7/7/1997	253	242	264	265	270	302	472	321	550	613	582	623	642	572	588	568	645	641	705	621	582	512	370	319
7/8/1997	182	112	15	68	66	90	122	378	465	556	608	614	694	633	558	576	547	589	668	627	575	605	555	465
7/9/1997	634	30	-14	-12	-13	-15	23	283	415	543	589	566	531	556	562	504	544	544	449	359	466	472	415	207
7/10/1997	51	-13	-13	-13	39	49	147	213	234	339	366	536	512	493	504	557	547	569	562	460	490	395	319	113
7/11/1997	4	48	2	5	3	62	92	60	52	171	248	416	377	392	421	446	359	344	395	348	358	365	232	290
7/12/1997	69	29	7	8	6	28	46	56	70	212	263	227	203	237	379	471	404	387	336	325	276	311	326	218
7/13/1997	197	155	21	3	-12	-13	20	102	209	463	434	416	503	433	425	491	475	393	410	349	276	332	300	-7
7/14/1997	-14	-12	-14	-13	-5	75	154	317	489	609	591	618	625	678	666	636	692	643	616	600	517	467	234	0
7/15/1997	-12	-12	-12	-12	-13	-15	31	154	394	416	531	556	640	614	555	583	623	529	567	484	409	380	276	151

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7/16/1997	14	-11	-12	-12	-14	-11	77	398	343	279	256	289	332	453	553	661	648	624	590	434	374	394	322	286
7/17/1997	93	67	-2	-13	-13	-2	122	459	395	297	444	581	390	359	288	386	439	434	406	387	403	492	359	215
7/18/1997	110	33	-13	-12	-13	-14	-8	204	270	252	193	236	281	277	264	334	411	404	307	331	438	439	510	276
7/19/1997	-3	70	35	-12	-14	43	59	289	281	212	245	298	293	358	426	407	433	443	411	416	345	423	458	443
7/20/1997	157	-8	-14	-12	-13	-13	16	207	47	208	318	312	419	411	521	505	341	335	399	284	276	234	133	68
7/21/1997	23	25	44	45	62	75	194	257	387	318	382	448	441	497	534	611	550	478	482	519	495	500	353	145
7/22/1997	140	227	90	3	-6	-7	118	69	182	255	261	299	328	373	373	390	429	386	381	346	249	256	214	290
7/23/1997	125	0	-14	-15	-14	-14	-1	73	145	415	337	327	380	533	558	587	643	564	643	627	560	430	398	446
7/24/1997	398	159	138	98	169	251	263	368	310	333	488	511	423	460	521	552	591	538	452	312	310	422	487	312
7/25/1997	207	172	0	-14	-13	-13	-14	84	237	201	412	457	498	429	375	516	555	541	579	417	384	411	536	438
7/26/1997	395	211	197	208	260	288	317	250	403	544	492	579	552	414	279	390	415	474	468	379	307	429	408	516
7/27/1997	263	152	144	109	197	127	161	204	177	332	360	337	435	561	621	643	573	494	426	358	300	261	96	131
7/28/1997	211	168	160	145	159	262	150	164	250	294	315	333	332	341	501	519	526	516	651	654	688	572	444	189
7/29/1997	200	52	51	53	86	137	180	224	333	338	339	315	368	491	556	623	504	544	479	481	427	488	343	67
7/30/1997	53	117	141	154	247	286	374	180	249	268	374	372	442	456	624	522	469	428	484	443	470	551	615	599
7/31/1997	331	137	177	204	278	240	233	158	314	326	447	480	485	539	522	447	523	496	469	479	475	472	420	349
8/1/1997	199	335	208	133	119	144	340	497	471	477	431	272	260	269	287	357	322	344	324	465	457	452	434	473
8/2/1997	364	139	101	100	127	130	154	99	112	175	201	241	450	692	691	616	476	435	481	408	198	163	254	326
8/3/1997	362	359	313	273	282	317	341	373	401	531	587	466	308	334	407	574	557	519	547	400	357	237	371	179
8/4/1997	331	390	221	268	286	298	356	384	248	195	358	316	330	411	548	609	560	521	556	423	396	481	347	339
8/5/1997	528	222	223	174	71	169	192	188	294	195	288	241	323	442	581	394	366	457	397	376	507	627	515	338
8/6/1997	170	104	50	13	33	67	376	472	472	475	293	455	360	350	419	489	567	509	530	575	662	670	549	317
8/7/1997	214	29	9	36	38	287	416	487	474	286	364	472	388	446	400	434	482	490	313	334	398	492	349	510
8/8/1997	357	315	190	100	77	105	70	144	189	262	321	281	271	316	416	464	544	536	546	541	487	481	395	512
8/9/1997	505	397	221	172	230	361	451	343	179	302	466	366	180	245	370	407	484	495	437	397	433	660	656	353
8/10/1997	158	149	227	196	144	208	267	207	235	342	340	297	315	337	450	568	472	461	476	472	464	507	489	29
8/11/1997	-12	-14	-12	-13	-3	154	299	232	234	243	308	280	267	261	437	483	515	508	514	510	380	466	422	423
8/12/1997	348	276	260	239	253	368	340	211	252	304	368	416	514	493	568	573	556	383	217	323	350	464	389	293
8/13/1997	189	162	106	136	237	252	344	309	440	540	596	598	463	330	444	456	414	369	331	257	240	400	450	583
8/14/1997	434	210	130	102	153	259	380	309	401	395	383	426	464	427	460	485	493	391	451	451	363	344	378	369
8/15/1997	366	110	113	304	242	319	327	312	375	417	388	357	398	408	406	350	461	472	465	491	474	464	416	568
8/16/1997	559	485	224	70	-5	52	293	313	289	362	407	478	423	442	407	370	434	460	453	513	501	479	239	134
8/17/1997	158	347	447	384	287	223	233	215	226	267	409	443	469	412	415	420	420	360	325	331	371	434	347	266
8/18/1997	200	72	86	81	121	214	535	318	335	400	344	413	465	511	491	504	476	480	513	446	404	420	298	328
8/19/1997	365	65	113	66	72	145	285	319	276	362	245	415	432	456	487	434	552	497	509	467	444	545	289	260
8/20/1997	251	100	6	46	264	437	442	436	312	413	498	645	602	523	365	424	514	554	431	298	307	357	288	339
8/21/1997	319	237	233	180	179	208	280	279	234	267	265	305	438	490	482	528	439	462	504	490	498	506	388	180
8/22/1997	251	185	210	130	101	134	205	190	203	312	285	455	444	486	623	412	469	448	464	441	305	251	187	289
8/23/1997	331	323	214	191	287	355	323	418	571	504	427	403	361	309	380	441	513	464	404	346	311	350	409	427
8/24/1997	411	451	389	338	258	173	83	169	357	501	484	410	423	417	413	369	370	259	229	434	456	446	322	441

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8/25/1997	206	136	81	80	41	132	200	287	381	399	447	361	382	430	534	491	534	520	575	568	456	447	383	341
8/26/1997	262	181	412	95	36	32	120	259	115	169	200	382	569	498	577	475	423	475	496	477	470	473	335	275
8/27/1997	282	140	148	174	136	98	223	219	247	311	257	310	390	397	452	507	492	460	497	526	462	412	328	497
8/28/1997	494	291	144	96	116	178	333	168	228	383	291	344	412	404	335	432	489	491	519	551	536	506	353	469
8/29/1997	369	143	28	35	54	88	222	269	314	425	478	493	384	360	449	544	517	443	398	397	383	375	207	359
8/30/1997	395	498	425	295	165	192	251	215	346	375	326	396	469	406	321	304	453	502	504	450	400	343	289	328
8/31/1997	509	370	317	284	279	273	278	162	199	201	321	314	384	366	337	425	459	607	431	335	334	428	287	237
9/1/1997	300	237	208	176	302	442	361	157	261	400	257	602	451	378	546	520	496	436	264	276	323	294	201	374
9/2/1997	375	244	149	135	153	237	239	198	333	408	444	440	473	522	546	475	502	442	359	407	443	463	244	251
9/3/1997	119	90	115	58	28	115	260	562	379	336	560	543	549	541	612	468	405	267	208	388	514	510	419	235
9/4/1997	198	154	40	40	48	71	222	455	440	519	529	353	392	559	361	353	507	469	507	414	385	328	140	518
9/5/1997	489	65	33	40	35	40	242	450	419	272	461	461	414	380	467	508	504	443	350	172	174	110	256	354
9/6/1997	429	405	461	337	340	347	322	201	347	385	358	245	275	364	503	520	439	429	458	422	358	349	288	492
9/7/1997	330	132	264	183	200	130	174	223	226	239	392	414	500	440	484	527	467	461	431	364	311	285	109	-13
9/8/1997	53	9	53	90	140	185	319	214	386	434	404	434	431	406	472	544	538	397	403	329	363	488	277	362
9/9/1997	387	128	85	67	63	159	280	239	283	338	459	455	501	515	498	462	519	431	405	224	367	349	192	293
9/10/1997	284	376	340	265	227	213	250	253	258	311	392	271	364	404	618	485	509	447	511	536	453	303	57	282
9/11/1997	363	227	256	243	159	148	241	396	344	378	432	447	410	395	374	377	357	335	353	293	330	234	210	206
9/12/1997	165	212	126	220	245	225	246	310	289	371	349	562	414	461	640	524	601	476	256	326	396	342	224	125
9/13/1997	129	251	198	281	302	378	496	176	278	498	502	526	443	369	355	465	524	604	531	425	398	280	221	381
9/14/1997	333	306	249	163	79	133	156	249	261	362	402	426	495	429	520	542	528	491	502	469	560	519	320	287
9/15/1997	248	205	194	237	278	350	380	400	524	467	508	606	586	552	427	551	600	447	411	453	491	425	295	428
9/16/1997	327	245	218	235	220	260	513	526	644	564	611	591	524	565	522	513	559	556	649	552	567	524	426	324
9/17/1997	258	144	147	187	263	315	422	424	372	457	554	582	521	572	607	635	619	571	567	613	561	585	517	532
9/18/1997	593	628	644	611	598	604	574	550	537	573	568	498	545	580	522	445	500	469	415	602	631	388	333	503
9/19/1997	570	474	378	453	466	535	454	557	556	460	384	460	506	525	557	491	544	544	532	573	595	568	573	619
9/20/1997	488	436	444	443	472	517	571	537	577	587	578	624	613	614	585	531	601	620	634	606	578	502	506	514
9/21/1997	582	543	416	443	393	430	541	408	427	508	505	524	490	525	478	547	598	654	639	607	618	530	478	456
9/22/1997	499	506	525	522	533	528	388	342	422	465	572	522	467	491	521	557	595	556	571	576	581	465	449	533
9/23/1997	541	560	566	541	564	468	455	476	517	571	545	511	520	562	572	534	486	368	422	556	575	446	360	482
9/24/1997	552	503	392	370	388	493	469	520	489	474	472	581	512	490	536	586	573	586	536	503	531	363	457	440
9/25/1997	449	421	349	319	350	448	373	502	577	564	535	540	499	509	550	546	559	537	531	531	519	424	357	474
9/26/1997	462	500	423	367	394	427	446	444	536	476	475	544	538	522	454	517	571	474	489	470	470	406	443	494
9/27/1997	512	465	470	399	402	456	523	415	442	464	500	487	495	466	460	458	435	494	477	606	613	607	542	507
9/28/1997	495	401	363	327	293	326	364	333	485	506	531	491	491	546	529	517	483	480	516	540	514	449	393	378
9/29/1997	405	426	425	390	416	508	515	550	458	530	452	532	535	522	538	526	553	539	540	544	509	386	416	458
9/30/1997	456	451	407	397	457	489	405	392	454	496	550	494	491	505	529	474	486	448	501	460	474	512	450	450
10/1/1997	409	446	464	466	508	390	415	431	471	525	513	482	467	514	519	475	464	495	469	464	504	397	339	485
10/2/1997	509	431	481	399	435	405	353	502	484	479	439	290	352	287	311	404	334	377	437	497	499	393	365	254
10/3/1997	333	374	131	111	152	230	281	396	438	462	495	396	288	448	432	407	474	448	379	509	450	394	362	354

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10/4/1997	473	469	399	290	337	307	484	400	356	498	518	431	410	467	423	422	475	467	500	514	454	431	381	420
10/5/1997	403	335	323	351	307	227	358	383	471	448	452	480	473	431	468	394	480	506	475	492	435	394	428	383
10/6/1997	401	376	360	400	436	257	361	403	346	401	400	306	382	377	405	348	423	440	509	485	436	396	367	432
10/7/1997	436	387	399	403	410	395	333	456	497	433	447	398	402	382	376	381	385	373	396	456	444	452	330	388
10/8/1997	340	363	295	355	457	450	429	404	271	380	438	386	323	282	281	339	424	383	409	427	479	327	334	305
10/9/1997	312	278	330	424	453	376	351	476	426	474	462	352	372	420	435	431	481	471	449	339	371	358	327	349
10/10/1997	341	412	396	421	465	441	409	379	304	423	374	406	377	430	399	448	470	432	329	299	349	377	307	323
10/11/1997	455	392	423	374	413	423	419	395	449	392	421	385	335	397	330	299	272	332	379	435	388	381	378	333
10/12/1997	358	203	355	457	461	383	327	182	286	318	334	324	449	454	408	369	391	408	424	458	450	384	316	324
10/13/1997	435	407	391	402	387	399	369	349	324	321	400	345	379	365	423	301	300	411	375	435	420	348	338	406
10/14/1997	448	342	427	435	420	395	335	376	352	342	383	336	291	306	401	441	439	342	350	394	287	322	350	298
10/15/1997	368	398	403	410	434	336	345	399	266	243	315	310	320	403	400	378	362	392	383	389	320	372	396	372
10/16/1997	388	281	378	368	314	330	334	359	412	347	375	373	402	400	335	331	372	379	362	348	334	331	350	360
10/17/1997	365	303	380	358	391	344	278	330	327	273	336	344	335	334	340	340	314	300	309	327	314	345	312	341
10/18/1997	355	303	323	333	330	323	381	315	368	322	306	282	342	297	326	339	404	335	380	384	320	290	205	347
10/19/1997	341	375	336	209	166	63	102	41	148	239	237	129	219	185	138	150	151	107	130	169	160	133	39	74
10/20/1997	59	127	51	65	35	36	316	328	310	316	269	143	88	81	187	204	148	87	117	293	289	53	71	34
10/21/1997	93	28	2	-12	-12	10	127	410	352	237	180	158	112	105	82	80	89	115	189	244	259	146	2	19
10/22/1997	-11	-1	44	34	31	77	375	337	308	275	221	192	87	71	95	93	100	91	27	112	295	388	315	94
10/23/1997	68	10	-12	-12	-12	22	137	258	371	286	167	173	115	132	114	69	50	137	256	363	278	176	26	63
10/24/1997	60	25	45	80	52	92	242	422	353	269	222	185	137	135	388	290	116	158	169	180	135	81	118	143
10/25/1997	29	102	45	41	76	112	240	275	366	325	233	146	150	30	6	8	32	39	53	258	276	230	189	109
10/26/1997	45	104	54	131	113	41	45	79	323	325	182	142	204	200	25	11	6	76	228	433	309	286	48	98
10/27/1997	-12	-13	-2	-4	66	110	353	358	250	327	345	264	118	148	173	192	237	319	484	391	378	139	12	-13
10/28/1997	-12	-13	-13	-12	-13	0	156	170	312	440	330	216	171	142	143	98	209	322	407	339	286	136	2	9
10/29/1997	12	4	-2	14	20	47	115	250	313	285	288	277	107	123	144	127	156	260	321	401	287	102	80	-5
10/30/1997	-4	1	3	0	26	34	144	190	221	268	274	351	284	175	118	118	198	273	254	220	330	236	88	49
10/31/1997	40	13	-13	-12	26	25	132	201	190	249	237	198	267	212	193	127	225	293	279	241	203	282	157	71
11/1/1997	130	-11	5	4	48	44	30	129	280	367	295	306	193	138	194	162	153	300	439	297	122	105	50	39
11/2/1997	42	24	47	44	27	46	92	168	257	288	102	112	75	147	132	95	202	389	521	380	339	230	82	2
11/3/1997	36	13	83	169	121	99	117	192	162	261	193	174	181	160	220	234	404	407	269	177	220	187	76	-7
11/4/1997	28	1	29	37	52	77	156	240	190	227	272	244	165	256	213	237	253	309	289	223	300	185	122	44
11/5/1997	11	26	36	28	42	125	152	246	155	106	48	131	141	142	132	160	231	254	489	422	377	347	148	66
11/6/1997	120	145	122	156	18	84	254	490	433	325	286	226	212	137	65	92	171	275	466	398	180	-8	34	26
11/7/1997	23	3	25	43	28	54	104	273	335	315	240	215	220	257	190	235	241	369	273	182	240	135	70	129
11/8/1997	90	33	45	22	51	69	46	106	303	323	295	260	138	103	171	244	286	330	393	258	293	155	202	162
11/9/1997	57	151	49	7	17	60	67	98	153	219	265	239	161	235	295	199	192	201	269	279	277	138	52	42
11/10/1997	49	29	21	42	33	76	246	495	484	489	466	357	276	252	223	60	196	320	463	471	274	241	61	19
11/11/1997	18	-12	-13	-12	-13	4	61	267	182	119	147	171	156	131	93	105	176	335	371	280	295	249	170	139
11/12/1997	61	-11	-13	-12	-1	54	285	354	256	145	223	206	290	264	230	269	345	330	420	317	291	223	127	47

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11/13/1997	-11	-12	-13	-12	30	122	308	364	312	280	267	289	194	116	99	63	97	204	451	429	398	334	110	39
11/14/1997	-12	-13	-13	-12	-5	123	336	327	313	385	312	331	225	74	46	37	129	430	484	391	289	185	-1	-15
11/15/1997	-13	-12	-13	-13	-9	91	187	232	330	420	404	283	314	244	242	254	229	323	450	386	293	240	182	187
11/16/1997	73	-8	-13	-12	-13	29	85	117	377	348	290	221	217	206	189	135	213	454	368	239	252	247	75	58
11/17/1997	-10	-13	-12	-13	-13	32	219	386	281	503	524	329	284	254	220	117	215	248	376	284	329	291	101	20
11/18/1997	-13	-13	-14	-13	-13	84	290	373	258	152	161	120	107	235	182	136	129	271	412	391	376	276	102	0
11/19/1997	-14	-13	-13	-14	-13	23	342	302	265	119	112	224	156	144	243	214	303	336	366	372	359	306	170	150
11/20/1997	175	70	-7	-13	-13	115	448	318	276	257	247	252	231	19	33	33	35	267	480	389	333	305	189	112
11/21/1997	-9	-13	-14	-12	-13	25	259	509	457	370	367	274	29	60	102	20	51	144	351	392	439	449	335	42
11/22/1997	30	-13	-13	-13	-14	46	139	384	495	537	383	243	133	84	74	85	188	330	417	359	318	288	141	38
11/23/1997	-14	-12	-13	-13	-13	19	71	150	361	426	479	203	148	87	158	146	189	338	342	317	284	201	70	9
11/24/1997	-12	-13	-13	-13	-12	-7	198	567	479	412	436	246	171	113	68	143	158	347	510	295	255	238	44	18
11/25/1997	-12	-14	-13	-14	-13	66	106	279	362	303	364	196	326	401	255	125	245	351	547	557	295	314	161	108
11/26/1997	42	-11	-13	-13	-13	10	113	354	291	443	366	273	162	124	150	127	219	351	267	247	328	223	148	141
11/27/1997	-7	-13	-13	-13	-13	-12	26	192	303	404	341	234	181	126	175	148	138	181	297	469	643	609	517	248
11/28/1997	21	-13	-13	-13	-14	-13	26	150	161	203	215	237	182	163	162	155	165	283	349	630	491	396	226	221
11/29/1997	103	71	62	137	117	81	59	164	220	355	374	304	253	194	188	143	221	226	297	507	512	384	290	187
11/30/1997	34	26	83	61	-11	-13	-1	88	237	329	239	223	240	256	206	173	255	406	462	316	208	207	162	127
12/1/1997	12	15	77	31	42	110	190	343	424	372	334	291	156	97	19	80	161	437	518	461	425	330	169	39
12/2/1997	144	41	28	8	28	120	199	462	474	510	358	197	59	10	-9	-14	22	260	448	345	363	272	103	4
12/3/1997	-13	-14	-14	-14	-14	56	352	561	435	363	288	253	242	133	72	142	219	321	563	462	347	292	168	58
12/4/1997	0	14	26	-9	-13	45	318	490	573	458	264	125	-3	-13	-15	-14	8	263	584	554	597	448	244	98
12/5/1997	29	36	8	7	2	132	335	427	411	479	287	316	96	16	45	11	79	242	381	396	404	328	238	57
12/6/1997	30	-10	-13	-13	-7	43	113	414	603	557	455	360	215	97	78	108	156	333	294	304	384	284	196	-3
12/7/1997	-13	-13	-12	-13	-13	65	108	193	260	312	409	397	337	270	169	56	152	516	600	536	442	242	102	35
12/8/1997	-12	-14	-12	-13	-13	28	196	374	407	501	477	468	297	243	196	165	249	428	493	428	339	48	45	-14
12/9/1997	-14	-14	-15	-13	-15	25	286	523	419	321	370	289	46	131	85	57	159	525	670	602	508	536	260	51
12/10/1997	-14	-13	-13	-14	34	181	292	484	422	422	397	393	452	494	453	351	322	467	560	551	526	374	299	62
12/11/1997	99	86	31	52	75	253	576	646	550	473	601	556	456	448	444	467	511	483	619	578	539	483	385	53
12/12/1997	-13	-13	-14	-14	-12	113	382	646	573	549	532	428	502	510	494	268	223	338	601	539	623	602	522	227
12/13/1997	87	-11	5	4	49	28	93	432	578	526	575	601	444	330	252	340	475	558	536	487	518	494	300	54
12/14/1997	42	43	73	190	165	169	279	451	527	617	586	482	337	228	142	60	127	377	408	392	398	328	318	107
12/15/1997	7	-7	63	81	117	130	315	452	530	526	475	431	349	252	214	249	297	486	589	570	550	542	350	166
12/16/1997	240	168	315	319	248	267	396	591	615	530	537	521	497	469	353	362	438	494	501	563	633	532	392	40
12/17/1997	-14	-12	-14	-7	-7	68	320	399	593	482	515	572	493	437	438	390	515	516	635	588	594	600	326	80
12/18/1997	12	10	-12	-8	-8	9	163	480	470	500	636	546	312	446	439	501	473	549	589	602	606	558	300	101
12/19/1997	-14	-15	-14	-13	-1	75	381	581	536	437	562	585	512	530	458	473	565	565	616	569	581	529	356	177
12/20/1997	68	-13	-14	10	45	118	199	443	638	601	527	509	424	400	441	384	458	615	579	471	425	406	347	209
12/21/1997	92	-12	-13	-14	61	72	112	204	317	270	235	170	175	214	311	292	317	482	615	599	592	557	309	145
12/22/1997	22	-14	-13	-13	-1	147	565	622	692	608	553	529	555	470	367	293	329	623	633	486	657	644	465	161

	Generation																						
12/23/1997	123	7	-14	-14	8	22	158	473	601	585	580	580	436	290	111	101	274	344	490	536	550	515	433	253
12/24/1997	150	121	53	55	36	106	334	506	644	602	522	494	401	321	296	282	338	407	397	429	502	495	424	187
12/25/1997	64	23	-5	-13	-14	1	101	226	328	290	279	274	296	139	80	200	315	446	586	615	608	458	246	148
12/26/1997	71	45	-14	-14	-14	-15	41	446	632	638	592	525	454	295	190	160	144	440	520	556	499	473	376	40
12/27/1997	-14	-14	-13	-13	-14	-14	-10	292	477	571	522	383	296	217	197	192	212	399	474	553	538	505	409	35
12/28/1997	-13	-14	-13	-13	-14	-13	-5	105	184	311	328	268	244	191	179	187	149	244	258	340	355	127	136	0
12/29/1997	-15	35	74	99	92	66	97	473	474	663	640	612	546	576	582	531	564	570	573	557	547	417	163	-15
12/30/1997	-14	-14	-14	-14	38	145	243	608	641	564	559	565	584	550	502	431	509	553	665	589	556	485	345	66
12/31/1997	-13	-13	-14	-14	-13	-14	123	608	643	618	683	612	568	523	475	362	302	422	506	555	445	436	507	143

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
3/1/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/2/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/3/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/4/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/5/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/6/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/7/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/8/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/9/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/10/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/11/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/12/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/13/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/14/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/15/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/16/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/17/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/18/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/19/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/20/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/21/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/22/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/23/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/24/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/25/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/26/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/27/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/28/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/29/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/30/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/31/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
4/1/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/2/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/3/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/4/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/5/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/6/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/7/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/8/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/9/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/10/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/11/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/12/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/13/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/14/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/15/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/16/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/17/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/18/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/19/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/20/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/21/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1993.15	1993.13	1993.11	1993.08	1993.06	1993.03	1993.01	1992.99	1992.97	1992.98
4/22/1997	1992.99	1993.00	1993.01	1993.01	1993.02	1993.03	1993.04	1993.05	1993.05	1993.06	1993.07	1993.08	1993.09	1993.09	1993.08	1993.02	1992.97	1992.91	1992.85	1992.80	1992.74	1992.69	1992.61	1992.49
4/23/1997	1992.37	1992.25	1992.13	1992.01	1991.89	1991.77	1991.69	1991.69	1991.69	1991.69	1991.69	1991.69	1991.69	1991.69	1991.69	1991.70	1991.71	1991.72	1991.73	1991.73	1991.74	1991.75	1991.76	1991.77
4/24/1997	1991.77	1991.78	1991.79	1991.80	1991.81	1991.81	1991.81	1991.78	1991.76	1991.74	1991.71	1991.69	1991.66	1991.64	1991.59	1991.52	1991.45	1991.38	1991.31	1991.23	1991.16	1991.09	1991.03	1990.99
4/25/1997	1990.95	1990.91	1990.87	1990.83	1990.79	1990.75	1990.70	1990.62	1990.55	1990.48	1990.41	1990.33	1990.26	1990.19	1990.16	1990.19	1990.21	1990.24	1990.26	1990.28	1990.31	1990.33	1990.33	1990.31
4/26/1997	1990.28	1990.26	1990.24	1990.21	1990.19	1990.16	1990.15	1990.15	1990.15	1990.15	1990.15	1990.15	1990.15	1990.15	1990.16	1990.19	1990.21	1990.24	1990.26	1990.28	1990.31	1990.33	1990.36	1990.38
4/27/1997	1990.40	1990.43	1990.45	1990.48	1990.50	1990.52	1990.52	1990.50	1990.48	1990.45	1990.43	1990.40	1990.38	1990.36	1990.35	1990.37	1990.38	1990.40	1990.42	1990.43	1990.45	1990.46	1990.48	1990.50
4/28/1997	1990.51	1990.53	1990.54	1990.56	1990.58	1990.59	1990.61	1990.62	1990.64	1990.66	1990.67	1990.69	1990.71	1990.72	1990.59	1990.38	1990.16	1989.94	1989.73	1989.51	1989.29	1989.08	1988.89	1988.71
4/29/1997	1988.53	1988.36	1988.18	1988.01	1987.83	1987.65	1987.48	1987.30	1987.12	1986.95	1986.77	1986.59	1986.42	1986.24	1986.11	1986.01	1985.90	1985.80	1985.69	1985.59	1985.49	1985.38	1985.29	1985.21
4/30/1997	1985.13	1985.05	1984.97	1984.89	1984.81	1984.73	1984.63	1984.52	1984.41	1984.29	1984.18	1984.07	1983.96	1983.84	1983.72	1983.59	1983.47	1983.34	1983.21	1983.08	1982.95	1982.82	1982.63	1982.41

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
5/1/1997	1982.18	1981.96	1981.74	1981.51	1981.29	1981.06	1980.90	1980.76	1980.62	1980.49	1980.35	1980.22	1980.08	1979.94	1979.77	1979.58	1979.39	1979.19	1979.00	1978.81	1978.62	1978.42	1978.24	1978.05
5/2/1997	1977.87	1977.68	1977.50	1977.32	1977.13	1976.95	1976.80	1976.67	1976.84	1976.57	1976.58	1976.59	1976.60	1976.61	1976.61	1976.62	1976.62	1976.59	1976.56	1976.53	1976.50	1976.46	1976.43	1976.40
5/3/1997	1976.37	1976.36	1976.36	1976.35	1976.34	1976.33	1976.32	1976.32	1976.31	1976.33	1976.34	1976.36	1976.38	1976.39	1976.41	1976.42	1976.44	1976.46	1976.49	1976.51	1976.54	1976.56	1976.58	1976.61
5/4/1997	1976.63	1976.63	1976.63	1976.63	1976.63	1976.63	1976.63	1976.63	1976.63	1976.62	1976.61	1976.60	1976.60	1976.59	1976.58	1976.57	1976.57	1976.59	1976.61	1976.63	1976.66	1976.68	1976.98	1976.72
5/5/1997	1976.75	1976.77	1976.80	1976.82	1976.85	1976.87	1976.89	1976.91	1976.92	1976.94	1976.95	1976.97	1976.99	1977.00	1977.01	1976.99	1976.98	1976.96	1976.94	1976.93	1976.91	1976.90	1976.89	1976.92
5/6/1997	1976.94	1976.97	1976.99	1977.01	1977.04	1977.06	1977.08	1977.10	1977.11	1977.13	1977.15	1977.16	1977.18	1977.20	1977.19	1977.15	1977.11	1977.07	1977.03	1976.99	1976.95	1976.91	1976.87	1976.83
5/7/1997	1976.79	1976.75	1976.71	1976.67	1976.63	1976.59	1976.57	1976.59	1976.60	1976.62	1976.63	1976.65	1976.67	1976.68	1976.70	1976.71	1976.73	1976.75	1976.76	1976.78	1976.79	1976.81	1976.81	1976.78
5/8/1997	1976.75	1976.71	1976.68	1976.65	1976.62	1976.59	1976.55	1976.51	1976.47	1976.43	1976.39	1976.35	1976.31	1976.27	1976.24	1976.24	1976.24	1976.24	1976.24	1976.24	1976.24	1976.24	1976.25	1976.27
5/9/1997	1976.28	1976.30	1976.31	1976.33	1976.35	1976.36	1976.36	1976.34	1976.32	1976.29	1976.27	1976.24	1976.22	1976.20	1976.19	1976.21	1976.24	1976.26	1976.28	1976.31	1976.33	1976.36	1976.37	1976.37
5/10/1997	1976.37	1976.37	1976.37	1976.37	1976.37	1976.37	1976.36	1976.31	1976.26	1976.21	1976.16	1976.12	1976.07	1976.02	1976.01	1976.08	1976.16	1976.23	1976.30	1976.37	1976.44	1976.52	1976.57	1976.58
5/11/1997	1976.58	1976.59	1976.60	1976.61	1976.62	1976.62	1976.63	1976.65	1976.67	1976.68	1976.70	1976.71	1976.73	1976.75	1976.76	1976.77	1976.78	1976.78	1976.79	1976.80	1976.81	1976.82	1976.86	1976.97
5/12/1997	1977.08	1977.19	1977.31	1977.42	1977.53	1977.64	1977.77	1977.93	1978.10	1978.26	1978.42	1978.58	1978.74	1978.90	1979.08	1979.29	1979.50	1979.71	1979.92	1980.13	1980.33	1980.54	1980.74	1980.94
5/13/1997	1981.13	1981.32	1981.51	1981.71	1981.90	1982.09	1982.27	1982.42	1982.58	1983.30	1982.92	1983.06	1983.21	1983.35	1983.50	1983.64	1983.78	1983.93	1984.11	1984.33	1984.54	1984.76	1984.97	1985.19
5/14/1997	1985.41	1985.62	1985.84	1986.06	1986.27	1986.49	1986.70	1986.92	1987.14	1987.35	1987.57	1987.77	1987.98	1988.19	1988.40	1988.61	1988.82	1989.02	1989.21	1989.38	1989.55	1989.72	1989.88	1990.05
5/15/1997	1990.22	1990.39	1990.53	1990.65	1990.77	1990.89	1991.01	1991.13	1991.25	1991.37	1991.51	1991.68	1991.84	1992.00	1992.16	1992.32	1992.48	1992.64	1992.79	1992.93	1993.08	1993.22	1993.37	1993.51
5/16/1997	1993.65	1993.80	1993.95	1994.11	1994.27	1994.43	1994.59	1994.75	1994.91	1995.07	1995.25	1995.45	1995.65	1995.85	1996.05	1996.25	1996.45	1996.65	1996.86	1997.07	1997.28	1997.48	1997.69	1997.90
5/17/1997	1998.11	1998.32	1998.52	1998.71	1998.90	1999.09	1999.28	1999.47	1999.67	2038.22	2018.10	2000.24	2000.41	2000.58	2000.75	2000.92	2001.08	2001.25	2001.43	2001.64	2001.85	2002.06	2002.27	2002.47
5/18/1997	2002.68	2002.89	2003.09	2003.28	2003.46	2003.65	2003.83	2004.01	2004.20	2004.38	2004.57	2004.77	2004.97	2005.17	2005.37	2005.57	2005.77	2005.97	2006.18	2006.40	2006.61	2006.83	2007.04	2007.26
5/19/1997	2007.48	2007.69	2007.91	2008.13	2008.35	2008.56	2008.78	2009.00	2009.11	2009.57	2009.88	2010.19	2010.49	2010.80	2011.11	2011.41	2011.69	2011.83	2011.96	2012.08	2012.21	2012.34	2012.47	2012.60
5/20/1997	2012.73	2012.87	2013.02	2013.16	2013.30	2013.45	2013.59	2013.74	2013.88	2014.03	2014.19	2014.34	2014.49	2014.64	2014.79	2014.95	2015.09	2015.22	2015.35	2015.48	2015.61	2015.74	2015.87	2015.99
5/21/1997	2016.12	2016.24	2016.36	2016.48	2016.60	2016.72	2016.84	2016.96	2016.97	2017.22	2017.36	2017.50	2017.63	2017.77	2017.91	2018.05	2018.19	2018.33	2018.48	2018.62	2018.76	2018.91	2019.05	2019.20
5/22/1997	2019.33	2019.46	2019.58	2019.70	2019.82	2019.94	2020.06	2020.18	2020.30	2020.43	2020.55	2020.68	2020.81	2020.94	2021.07	2021.20	2021.32	2021.45	2021.58	2021.71	2021.84	2021.96	2022.09	2022.22
5/23/1997	2022.35	2022.47	2022.59	2022.71	2022.83	2022.95	2023.07	2023.19	2023.31	2023.45	2023.58	2023.72	2023.86	2023.99	2024.13	2024.27	2024.41	2024.59	2024.76	2024.94	2025.11	2025.29	2025.47	2025.64
5/24/1997	2025.81	2025.96	2026.10	2026.25	2026.39	2026.53	2026.68	2026.82	2026.96	2027.07	2027.18	2027.30	2027.41	2027.52	2027.63	2027.75	2027.86	2027.98	2028.10	2028.22	2028.34	2028.46	2028.58	2028.70
5/25/1997	2028.82	2028.93	2029.04	2029.16	2029.27	2029.38	2029.49	2029.60	2029.71	2029.81	2029.91	2030.00	2030.10	2030.19	2030.29	2030.39	2030.49	2030.63	2030.76	2030.90	2031.03	2031.17	2031.31	2031.44
5/26/1997	2031.58	2031.72	2031.85	2031.99	2032.12	2032.26	2032.40	2032.53	2032.67	2032.80	2032.92	2033.05	2033.18	2033.31	2033.44	2033.56	2033.69	2033.83	2033.97	2034.10	2034.24	2034.38	2034.51	2034.65
5/27/1997	2034.79	2034.93	2035.07	2035.22	2035.36	2035.51	2035.65	2035.79	2035.94	2036.07	2036.21	2036.35	2036.48	2036.62	2036.75	2036.89	2037.02	2037.13	2037.23	2037.33	2037.44	2037.54	2037.65	2037.75
5/28/1997	2037.85	2037.96	2038.06	2038.17	2038.27	2038.37	2038.48	2038.58	2038.69	2038.79	2038.90	2039.00	2039.10	2039.21	2039.31	2039.42	2039.52	2039.61	2039.71	2039.81	2039.90	2040.00	2040.10	2040.19
5/29/1997	2040.29	2040.39	2040.50	2040.60	2040.71	2040.81	2040.91	2041.02	2041.11	2041.17	2041.23	2041.28	2041.34	2041.39	2041.45	2041.51	2041.58	2041.69	2041.81	2041.93	2042.05	2042.18	2042.30	2042.42
5/30/1997	2042.55	2042.70	2042.86	2043.02	2043.18	2043.34	2043.50	2043.67	2043.80	2043.87	2043.93	2044.00	2044.06	2044.13	2044.19	2044.26	2044.33	2044.42	2044.52	2044.61	2044.71	2044.81	2044.90	2045.00
5/31/1997	2045.11	2045.29	2045.46	2045.64	2045.82	2045.99	2046.17	2046.34	2046.49	2046.55	2046.61	2046.67	2046.72	2046.78	2046.83	2046.89	2046.96	2047.06	2047.16	2047.27	2047.37	2047.48	2047.58	2047.68

Brownlee Headwater

	Hour Ending																						
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
6/1/1997	2047.81	2047.98	2048.15	2048.33	2048.51	2048.68	2048.86	2049.04	2049.19	2049.26	2049.34	2049.41	2049.48	2049.55	2049.62	2049.70	2049.78	2049.91	2050.04	2050.16	2050.29	2050.42	2050.55	2050.68
6/2/1997	2050.82	2051.00	2051.19	2051.37	2051.56	2051.74	2051.93	2052.11	2052.27	2052.37	2052.47	2052.56	2052.66	2052.76	2052.85	2052.95	2053.05	2053.15	2053.25	2053.36	2053.46	2053.57	2053.67	2053.78
6/3/1997	2053.91	2054.10	2054.31	2054.51	2054.71	2054.91	2055.12	2055.32	2055.48	2055.56	2055.64	2055.72	2055.80	2055.88	2055.96	2056.04	2056.13	2056.22	2056.30	2056.39	2056.48	2056.57	2056.66	2056.74
6/4/1997	2056.86	2057.03	2057.19	2057.36	2057.53	2057.70	2057.87	2058.03	2058.18	2058.28	2058.37	2058.47	2058.57	2058.67	2058.76	2058.86	2058.95	2059.03	2059.11	2059.19	2059.27	2059.35	2059.43	2059.51
6/5/1997	2059.59	2059.67	2059.75	2059.83	2059.91	2059.99	2060.07	2060.15	2060.22	2060.28	2060.34	2060.40	2060.45	2060.51	2060.57	2060.62	2060.69	2060.76	2060.83	2060.91	2060.98	2061.05	2061.12	2061.19
6/6/1997	2061.27	2061.35	2061.43	2061.51	2061.59	2061.67	2061.75	2061.83	2061.89	2061.92	2061.95	2061.98	2062.01	2062.05	2062.08	2062.11	2062.16	2062.22	2062.29	2062.35	2062.42	2062.48	2062.54	2062.61
6/7/1997	2062.67	2062.74	2062.80	2062.86	2062.93	2062.99	2063.06	2063.12	2063.18	2063.25	2063.31	2063.38	2063.44	2063.50	2063.57	2063.63	2063.69	2063.75	2063.80	2063.86	2063.92	2063.97	2064.03	2064.09
6/8/1997	2064.16	2064.24	2064.32	2064.40	2064.48	2064.56	2064.64	2064.72	2064.77	2064.81	2064.85	2064.89	2064.93	2064.97	2065.01	2065.05	2065.08	2065.08	2065.09	2065.10	2065.11	2065.12	2065.12	2065.13
6/9/1997	2065.23	2065.40	2065.57	2065.74	2065.91	2066.07	2066.24	2066.41	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48
6/10/1997	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.60	2066.79	2066.98	2067.17	2067.37	2067.56	2067.75	2067.94	2068.03	2068.06	2068.08	2068.11	2068.13	2068.15	2068.18	2068.20
6/11/1997	2068.21	2068.21	2068.21	2068.21	2068.21	2068.21	2068.21	2068.21	2068.27	2068.37	2068.46	2068.56	2068.66	2068.75	2068.85	2068.95	2068.98	2068.98	2068.98	2068.98	2068.98	2068.98	2068.98	2068.98
6/12/1997	2068.96	2068.93	2068.90	2068.86	2068.83	2068.80	2068.77	2068.74	2068.81	2068.94	2069.07	2069.20	2069.33	2069.46	2069.59	2069.71	2069.77	2069.79	2069.82	2069.84	2069.86	2069.89	2069.91	2069.94
6/13/1997	2069.98	2070.04	2070.10	2070.15	2070.21	2070.26	2070.32	2070.38	2070.43	2070.48	2070.52	2070.57	2070.62	2070.67	2070.72	2070.76	2070.80	2070.83	2070.86	2070.90	2070.93	2070.96	2070.99	2071.02
6/14/1997	2071.07	2071.12	2071.16	2071.21	2071.26	2071.31	2071.36	2071.40	2071.42	2071.43	2071.44	2071.45	2071.45	2071.46	2071.47	2071.48	2071.47	2071.47	2071.46	2071.45	2071.44	2071.43	2071.43	2071.42
6/15/1997	2071.44	2071.47	2071.50	2071.54	2071.57	2071.60	2071.63	2071.66	2071.67	2071.66	2071.65	2071.64	2071.63	2071.63	2071.62	2071.61	2071.62	2071.64	2071.65	2071.67	2071.68	2071.70	2071.72	2071.73
6/16/1997	2071.72	2071.71	2071.69	2071.68	2071.66	2071.64	2071.63	2071.61	2071.62	2071.64	2071.65	2071.67	2071.69	2071.70	2071.72	2071.73	2071.76	2071.79	2071.83	2071.86	2071.89	2071.92	2071.96	2071.99
6/17/1997	2072.02	2072.05	2072.08	2072.12	2072.15	2072.18	2072.21	2072.24	2072.27	2072.29	2072.32	2072.34	2072.37	2072.39	2072.41	2072.44	2072.48	2072.53	2072.58	2072.63	2072.68	2072.72	2072.77	2072.82
6/18/1997	2072.84	2072.86	2072.87	2072.89	2072.90	2072.92	2072.94	2072.96	2073.00	2073.05	2073.10	2073.15	2073.20	2073.22	2073.24	2073.26	2073.27	2073.29	2073.30	2073.32	2073.34	2073.35	2073.35	2073.36
6/19/1997	2073.37	2073.38	2073.39	2073.39	2073.40	2073.42	2073.43	2073.45	2073.46	2073.47	2073.48	2073.49	2073.50	2073.50	2073.51	2073.52	2073.53	2073.54	2073.56	2073.57	2073.59	2073.61	2073.62	2073.64
6/20/1997	2073.65	2073.67	2073.69	2073.70	2073.72	2073.73	2073.75	2073.77	2073.78	2073.80	2073.82	2073.83	2073.85	2073.86	2073.88	2073.90	2073.91	2073.92	2073.93	2073.94	2073.95	2073.95	2073.96	2073.97
6/21/1997	2073.98	2073.99	2074.01	2074.02	2074.04	2074.06	2074.07	2074.09	2074.10	2074.10	2074.09	2074.09	2074.08	2074.07	2074.06	2074.05	2074.05	2074.05	2074.06	2074.07	2074.07	2074.08	2074.09	2074.10
6/22/1997	2074.11	2074.11	2074.12	2074.13	2074.14	2074.15	2074.15	2074.16	2074.17	2074.16	2074.14	2074.13	2074.11	2074.10	2074.08	2074.06	2074.05	2074.06	2074.07	2074.09	2074.10	2074.12	2074.14	2074.15
6/23/1997	2074.17	2074.18	2074.19	2074.19	2074.20	2074.21	2074.22	2074.23	2074.23	2074.23	2074.22	2074.21	2074.21	2074.20	2074.19	2074.18	2074.17	2074.17	2074.16	2074.15	2074.14	2074.13	2074.13	2074.12
6/24/1997	2074.11	2074.11	2074.12	2074.13	2074.14	2074.15	2074.16	2074.16	2074.17	2074.21	2074.25	2074.29	2074.33	2074.37	2074.41	2074.45	2074.49	2074.52	2074.55	2074.59	2074.62	2074.65	2074.68	2074.71
6/25/1997	2074.75	2074.79	2074.84	2074.89	2074.94	2074.98	2075.03	2075.08	2075.13	2075.14	2075.15	2075.16	2075.16	2075.17	2075.18	2075.19	2075.20	2075.21	2075.23	2075.24	2075.26	2075.28	2075.29	2075.31
6/26/1997	2075.33	2075.37	2075.42	2075.47	2075.51	2075.56	2075.61	2075.66	2075.71	2075.75	2075.80	2075.85	2075.90	2075.95	2075.99	2076.04	2076.09	2076.11	2076.13	2076.14	2076.16	2076.17	2076.19	2076.21
6/27/1997	2076.22	2076.24	2076.25	2076.27	2076.29	2076.30	2076.32	2076.33	2076.35	2076.37	2076.38	2076.40	2076.41	2076.43	2076.45	2076.46	2076.48	2076.48	2076.48	2076.48	2076.48	2076.48	2076.48	2076.48
6/28/1997	2076.48	2076.49	2076.49	2076.50	2076.51	2076.52	2076.53	2076.53	2076.54	2076.55	2076.56	2076.57	2076.57	2076.58	2076.59	2076.60	2076.60	2076.58	2076.55	2076.51	2076.48	2076.45	2076.42	2076.39
6/29/1997	2076.36	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35	2076.32	2076.29	2076.26	2076.23	2076.19	2076.16	2076.13	2076.10	2076.09	2076.08	2076.07	2076.06	2076.06	2076.05	2076.04
6/30/1997	2076.03	2076.01	2075.98	2075.96	2075.94	2075.91	2075.89	2075.86	2075.84	2075.84	2075.84	2075.84	2075.84	2075.84	2075.84	2075.84	2075.84	2075.85	2075.87	2075.89	2075.90	2075.92	2075.93	2075.95

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
7/1/1997	2075.96	2075.97	2075.98	2075.99	2076.00	2076.01	2076.01	2076.02	2076.03	2076.05	2076.06	2076.08	2076.09	2076.11	2076.13	2076.14	2076.16	2076.16	2076.16	2076.16	2076.16	2076.16	2076.16	2076.16
7/2/1997	2076.16	2076.17	2076.19	2076.21	2076.22	2076.24	2076.25	2076.27	2076.29	2076.29	2076.30	2076.31	2076.32	2076.33	2076.33	2076.34	2076.35	2076.37	2076.38	2076.40	2076.41	2076.43	2076.45	2076.46
7/3/1997	2076.48	2076.49	2076.50	2076.50	2076.51	2076.52	2076.53	2076.53	2076.54	2076.55	2076.56	2076.57	2076.58	2076.58	2076.59	2076.60	2076.61	2076.61	2076.61	2076.61	2076.61	2076.61	2076.61	2076.61
7/4/1997	2076.61	2076.62	2076.62	2076.63	2076.64	2076.65	2076.66	2076.66	2076.67	2076.65	2076.63	2076.60	2076.58	2076.55	2076.53	2076.51	2076.48	2076.46	2076.45	2076.43	2076.42	2076.40	2076.38	2076.37
7/5/1997	2076.35	2076.34	2076.32	2076.30	2076.29	2076.27	2076.26	2076.24	2076.22	2076.21	2076.19	2076.18	2076.16	2076.14	2076.13	2076.11	2076.10	2076.08	2076.06	2076.05	2076.03	2076.02	2076.00	2075.98
7/6/1997	2075.98	2076.03	2076.09	2076.16	2076.22	2076.28	2076.35	2076.41	2076.47	2076.46	2076.45	2076.43	2076.42	2076.40	2076.38	2076.37	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35	2076.35
7/7/1997	2076.35	2076.37	2076.38	2076.40	2076.42	2076.43	2076.45	2076.46	2076.47	2076.42	2076.35	2076.29	2076.22	2076.16	2076.10	2076.03	2075.98	2075.97	2075.97	2075.97	2075.97	2075.97	2075.97	2075.97
7/8/1997	2075.97	2076.01	2076.05	2076.09	2076.13	2076.17	2076.21	2076.25	2076.28	2076.23	2076.17	2076.12	2076.06	2076.00	2075.95	2075.89	2075.83	2075.79	2075.75	2075.71	2075.67	2075.63	2075.59	2075.55
7/9/1997	2075.53	2075.57	2075.62	2075.67	2075.72	2075.77	2075.82	2075.87	2075.88	2075.82	2075.76	2075.69	2075.63	2075.56	2075.50	2075.43	2075.39	2075.39	2075.39	2075.39	2075.39	2075.39	2075.39	2075.39
7/10/1997	2075.41	2075.47	2075.52	2075.58	2075.64	2075.70	2075.75	2075.81	2075.81	2075.75	2075.70	2075.64	2075.59	2075.53	2075.47	2075.42	2075.39	2075.38	2075.37	2075.36	2075.35	2075.35	2075.34	2075.33
7/11/1997	2075.35	2075.41	2075.47	2075.52	2075.58	2075.64	2075.69	2075.75	2075.78	2075.80	2075.81	2075.82	2075.83	2075.83	2075.82	2075.82	2075.81	2075.80	2075.79	2075.78	2075.78	2075.78	2075.79	2075.80
7/12/1997	2075.81	2075.81	2075.82	2075.83	2075.84	2075.89	2075.96	2076.02	2076.08	2076.15	2076.21	2076.28	2076.34	2076.34	2076.32	2076.31	2076.29	2076.27	2076.26	2076.24	2076.23	2076.27	2076.33	2076.38
7/13/1997	2076.44	2076.49	2076.55	2076.61	2076.66	2076.67	2076.67	2076.67	2076.67	2076.67	2076.67	2076.67	2076.67	2076.65	2076.63	2076.60	2076.58	2076.56	2076.53	2076.51	2076.49	2076.53	2076.60	2076.66
7/14/1997	2076.73	2076.79	2076.85	2076.92	2076.98	2076.95	2076.90	2076.85	2076.81	2076.76	2076.71	2076.66	2076.61	2076.52	2076.42	2076.33	2076.23	2076.13	2076.04	2075.94	2075.86	2075.90	2075.96	2076.03
7/15/1997	2076.09	2076.15	2076.22	2076.28	2076.34	2076.32	2076.29	2076.26	2076.23	2076.19	2076.16	2076.13	2076.09	2076.04	2075.97	2075.91	2075.84	2075.78	2075.71	2075.65	2075.60	2075.64	2075.71	2075.77
7/16/1997	2075.83	2075.90	2075.96	2076.03	2076.08	2076.09	2076.08	2076.07	2076.06	2076.06	2076.05	2076.04	2076.03	2075.97	2075.91	2075.84	2075.78	2075.71	2075.65	2075.59	2075.53	2075.55	2075.58	2075.61
7/17/1997	2075.64	2075.68	2075.71	2075.74	2075.77	2075.75	2075.73	2075.70	2075.68	2075.66	2075.63	2075.61	2075.58	2075.54	2075.50	2075.46	2075.42	2075.38	2075.34	2075.30	2075.27	2075.31	2075.35	2075.40
7/18/1997	2075.45	2075.50	2075.55	2075.59	2075.64	2075.66	2075.68	2075.69	2075.71	2075.73	2075.74	2075.76	2075.77	2075.75	2075.73	2075.70	2075.68	2075.66	2075.63	2075.61	2075.59	2075.62	2075.66	2075.70
7/19/1997	2075.74	2075.78	2075.82	2075.86	2075.90	2075.92	2075.93	2075.95	2075.97	2075.98	2076.00	2076.01	2076.02	2075.99	2075.95	2075.91	2075.87	2075.83	2075.79	2075.75	2075.72	2075.75	2075.79	2075.83
7/20/1997	2075.87	2075.91	2075.95	2075.99	2076.03	2076.04	2076.05	2076.05	2076.06	2076.07	2076.08	2076.09	2076.09	2076.09	2076.08	2076.07	2076.06	2076.06	2076.05	2076.04	2076.04	2076.08	2076.12	2076.17
7/21/1997	2076.22	2076.27	2076.32	2076.36	2076.41	2076.40	2076.38	2076.37	2076.35	2076.34	2076.32	2076.30	2076.28	2076.23	2076.16	2076.10	2076.04	2075.97	2075.91	2075.84	2075.79	2075.81	2075.85	2075.89
7/22/1997	2075.93	2075.97	2076.01	2076.05	2076.09	2076.11	2076.13	2076.14	2076.16	2076.17	2076.19	2076.21	2076.22	2076.20	2076.18	2076.15	2076.13	2076.10	2076.08	2076.06	2076.04	2076.08	2076.12	2076.17
7/23/1997	2076.22	2076.27	2076.32	2076.36	2076.41	2076.42	2076.42	2076.42	2076.42	2076.42	2076.42	2076.42	2076.41	2076.34	2076.26	2076.18	2076.10	2076.02	2075.94	2075.86	2075.79	2075.76	2075.74	2075.73
7/24/1997	2075.71	2075.70	2075.68	2075.66	2075.65	2075.61	2075.57	2075.53	2075.49	2075.45	2075.41	2075.37	2075.33	2075.27	2075.20	2075.14	2075.07	2075.01	2074.95	2074.88	2074.83	2074.84	2074.88	2074.91
7/25/1997	2074.94	2074.97	2075.00	2075.04	2075.06	2075.06	2075.05	2075.05	2075.04	2075.03	2075.02	2075.01	2075.00	2074.94	2074.87	2074.79	2074.72	2074.65	2074.58	2074.51	2074.44	2074.41	2074.40	2074.38
7/26/1997	2074.37	2074.35	2074.33	2074.32	2074.30	2074.25	2074.19	2074.14	2074.08	2074.02	2073.97	2073.91	2073.86	2073.81	2073.76	2073.71	2073.66	2073.61	2073.57	2073.52	2073.48	2073.47	2073.47	2073.47
7/27/1997	2073.47	2073.47	2073.47	2073.47	2073.47	2073.44	2073.42	2073.40	2073.37	2073.35	2073.32	2073.30	2073.27	2073.23	2073.18	2073.13	2073.09	2073.04	2072.99	2072.94	2072.90	2072.91	2072.92	2072.94
7/28/1997	2072.95	2072.97	2072.99	2073.00	2073.02	2073.01	2073.00	2073.00	2072.99	2072.98	2072.97	2072.96	2072.95	2072.88	2072.80	2072.72	2072.64	2072.56	2072.48	2072.40	2072.33	2072.33	2072.34	2072.36
7/29/1997	2072.38	2072.39	2072.41	2072.42	2072.44	2072.43	2072.41	2072.40	2072.38	2072.36	2072.35	2072.33	2072.31	2072.25	2072.19	2072.13	2072.06	2072.00	2071.93	2071.87	2071.81	2071.82	2071.85	2071.87
7/30/1997	2071.90	2071.92	2071.94	2071.97	2071.99	2071.97	2071.95	2071.92	2071.90	2071.87	2071.85	2071.83	2071.80	2071.73	2071.66	2071.59	2071.52	2071.45	2071.37	2071.30	2071.23	2071.22	2071.21	2071.20
7/31/1997	2071.19	2071.18	2071.18	2071.17	2071.16	2071.14	2071.11	2071.09	2071.06	2071.04	2071.02	2070.99	2070.96	2070.91	2070.86	2070.80	2070.74	2070.69	2070.63	2070.58	2070.53	2070.53	2070.54	2070.54

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
8/1/1997	2070.55	2070.56	2070.57	2070.58	2070.58	2070.56	2070.54	2070.51	2070.49	2070.46	2070.44	2070.42	2070.39	2070.37	2070.34	2070.32	2070.29	2070.27	2070.25	2070.22	2070.20	2070.21	2070.23	2070.25
8/2/1997	2070.26	2070.28	2070.29	2070.31	2070.33	2070.33	2070.34	2070.35	2070.36	2070.37	2070.38	2070.38	2070.38	2070.34	2070.29	2070.25	2070.20	2070.15	2070.10	2070.05	2070.01	2070.00	2069.99	2069.98
8/3/1997	2069.97	2069.97	2069.96	2069.95	2069.94	2069.91	2069.88	2069.85	2069.81	2069.78	2069.75	2069.72	2069.68	2069.63	2069.57	2069.52	2069.46	2069.41	2069.35	2069.29	2069.24	2069.23	2069.22	2069.21
8/4/1997	2069.21	2069.20	2069.19	2069.18	2069.17	2069.16	2069.14	2069.13	2069.11	2069.09	2069.08	2069.06	2069.04	2068.98	2068.91	2068.85	2068.78	2068.72	2068.66	2068.59	2068.54	2068.53	2068.53	2068.53
8/5/1997	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.53	2068.52	2068.47	2068.42	2068.36	2068.30	2068.25	2068.19	2068.14	2068.09	2068.10	2068.12	2068.13
8/6/1997	2068.15	2068.17	2068.18	2068.20	2068.21	2068.18	2068.14	2068.11	2068.08	2068.05	2068.01	2067.98	2067.94	2067.84	2067.75	2067.65	2067.55	2067.46	2067.36	2067.27	2067.20	2067.21	2067.24	2067.26
8/7/1997	2067.29	2067.31	2067.33	2067.36	2067.37	2067.33	2067.29	2067.25	2067.21	2067.17	2067.13	2067.09	2067.05	2066.99	2066.94	2066.88	2066.82	2066.77	2066.71	2066.65	2066.61	2066.59	2066.57	2066.56
8/8/1997	2066.54	2066.53	2066.51	2066.49	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.48	2066.46	2066.38	2066.29	2066.20	2066.11	2066.02	2065.94	2065.85	2065.77	2065.73	2065.69	2065.65
8/9/1997	2065.61	2065.57	2065.53	2065.49	2065.45	2065.43	2065.40	2065.38	2065.36	2065.33	2065.31	2065.28	2065.25	2065.18	2065.11	2065.03	2064.96	2064.89	2064.82	2064.74	2064.69	2064.67	2064.65	2064.64
8/10/1997	2064.62	2064.60	2064.59	2064.57	2064.56	2064.54	2064.52	2064.51	2064.49	2064.48	2064.46	2064.44	2064.41	2064.34	2064.27	2064.20	2064.13	2064.06	2063.98	2063.91	2063.87	2063.91	2063.96	2064.01
8/11/1997	2064.06	2064.10	2064.15	2064.20	2064.24	2064.24	2064.24	2064.24	2064.24	2064.24	2064.23	2064.18	2064.12	2064.07	2064.01	2063.95	2063.90	2063.84	2063.79	2063.75	2063.71	2063.67	2063.63	2063.59
8/12/1997	2063.55	2063.51	2063.47	2063.43	2063.40	2063.37	2063.34	2063.31	2063.27	2063.24	2063.20	2063.13	2063.05	2062.97	2062.89	2062.81	2062.73	2062.65	2062.58	2062.56	2062.56	2062.55	2062.54	2062.53
8/13/1997	2062.52	2062.52	2062.50	2062.46	2062.42	2062.38	2062.34	2062.30	2062.26	2062.22	2062.18	2062.14	2062.10	2062.06	2062.02	2061.98	2061.94	2061.90	2061.86	2061.83	2061.80	2061.77	2061.74	2061.70
8/14/1997	2061.67	2061.64	2061.61	2061.58	2061.56	2061.53	2061.51	2061.49	2061.46	2061.44	2061.40	2061.34	2061.27	2061.21	2061.15	2061.08	2061.02	2060.95	2060.90	2060.87	2060.83	2060.80	2060.77	2060.74
8/15/1997	2060.71	2060.67	2060.64	2060.61	2060.58	2060.55	2060.51	2060.48	2060.45	2060.42	2060.38	2060.31	2060.25	2060.18	2060.12	2060.06	2059.99	2059.93	2059.86	2059.80	2059.73	2059.67	2059.61	2059.54
8/16/1997	2059.48	2059.41	2059.36	2059.35	2059.33	2059.32	2059.30	2059.28	2059.27	2059.25	2059.22	2059.16	2059.09	2059.03	2058.97	2058.90	2058.84	2058.77	2058.72	2058.68	2058.64	2058.60	2058.56	2058.52
8/17/1997	2058.48	2058.44	2058.40	2058.39	2058.37	2058.35	2058.34	2058.32	2058.31	2058.29	2058.26	2058.22	2058.17	2058.12	2058.07	2058.02	2057.98	2057.93	2057.90	2057.90	2057.91	2057.92	2057.93	2057.94
8/18/1997	2057.94	2057.95	2057.99	2058.12	2058.24	2058.36	2058.49	2058.61	2057.56	2057.54	2057.51	2057.49	2057.46	2057.44	2057.42	2057.39	2057.37	2057.34	2057.32	2057.30	2057.27	2057.25	2057.22	2057.20
8/19/1997	2057.21	2057.25	2057.29	2057.33	2057.37	2057.41	2057.45	2057.49	2057.48	2057.44	2057.39	2057.34	2057.29	2057.24	2057.20	2057.15	2057.11	2057.08	2057.04	2057.01	2056.98	2056.95	2056.92	2056.88
8/20/1997	2056.87	2056.88	2056.89	2056.90	2056.91	2056.91	2056.92	2056.93	2056.88	2056.81	2056.74	2056.67	2056.59	2056.52	2056.45	2056.38	2056.34	2056.31	2056.29	2056.27	2056.24	2056.22	2056.20	2056.17
8/21/1997	2056.18	2056.20	2056.23	2056.25	2056.28	2056.30	2056.32	2056.35	2056.33	2056.29	2056.25	2056.21	2056.17	2056.13	2056.09	2056.05	2056.01	2055.97	2055.93	2055.89	2055.85	2055.81	2055.77	2055.73
8/22/1997	2055.74	2055.78	2055.82	2055.86	2055.90	2055.94	2055.98	2056.02	2055.99	2055.94	2055.88	2055.82	2055.77	2055.71	2055.65	2055.60	2055.58	2055.57	2055.56	2055.56	2055.55	2055.54	2055.53	2055.52
8/23/1997	2055.50	2055.48	2055.45	2055.43	2055.41	2055.38	2055.36	2055.33	2055.29	2055.24	2055.19	2055.15	2055.10	2055.05	2055.00	2054.95	2054.91	2054.87	2054.83	2054.79	2054.75	2054.71	2054.67	2054.63
8/24/1997	2054.63	2054.64	2054.65	2054.66	2054.66	2054.67	2054.68	2054.69	2054.66	2054.62	2054.58	2054.54	2054.50	2054.46	2054.42	2054.38	2054.36	2054.34	2054.32	2054.31	2054.29	2054.28	2054.26	2054.25
8/25/1997	2054.27	2054.31	2054.35	2054.39	2054.43	2054.47	2054.51	2054.55	2054.52	2054.46	2054.40	2054.35	2054.29	2054.23	2054.18	2054.12	2054.07	2054.01	2053.95	2053.90	2053.84	2053.79	2053.73	2053.68
8/26/1997	2053.71	2053.77	2053.82	2053.88	2053.93	2053.99	2054.05	2054.10	2054.09	2054.05	2054.02	2053.99	2053.96	2053.92	2053.89	2053.86	2053.83	2053.80	2053.76	2053.73	2053.70	2053.67	2053.64	2053.61
8/27/1997	2053.63	2053.67	2053.71	2053.75	2053.79	2053.83	2053.88	2053.91	2053.89	2053.86	2053.83	2053.80	2053.76	2053.73	2053.70	2053.67	2053.61	2053.56	2053.50	2053.45	2053.39	2053.33	2053.28	2053.23
8/28/1997	2053.24	2053.28	2053.31	2053.34	2053.37	2053.40	2053.44	2053.46	2053.45	2053.43	2053.40	2053.38	2053.35	2053.33	2053.31	2053.28	2053.23	2053.17	2053.12	2053.06	2053.01	2052.95	2052.89	2052.85
8/29/1997	2052.88	2052.94	2052.99	2053.05	2053.11	2053.17	2053.22	2053.27	2053.22	2053.17	2053.11	2053.05	2053.00	2052.94	2052.88	2052.83	2052.80	2052.76	2052.73	2052.70	2052.67	2052.64	2052.60	2052.58
8/30/1997	2052.57	2052.57	2052.57	2052.57	2052.57	2052.57	2052.57	2052.57	2052.56	2052.54	2052.52	2052.51	2052.49	2052.48	2052.46	2052.44	2052.39	2052.35	2052.30	2052.25	2052.20	2052.15	2052.10	2052.07
8/31/1997	2052.08	2052.10	2052.11	2052.13	2052.14	2052.16	2052.18	2052.18	2052.16	2052.14	2052.12	2052.09	2052.07	2052.04	2052.02	2052.00	2051.98	2051.96	2051.95	2051.93	2051.92	2051.90	2051.88	2051.87

Brownlee Headwater

	Hour Ending																						
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
9/1/1997	2051.88	2051.89	2051.89	2051.90	2051.91	2051.92	2051.93	2051.92	2051.88	2051.83	2051.78	2051.74	2051.69	2051.64	2051.59	2051.55	2051.55	2051.55	2051.55	2051.55	2051.55	2051.55	2051.55	2051.56
9/2/1997	2051.59	2051.63	2051.67	2051.71	2051.75	2051.79	2051.83	2051.86	2051.81	2051.75	2051.69	2051.64	2051.58	2051.52	2051.46	2051.43	2051.44	2051.46	2051.47	2051.49	2051.50	2051.52	2051.54	2051.56
9/3/1997	2051.63	2051.69	2051.76	2051.82	2051.88	2051.95	2052.01	2052.04	2051.97	2051.90	2051.83	2051.75	2051.68	2051.61	2051.54	2051.48	2051.47	2051.47	2051.46	2051.45	2051.44	2051.43	2051.43	2051.44
9/4/1997	2051.50	2051.57	2051.63	2051.70	2051.76	2051.82	2051.89	2051.92	2051.89	2051.86	2051.83	2051.79	2051.76	2051.73	2051.70	2051.67	2051.63	2051.60	2051.57	2051.54	2051.50	2051.47	2051.44	2051.44
9/5/1997	2051.50	2051.55	2051.61	2051.67	2051.72	2051.78	2051.83	2051.85	2051.81	2051.77	2051.73	2051.69	2051.65	2051.61	2051.57	2051.55	2051.56	2051.57	2051.58	2051.58	2051.59	2051.60	2051.61	2051.61
9/6/1997	2051.60	2051.59	2051.58	2051.58	2051.57	2051.56	2051.55	2051.54	2051.51	2051.49	2051.47	2051.44	2051.42	2051.39	2051.37	2051.34	2051.31	2051.28	2051.25	2051.21	2051.18	2051.15	2051.12	2051.12
9/7/1997	2051.16	2051.20	2051.24	2051.28	2051.32	2051.36	2051.40	2051.40	2051.35	2051.30	2051.25	2051.21	2051.16	2051.11	2051.06	2051.04	2051.06	2051.08	2051.09	2051.11	2051.12	2051.14	2051.16	2051.19
9/8/1997	2051.25	2051.30	2051.36	2051.42	2051.47	2051.53	2051.58	2051.59	2051.54	2051.49	2051.45	2051.40	2051.35	2051.30	2051.25	2051.22	2051.19	2051.17	2051.14	2051.12	2051.10	2051.07	2051.05	2051.06
9/9/1997	2051.12	2051.18	2051.23	2051.29	2051.34	2051.40	2051.46	2051.46	2051.41	2051.36	2051.31	2051.26	2051.22	2051.17	2051.12	2051.10	2051.10	2051.10	2051.10	2051.10	2051.10	2051.10	2051.10	2051.11
9/10/1997	2051.13	2051.14	2051.16	2051.17	2051.19	2051.21	2051.22	2051.21	2051.17	2051.14	2051.11	2051.08	2051.04	2051.01	2050.98	2050.96	2050.94	2050.93	2050.91	2050.90	2050.88	2050.86	2050.85	2050.87
9/11/1997	2050.90	2050.93	2050.96	2051.00	2051.03	2051.06	2051.09	2051.08	2051.04	2051.01	2050.98	2050.95	2050.92	2050.88	2050.85	2050.86	2050.89	2050.91	2050.93	2050.96	2050.98	2051.01	2051.03	2051.07
9/12/1997	2051.12	2051.17	2051.22	2051.27	2051.31	2051.36	2051.41	2051.37	2051.31	2051.24	2051.18	2051.12	2051.05	2050.99	2050.93	2050.93	2050.95	2050.97	2051.00	2051.02	2051.05	2051.07	2051.09	2051.11
9/13/1997	2051.13	2051.14	2051.16	2051.18	2051.19	2051.21	2051.22	2051.20	2051.17	2051.14	2051.11	2051.08	2051.04	2051.01	2050.98	2050.96	2050.94	2050.93	2050.91	2050.90	2050.88	2050.86	2050.85	2050.89
9/14/1997	2050.96	2051.02	2051.08	2051.15	2051.21	2051.28	2051.34	2051.33	2051.30	2051.27	2051.24	2051.20	2051.17	2051.14	2051.11	2051.08	2051.06	2051.03	2051.01	2050.99	2050.96	2050.94	2050.92	2050.93
9/15/1997	2050.95	2050.97	2051.00	2051.02	2051.05	2051.07	2051.09	2051.06	2051.00	2050.95	2050.89	2050.83	2050.78	2050.72	2050.67	2050.63	2050.61	2050.58	2050.56	2050.54	2050.51	2050.49	2050.47	2050.46
9/16/1997	2050.46	2050.46	2050.46	2050.46	2050.46	2050.46	2050.46	2050.41	2050.35	2050.28	2050.22	2050.15	2050.09	2050.03	2049.96	2049.90	2049.85	2049.79	2049.74	2049.68	2049.62	2049.57	2049.51	2049.53
9/17/1997	2049.57	2049.61	2049.65	2049.69	2049.73	2049.77	2049.80	2049.75	2049.66	2049.57	2049.49	2049.40	2049.31	2049.22	2049.13	2049.06	2048.99	2048.91	2048.84	2048.77	2048.70	2048.63	2048.55	2048.47
9/18/1997	2048.38	2048.29	2048.20	2048.12	2048.03	2047.94	2047.85	2047.78	2047.70	2047.63	2047.56	2047.48	2047.41	2047.34	2047.27	2047.21	2047.15	2047.10	2047.04	2046.98	2046.93	2046.87	2046.82	2046.77
9/19/1997	2046.72	2046.67	2046.62	2046.57	2046.53	2046.48	2046.43	2046.37	2046.30	2046.24	2046.17	2046.11	2046.04	2045.98	2045.91	2045.83	2045.75	2045.67	2045.59	2045.51	2045.43	2045.35	2045.27	2045.20
9/20/1997	2045.13	2045.06	2044.98	2044.91	2044.84	2044.77	2044.69	2044.59	2044.49	2044.39	2044.28	2044.18	2044.07	2043.97	2043.87	2043.76	2043.66	2043.55	2043.45	2043.34	2043.24	2043.14	2043.04	2042.96
9/21/1997	2042.89	2042.81	2042.74	2042.67	2042.60	2042.53	2042.45	2042.38	2042.31	2042.24	2042.16	2042.09	2042.02	2041.95	2041.87	2041.77	2041.65	2041.54	2041.43	2041.32	2041.21	2041.09	2040.99	2040.91
9/22/1997	2040.83	2040.76	2040.69	2040.62	2040.55	2040.47	2040.40	2040.33	2040.26	2040.18	2040.11	2040.04	2039.97	2039.89	2039.82	2039.72	2039.63	2039.53	2039.44	2039.34	2039.24	2039.15	2039.05	2038.97
9/23/1997	2038.89	2038.81	2038.73	2038.65	2038.57	2038.49	2038.41	2038.31	2038.22	2038.12	2038.03	2037.93	2037.83	2037.74	2037.64	2037.57	2037.50	2037.42	2037.35	2037.28	2037.21	2037.14	2037.07	2037.00
9/24/1997	2036.94	2036.87	2036.81	2036.74	2036.68	2036.62	2036.55	2036.46	2036.37	2036.29	2036.20	2036.11	2036.02	2035.93	2035.84	2035.75	2035.67	2035.58	2035.49	2035.40	2035.31	2035.23	2035.14	2035.08
9/25/1997	2035.03	2034.97	2034.92	2034.86	2034.80	2034.75	2034.68	2034.59	2034.50	2034.40	2034.30	2034.22	2034.11	2034.01	2033.90	2033.80	2033.69	2033.59	2033.48	2033.39	2033.32	2033.26	2033.20	2033.13
9/26/1997	2033.07	2033.00	2032.94	2032.87	2032.79	2032.71	2032.63	2032.54	2032.46	2032.38	2032.30	2032.21	2032.11	2032.02	2031.92	2031.83	2031.73	2031.63	2031.54	2031.46	2031.39	2031.33	2031.26	2031.20
9/27/1997	2031.14	2031.07	2031.01	2030.94	2030.86	2030.78	2030.70	2030.62	2030.54	2030.46	2030.38	2030.29	2030.20	2030.12	2030.03	2029.94	2029.85	2029.76	2029.67	2029.59	2029.51	2029.43	2029.35	2029.27
9/28/1997	2029.19	2029.11	2029.03	2028.95	2028.88	2028.81	2028.74	2028.67	2028.59	2028.52	2028.45	2028.36	2028.26	2028.15	2028.05	2027.94	2027.84	2027.74	2027.63	2027.55	2027.48	2027.42	2027.36	2027.29
9/29/1997	2027.23	2027.16	2027.10	2027.00	2026.87	2026.75	2026.62	2026.49	2026.36	2026.23	2026.10	2025.97	2025.84	2025.72	2025.59	2025.46	2025.33	2025.20	2025.07	2024.97	2024.89	2024.81	2024.73	2024.65
9/30/1997	2024.57	2024.49	2024.41	2024.33	2024.24	2024.15	2024.06	2023.97	2023.89	2023.80	2023.71	2023.61	2023.51	2023.40	2023.29	2023.19	2023.08	2022.97	2022.87	2022.78	2022.69	2022.60	2022.51	2022.42

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
10/1/1997	2022.33	2022.25	2022.16	2022.07	2021.98	2021.89	2021.80	2021.71	2021.62	2021.53	2021.44	2021.34	2021.24	2021.15	2021.05	2020.95	2020.85	2020.75	2020.66	2020.58	2020.50	2020.42	2020.34	2020.26
10/2/1997	2020.18	2020.10	2020.02	2019.94	2019.86	2019.78	2019.70	2019.61	2019.53	2019.45	2019.38	2019.34	2019.31	2019.28	2019.25	2019.22	2019.18	2019.15	2019.12	2019.10	2019.09	2019.07	2019.06	2019.04
10/3/1997	2019.02	2019.01	2018.99	2018.98	2018.96	2018.94	2018.93	2018.91	2018.90	2018.88	2018.85	2018.77	2018.68	2018.60	2018.51	2018.42	2018.33	2018.24	2018.16	2018.09	2018.03	2017.96	2017.90	2017.84
10/4/1997	2017.77	2017.71	2017.64	2017.57	2017.50	2017.43	2017.35	2017.28	2017.21	2017.14	2017.06	2016.97	2016.87	2016.78	2016.68	2016.58	2016.49	2016.39	2016.30	2016.24	2016.19	2016.13	2016.07	2016.02
10/5/1997	2015.96	2015.91	2015.85	2015.78	2015.72	2015.66	2015.59	2015.53	2015.46	2015.40	2015.33	2015.23	2015.13	2015.02	2014.92	2014.81	2014.71	2014.61	2014.51	2014.43	2014.36	2014.29	2014.21	2014.14
10/6/1997	2014.07	2014.00	2013.93	2013.87	2013.81	2013.76	2013.70	2013.65	2013.59	2013.53	2013.47	2013.39	2013.30	2013.21	2013.12	2013.04	2012.95	2012.86	2012.77	2012.68	2012.58	2012.48	2012.39	2012.29
10/7/1997	2012.19	2012.10	2012.00	2011.91	2011.82	2011.74	2011.65	2011.56	2011.47	2011.38	2011.30	2011.22	2011.15	2011.08	2011.01	2010.93	2010.86	2010.79	2010.72	2010.65	2010.59	2010.53	2010.46	2010.40
10/8/1997	2010.33	2010.27	2010.20	2010.13	2010.06	2009.99	2009.92	2009.84	2009.77	2009.70	2009.63	2009.57	2009.52	2009.46	2009.41	2009.35	2009.29	2009.24	2009.18	2009.15	2009.12	2009.09	2009.05	2009.02
10/9/1997	2008.99	2008.96	2008.92	2008.82	2008.73	2008.63	2008.54	2008.44	2008.34	2008.25	2008.15	2008.06	2007.97	2007.88	2007.80	2007.71	2007.62	2007.53	2007.45	2007.38	2007.32	2007.25	2007.19	2007.12
10/10/1997	2007.06	2007.00	2006.93	2006.85	2006.76	2006.68	2006.60	2006.52	2006.44	2006.36	2006.28	2006.21	2006.13	2006.06	2005.99	2005.92	2005.85	2005.77	2005.71	2005.65	2005.59	2005.54	2005.48	2005.43
10/11/1997	2005.37	2005.31	2005.25	2005.16	2005.07	2004.98	2004.89	2004.81	2004.72	2004.63	2004.56	2004.52	2004.48	2004.44	2004.40	2004.36	2004.32	2004.28	2004.23	2004.17	2004.10	2004.04	2003.97	2003.91
10/12/1997	2003.84	2003.78	2003.73	2003.68	2003.64	2003.60	2003.56	2003.52	2003.48	2003.44	2003.38	2003.27	2003.16	2003.04	2002.93	2002.82	2002.71	2002.60	2002.49	2002.39	2002.30	2002.20	2002.10	2002.01
10/13/1997	2001.91	2001.81	2001.73	2001.67	2001.60	2001.54	2001.47	2001.41	2001.35	2001.28	2001.21	2001.13	2001.05	2000.97	2000.89	2000.81	2000.73	2000.65	2000.57	2000.48	2000.39	2000.30	2000.22	2000.13
10/14/1997	2000.05	1999.91	1999.87	1999.80	1999.71	1999.62	1999.53	1999.44	1999.36	1999.27	1999.17	1999.03	1998.88	1998.74	1998.59	1998.45	1998.31	1998.16	1998.02	1997.86	1997.71	1997.56	1997.41	1997.25
10/15/1997	1997.10	1996.95	1996.81	1996.71	1996.61	1996.51	1996.42	1996.32	1996.22	1996.13	1996.03	1995.93	1995.84	1995.74	1995.64	1995.55	1995.45	1995.36	1995.26	1995.14	1995.03	1994.92	1994.81	1994.70
10/16/1997	1994.58	1994.47	1994.35	1994.18	1994.01	1993.85	1993.68	1993.51	1993.34	1993.20	---	1992.81	1992.70	1992.59	1992.49	1992.38	1992.28	1992.17	1992.06	1991.96	1991.85	1991.75	1991.64	1991.54
10/17/1997	1991.43	1991.33	1991.22	1991.12	1991.01	1990.91	1990.80	1990.70	1990.57	1990.43	1990.30	1990.16	1990.02	1989.89	1989.75	1989.61	1989.47	1989.33	1989.18	1989.04	1988.89	1988.75	1988.61	1988.46
10/18/1997	1988.32	1988.19	1988.05	1987.92	1987.78	1987.64	1987.51	1987.37	1987.26	1987.17	1987.07	1986.98	1986.88	1986.78	1986.69	1986.59	1986.50	1986.41	1986.32	1986.24	1986.15	1986.06	1985.97	1985.89
10/19/1997	1985.91	1985.98	1986.05	1986.13	1986.20	1986.27	1986.34	1986.42	1986.50	1986.59	1986.68	1986.76	1986.85	1986.94	1987.03	1987.12	1987.23	1987.36	1987.49	1987.62	1987.74	1987.87	1988.00	1988.13
10/20/1997	1988.23	1988.33	1988.43	1988.52	1988.62	1988.71	1988.80	1988.87	1988.92	1988.98	1989.03	1989.09	1989.15	1989.20	1989.27	1989.37	1989.47	1989.58	1989.68	1989.79	1989.89	1989.99	1990.11	1990.25
10/21/1997	1990.41	1990.56	1990.71	1990.86	1991.01	1991.17	1991.31	1991.40	1991.49	1991.58	1991.67	1991.75	1991.84	1991.93	1992.03	1992.14	1992.26	1992.38	1992.50	1992.62	1992.75	1992.87	1992.99	1993.12
10/22/1997	1993.26	1993.40	1993.53	1993.67	1993.80	1993.94	1994.06	1994.14	1994.21	1994.29	1994.36	1994.43	1994.50	1994.57	1994.65	1994.73	1994.81	1994.89	1994.97	1995.05	1995.13	1995.21	1995.31	1995.46
10/23/1997	1995.62	1995.78	1995.94	1996.10	1996.26	1996.42	1996.57	1996.65	1996.73	1996.81	1996.89	1996.97	1997.05	1997.13	1997.21	1997.28	1997.34	1997.40	1997.47	1997.53	1997.60	1997.66	1997.74	1997.85
10/24/1997	1997.97	1998.09	1998.21	1998.33	1998.45	1998.57	1998.67	1998.70	1998.73	1998.75	1998.78	1998.80	1998.82	1998.85	1998.89	1998.98	1999.07	1999.17	1999.27	1999.36	1999.46	1999.55	1999.66	1999.78
10/25/1997	2000.02	2000.07	2000.13	2000.18	2000.24	2000.30	2000.35	2000.41	2000.47	2000.60	2000.74	2000.89	2001.03	2001.18	2001.32	2001.47	2001.60	2001.69	2001.76	2001.83	2001.90	2001.97	2002.04	2002.11
10/26/1997	2002.20	2002.30	2002.41	2002.52	2002.62	2002.73	2002.83	2002.94	2003.04	2003.15	2003.25	2003.36	2003.46	2003.56	2003.67	2003.77	2003.85	2003.93	2004.00	2004.07	2004.14	2004.21	2004.29	2004.36
10/27/1997	2004.45	2004.56	2004.66	2004.77	2004.87	2004.97	2005.08	2005.18	2005.23	2005.27	2005.30	2005.33	2005.36	2005.40	2005.43	2005.46	2005.50	2005.54	2005.58	2005.62	2005.66	2005.70	2005.75	2005.80
10/28/1997	2005.94	2006.10	2006.27	2006.43	2006.59	2006.75	2006.92	2007.06	2007.11	2007.14	2007.17	2007.20	2007.23	2007.26	2007.30	2007.33	2007.39	2007.44	2007.50	2007.55	2007.61	2007.67	2007.72	2007.79
10/29/1997	2007.93	2008.07	2008.22	2008.36	2008.50	2008.65	2008.79	2008.92	2008.98	2009.03	2009.08	2009.12	2009.17	2009.22	2009.27	2009.32	2009.38	2009.45	2009.51	2009.58	2009.64	2009.70	2009.77	2009.85
10/30/1997	2009.98	2010.13	2010.27	2010.41	2010.56	2010.70	2010.85	2010.97	2011.01	2011.05	2011.08	2011.11	2011.14	2011.18	2011.21	2011.25	2011.31	2011.38	2011.44	2011.50	2011.57	2011.63	2011.69	2011.78
10/31/1997	2011.94	2012.11	2012.28	2012.45	2012.61	2012.78	2012.95	2013.10	2013.17	2013.23	2013.30	2013.36	2013.43	2013.50	2013.56	2013.62	2013.67	2013.72	2013.77	2013.81	2013.86	2013.91	2013.96	2014.04

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
11/1/1997	2014.20	2014.36	2014.52	2014.68	2014.84	2015.00	2015.16	2015.28	2015.32	2015.36	2015.40	2015.44	2015.49	2015.53	2015.57	2015.61	2015.68	2015.74	2015.81	2015.87	2015.93	2016.00	2016.06	2016.15
11/2/1997	2016.29	2016.44	2016.58	2016.72	2016.87	2017.01	2017.16	2017.29	2017.38	2017.48	2017.57	2017.67	2017.77	2017.86	2017.96	2018.04	2018.08	2018.12	2018.16	2018.20	2018.24	2018.28	2018.32	2018.39
11/3/1997	2018.50	2018.62	2018.74	2018.86	2018.98	2019.10	2019.22	2019.33	2019.38	2019.44	2019.50	2019.55	2019.61	2019.66	2019.72	2019.77	2019.82	2019.87	2019.92	2019.97	2020.01	2020.06	2020.11	2020.18
11/4/1997	2020.32	2020.45	2020.59	2020.73	2020.86	2021.00	2021.14	2021.25	2021.30	2021.35	2021.40	2021.45	2021.50	2021.55	2021.61	2021.66	2021.71	2021.76	2021.81	2021.90	2022.00	2022.10	2022.21	2022.31
11/5/1997	2022.42	2022.52	2022.62	2022.73	2022.83	2022.94	2023.04	2023.14	2023.25	2023.35	2023.46	2023.53	2023.57	2023.63	2023.68	2023.72	2023.77	2023.82	2023.87	2023.92	2023.96	2024.01	2024.05	2024.09
11/6/1997	2024.14	2024.18	2024.23	2024.25	2024.27	2024.29	2024.30	2024.32	2024.34	2024.36	2024.38	2024.40	2024.44	2024.47	2024.51	2024.54	2024.58	2024.61	2024.65	2024.74	2024.85	2024.96	2025.06	2025.17
11/7/1997	2025.28	2025.39	2025.50	2025.58	2025.66	2025.74	2025.81	2025.89	2012.22	2000.00	2000.00	2010.26	2026.00	2026.02	2026.04	2026.06	2026.08	2026.10	2026.13	2026.16	2026.26	2026.38	2026.50	2026.62
11/8/1997	2026.74	2026.86	2026.98	2027.09	2027.17	2027.24	2027.31	2027.38	2027.45	2027.52	2027.59	2027.66	2027.70	2027.72	2027.75	2027.78	2027.81	2027.83	2027.86	2027.90	2027.98	2028.07	2028.16	2028.25
11/9/1997	2028.34	2028.43	2028.52	2028.60	2028.69	2028.78	2028.87	2028.95	2029.04	2029.13	2029.22	2029.30	2029.34	2029.37	2029.41	2029.45	2029.48	2029.52	2029.56	2029.61	2029.71	2029.83	2029.95	2030.07
11/10/1997	2030.18	2030.30	2030.42	2030.52	2030.54	2030.54	2030.55	2030.56	2030.56	2030.57	2030.58	2030.59	2030.62	2030.65	2030.68	2030.71	2030.73	2030.74	2030.76	2030.78	2030.80	2030.82	2030.85	2030.97
11/11/1997	2031.11	2031.25	2031.39	2031.53	2031.67	2031.82	2031.95	2032.03	2032.10	2028.99	2032.26	2032.33	2032.41	2032.49	2032.57	2032.64	2032.72	2032.80	2032.86	2032.92	2032.98	2033.05	2033.11	2033.17
11/12/1997	2033.23	2033.30	2033.38	2033.46	2033.54	2033.62	2033.71	2033.79	2033.87	2033.94	2033.97	2033.99	2034.01	2034.03	2034.06	2034.08	2034.10	2034.13	2034.20	2034.27	2034.34	2034.41	2034.48	2034.55
11/13/1997	2034.62	2034.69	2034.75	2034.82	2034.88	2034.95	2035.01	2035.08	2035.14	2035.21	2035.27	2035.34	2035.41	2035.47	2035.54	2035.61	2035.67	2035.73	2035.78	2035.83	2035.88	2035.93	2035.97	2036.02
11/14/1997	2036.07	2036.12	2036.18	2036.25	2036.31	2036.38	2036.44	2036.50	2036.57	2036.62	2036.64	2036.68	2036.73	2036.77	2036.81	2036.86	2036.90	2036.95	2037.01	2037.09	2037.17	2037.25	2037.34	2037.42
11/15/1997	2037.50	2037.58	2037.65	2037.71	2037.76	2037.82	2037.87	2037.92	2037.98	2038.03	2038.06	2038.07	2038.07	2038.07	2038.08	2038.08	2038.08	2038.09	2038.11	2038.16	2038.20	2038.25	2038.29	2038.33
11/16/1997	2038.38	2038.42	2038.48	2038.55	2038.62	2038.69	2038.76	2038.83	2038.90	2038.97	2039.02	2039.04	2039.05	2039.07	2039.09	2039.11	2039.12	2039.14	2039.18	2039.25	2039.31	2039.38	2039.44	2039.51
11/17/1997	2039.58	2039.64	2039.70	2039.75	2039.80	2039.85	2039.90	2039.95	2040.00	2040.05	2040.08	2040.07	2040.07	2040.06	2040.06	2040.05	2040.05	2040.04	2040.07	2040.13	2040.18	2040.24	2040.30	2040.36
11/18/1997	2040.41	2040.47	2040.52	2040.55	2040.58	2040.61	2040.65	2040.68	2040.71	2040.74	2040.76	2040.77	2040.78	2040.79	2040.80	2040.81	2040.82	2040.83	2040.85	2040.89	2040.93	2040.97	2041.01	2041.05
11/19/1997	2041.08	2041.12	2041.18	2041.24	2041.30	2041.36	2041.42	2041.48	2041.54	2041.60	2041.63	2041.65	2041.66	2041.68	2041.69	2041.71	2041.73	2041.74	2041.77	2041.81	2041.84	2041.88	2041.92	2041.95
11/20/1997	2041.99	2042.03	2042.06	2042.10	2042.13	2042.17	2042.21	2042.24	2042.28	2042.32	2042.35	2042.39	2042.42	2042.45	2042.49	2042.52	2042.56	2042.59	2042.61	2042.63	2042.65	2042.67	2042.68	2042.70
11/21/1997	2042.72	2042.74	2042.74	2042.74	2042.74	2042.74	2042.73	2042.73	2042.73	2042.73	2042.75	2042.78	2042.81	2042.84	2042.87	2042.89	2042.92	2042.95	2042.95	2042.95	2042.94	2042.93	2042.92	2042.92
11/22/1997	2042.91	2042.90	2042.91	2042.92	2042.92	2042.93	2042.94	2042.95	2042.96	2042.97	2042.99	2043.01	2043.03	2043.06	2043.08	2043.11	2043.13	2043.15	2043.19	2043.23	2043.27	2043.31	2043.35	2043.39
11/23/1997	2043.43	2043.47	2043.52	2043.57	2043.62	2043.67	2043.72	2043.77	2043.82	2043.88	2043.91	2043.95	2043.99	2044.02	2044.06	2044.09	2044.13	2044.16	2044.22	2044.28	2044.34	2044.40	2044.47	2044.53
11/24/1997	2044.59	2044.65	2044.69	2044.72	2044.75	2044.77	2044.80	2044.83	2044.85	2044.88	2044.91	2044.94	2044.97	2045.00	2045.03	2045.06	2045.09	2045.13	2045.18	2045.25	2045.31	2045.38	2045.44	2045.51
11/25/1997	2045.57	2045.64	2045.71	2045.77	2045.84	2045.90	2045.97	2046.04	2046.10	2046.17	2046.19	2046.21	2046.23	2046.24	2046.26	2046.28	2046.29	2046.31	2046.34	2046.36	2046.39	2046.42	2046.45	2046.47
11/26/1997	2046.50	2046.54	2046.61	2046.68	2046.76	2046.84	2046.92	2046.99	2047.07	2047.15	2047.19	2047.24	2047.28	2047.32	2047.36	2047.40	2047.45	2047.49	2047.56	2047.62	2047.69	2047.75	2047.82	2047.89
11/27/1997	2047.95	2048.03	2048.12	2048.22	2048.32	2048.41	2048.51	2048.61	2048.71	2048.80	2048.86	2048.92	2048.98	2049.04	2049.10	2049.16	2049.22	2049.26	2049.26	2049.26	2049.26	2049.25	2049.25	2049.25
11/28/1997	2049.25	2049.28	2049.39	2049.50	2049.61	2049.72	2049.83	2049.94	2050.05	2050.14	2050.20	2050.25	2050.31	2050.36	2050.41	2050.47	2050.52	2050.56	2050.56	2050.57	2050.57	2050.58	2050.58	2050.58
11/29/1997	2050.59	2050.61	2050.69	2050.76	2050.84	2050.92	2050.99	2051.07	2051.15	2051.21	2051.25	2051.29	2051.32	2051.36	2051.40	2051.44	2051.47	2051.51	2051.54	2051.57	2051.59	2051.62	2051.65	2051.68
11/30/1997	2051.71	2051.76	2051.87	2051.97	2052.08	2052.19	2052.29	2052.40	2052.51	2052.59	2052.63	2052.67	2052.71	2052.75	2052.78	2052.82	2052.86	2052.91	2052.96	2053.02	2053.08	2053.14	2053.19	2053.25

Brownlee Headwater

	Hour Ending																							
Date	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
12/1/1997	2053.31	2053.37	2053.43	2053.50	2053.57	2053.63	2053.70	2053.77	2053.83	2053.90	2053.95	2054.00	2054.06	2054.11	2054.17	2054.22	2054.28	2054.32	2054.35	2054.39	2054.42	2054.45	2054.48	2054.51
12/2/1997	2054.54	2054.58	2054.63	2054.67	2054.72	2054.77	2054.82	2054.86	2054.91	2054.98	2055.07	2055.15	2055.24	2055.33	2055.41	2055.50	2055.59	2055.66	2055.73	2055.79	2055.86	2055.92	2055.99	2056.06
12/3/1997	2056.12	2056.19	2056.26	2056.33	2056.40	2056.46	2056.53	2056.60	2056.67	2056.73	2056.79	2056.84	2056.90	2056.95	2057.00	2057.06	2057.11	2057.16	2057.19	2057.23	2057.26	2057.30	2057.34	2057.37
12/4/1997	2057.41	2057.46	2057.52	2057.58	2057.64	2057.70	2057.76	2057.82	2057.89	2057.96	2058.05	2058.14	2058.22	2058.31	2058.39	2058.48	2058.56	2058.60	2058.62	2058.63	2058.65	2058.66	2058.68	2058.69
12/5/1997	2058.71	2058.76	2058.82	2058.88	2058.93	2058.99	2059.05	2059.11	2059.17	2059.23	2059.30	2059.37	2059.43	2059.50	2059.57	2059.63	2059.70	2059.74	2059.78	2059.82	2059.86	2059.90	2059.95	2059.99
12/6/1997	2060.04	2060.13	2060.22	2060.30	2060.39	2060.48	2060.57	2060.66	2060.73	2060.76	2060.79	2060.82	2060.84	2060.87	2060.90	2060.93	2060.97	2061.02	2061.08	2061.14	2061.19	2061.25	2061.31	2061.36
12/7/1997	2061.43	2061.53	2061.63	2061.73	2061.84	2061.94	2062.04	2062.14	2062.21	2062.24	2062.27	2062.30	2062.33	2062.36	2062.39	2062.42	2062.45	2062.47	2062.49	2062.51	2062.53	2062.55	2062.58	2062.60
12/8/1997	2062.64	2062.72	2062.81	2062.89	2062.97	2063.06	2063.14	2063.22	2063.28	2063.28	2063.28	2063.29	2063.29	2063.29	2063.29	2063.30	2063.32	2063.38	2063.43	2063.49	2063.55	2063.60	2063.66	2063.71
12/9/1997	2063.78	2063.87	2063.95	2064.04	2064.12	2064.21	2064.29	2064.38	2064.45	2064.51	2064.57	2064.63	2064.69	2064.75	2064.81	2064.87	2064.91	2064.91	2064.92	2064.92	2064.92	2064.92	2064.93	2064.93
12/10/1997	2064.96	2065.03	2065.11	2065.18	2065.25	2065.33	2065.40	2065.48	2065.52	2065.51	2065.51	2065.50	2065.49	2065.49	2065.48	2065.47	2065.47	2065.46	2065.46	2065.46	2065.45	2065.45	2065.45	2065.44
12/11/1997	2065.46	2065.50	2065.53	2065.57	2065.60	2065.64	2065.68	2065.71	2065.71	2065.66	2065.62	2065.58	2065.54	2065.50	2065.46	2065.41	2065.39	2065.37	2065.35	2065.33	2065.31	2065.29	2065.27	2065.25
12/12/1997	2065.29	2065.37	2065.44	2065.52	2065.59	2065.67	2065.75	2065.82	2065.83	2065.81	2065.78	2065.75	2065.73	2065.70	2065.67	2065.65	2065.62	2065.59	2065.57	2065.54	2065.51	2065.48	2065.46	2065.43
12/13/1997	2065.47	2065.55	2065.63	2065.70	2065.78	2065.86	2065.94	2066.01	2066.02	2066.00	2065.97	2065.94	2065.92	2065.89	2065.87	2065.84	2065.82	2065.80	2065.79	2065.77	2065.75	2065.74	2065.72	2065.71
12/14/1997	2065.73	2065.79	2065.84	2065.89	2065.94	2066.00	2066.05	2066.10	2066.13	2066.14	2066.15	2066.16	2066.17	2066.18	2066.19	2066.20	2066.22	2066.25	2066.29	2066.32	2066.35	2066.38	2066.42	2066.45
12/15/1997	2066.51	2066.57	2066.64	2066.71	2066.78	2066.85	2066.92	2066.99	2067.01	2067.01	2067.01	2067.01	2067.01	2067.00	2067.00	2067.00	2066.99	2066.98	2066.96	2066.95	2066.93	2066.92	2066.90	2066.89
12/16/1997	2066.90	2066.92	2066.94	2066.96	2066.99	2067.01	2067.03	2067.05	2067.04	2067.02	2067.00	2066.98	2066.95	2066.93	2066.91	2066.89	2066.87	2066.86	2066.84	2066.83	2066.82	2066.81	2066.79	2066.79
12/17/1997	2066.86	2066.94	2067.02	2067.10	2067.18	2067.26	2067.34	2067.41	2067.40	2067.37	2067.34	2067.32	2067.29	2067.26	2067.24	2067.21	2067.18	2067.15	2067.12	2067.09	2067.06	2067.03	2067.00	2066.99
12/18/1997	2067.08	2067.17	2067.26	2067.35	2067.45	2067.54	2067.63	2067.70	2067.68	2067.66	2067.63	2067.61	2067.58	2067.56	2067.53	2067.51	2067.48	2067.46	2067.44	2067.42	2067.39	2067.37	2067.35	2067.35
12/19/1997	2067.43	2067.51	2067.59	2067.67	2067.75	2067.84	2067.92	2067.98	2067.94	2067.90	2067.86	2067.82	2067.78	2067.74	2067.70	2067.67	2067.64	2067.61	2067.58	2067.56	2067.53	2067.50	2067.47	2067.47
12/20/1997	2067.55	2067.64	2067.73	2067.82	2067.91	2068.00	2068.09	2068.16	2068.14	2068.12	2068.09	2068.07	2068.05	2068.02	2068.00	2067.98	2067.96	2067.95	2067.93	2067.92	2067.90	2067.89	2067.87	2067.88
12/21/1997	2067.97	2068.06	2068.15	2068.24	2068.33	2068.42	2068.51	2068.59	2068.63	2068.67	2068.70	2068.74	2068.78	2068.81	2068.85	2068.88	2068.86	2068.84	2068.82	2068.80	2068.78	2068.77	2068.75	2068.74
12/22/1997	2068.80	2068.86	2068.92	2068.98	2069.05	2069.11	2069.17	2069.21	2069.18	2069.14	2069.10	2069.06	2069.03	2068.99	2068.95	2068.91	2068.88	2068.84	2068.80	2068.77	2068.73	2068.70	2068.66	2068.65
12/23/1997	2068.72	2068.81	2068.89	2068.97	2069.06	2069.14	2069.22	2069.27	2069.27	2069.25	2069.24	2069.23	2069.21	2069.20	2069.19	2069.18	2069.16	2069.15	2069.13	2069.12	2069.10	2069.08	2069.07	2069.08
12/24/1997	2069.14	2069.20	2069.26	2069.32	2069.38	2069.44	2069.50	2069.52	2069.50	2069.47	2069.45	2069.42	2069.40	2069.38	2069.35	2069.34	2069.33	2069.32	2069.31	2069.30	2069.29	2069.28	2069.28	2069.31
12/25/1997	2069.40	2069.49	2069.58	2069.67	2069.75	2069.84	2069.93	2069.99	2070.03	2070.06	2070.10	2070.13	2070.16	2070.20	2070.23	2070.24	2070.23	2070.21	2070.19	2070.18	2070.16	2070.15	2070.13	2070.16
12/26/1997	2070.24	2070.33	2070.41	2070.49	2070.58	2070.66	2070.75	2070.78	2070.77	2070.75	2070.73	2070.71	2070.70	2070.68	2070.66	2070.65	2070.65	2070.65	2070.65	2070.65	2070.64	2070.64	2070.64	2070.68
12/27/1997	2070.78	2070.88	2070.97	2071.07	2071.16	2071.26	2071.36	2071.41	2071.42	2071.42	2071.42	2071.43	2071.43	2071.43	2071.44	2071.44	2071.43	2071.43	2071.43	2071.42	2071.42	2071.42	2071.41	2071.46
12/28/1997	2071.56	2071.66	2071.76	2071.86	2071.96	2072.06	2072.16	2072.23	2072.27	2072.30	2072.34	2072.37	2072.40	2072.44	2072.47	2072.51	2072.54	2072.58	2072.61	2072.65	2072.69	2072.72	2072.76	2072.81
12/29/1997	2072.87	2072.93	2073.00	2073.06	2073.12	2073.18	2073.25	2073.25	2073.18	2073.12	2073.05	2072.99	2072.92	2072.86	2072.79	2072.75	2072.72	2072.69	2072.66	2072.63	2072.60	2072.57	2072.54	2072.55
12/30/1997	2072.62	2072.69	2072.76	2072.83	2072.90	2072.97	2073.04	2073.05	2073.00	2072.95	2072.90	2072.85	2072.81	2072.76	2072.71	2072.67	2072.64	2072.61	2072.57	2072.54	2072.51	2072.47	2072.44	2072.49
12/31/1997	2072.57	2072.65	2072.74	2072.82	2072.91	2072.99	2073.07	2073.07	2073.01	2072.96	2072.91	2072.85	2072.80	2072.75	2072.70	2072.67	2072.65	2072.64	2072.62	2072.61	2072.59	2072.58	2072.57	2072.62

Tailwater

Brownlee Tailwater

Date	Hour Ending 1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
3/1/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/2/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/3/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/4/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/5/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/6/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/7/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/8/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/9/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/10/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/11/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/12/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/13/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/14/1997	---	---	---	---	---	---	---	---	---	---	1801.67	1801.39	1801.33	1801.37	1801.37	1801.66	1801.73	1801.58	1801.63	1801.58	1801.60	1801.79	1801.76	1801.53
3/15/1997	1801.66	1801.86	1801.77	1801.84	1801.70	1801.52	1801.56	1801.53	1801.82	1801.78	1801.75	1801.52	1801.45	1801.27	1801.38	1801.60	1801.61	1801.45	1801.48	1801.46	1801.44	1801.47	1801.44	1801.41
3/16/1997	1801.57	1801.50	1801.55	1801.57	1801.61	1801.51	1801.42	1801.43	1801.57	1801.65	1801.56	1801.49	1801.64	1801.59	1801.56	1801.54	1801.76	1801.57	1801.68	1801.59	1801.76	1801.59	1801.49	1801.81
3/17/1997	1801.94	1801.92	1801.95	1801.98	1801.75	1801.62	1801.78	1801.45	1801.18	1801.25	1801.27	1801.26	1801.25	1801.24	1801.24	1801.23	1801.22	1801.21	1801.20	1801.19	1801.18	1801.17	1801.16	1801.15
3/18/1997	1801.14	1801.13	1801.13	1801.12	1801.11	1801.10	1801.09	1801.08	1801.07	1801.26	1801.33	1801.49	1801.44	1801.65	1801.71	1801.64	1801.36	1801.22	1801.43	1801.47	1801.43	1801.40	1801.51	1801.62
3/19/1997	1801.71	1801.83	1801.82	1801.64	1801.71	1801.47	1800.99	1801.79	1801.80	1801.99	1801.92	1801.70	1801.88	1802.07	1801.94	1802.12	1801.82	1801.66	1801.90	1802.04	1802.14	1801.84	1802.04	1801.78
3/20/1997	1802.02	1802.02	1802.01	1802.09	1801.79	1801.46	1802.12	1802.15	1801.36	1801.62	1801.61	1801.31	1801.46	1801.19	1801.41	1801.22	1802.03	1802.22	1802.13	1802.17	1802.07	1802.37	1801.81	1802.14
3/21/1997	1802.06	1802.15	1802.58	1802.33	1801.35	1801.82	1802.03	1802.03	1801.82	1802.03	1802.13	1802.16	1802.43	1802.24	1802.26	1802.27	1802.13	1802.31	1802.26	1802.61	1802.24	1802.35	1801.88	1802.21
3/22/1997	1802.07	1802.13	1802.17	1802.07	1802.09	1801.94	1801.98	1801.88	1801.97	1801.98	1801.96	1802.15	1802.15	1802.16	1802.19	1802.39	1802.11	1802.20	1802.55	1802.51	1802.32	1802.39	1802.20	1801.92
3/23/1997	1802.18	1802.28	1802.36	1802.26	1802.27	1802.26	1802.28	1801.81	1801.65	1801.91	1801.81	1801.93	1802.07	1801.91	1802.04	1801.98	1801.96	1802.01	1801.92	1802.13	1802.08	1801.79	1801.79	1802.19
3/24/1997	1802.35	1802.58	1802.64	1802.41	1802.31	1801.55	1801.57	1801.72	1801.58	1801.58	1801.37	1801.15	1801.71	1802.04	1802.00	1802.13	1802.04	1801.68	1801.88	1802.06	1801.92	1801.92	1801.63	1801.94
3/25/1997	1801.98	1802.11	1802.17	1802.10	1801.84	1801.76	1802.13	1801.83	1801.69	1801.79	1801.71	1801.82	1802.20	1802.72	1802.42	1802.64	1802.50	1802.23	1802.50	1802.10	1801.96	1801.89	1801.95	1801.88
3/26/1997	1801.79	1802.01	1802.05	1802.18	1801.52	1801.14	1801.89	1801.61	1801.28	1801.66	1801.71	1801.96	1802.16	1801.91	1802.01	1801.97	1801.69	1801.35	1801.10	1801.32	1801.55	1801.72	1801.76	1801.77
3/27/1997	1801.79	1801.99	1802.05	1802.04	1801.88	1801.43	1801.65	1801.62	1801.71	1801.66	1801.71	1801.63	1801.68	1801.57	1801.48	1801.55	1801.71	1801.70	1801.97	1802.28	1801.96	1801.92	1801.72	1802.04
3/28/1997	1802.01	1802.12	1802.44	1802.17	1802.00	1802.18	1802.23	1802.32	1802.31	1802.29	1802.25	1802.19	1802.21	1801.95	1802.00	1801.73	1801.91	1802.01	1802.01	1802.01	1802.11	1802.04	1802.03	1801.95
3/29/1997	1802.05	1802.11	1802.07	1802.08	1802.01	1801.76	1801.56	1801.98	1802.00	1801.86	1801.82	1801.92	1801.89	1802.04	1801.96	1801.98	1801.93	1802.03	1802.01	1802.08	1802.09	1801.91	1801.73	1801.74
3/30/1997	1802.05	1802.05	1802.02	1801.91	1802.10	1801.93	1802.04	1802.04	1802.13	1802.01	1801.86	1801.98	1802.04	1801.99	1801.91	1801.77	1801.50	1801.67	1801.85	1802.12	1801.99	1801.95	1801.88	1801.82
3/31/1997	1802.03	1802.04	1802.13	1802.13	1802.07	1801.85	1802.03	1802.20	1802.13	1802.06	1802.01	1801.73	1801.89	1801.99	1802.01	1802.13	1802.09	1802.14	1802.25	1802.12	1802.02	1802.05	1801.99	1802.21
4/1/1997	1802.22	1802.22	1802.16	1802.14	1802.05	1802.14	1801.87	1801.63	1801.63	1801.97	1802.12	1802.14	1802.30	1802.32	1802.01	1802.03	1802.08	1802.15	1802.32	1802.58	1802.26	1801.74	1801.67	1802.08
4/2/1997	1802.06	1801.91	1801.87	1801.78	1801.26	1801.88	1801.86	1801.94	1801.81	1801.91	1801.82	1801.74	1801.88	1802.00	1802.11	1801.86	1801.89	1802.08	1802.25	1802.03	1801.67	1801.54	1801.86	1801.88
4/3/1997	1802.03	1801.99	1801.91	1801.67	1801.53	1801.41	1801.64	1801.67	1801.78	1801.81	1801.78	1801.74	1801.79	1801.83	1801.80	1801.94	1801.81	1801.59	1801.62	1801.84	1801.54	1801.73	1802.02	1801.88
4/4/1997	1801.70	1802.11	1802.08	1802.00	1801.92	1801.86	1802.11	1802.27	1802.32	1802.09	1802.12	1802.21	1802.09	1802.01	1801.87	1801.75	1801.80	1801.57	1801.36	1801.31	1801.37	1801.32	1801.71	1801.65
4/5/1997	1801.40	1801.74	1801.89	1801.72	1801.60	1801.40	1801.55	1801.57	1801.81	1801.61	1801.63	1801.50	1801.45	1801.75	1801.41	1801.51	1801.48	1801.32	1801.35	1801.56	1801.33	1801.35	1801.56	1801.70
4/6/1997	1801.51	1801.68	1801.74	1801.59	1801.39	1801.25	1801.36	1801.55	1801.58	1801.52	1801.77	1801.70	1801.51	1801.44	1801.61	1801.39	1801.40	1801.37	1801.45	1801.42	1801.16	1801.04	1801.21	1801.47
4/7/1997	1801.40	1801.54	1801.56	1801.39	1801.37	1801.32	1800.92	1801.25	1801.47	1801.48	1801.14	1801.22	1801.27	1801.21	1801.10	1801.41	1801.36	1801.28	1801.48	1801.69	1801.41	1801.37	1801.53	1801.77
4/8/1997	1801.90	1802.16	1801.87	1801.66	1801.71	1801.55	1801.38	1801.19	1801.39	1801.40	1800.69	1801.07	1801.46	1801.72	1801.63	1801.28	1801.41	1801.45	1801.66	1801.98	1801.94	1801.60	1801.82	1801.93
4/9/1997	1801.97	1801.97	1801.95	1801.79	1801.94	1801.48	1801.63	1801.58	1801.73	1801.56	1801.55	1801.71	1801.83	1801.73	1801.96	1801.88	1801.73	1801.62	1801.57	1801.95	1801.71	1801.66	1801.62	1801.84
4/10/1997	1801.82	1801.85	1801.71	1801.60	1801.52	1801.48	1801.50	1801.59	1801.41	1801.61	1801.46	1801.74	1801.55	1801.49	1801.39	1801.61	1801.79	1801.68	1801.62	1801.71	1801.40	1801.41	1801.38	1801.39

Tailwater

4/11/1997	1801.36	1801.48	1801.38	1801.17	1801.11	1801.29	1801.62	1801.17	1801.30	1801.21	1801.23	1801.39	1801.28	1801.27	1801.21	1801.20	1801.29	1801.04	1801.00	1801.22	1801.45	1801.20	1801.27	1801.47
4/12/1997	1801.55	1801.70	1801.61	1801.51	1801.35	1801.66	1801.46	1801.40	1801.45	1801.33	1801.40	1801.30	1801.28	1801.42	1801.37	1801.52	1801.46	1801.38	1801.20	1801.19	1801.14	1801.27	1801.13	1801.12
4/13/1997	1801.06	1801.36	1801.22	1801.10	1801.10	1801.24	1801.52	1801.12	1801.13	1801.13	1801.12	1801.15	1801.17	1801.20	1801.22	1801.24	1801.27	1801.29	1801.32	1801.34	1801.36	1801.39	1801.41	1801.44
4/14/1997	1801.46	1801.48	1801.51	1801.53	1801.56	1801.58	1801.61	1801.63	1801.63	1801.47	1801.74	1801.21	1801.29	1801.49	1801.59	1801.57	1801.55	1801.53	1801.51	1801.48	1801.46	1801.44	1801.42	1801.40
4/15/1997	1801.37	1801.35	1801.33	1801.31	1801.29	1801.26	1801.23	1801.11	1801.19	1800.89	1800.84	1801.18	1801.37	1801.35	1801.30	1801.30	1801.22	1800.98	1800.78	1801.02	1800.79	1800.60	1800.65	1800.63
4/16/1997	1800.91	1800.81	1800.73	1800.67	1800.54	1800.93	1800.84	1800.76	1800.87	1800.96	1801.01	1801.03	1801.05	1801.06	1801.08	1801.10	1801.12	1801.14	1801.16	1801.17	1801.19	1801.21	1801.23	1801.25
4/17/1997	1801.27	1801.28	1801.30	1801.32	1801.34	1801.48	1801.47	1801.46	1801.49	1801.54	1801.40	1801.64	1801.56	1801.11	1801.13	1801.16	1801.11	1801.01	1801.01	1801.20	1800.74	1800.64	1800.75	1800.89
4/18/1997	1800.88	1800.84	1800.91	1800.88	1800.88	1800.65	1801.12	1800.80	1800.79	1800.96	1801.11	1801.41	1801.15	1800.76	1800.87	1800.90	1801.11	1801.03	1801.20	1801.40	1801.14	1801.12	1801.37	1801.25
4/19/1997	1801.24	1801.10	1801.31	1801.28	1801.18	1800.95	1801.18	1801.49	1801.37	1801.54	1800.98	1801.01	1800.66	1800.61	1800.54	1800.51	1800.82	1800.71	1800.97	1800.89	1801.15	1801.46	1801.38	1801.37
4/20/1997	1801.41	1801.48	1801.49	1801.50	1801.49	1801.35	1801.69	1801.41	1801.68	1801.59	1801.64	1801.65	1801.41	1801.46	1801.65	1801.75	1801.73	1801.70	1801.87	1801.95	1801.81	1801.77	1801.74	1801.71
4/21/1997	1801.68	1801.65	1801.62	1801.59	1801.56	1801.53	1801.50	1801.47	1801.33	1801.54	1801.48	1801.64	1801.67	1801.83	1801.98	1802.23	1802.19	1802.06	1802.11	1802.16	1801.84	1801.72	1801.82	1801.77
4/22/1997	1801.90	1801.92	1801.86	1801.87	1801.79	1802.24	1802.05	1801.68	1801.60	1801.92	1802.13	1801.75	1801.52	1801.50	1801.57	1801.60	1801.79	1801.88	1801.98	1802.34	1802.23	1802.02	1802.39	1802.51
4/23/1997	1802.44	1802.44	1802.51	1802.19	1802.04	1802.20	1802.06	1801.93	1801.81	1801.64	1801.49	1801.60	1801.72	1801.87	1802.03	1801.88	1802.00	1801.61	1801.51	1801.60	1801.51	1801.86	1801.69	1801.74
4/24/1997	1801.76	1801.76	1801.84	1801.81	1801.60	1801.64	1801.53	1801.65	1801.67	1801.52	1801.72	1801.76	1802.14	1802.20	1802.31	1802.27	1802.15	1801.99	1801.91	1801.88	1802.00	1801.70	1801.18	1801.83
4/25/1997	1801.99	1802.10	1802.01	1801.21	1801.26	1801.86	1802.31	1802.04	1802.20	1802.25	1802.12	1802.11	1801.99	1801.81	1801.90	1801.89	1801.76	1801.73	1801.12	1801.61	1801.54	1800.97	1800.89	1801.90
4/26/1997	1801.81	1801.83	1801.96	1801.93	1801.82	1801.57	1801.64	1801.77	1801.56	1801.56	1801.51	1801.78	1801.74	1801.50	1801.56	1801.55	1801.39	1801.30	1801.01	1801.48	1801.59	1801.57	1801.48	1801.57
4/27/1997	1801.50	1801.68	1801.56	1801.62	1801.55	1801.43	1801.69	1801.98	1802.02	1802.12	1802.05	1801.82	1801.82	1801.73	1801.73	1801.75	1801.83	1801.89	1801.76	1801.87	1801.72	1801.66	1801.92	1802.00
4/28/1997	1801.62	1801.89	1802.07	1801.71	1801.53	1801.76	1801.30	1801.28	1801.27	1801.04	1801.36	1801.68	1801.91	1802.29	1802.47	1802.52	1802.58	1802.60	1802.33	1802.30	1802.19	1802.32	1802.52	1802.35
4/29/1997	1802.35	1802.36	1802.37	1801.95	1801.90	1802.14	1802.17	1801.87	1802.02	1802.24	1802.30	1802.17	1802.39	1802.29	1802.11	1801.95	1801.90	1801.62	1801.37	1801.81	1801.59	1801.61	1801.68	1801.68
4/30/1997	1801.66	1801.64	1801.62	1801.59	1801.67	1801.50	1801.42	1801.63	1801.91	1802.07	1801.84	1801.80	1801.68	1801.67	1801.73	1801.82	1801.27	1801.28	1801.51	1801.54	1801.58	1801.84	1801.96	1801.88
5/1/1997	1802.02	1801.95	1802.00	1801.85	1801.94	1802.11	1801.62	1801.66	1801.68	1801.63	1801.38	1801.64	1801.44	1801.19	1801.29	1801.56	1801.55	1801.63	1801.49	1801.80	1801.79	1801.59	1801.45	1801.60
5/2/1997	1801.54	1801.84	1801.82	1801.50	1801.60	1801.77	1801.67	1801.17	1800.61	1800.54	1800.62	1801.00	1800.87	1800.61	1801.27	1801.34	1801.32	1801.16	1801.15	1801.32	1801.38	1801.24	1801.12	1801.20
5/3/1997	1801.09	1801.22	1801.16	1801.24	1801.28	1800.98	1801.25	1801.08	1801.08	1801.21	1800.80	1800.82	1800.66	1800.63	1800.67	1800.87	1800.81	1800.82	1800.76	1800.86	1801.01	1800.96	1800.87	1800.82
5/4/1997	1800.64	1801.12	1801.09	1801.00	1801.18	1800.94	1801.08	1801.17	1801.22	1801.25	1801.22	1800.87	1801.09	1801.10	1801.15	1801.18	1801.15	1801.07	1800.88	1800.96	1800.94	1800.72	1800.58	1800.97
5/5/1997	1801.17	1801.43	1800.89	1800.75	1800.60	1801.03	1801.05	1801.08	1801.17	1801.09	1801.05	1801.07	1801.10	1801.06	1800.81	1800.95	1801.10	1800.83	1801.12	1801.30	1800.80	1800.90	1801.23	1801.24
5/6/1997	1801.14	1801.11	1801.09	1800.67	1800.63	1800.70	1800.74	1801.02	1801.28	1800.73	1800.55	1800.98	1801.03	1800.90	1801.02	1801.10	1801.05	1800.93	1801.20	1801.28	1800.88	1800.87	1801.02	1801.04
5/7/1997	1801.02	1801.11	1801.12	1800.90	1800.94	1801.07	1800.68	1800.67	1800.81	1800.72	1800.65	1800.59	1800.88	1801.12	1800.86	1800.52	1800.43	1800.60	1800.88	1800.93	1800.63	1800.82	1800.81	1801.05
5/8/1997	1800.95	1800.88	1800.92	1800.78	1800.93	1801.04	1801.15	1801.14	1801.06	1800.95	1800.97	1801.01	1801.12	1800.94	1801.07	1800.93	1800.90	1800.77	1800.80	1800.95	1800.71	1800.73	1800.79	1800.79
5/9/1997	1800.86	1800.74	1800.69	1800.53	1800.79	1801.11	1800.98	1801.10	1801.14	1801.08	1801.17	1801.01	1800.76	1800.94	1800.71	1800.72	1800.55	1800.53	1800.38	1800.45	1800.65	1800.53	1800.32	1800.63
5/10/1997	1800.68	1800.71	1800.53	1800.54	1800.65	1800.48	1800.54	1800.71	1800.91	1800.93	1800.98	1800.99	1800.59	1800.38	1800.71	1800.59	1800.34	1800.24	1800.10	1800.25	1800.40	1800.41	1800.58	1800.70
5/11/1997	1800.92	1800.85	1800.71	1800.88	1800.89	1800.92	1800.88	1800.73	1800.76	1800.83	1800.83	1800.85	1800.90	1801.00	1801.06	1801.00	1800.88	1800.96	1801.07	1800.91	1800.69	1800.53	1800.89	1800.65
5/12/1997	1800.40	1800.06	1800.00	1800.21	1800.45	1800.67	1800.56	1800.72	1800.70	1799.88	1800.09	1800.12	1800.06	1800.11	1800.19	1800.06	1799.88	1799.89	1799.90	1799.89	1799.54	1799.71	1799.99	1799.83
5/13/1997	1799.71	1799.87	1800.08	1799.96	1800.07	1799.89	1800.05	1800.13	1800.23	1800.17	1800.45	1800.40	1800.39	1800.52	1800.65	1800.47	1800.39	1800.20	1800.06	1800.38	1800.12	1800.10	1800.39	1799.96
5/14/1997	1800.32	1800.07	1799.99	1799.69	1799.92	1799.69	1799.89	1800.00	1800.36	1800.38	1800.19	1800.12	1800.15	1800.25	1800.07	1799.79	1799.71	1799.61	1799.51	1799.37	1799.17	1799.21	1799.86	1800.01
5/15/1997	1800.37	1800.24	1800.56	1800.26	1800.08	1800.50	1800.51	1800.40	1800.40	1800.43	1800.81	1800.74	1800.43	1800.33	1800.41	1800.05	1799.97	1799.51	1799.30	1799.32	1800.06	1800.20	1799.81	1800.39
5/16/1997	1800.46	1800.55	1800.63	1800.33	1800.12	1800.39	1800.40	1800.40	1800.48	1800.38	1800.16	1800.22	1800.25	1800.16	1800.29	1800.25	1799.91	1799.90	1799.94	1800.05	1799.91	1799.89	1799.60	1799.76
5/17/1997	1799.87	1799.93	1800.02	1799.86	1799.69	1799.45	1800.15	1800.15	1800.35	1800.26	1800.40	1800.42	1800.29	1800.39	1800.12	1800.23	1800.28	1800.08	1800.26	1800.37	1800.23	1800.07	1800.00	1800.17
5/18/1997	1800.11	1800.27	1800.35	1800.37	1800.34	1800.44	1800.59	1800.19	1800.42	1800.35	1800.28	1800.25	1800.30	1800.33	1800.32	1800.40	1800.36	1800.02	1800.21	1800.45	1800.25	1799.98	1799.90	1799.86
5/19/1997	1799.84	1799.86	1799.99	1800.00	1799.97	1799.81	1799.48	1799.52	1799.48	1799.81	1799.83	1799.44	1799.83	1800.00	1800.03	1800.27	1800.33	1800.31	1800.25	1800.32	1800.34	1800.31	1800.20	1800.23
5/20/1997	1800.27	1800.36	1800.33	1800.20	1800.01	1800.02	1799.98	1800.28	1800.39	1800.42	1800.17	1800.26	1800.36	1799.93	1799.65	1799.71	1799.89	1799.86	1799.70	1800.12	1800.06	1800.06	1800.01	1800.34
5/21/1997	1800.37	1800.30	1800.28	1800.42	1800.44	1800.49	1799.97	1800.03	1800.07	1800.35	1800.16	1800.34	1800.39	1800.26	1800.35	1800.52	1800.49	1800.24	1800.21	1800.19	1799.99	1799.60	1800.04	1799.92
5/22/1997	1799.85	1799.82	1799.86	1799.91	1800.08	1800.10	1800.30	1800.35	1800.39	1800.16	1800.13	1800.28	1800.40	1800.25	1800.17	1800.12	1800.14	1800.14	1800.25	1800.32	1800.10	1800.21	1800.38	1800.36
5/23/1997	1800.39	1800.21	1800.15	1800.24	1800.27	1800.40	1800.52	1800.35	1800.23	1800.23	1800.40	1800.37	1800.28	1800.22	1800.06	1799.97	1799.85	1799.97	1799.77	1799.43	1799.48	1799.52	1799.59	1799.54
5/24/1997	1799.56	1799.31	1799.30	1799.49	1799.33	1799.48	1799.61	1799.72	1799.86	1799.94	1799.81	1799.68	1799.82	1799.94	1799.99	1800.07	1800.08	1800.05	1800.10	1800.18	1800.18	1799.79	1800.04	1799.56
5/25/1997	1800.05	1800.11	1800.15	1800.18	1800.12	1799.64	1800.16	1800.07	1800.39	1800.39	1800.37	1800.46	1800.36	1800.29	1800.27	1800.29	1800.11	1800.10	1800.27	1800.29	1800.42	1800.38	1800.32	1799.74

Tailwater

5/26/1997	1800.25	1800.35	1800.29	1800.30	1800.13	1800.14	1800.15	1800.22	1800.38	1800.35	1800.26	1800.28	1800.22	1800.26	1800.25	1800.20	1800.31	1800.31	1800.22	1800.23	1800.18	1800.15	1800.07	1800.12
5/27/1997	1800.18	1800.03	1800.20	1799.98	1799.73	1799.63	1799.73	1800.02	1800.05	1799.97	1799.91	1800.08	1799.87	1799.60	1799.77	1799.81	1799.73	1799.72	1799.87	1800.09	1800.02	1799.81	1800.10	1800.12
5/28/1997	1800.00	1799.98	1800.10	1800.13	1799.94	1800.01	1799.93	1799.81	1799.95	1799.85	1799.63	1799.57	1799.28	1799.61	1800.01	1800.06	1800.05	1799.82	1799.80	1800.02	1799.90	1799.88	1799.89	1799.63
5/29/1997	1799.91	1799.61	1799.28	1799.50	1799.73	1799.62	1800.16	1800.43	1800.50	1800.55	1800.60	1800.66	1800.83	1800.65	1800.61	1800.49	1800.28	1800.14	1799.93	1799.91	1799.99	1799.93	1799.51	1799.61
5/30/1997	1798.94	1798.86	1798.94	1798.62	1798.55	1799.19	1799.93	1800.06	1800.19	1799.88	1800.14	1800.14	1800.22	1800.01	1800.13	1800.27	1800.52	1800.27	1800.46	1800.32	1800.34	1800.36	1800.41	1799.53
5/31/1997	1799.12	1798.65	1798.34	1798.07	1798.04	1799.05	1799.78	1800.21	1800.18	1800.00	1799.88	1799.98	1800.07	1800.11	1800.30	1800.41	1800.41	1800.27	1799.94	1800.21	1800.14	1800.23	1800.14	1799.40
6/1/1997	1799.18	1798.99	1798.84	1798.23	1798.07	1798.47	1799.49	1800.04	1799.98	1799.91	1799.98	1800.17	1800.12	1800.05	1800.11	1800.39	1800.28	1800.17	1800.11	1800.16	1800.13	1799.88	1799.43	1798.93
6/2/1997	1798.74	1798.94	1798.53	1798.07	1798.28	1799.02	1799.20	1799.76	1799.74	1799.82	1799.88	1799.99	1799.96	1800.05	1800.10	1800.20	1800.20	1800.11	1799.95	1800.13	1800.02	1799.98	1800.07	1799.55
6/3/1997	1799.10	1798.00	1797.37	1797.45	1798.34	1798.97	1799.78	1799.83	1799.88	1799.89	1799.84	1799.84	1799.92	1799.88	1799.83	1799.76	1799.94	1800.09	1800.16	1800.12	1800.12	1800.06	1800.14	1799.48
6/4/1997	1799.04	1798.65	1798.30	1798.22	1798.76	1799.54	1799.74	1799.67	1799.71	1799.80	1799.86	1799.81	1799.64	1799.52	1799.74	1799.94	1800.18	1800.18	1800.15	1800.32	1800.26	1799.82	1799.31	1799.89
6/5/1997	1800.25	1800.28	1800.28	1800.25	1800.10	1800.02	1800.33	1800.59	1800.62	1800.64	1800.67	1800.60	1800.53	1800.52	1800.48	1800.53	1800.55	1800.54	1800.68	1800.77	1800.91	1800.58	1800.15	1800.32
6/6/1997	1799.97	1800.58	1800.62	1800.53	1800.13	1800.24	1800.42	1800.60	1800.72	1800.79	1800.76	1800.80	1800.88	1800.88	1800.94	1800.93	1800.94	1800.85	1800.76	1800.73	1800.87	1800.77	1800.74	1800.78
6/7/1997	1800.78	1800.82	1800.54	1800.40	1800.26	1800.46	1800.60	1800.59	1800.51	1800.49	1800.50	1800.60	1800.59	1800.61	1800.74	1800.74	1800.84	1800.78	1800.58	1800.72	1800.74	1800.55	1800.62	1800.74
6/8/1997	1800.60	1800.14	1800.08	1799.91	1799.77	1800.59	1800.49	1800.46	1800.66	1800.65	1800.73	1800.71	1800.68	1800.52	1800.67	1800.79	1800.76	1800.77	1800.78	1800.77	1800.78	1800.45	1800.01	1800.46
6/9/1997	1800.31	1799.79	1799.86	1800.14	1800.18	1800.15	1800.48	1800.69	1800.66	1800.48	1800.65	1800.78	1800.77	1800.75	1800.84	1800.82	1800.99	1801.04	1801.05	1800.96	1801.04	1800.94	1801.08	1800.99
6/10/1997	1800.86	1800.82	1800.53	1800.15	1799.62	1799.58	1799.38	1800.20	1800.26	1800.32	1800.84	1801.19	1801.18	1801.22	1801.21	1801.09	1801.18	1801.18	1801.18	1801.01	1800.60	1800.79	1801.09	1801.26
6/11/1997	1801.07	1800.42	1800.24	1800.45	1800.98	1800.86	1800.30	1800.96	1801.24	1801.21	1801.21	1801.17	1801.29	1801.17	1801.22	1801.25	1801.28	1801.21	1801.07	1800.81	1800.87	1800.82	1800.71	1800.84
6/12/1997	1800.82	1800.87	1801.05	1801.21	1801.14	1801.09	1801.04	1800.64	1801.29	1801.36	1800.94	1800.88	1801.04	1800.90	1801.29	1801.16	1801.22	1801.24	1801.14	1801.19	1801.42	1801.00	1800.84	1800.98
6/13/1997	1800.92	1800.74	1800.88	1800.85	1800.55	1800.63	1801.01	1800.84	1800.90	1800.98	1800.80	1800.78	1801.02	1800.75	1800.57	1800.58	1800.68	1800.62	1800.98	1801.08	1801.23	1801.24	1801.12	1800.99
6/14/1997	1801.18	1800.80	1800.87	1800.76	1801.15	1801.08	1801.11	1801.17	1801.20	1801.10	1801.33	1801.35	1801.47	1801.41	1801.49	1801.48	1801.43	1801.39	1801.44	1801.44	1801.40	1801.39	1801.33	1801.31
6/15/1997	1800.98	1800.20	1800.53	1800.25	1800.23	1800.95	1802.10	1802.22	1802.08	1801.98	1801.98	1801.98	1801.77	1801.76	1801.88	1801.79	1801.77	1801.72	1801.67	1801.65	1801.69	1801.76	1801.80	1801.27
6/16/1997	1801.74	1801.65	1802.00	1801.95	1801.79	1801.77	1802.01	1801.97	1801.89	1801.76	1801.70	1801.86	1801.93	1801.97	1801.99	1801.99	1801.96	1801.58	1801.68	1801.78	1801.74	1801.50	1801.52	1801.87
6/17/1997	1801.88	1801.77	1801.90	1801.86	1801.73	1801.89	1801.86	1801.78	1802.02	1802.01	1801.86	1801.84	1801.90	1801.96	1801.97	1801.79	1801.76	1801.44	1801.62	1801.61	1801.66	1801.09	1801.68	1802.07
6/18/1997	1802.03	1801.99	1801.72	1801.83	1801.67	1801.96	1801.87	1801.65	1801.49	1801.25	1801.54	1801.39	1801.52	1802.10	1801.66	1801.60	1801.58	1801.58	1801.57	1801.56	1801.53	1801.62	1801.96	1802.03
6/19/1997	1801.99	1801.86	1801.82	1801.83	1801.71	1801.39	1801.76	1801.89	1801.95	1801.83	1801.62	1801.84	1801.83	1801.80	1802.02	1801.97	1802.04	1801.74	1801.61	1801.65	1801.71	1801.47	1801.58	1801.76
6/20/1997	1801.83	1801.84	1801.78	1801.62	1801.79	1801.68	1801.49	1801.43	1801.71	1801.51	1801.67	1801.76	1801.77	1801.26	1801.75	1801.84	1801.81	1801.78	1801.85	1801.76	1801.73	1801.76	1801.74	1801.87
6/21/1997	1801.97	1801.92	1801.91	1801.82	1801.62	1801.62	1801.67	1801.75	1801.90	1801.90	1801.74	1801.93	1801.97	1802.01	1801.92	1801.90	1801.94	1801.87	1801.62	1801.78	1801.68	1801.65	1801.71	1801.45
6/22/1997	1801.73	1801.67	1801.61	1801.61	1801.34	1801.66	1801.67	1801.56	1801.64	1801.64	1801.74	1801.76	1801.79	1801.80	1801.68	1801.53	1801.63	1801.50	1801.57	1801.57	1801.58	1801.63	1801.55	1801.55
6/23/1997	1801.54	1801.68	1801.72	1801.61	1801.24	1801.72	1801.47	1801.54	1801.84	1801.72	1801.61	1801.76	1801.78	1801.66	1801.45	1801.77	1802.00	1801.96	1801.78	1801.80	1801.84	1801.77	1801.86	1801.70
6/24/1997	1801.85	1801.83	1801.83	1801.81	1801.78	1801.76	1801.62	1801.13	1801.06	1801.08	1801.38	1801.32	1801.31	1801.26	1801.05	1801.12	1801.19	1801.26	1801.29	1801.24	1801.34	1801.21	1801.36	1801.43
6/25/1997	1801.36	1801.36	1801.16	1800.92	1800.91	1800.83	1800.79	1800.99	1801.40	1801.34	1801.32	1801.49	1801.53	1801.51	1801.52	1801.57	1801.57	1801.64	1801.62	1801.57	1801.51	1801.30	1801.32	1801.51
6/26/1997	1801.48	1801.35	1801.25	1801.09	1800.77	1800.50	1800.38	1800.58	1800.51	1800.75	1800.72	1800.59	1800.82	1800.94	1800.82	1800.72	1800.69	1800.83	1800.91	1800.77	1800.86	1800.97	1800.79	1800.68
6/27/1997	1800.90	1800.99	1800.94	1800.87	1800.66	1800.61	1800.99	1800.95	1801.11	1800.80	1801.02	1800.82	1800.93	1801.12	1801.18	1801.44	1801.25	1801.15	1801.07	1801.12	1800.97	1800.84	1801.17	1801.04
6/28/1997	1800.96	1801.00	1800.96	1801.06	1801.06	1800.91	1801.12	1801.17	1801.16	1801.18	1801.04	1801.14	1801.12	1801.30	1801.11	1801.19	1801.25	1801.15	1801.04	1801.18	1801.33	1801.17	1801.36	1801.21
6/29/1997	1801.17	1801.07	1800.83	1800.58	1800.35	1800.78	1801.09	1801.24	1801.32	1801.28	1801.35	1801.41	1801.36	1801.21	1801.23	1801.25	1801.15	1801.05	1801.08	1801.04	1801.04	1800.87	1800.77	1800.54
6/30/1997	1800.54	1800.53	1800.54	1800.93	1800.87	1800.94	1801.13	1801.12	1801.16	1800.96	1801.06	1800.95	1800.97	1800.88	1800.82	1800.66	1800.55	1800.64	1800.80	1800.78	1800.68	1800.80	1800.84	1800.85
7/1/1997	1800.84	1800.77	1800.69	1800.79	1800.73	1800.48	1800.38	1800.48	1800.67	1800.34	1800.57	1800.29	1800.09	1800.29	1800.33	1800.34	1800.51	1800.56	1800.57	1800.61	1800.53	1800.62	1800.54	1800.11
7/2/1997	1800.23	1800.57	1800.63	1800.63	1800.49	1800.50	1800.60	1800.56	1800.59	1800.57	1800.45	1800.58	1800.52	1800.60	1800.53	1800.65	1800.65	1800.71	1800.63	1800.39	1800.67	1800.73	1800.79	1800.70
7/3/1997	1800.53	1800.56	1800.63	1800.62	1800.58	1800.57	1800.57	1800.57	1800.17	1800.40	1800.45	1800.49	1800.42	1800.48	1800.45	1800.43	1800.52	1800.58	1800.48	1800.43	1800.62	1800.53	1800.46	1800.38
7/4/1997	1799.82	1799.63	1800.21	1800.26	1800.20	1800.38	1800.56	1800.59	1800.73	1800.82	1800.69	1800.66	1800.60	1800.52	1800.53	1800.54	1800.53	1800.52	1800.40	1800.42	1800.41	1800.28	1800.51	1800.39
7/5/1997	1800.45	1800.39	1800.38	1800.39	1800.42	1800.29	1800.24	1800.16	1800.21	1800.24	1800.28	1800.28	1800.24	1800.22	1800.26	1800.30	1800.30	1800.31	1800.27	1800.26	1800.41	1800.49	1800.19	1799.81
7/6/1997	1799.50	1799.08	1798.64	1798.30	1798.04	1797.82	1798.18	1798.67	1798.68	1799.17	1799.55	1799.81	1799.98	1800.03	1800.01	1799.92	1799.97	1800.14	1800.07	1799.95	1799.87	1799.48	1798.98	1798.74
7/7/1997	1798.42	1798.13	1798.13	1798.13	1798.58	1798.77	1798.93	1799.25	1799.33	1799.34	1799.41	1799.43	1799.43	1799.43	1799.52	1799.56	1799.79	1799.83	1799.83	1799.83	1799.83	1799.82	1799.63	1799.53
7/8/1997	1799.53	1799.53	1799.53	1799.53	1799.53	1799.55	1799.73	1800.03	1800.39	1800.37	1800.64	1800.64	1800.46	1800.34	1800.26	1800.37	1800.65	1800.68	1800.52	1800.54	1800.50	1800.24	1800.69	1800.28
7/9/1997	1799.63	1799.63	1799.63	1799.63	1799.63	1799.63	1799.63	1799.95	1800.29	1800.32	1800.19	1800.15	1800.24	1800.23	1800.22	1800.35	1800.32	1800.32	1800.02	1800.16	1800.26	1800.22	1800.22	1800.23

Tailwater

7/10/1997	1800.22	1800.22	1800.22	1800.22	1800.22	1800.22	1800.22	1800.22	1799.64	1800.07	1800.19	1800.10	1800.18	1800.33	1800.45	1800.54	1800.61	1800.36	1800.60	1800.48	1800.32	1799.94	1799.89	1799.90
7/11/1997	1799.78	1799.65	1799.62	1799.54	1799.36	1798.96	1798.57	1798.67	1798.83	1799.68	1799.68	1799.73	1799.92	1800.06	1799.92	1799.92	1800.17	1800.17	1800.28	1800.43	1800.24	1800.32	1800.06	1799.93
7/12/1997	1799.81	1799.65	1799.54	1799.46	1799.39	1799.33	1799.20	1799.39	1799.57	1799.47	1799.34	1799.34	1799.80	1800.18	1800.23	1800.27	1800.24	1800.23	1800.16	1800.22	1800.31	1800.12	1800.11	1800.06
7/13/1997	1799.93	1799.84	1799.75	1799.55	1799.37	1799.36	1799.48	1800.27	1800.36	1800.39	1800.60	1800.57	1800.42	1800.62	1800.65	1800.40	1800.41	1800.18	1799.81	1799.78	1799.67	1798.63	1798.22	1797.83
7/14/1997	1797.61	1797.43	1797.26	1797.42	1798.00	1798.97	1799.84	1800.41	1800.40	1800.46	1800.54	1800.68	1800.75	1800.67	1800.80	1800.81	1800.76	1800.82	1800.67	1800.55	1799.91	1799.19	1798.86	1798.71
7/15/1997	1798.63	1798.47	1798.27	1798.12	1797.88	1798.20	1799.39	1799.59	1800.13	1800.28	1800.53	1800.57	1800.42	1800.52	1800.73	1800.62	1800.81	1800.82	1800.74	1800.65	1800.46	1800.07	1799.63	1799.30
7/16/1997	1798.97	1798.60	1798.31	1797.94	1797.71	1799.38	1799.45	1799.13	1798.95	1799.09	1799.26	1799.74	1800.13	1800.66	1800.81	1800.88	1800.95	1800.60	1800.46	1800.41	1800.32	1800.30	1799.96	1799.72
7/17/1997	1799.48	1799.17	1798.85	1798.47	1798.28	1799.77	1799.71	1799.28	1799.65	1800.54	1799.85	1799.72	1799.48	1799.83	1800.00	1800.07	1800.01	1799.97	1800.05	1800.40	1800.17	1799.85	1799.60	1799.29
7/18/1997	1799.05	1798.90	1798.64	1798.50	1798.30	1798.61	1798.96	1799.00	1798.67	1798.87	1799.05	1799.10	1799.06	1799.35	1799.69	1799.82	1799.57	1799.63	1800.04	1800.07	1800.53	1799.97	1799.35	1799.13
7/19/1997	1798.93	1798.91	1798.71	1798.46	1798.24	1799.00	1799.11	1798.88	1798.90	1799.12	1799.16	1799.41	1799.74	1799.77	1799.86	1799.94	1799.98	1800.01	1799.90	1800.10	1800.40	1800.51	1799.89	1799.48
7/20/1997	1799.29	1798.94	1798.50	1798.14	1797.88	1798.56	1797.96	1798.63	1799.10	1799.13	1799.63	1799.65	1800.11	1800.26	1799.73	1799.63	1799.89	1799.64	1799.58	1799.48	1799.16	1798.88	1798.78	1798.70
7/21/1997	1798.57	1798.42	1798.42	1798.34	1798.62	1798.90	1799.57	1799.35	1799.56	1799.82	1799.81	1800.01	1800.14	1800.53	1800.48	1800.30	1800.31	1800.45	1800.52	1800.64	1800.42	1799.95	1799.80	1799.91
7/22/1997	1799.69	1799.50	1799.30	1799.15	1799.12	1798.81	1798.88	1799.02	1799.02	1799.10	1799.28	1799.48	1799.57	1799.73	1799.96	1799.92	1799.94	1799.90	1799.59	1799.53	1799.42	1799.68	1799.22	1798.87
7/23/1997	1798.73	1798.57	1798.47	1798.32	1798.06	1798.06	1798.24	1799.53	1799.43	1799.34	1799.49	1800.13	1800.30	1800.39	1800.70	1800.50	1800.78	1800.89	1800.83	1800.57	1800.44	1800.56	1800.49	1799.87
7/24/1997	1799.63	1799.30	1799.16	1799.22	1799.21	1799.53	1799.39	1799.41	1799.99	1800.24	1800.01	1800.16	1800.43	1800.63	1800.85	1800.92	1800.81	1800.55	1800.48	1800.73	1801.00	1800.69	1800.35	1800.13
7/25/1997	1799.78	1799.52	1799.26	1799.05	1798.79	1798.53	1798.82	1798.62	1799.56	1799.78	1800.00	1799.87	1799.63	1800.07	1800.39	1800.39	1800.55	1800.23	1800.11	1800.16	1800.67	1800.49	1800.42	1799.98
7/26/1997	1799.78	1799.67	1799.70	1799.81	1799.88	1799.61	1799.92	1800.45	1800.50	1800.71	1800.83	1800.57	1800.19	1800.29	1800.35	1800.62	1800.68	1800.54	1800.29	1800.54	1800.61	1800.93	1800.46	1800.16
7/27/1997	1799.97	1799.75	1799.78	1799.52	1799.41	1799.42	1799.23	1799.68	1799.78	1799.75	1799.96	1800.52	1800.79	1800.97	1801.01	1800.91	1800.82	1800.68	1800.50	1800.31	1799.80	1799.49	1799.41	1799.10
7/28/1997	1798.78	1798.70	1798.62	1798.97	1798.63	1798.63	1798.88	1799.10	1799.19	1799.27	1799.27	1799.30	1799.97	1800.10	1800.24	1800.24	1800.73	1800.90	1801.09	1801.06	1800.88	1800.30	1800.09	1799.59
7/29/1997	1799.19	1798.73	1798.40	1798.40	1798.56	1798.72	1799.23	1799.48	1799.47	1799.43	1799.59	1800.01	1800.31	1800.73	1800.47	1800.58	1800.53	1800.58	1800.50	1800.70	1800.49	1799.89	1799.53	1799.26
7/30/1997	1799.06	1798.86	1799.05	1799.21	1799.55	1798.85	1798.98	1799.04	1799.57	1799.61	1799.86	1799.90	1800.59	1800.44	1800.25	1800.10	1800.31	1800.25	1800.33	1800.62	1800.94	1801.06	1800.50	1799.95
7/31/1997	1799.77	1799.60	1799.62	1799.43	1799.28	1799.03	1799.21	1799.47	1799.74	1800.01	1800.14	1800.33	1800.39	1800.15	1800.39	1800.40	1800.31	1800.39	1800.49	1800.55	1800.54	1800.36	1799.98	1800.19
8/1/1997	1799.85	1799.55	1799.35	1799.20	1799.58	1800.15	1800.21	1800.25	1800.20	1799.62	1799.59	1799.60	1799.66	1799.96	1799.91	1800.01	1800.03	1800.42	1800.46	1800.49	1800.50	1800.68	1800.48	1799.91
8/2/1997	1799.61	1799.35	1799.21	1798.81	1798.82	1798.73	1798.72	1798.80	1798.85	1798.97	1799.65	1800.49	1800.69	1800.70	1800.41	1800.34	1800.51	1800.44	1799.93	1799.59	1799.49	1799.61	1799.64	1799.69
8/3/1997	1799.54	1799.39	1799.31	1799.34	1799.43	1799.44	1799.56	1799.86	1800.25	1800.06	1799.57	1799.52	1799.68	1800.29	1800.37	1800.32	1800.54	1800.29	1800.24	1799.89	1800.07	1799.65	1799.77	1799.89
8/4/1997	1799.42	1799.36	1799.27	1799.23	1799.30	1799.48	1798.95	1798.64	1799.13	1799.03	1799.03	1799.30	1799.92	1800.23	1800.23	1800.13	1800.31	1800.01	1799.92	1800.16	1800.01	1799.88	1800.43	1799.74
8/5/1997	1799.63	1799.45	1799.05	1798.94	1798.80	1798.66	1798.94	1798.54	1798.80	1798.60	1798.82	1799.39	1799.99	1799.57	1799.53	1799.84	1799.83	1799.68	1800.03	1800.58	1800.55	1800.20	1799.75	1799.39
8/6/1997	1798.98	1798.53	1798.20	1797.84	1798.99	1799.49	1799.34	1799.59	1798.93	1799.56	1799.29	1799.18	1799.56	1799.66	1800.10	1799.93	1800.04	1800.21	1800.62	1800.76	1800.73	1800.29	1799.93	1799.45
8/7/1997	1799.00	1798.53	1798.08	1798.66	1799.32	1799.58	1799.69	1798.98	1799.15	1799.58	1799.38	1799.46	1799.43	1799.50	1799.78	1799.92	1799.42	1799.37	1799.58	1799.96	1799.54	1800.07	1799.79	1799.63
8/8/1997	1799.35	1799.08	1798.80	1798.68	1798.48	1798.52	1798.45	1798.66	1798.80	1798.85	1798.76	1798.91	1799.31	1799.60	1799.94	1800.02	1800.14	1800.17	1800.13	1800.10	1799.91	1800.25	1800.34	1800.07
8/9/1997	1799.61	1799.29	1799.20	1799.53	1799.97	1799.61	1799.07	1799.30	1799.84	1799.69	1799.02	1799.04	1799.48	1799.57	1799.96	1800.13	1800.04	1799.99	1800.02	1800.71	1800.98	1800.52	1800.00	1799.75
8/10/1997	1799.73	1799.59	1799.38	1799.34	1799.38	1799.13	1799.05	1799.35	1799.41	1799.26	1799.25	1799.32	1799.69	1800.24	1800.08	1800.06	1800.15	1800.23	1800.30	1800.46	1800.59	1799.64	1799.32	1799.01
8/11/1997	1798.61	1798.18	1797.91	1798.16	1798.79	1798.67	1798.62	1798.67	1798.94	1798.81	1798.74	1799.11	1799.54	1799.70	1799.90	1799.93	1800.01	1800.05	1799.71	1799.93	1799.88	1799.90	1799.67	1799.42
8/12/1997	1799.28	1799.08	1799.01	1799.35	1799.29	1798.76	1798.86	1799.02	1799.24	1799.43	1799.78	1799.86	1800.16	1800.28	1800.40	1800.08	1799.67	1799.81	1799.89	1800.30	1800.25	1800.02	1799.74	1799.52
8/13/1997	1799.20	1798.94	1798.99	1798.93	1799.18	1799.07	1799.58	1799.95	1800.27	1800.45	1800.16	1799.79	1800.04	1800.20	1800.28	1800.09	1799.99	1799.70	1799.51	1799.78	1800.02	1800.50	1800.20	1799.52
8/14/1997	1799.10	1798.61	1798.50	1798.69	1799.19	1799.00	1799.28	1799.35	1799.27	1799.41	1799.59	1799.58	1799.63	1799.78	1799.96	1799.78	1799.94	1800.05	1799.95	1799.83	1799.94	1799.91	1799.91	1799.19
8/15/1997	1798.83	1799.18	1798.92	1799.04	1799.08	1798.99	1799.16	1799.39	1799.29	1799.21	1799.28	1799.38	1799.36	1799.22	1799.62	1799.78	1799.86	1799.98	1799.86	1800.03	1799.89	1800.41	1800.54	1800.48
8/16/1997	1799.87	1799.54	1799.19	1798.76	1799.17	1799.23	1799.18	1799.39	1799.63	1799.88	1799.83	1799.87	1799.83	1799.66	1799.84	1800.00	1800.03	1800.24	1800.33	1800.39	1799.79	1799.29	1799.02	1799.45
8/17/1997	1799.85	1799.69	1799.35	1799.09	1799.10	1798.99	1799.01	1799.07	1799.59	1799.82	1799.93	1799.81	1799.84	1799.89	1799.94	1799.77	1799.67	1799.60	1799.70	1799.91	1799.84	1799.66	1799.49	1799.46
8/18/1997	1799.46	1799.46	1799.46	1799.46	1799.81	1799.23	1799.15	1799.41	1799.26	1799.43	1799.65	1799.83	1799.91	1799.99	1800.05	1800.10	1800.24	1800.21	1800.20	1800.29	1800.05	1800.01	1800.08	1799.44
8/19/1997	1799.25	1798.82	1798.39	1798.24	1798.66	1798.93	1798.87	1799.22	1798.73	1799.37	1799.50	1799.70	1799.76	1799.68	1800.18	1800.10	1800.21	1800.21	1800.17	1800.62	1800.04	1799.86	1799.73	1799.20
8/20/1997	1798.65	1798.32	1798.77	1799.55	1799.67	1799.61	1799.17	1799.46	1799.85	1800.40	1800.43	1800.32	1799.89	1799.95	1800.30	1800.48	1800.30	1800.15	1800.11	1800.17	1799.96	1800.03	1799.93	1799.64
8/21/1997	1799.45	1799.10	1798.83	1798.74	1798.83	1798.79	1798.62	1798.72	1798.71	1798.84	1799.48	1799.79	1799.87	1800.01	1799.85	1799.88	1800.05	1800.11	1800.06	1800.27	1800.09	1799.54	1799.48	1799.20
8/22/1997	1799.08	1798.68	1798.47	1798.41	1798.56	1798.54	1798.44	1798.94	1798.86	1799.55	1799.63	1799.75	1800.36	1799.84	1800.01	1800.00	1800.11	1800.17	1799.89	1799.70	1799.45	1799.61	1799.71	1799.70
8/23/1997	1799.34	1799.11	1799.16	1799.41	1799.29	1799.51	1800.18	1800.19	1799.92	1799.85	1799.72	1799.52	1799.65	1799.87	1800.14	1800.15	1800.04	1799.99	1799.82	1799.90	1800.12	1800.18	1800.20	1800.31

Tailwater

8/24/1997	1800.28	1800.09	1799.83	1799.46	1799.01	1798.83	1799.45	1799.98	1800.10	1799.99	1799.98	1800.06	1800.10	1800.01	1800.00	1799.79	1799.54	1800.05	1800.17	1800.28	1800.03	1800.35	1799.81	1799.48
8/25/1997	1799.06	1798.67	1798.28	1798.24	1798.40	1798.77	1799.32	1799.40	1799.56	1799.35	1799.37	1799.50	1799.88	1800.00	1800.12	1800.19	1800.41	1800.52	1800.34	1800.40	1800.34	1800.26	1800.03	1799.71
8/26/1997	1800.18	1799.43	1798.97	1798.50	1798.24	1798.67	1798.07	1798.23	1798.29	1799.12	1800.05	1799.96	1800.25	1800.03	1799.85	1800.03	1800.21	1800.22	1800.27	1800.46	1800.19	1799.96	1799.89	1799.46
8/27/1997	1799.17	1798.94	1798.63	1798.16	1798.46	1798.58	1798.61	1798.90	1798.88	1798.94	1799.33	1799.44	1799.62	1799.83	1800.00	1799.87	1800.06	1800.26	1800.11	1800.01	1799.78	1800.29	1800.44	1799.91
8/28/1997	1799.44	1799.06	1798.78	1798.68	1799.10	1798.53	1798.53	1799.25	1799.01	1799.19	1799.47	1799.53	1799.21	1799.53	1799.80	1799.86	1800.01	1800.29	1800.34	1800.41	1799.98	1800.32	1800.18	1799.51
8/29/1997	1799.03	1798.57	1798.15	1798.00	1798.52	1798.68	1798.88	1799.41	1799.70	1799.79	1799.53	1799.39	1799.69	1800.10	1800.22	1800.05	1799.94	1799.94	1799.90	1799.92	1799.40	1799.68	1799.80	1800.12
8/30/1997	1800.02	1799.66	1799.08	1798.95	1799.09	1799.00	1799.39	1799.64	1799.44	1799.69	1799.93	1799.92	1799.67	1799.51	1799.91	1800.12	1800.25	1800.24	1800.15	1799.99	1799.78	1799.81	1800.33	1800.05
8/31/1997	1799.86	1799.68	1799.62	1799.44	1799.34	1798.83	1798.83	1798.97	1799.35	1799.35	1799.51	1799.53	1799.46	1799.78	1800.02	1800.62	1800.37	1800.12	1800.06	1800.28	1800.06	1799.80	1799.85	1799.62
9/1/1997	1799.49	1799.28	1799.44	1799.95	1799.80	1799.16	1799.24	1799.65	1799.26	1800.33	1800.12	1799.90	1800.38	1800.49	1800.55	1800.55	1800.19	1800.12	1800.16	1800.11	1799.81	1800.17	1800.22	1799.87
9/2/1997	1799.52	1799.26	1799.03	1799.03	1798.89	1798.66	1799.07	1799.41	1799.68	1799.72	1799.85	1800.05	1800.26	1800.13	1800.24	1800.16	1800.01	1800.11	1800.23	1800.43	1799.86	1799.69	1799.38	1799.27
9/3/1997	1799.13	1798.70	1798.21	1798.10	1798.54	1800.02	1799.56	1799.31	1800.07	1800.24	1800.26	1800.34	1800.58	1800.38	1800.27	1799.97	1799.65	1799.98	1800.41	1800.55	1800.38	1799.88	1799.63	1799.33
9/4/1997	1798.95	1798.72	1798.57	1798.43	1798.56	1799.69	1799.70	1799.99	1800.17	1799.49	1799.53	1800.18	1799.76	1799.61	1800.11	1800.19	1800.34	1800.25	1800.20	1800.16	1799.65	1800.56	1800.63	1799.76
9/5/1997	1799.46	1799.17	1798.79	1798.35	1798.57	1799.55	1799.59	1798.91	1799.58	1799.77	1799.63	1799.40	1799.74	1800.00	1800.12	1800.11	1799.86	1799.34	1799.10	1798.74	1798.99	1799.40	1799.76	1799.74
9/6/1997	1800.03	1799.64	1799.66	1799.68	1799.60	1799.21	1799.46	1799.58	1799.64	1799.24	1799.22	1799.44	1799.95	1800.23	1800.11	1800.15	1800.29	1800.33	1800.22	1800.21	1800.06	1800.47	1800.25	1799.74
9/7/1997	1799.74	1799.52	1799.44	1799.10	1799.02	1799.12	1799.10	1799.09	1799.61	1799.75	1800.16	1800.05	1800.14	1800.35	1800.42	1800.47	1800.52	1800.43	1800.30	1800.22	1799.71	1799.35	1799.13	1798.63
9/8/1997	1798.24	1797.97	1798.07	1798.27	1798.91	1798.49	1799.19	1799.49	1799.49	1799.53	1799.56	1799.55	1799.70	1800.04	1800.23	1799.81	1799.84	1799.61	1799.68	1800.19	1799.66	1799.80	1799.90	1799.17
9/9/1997	1798.70	1798.27	1797.92	1798.13	1798.71	1798.67	1798.77	1798.96	1799.56	1799.64	1799.84	1800.04	1800.05	1799.97	1800.27	1800.03	1800.00	1799.43	1799.69	1799.73	1799.19	1799.44	1799.35	1799.65
9/10/1997	1799.53	1799.31	1799.06	1798.87	1798.81	1798.83	1798.83	1798.98	1799.39	1798.96	1799.23	1799.47	1800.29	1800.08	1800.10	1799.97	1800.21	1800.39	1800.26	1799.88	1799.19	1799.43	1799.62	1799.24
9/11/1997	1799.19	1799.08	1798.76	1798.66	1798.76	1799.31	1799.29	1799.33	1799.56	1799.72	1799.65	1799.60	1799.46	1799.55	1799.42	1799.38	1799.42	1799.23	1799.41	1799.11	1799.05	1798.99	1798.74	1798.82
9/12/1997	1798.46	1798.65	1798.74	1798.62	1798.64	1799.05	1798.89	1799.18	1799.16	1800.09	1799.69	1799.80	1800.50	1800.42	1800.66	1800.48	1799.72	1799.61	1799.77	1799.70	1799.28	1798.91	1798.75	1799.10
9/13/1997	1799.00	1799.11	1799.19	1799.45	1800.15	1799.17	1799.24	1800.00	1800.13	1800.27	1800.21	1799.98	1799.94	1800.18	1800.43	1800.78	1800.75	1800.38	1800.27	1800.02	1799.70	1799.92	1799.90	1799.88
9/14/1997	1799.71	1799.35	1798.95	1798.89	1798.72	1799.02	1799.05	1799.43	1799.60	1799.74	1800.11	1799.96	1800.30	1800.47	1800.55	1800.51	1800.56	1800.48	1800.69	1800.68	1800.20	1799.92	1799.61	1799.26
9/15/1997	1798.98	1798.95	1798.99	1799.19	1799.31	1799.43	1799.94	1799.94	1800.08	1800.41	1800.47	1800.38	1800.18	1800.37	1800.61	1800.31	1800.14	1800.21	1800.36	1800.23	1799.83	1800.07	1799.80	1799.37
9/16/1997	1799.15	1799.12	1798.96	1798.96	1799.88	1800.18	1800.59	1800.51	1800.70	1800.71	1800.57	1800.65	1800.52	1800.45	1800.52	1800.54	1800.80	1800.63	1800.65	1800.57	1800.29	1799.87	1799.34	1798.63
9/17/1997	1798.21	1798.27	1798.64	1799.00	1799.38	1799.70	1799.36	1799.69	1800.04	1800.33	1800.08	1800.15	1800.35	1800.45	1800.47	1800.36	1800.29	1800.41	1800.36	1800.39	1800.19	1800.15	1800.39	1800.48
9/18/1997	1800.61	1800.54	1800.49	1800.53	1800.39	1800.45	1800.35	1800.37	1800.46	1800.18	1800.31	1800.37	1800.26	1799.95	1800.01	1799.93	1799.67	1800.20	1800.53	1799.71	1799.29	1799.90	1800.25	1800.01
9/19/1997	1799.53	1799.77	1799.84	1800.09	1799.84	1800.20	1800.25	1799.95	1799.55	1799.72	1799.91	1800.05	1800.20	1799.95	1800.07	1800.14	1800.15	1800.22	1800.42	1800.40	1800.42	1800.60	1800.28	1800.01
9/20/1997	1799.90	1799.84	1799.93	1800.07	1800.27	1800.25	1800.35	1800.51	1800.46	1800.63	1800.66	1800.71	1800.69	1800.52	1800.65	1800.72	1800.84	1800.78	1800.74	1800.47	1800.41	1800.38	1800.57	1800.48
9/21/1997	1800.00	1799.96	1799.79	1799.79	1800.28	1799.99	1799.93	1800.18	1800.14	1800.25	1800.10	1800.23	1800.09	1800.25	1800.43	1800.77	1800.89	1800.75	1800.92	1800.76	1800.57	1800.44	1800.50	1800.51
9/22/1997	1800.57	1800.57	1800.59	1800.64	1800.32	1800.02	1800.12	1800.23	1800.55	1800.54	1800.29	1800.41	1800.41	1800.56	1800.71	1800.73	1800.76	1800.82	1800.89	1800.57	1800.35	1800.56	1800.61	1800.65
9/23/1997	1800.73	1800.72	1800.75	1800.53	1800.34	1800.41	1800.48	1800.62	1800.59	1800.55	1800.57	1800.61	1800.70	1800.70	1800.62	1800.22	1800.24	1800.55	1800.77	1800.48	1800.13	1800.38	1800.59	1800.54
9/24/1997	1800.19	1800.00	1800.04	1800.29	1800.23	1800.45	1800.44	1800.47	1800.48	1800.49	1800.48	1800.49	1800.54	1800.70	1800.69	1800.73	1800.68	1800.58	1800.66	1800.16	1800.30	1800.26	1800.25	1800.18
9/25/1997	1799.94	1799.79	1799.73	1800.06	1799.81	1800.24	1800.54	1800.63	1800.65	1800.66	1800.77	---	---	---	1800.78	1800.75	1800.71	1800.69	1800.67	1800.40	1800.05	1800.40	1800.35	1800.49
9/26/1997	1800.31	1800.10	1800.09	1800.12	1800.14	1800.19	1800.38	1800.30	1800.23	1800.42	1800.43	1800.44	1800.23	1800.37	1800.60	1800.36	1800.36	1800.27	1800.30	1800.08	1800.15	1800.33	1800.38	1800.31
9/27/1997	1800.26	1800.08	1799.96	1800.12	1800.33	1800.03	1800.08	1800.09	1800.26	1800.20	1800.27	1800.23	1800.09	1800.14	1800.03	1800.17	1800.21	1800.58	1800.72	1800.83	1800.88	1800.76	1800.70	1800.47
9/28/1997	1800.24	1800.01	1799.68	1799.63	1799.71	1799.62	1800.12	1800.31	1800.40	1800.33	1800.25	1800.42	1800.40	1800.39	1800.29	1800.14	1800.36	1800.44	1800.40	1800.23	1799.93	1799.88	1799.89	1799.97
9/29/1997	1799.96	1799.85	1799.82	1800.21	1800.31	1800.50	1800.28	1800.43	1800.28	1800.47	1800.56	1800.58	1800.62	1800.67	1800.72	1800.76	1800.77	1800.81	1800.85	1800.46	1800.40	1800.47	1800.47	1800.41
9/30/1997	1800.18	1800.06	1800.23	1800.32	1800.00	1799.94	1800.05	1800.27	1800.43	1800.37	1800.32	1800.34	1800.46	1800.36	1800.34	1800.29	1800.39	1800.32	1800.38	1800.32	1800.34	1800.41	1800.12	1800.25
10/1/1997	1800.31	1800.35	1800.47	1800.10	1800.10	1800.19	1800.25	1800.45	1800.54	1800.44	1800.41	1800.55	1800.61	1800.56	1800.49	1800.60	1800.61	1800.52	1800.70	1800.45	1800.14	1800.46	1800.70	1800.46
10/2/1997	1800.57	1800.34	1800.40	1800.26	1800.03	1800.48	1800.52	1800.53	1800.45	1799.82	1799.93	1799.74	1799.70	1799.99	1799.78	1799.87	1800.07	1800.47	1800.57	1800.38	1800.28	1799.88	1800.02	1800.11
10/3/1997	1799.32	1798.87	1798.65	1798.71	1798.91	1799.65	1799.76	1799.99	1800.21	1799.87	1799.27	1799.89	1799.98	1799.84	1800.09	1800.10	1799.74	1800.19	1800.15	1799.87	1799.65	1799.61	1800.07	1800.13
10/4/1997	1799.93	1799.32	1799.43	1799.31	1800.11	1799.78	1799.64	1800.20	1800.34	1800.14	1799.95	1800.19	1800.05	1800.05	1800.26	1800.30	1800.44	1800.50	1800.45	1800.37	1800.18	1800.24	1800.25	1799.96
10/5/1997	1799.79	1799.89	1799.70	1799.14	1799.61	1799.71	1800.13	1800.16	1800.13	1800.24	1800.31	1800.18	1800.29	1800.05	1800.33	1800.50	1800.46	1800.58	1800.48	1800.31	1800.42	1800.24	1800.33	1800.21
10/6/1997	1800.06	1800.22	1800.33	1799.75	1799.88	1800.17	1799.91	1800.03	1800.06	1799.74	1799.90	1799.93	1800.03	1799.82	1800.02	1800.38	1800.70	1800.73	1800.67	1800.54	1800.46	1800.65	1800.65	1800.44
10/7/1997	1800.48	1800.42	1800.48	1800.39	1800.21	1800.47	1800.81	1800.75	1800.70	1800.63	1800.57	1800.54	1800.47	1800.46	1800.40	1800.35	1800.37	1800.53	1800.60	1800.67	1800.30	1800.41	1800.20	1800.25

Tailwater

10/8/1997	1799.96	1800.00	1800.35	1800.45	1800.43	1800.33	1799.88	1800.12	1800.37	1800.33	1800.09	1799.92	1799.87	1799.98	1800.31	1800.30	1800.37	1800.45	1800.71	1800.33	1800.24	1800.10	1800.05	1799.85
10/9/1997	1799.88	1800.25	1800.48	1800.22	1800.17	1800.57	1800.51	1800.66	1800.73	1800.41	1800.44	1800.48	1800.54	1800.52	1800.71	1800.77	1800.76	1800.35	1800.40	1800.31	1800.15	1800.14	1800.08	1800.33
10/10/1997	1800.29	1800.40	1800.54	1800.56	1800.50	1800.46	1800.14	1800.51	1800.36	1800.45	1800.40	1800.53	1800.51	1800.64	1800.76	1800.79	1800.47	1800.20	1800.23	1800.29	1800.07	1799.92	1800.42	1800.20
10/11/1997	1800.45	1800.17	1800.29	1800.34	1800.35	1800.26	1800.47	1800.36	1800.39	1800.41	1800.13	1800.34	1800.12	1799.96	1799.73	1799.81	1800.11	1800.25	1800.18	1800.13	1800.13	1799.92	1799.97	1799.21
10/12/1997	1799.71	1800.19	1800.33	1800.12	1799.78	1798.95	1799.23	1799.52	1799.86	1799.71	1800.30	1800.43	1800.33	1800.12	1800.20	1800.33	1800.37	1800.57	1800.61	1800.49	1800.20	1800.15	1800.57	1800.60
10/13/1997	1800.57	1800.62	1800.63	1800.68	1800.56	1800.44	1800.36	1800.30	1800.63	1800.48	1800.44	1800.54	---	---	1800.40	1800.61	1800.42	1800.70	1800.77	1800.55	1800.40	1800.55	1800.68	1800.39
10/14/1997	1800.53	1800.62	1800.58	1800.47	1800.17	1800.31	1800.20	1800.21	1800.39	1800.27	1800.21	1800.30	1800.72	1800.91	1801.01	1800.73	1800.68	1800.91	1800.60	1800.66	1800.79	1800.57	1800.80	1800.94
10/15/1997	1801.03	1800.94	1800.96	1800.68	1800.60	1800.84	1800.33	1800.45	1800.36	1800.24	1800.31	1800.49	1800.55	1800.42	1800.50	1800.57	1800.60	1800.67	1800.43	1800.58	1800.67	1800.64	1800.72	1800.31
10/16/1997	1800.60	1800.63	1800.63	1800.73	1800.74	1800.94	1801.13	1801.05	1801.16	1801.26	---	1801.11	1800.92	1800.84	1800.82	1800.79	1800.76	1800.74	1800.71	1800.68	1800.65	1800.63	1800.60	1800.57
10/17/1997	1800.55	1800.52	1800.49	1800.46	1800.44	1800.41	1800.38	1800.35	1800.62	1800.71	1800.70	1800.68	1800.74	1800.81	1800.70	1800.67	1800.67	1800.79	1800.77	1800.89	1800.77	1800.87	1801.00	1800.87
10/18/1997	1800.92	1800.94	1800.95	1800.88	1801.04	1800.77	1800.88	1800.67	1800.60	1800.36	1800.58	1800.39	1800.41	1800.42	1800.70	1800.48	1800.55	1800.65	1800.46	1800.21	1799.68	1800.09	1800.12	1800.26
10/19/1997	1800.25	1799.76	1799.36	1799.03	1798.93	1798.59	1798.84	1799.30	1799.45	1799.11	1799.44	1799.46	1799.32	1799.38	1799.40	1799.27	1799.28	1799.42	1799.45	1799.36	1799.05	1798.98	1798.82	1798.94
10/20/1997	1798.55	1798.35	1798.08	1797.89	1799.31	1799.75	1799.76	1799.79	1799.75	1799.29	1799.04	1798.92	1799.29	1799.38	1799.24	1799.03	1799.00	1799.73	1800.01	1799.28	1799.22	1799.09	1799.16	1798.89
10/21/1997	1798.73	1798.53	1798.26	1798.09	1798.24	1800.00	1800.08	1799.46	1799.36	1799.24	1799.01	1798.98	1798.83	1798.73	1798.66	1798.69	1798.95	1799.28	1799.45	1799.10	1798.66	1798.49	1798.23	1797.92
10/22/1997	1797.68	1797.46	1797.30	1797.46	1799.50	1799.74	1799.54	1799.46	1799.27	1799.20	1798.70	1798.38	1798.37	1798.31	1798.27	1798.18	1797.81	1798.09	1799.03	1800.11	1799.80	1798.88	1798.70	1798.46
10/23/1997	1798.24	1797.96	1797.66	1797.48	1797.93	1798.97	1799.72	1799.35	1798.76	1798.59	1798.35	1798.44	1798.29	1798.02	1797.77	1798.08	1798.86	1799.61	1799.48	1799.09	1798.46	1798.38	1798.17	1797.89
10/24/1997	1797.72	1797.73	1797.49	1797.54	1798.63	1799.98	1799.82	1799.31	1799.06	1798.88	1798.66	1798.61	1799.79	1799.77	1799.04	1799.11	1799.13	1799.20	1799.01	1798.81	1798.86	1798.91	1798.45	1798.57
10/25/1997	1798.29	1798.11	1798.06	1798.19	1798.85	1799.24	1799.80	1799.84	1799.51	1799.20	1799.19	1798.81	1798.73	1798.65	1798.58	1798.46	1798.41	1799.18	1799.50	1799.43	1799.31	1799.00	1798.92	1798.62
10/26/1997	1798.51	1798.40	1798.29	1798.22	1798.10	1798.04	1799.27	1799.60	1798.96	1798.77	1799.04	1799.04	1798.42	1798.29	1798.13	1798.02	1798.69	1800.00	1799.68	1799.61	1798.75	1798.81	1798.43	1798.31
10/27/1997	1798.05	1797.71	1797.35	1797.44	1797.67	1799.26	1799.70	1799.11	1799.36	1799.51	1799.28	1798.50	1798.51	1798.56	1798.62	1798.80	1799.30	1800.31	1800.24	1800.32	1799.71	1799.35	1799.15	1798.87
10/28/1997	1798.55	1798.30	1797.95	1797.66	1797.44	1797.90	1798.39	1799.12	1799.99	1799.63	1798.93	1798.72	1798.51	1798.54	1798.27	1798.67	1799.33	1800.04	1799.95	1799.88	1799.51	1799.17	1798.95	1798.77
10/29/1997	1798.51	1798.22	1797.92	1797.63	1797.42	1797.67	1798.77	1799.25	1799.16	1799.13	1799.24	1798.36	1798.33	1798.42	1798.30	1798.40	1798.93	1799.48	1799.96	1799.75	1799.14	1798.99	1798.76	1798.57
10/30/1997	1798.36	1798.09	1797.86	1797.65	1797.49	1797.91	1798.52	1798.65	1798.93	1798.96	1799.44	1799.26	1798.71	1798.39	1798.27	1798.62	1799.02	1799.14	1798.93	1799.55	1799.31	1798.75	1798.49	1798.32
10/31/1997	1798.14	1797.90	1797.61	1797.53	1797.46	1797.83	1798.54	1798.48	1798.77	1798.82	1798.52	1798.91	1798.78	1798.63	1798.29	1798.71	1799.11	1799.23	1799.10	1798.98	1799.37	1799.00	1798.66	1798.51
11/1/1997	1798.31	1798.15	1798.05	1798.00	1797.87	1797.80	1797.96	1798.87	1799.53	1799.46	1799.51	1799.10	1798.80	1798.91	1798.82	1798.70	1799.26	1800.12	1799.81	1799.24	1799.08	1798.78	1798.57	1798.49
11/2/1997	1798.35	1798.25	1798.03	1797.75	1797.60	1797.72	1798.14	1798.70	1799.02	1797.99	1797.94	1797.56	1798.05	1798.02	1797.70	1798.27	1799.45	1800.29	1799.78	1799.62	1799.28	1798.74	1798.45	1798.18
11/3/1997	1797.91	1797.86	1798.24	1798.10	1797.85	1797.80	1798.47	1798.21	1798.82	1798.49	1798.10	1797.86	1797.74	1798.05	1798.10	1799.09	1799.22	1798.72	1798.17	1798.40	1798.33	1797.86	1797.56	1797.52
11/4/1997	1797.38	1797.31	1797.16	1797.03	1797.06	1797.46	1798.25	1797.94	1798.10	1798.35	1798.23	1797.89	1798.15	1798.00	1798.14	1798.22	1798.52	1798.70	1798.35	1798.72	1798.39	1798.19	1797.91	1797.77
11/5/1997	1797.68	1797.61	1797.50	1797.48	1797.67	1797.77	1798.29	1797.93	1797.52	1797.15	1797.45	1797.51	1797.53	1797.41	1797.51	1797.98	1798.14	1799.47	1799.47	1799.34	1799.37	1798.84	1798.51	1798.54
11/6/1997	1798.54	1798.36	1798.40	1797.93	1797.86	1798.38	1799.59	1799.55	1799.17	1799.02	1798.86	1798.86	1798.66	1798.41	1798.43	1798.58	1798.84	1799.81	1799.85	1799.39	1799.08	1798.94	1798.89	1798.77
11/7/1997	1798.58	1798.35	1798.01	1797.74	1797.52	1797.50	1798.31	1798.66	1798.68	---	---	1798.20	1798.25	1798.06	1798.18	1798.20	1798.89	1798.81	1798.37	1798.57	1798.18	1797.88	1797.98	1797.82
11/8/1997	1797.61	1797.62	1797.55	1797.56	1797.58	1797.53	1797.59	1798.48	1798.76	1798.68	1798.55	1798.07	1797.77	1797.94	1798.31	1798.53	1798.79	1799.29	1798.81	1798.95	1798.52	1798.66	1798.56	1798.21
11/9/1997	1798.37	1798.03	1797.80	1797.58	1797.50	1797.36	1797.38	1797.62	1798.01	1798.32	1798.25	1797.82	1798.14	1798.54	1798.14	1798.04	1798.06	1798.44	1798.56	1798.63	1798.14	1797.71	1797.57	1797.43
11/10/1997	1797.17	1797.00	1796.97	1796.83	1796.82	1797.92	1799.42	1799.51	1799.51	1799.56	1799.18	1798.89	1798.78	1798.77	1798.43	1798.62	1799.00	1799.77	1799.95	1799.48	1799.47	1799.17	1799.08	1799.03
11/11/1997	1798.93	1798.73	1798.52	1798.30	1798.02	1797.74	1798.38	1798.20	1797.90	1797.79	1797.89	1797.89	1797.83	1797.60	1797.54	1797.81	1798.54	1799.02	1798.54	1798.56	1798.38	1797.96	1797.71	1797.36
11/12/1997	1797.18	1797.06	1796.93	1796.81	1796.81	1798.12	1798.77	1798.32	1797.62	1797.89	1797.89	1798.28	1798.30	1798.13	1798.27	1798.63	1798.65	1799.26	1798.99	1798.83	1798.67	1798.33	1798.03	1797.80
11/13/1997	1797.67	1797.54	1797.37	1797.26	1797.40	1798.30	1798.99	1798.64	1798.66	1798.59	1798.74	1798.45	1798.07	1797.89	1797.67	1797.59	1797.89	1799.34	1799.40	1799.38	1799.38	1798.80	1798.62	1798.39
11/14/1997	1798.13	1797.85	1797.56	1797.31	1797.47	1798.46	1798.75	1798.72	1799.04	1798.85	1799.02	1798.77	1798.25	1798.06	1797.86	1797.87	1799.06	1799.66	1799.45	1799.23	1798.95	1798.55	1798.45	1798.24
11/15/1997	1797.99	1797.78	1797.45	1797.10	1797.15	1797.65	1797.97	1798.51	1799.00	1799.11	1798.55	1798.73	1798.48	1798.45	1798.53	1798.49	1798.81	1799.57	1799.56	1799.36	1799.27	1799.20	1799.22	1799.05
11/16/1997	1798.82	1798.53	1798.33	1798.09	1797.84	1797.70	1797.53	1798.75	1798.89	1798.68	1798.54	1798.49	1798.48	1798.51	1798.35	1798.52	1799.38	1799.49	1799.16	1799.22	1799.29	1799.06	1798.87	1798.67
11/17/1997	1798.43	1798.14	1797.91	1797.65	1797.32	1797.77	1798.86	1798.50	1799.41	1799.74	1799.31	1799.23	1799.09	1799.07	1798.79	1798.85	1799.00	1799.51	1799.38	1799.60	1799.60	1799.24	1798.97	1798.76
11/18/1997	1798.46	1798.21	1798.00	1797.78	1797.63	1798.30	1798.94	1798.74	1798.30	1798.28	1798.15	1798.01	1798.39	1798.28	1798.09	1797.97	1798.41	1799.20	1799.25	1799.40	1799.27	1798.90	1798.65	1798.50
11/19/1997	1798.39	1798.18	1798.03	1797.71	1797.47	1798.41	1798.65	1798.46	1797.83	1797.63	1798.11	1797.89	1797.79	1798.16	1798.14	1798.63	1798.72	1798.95	1799.01	1799.03	1798.90	1798.58	1798.51	1798.65
11/20/1997	1798.50	1798.42	1798.35	1798.21	1798.08	1799.19	1799.09	1798.95	1798.79	1798.71	1798.77	1798.81	1798.41	1798.22	1797.97	1797.76	1798.37	1799.34	1799.22	1798.91	1798.75	1798.45	1798.15	1797.86
11/21/1997	1797.65	1797.35	1797.12	1796.91	1796.77	1797.90	1799.30	1799.34	1799.02	1798.90	1798.74	1797.94	1797.77	1797.72	1797.40	1797.24	1797.43	1798.60	1798.87	1799.20	1799.41	1799.17	1798.35	1798.17

Tailwater

11/22/1997	1797.96	1797.83	1797.60	1797.40	1797.22	1797.33	1798.60	1799.39	1799.65	1799.34	1798.89	1798.61	1798.38	1798.20	1798.03	1798.19	1798.74	1799.30	1799.30	1799.27	1799.25	1798.97	1798.72	1798.52
11/23/1997	1798.32	1798.10	1797.94	1797.75	1797.51	1797.40	1797.51	1798.60	1799.07	1799.50	1798.54	1798.28	1798.03	1798.09	1797.97	1798.04	1798.61	1798.83	1798.84	1798.78	1798.56	1798.19	1797.97	1797.78
11/24/1997	1797.51	1797.33	1797.19	1796.94	1796.69	1797.30	1799.47	1799.42	1799.11	1799.25	1798.64	1798.33	1798.04	1797.86	1797.88	1797.84	1798.59	1799.52	1798.85	1798.70	1798.63	1798.12	1797.87	1797.72
11/25/1997	1797.53	1797.30	1797.18	1797.04	1796.92	1796.96	1798.06	1798.67	1798.38	1798.71	1797.94	1798.46	1798.88	1798.35	1797.81	1798.11	1798.60	1799.60	1799.86	1799.20	1799.30	1798.98	1798.75	1798.54
11/26/1997	1798.34	1798.07	1797.75	1797.41	1797.12	1797.12	1798.50	1798.43	1799.03	1798.86	1798.52	1798.01	1797.76	1797.77	1797.63	1797.95	1798.62	1798.46	1798.30	1798.69	1798.39	1798.06	1797.87	1797.59
11/27/1997	1797.41	1797.24	1797.12	1796.92	1796.72	1796.60	1797.41	1798.20	1798.74	1798.60	1798.16	1797.83	1797.51	1797.65	1797.53	1797.40	1797.59	1798.27	1799.08	1799.90	1800.03	1799.89	1799.19	1798.75
11/28/1997	1798.44	1798.08	1797.74	1797.43	1797.21	1797.00	1797.31	1797.47	1797.66	1797.90	1797.92	1797.69	1797.59	1797.53	1797.45	1797.44	1798.10	1798.58	1799.74	1799.51	1799.27	1798.65	1798.63	1798.23
11/29/1997	1798.00	1797.77	1797.79	1797.63	1797.41	1797.17	1797.51	1797.88	1798.55	1798.75	1798.56	1798.35	1798.13	1798.12	1797.87	1798.10	1798.17	1798.47	1799.40	1799.64	1799.43	1799.23	1799.05	1798.73
11/30/1997	1798.51	1798.28	1798.07	1797.91	1797.66	1797.43	1797.25	1797.85	1798.49	1798.17	1798.09	1798.16	1798.24	1798.05	1797.93	1798.13	1798.85	1799.31	1798.95	1798.54	1798.54	1798.39	1798.26	1797.86
12/1/1997	1797.61	1797.46	1797.18	1796.99	1797.09	1797.50	1798.48	1799.01	1798.81	1798.68	1798.56	1798.05	1797.85	1797.56	1797.61	1797.84	1798.91	1799.60	1799.59	1799.58	1799.43	1799.09	1798.80	1798.73
12/2/1997	1798.55	1798.39	1798.19	1797.95	1797.87	1798.03	1799.28	1799.53	1799.68	1799.46	1799.08	1798.69	1798.45	1798.31	1798.15	1798.04	1798.37	1799.29	1799.09	1799.16	1799.00	1798.65	1798.35	1798.16
12/3/1997	1797.87	1797.59	1797.22	1796.87	1796.73	1798.23	1799.57	1799.28	1798.87	1798.63	1798.40	1798.42	1797.99	1797.74	1797.78	1798.03	1798.48	1799.68	1799.57	1799.25	1799.23	1799.02	1798.80	1798.56
12/4/1997	1798.25	1797.99	1797.74	1797.45	1797.16	1798.20	1799.21	1799.74	1799.53	1798.93	1798.56	1798.26	1798.17	1798.05	1797.93	1797.82	1798.24	1799.73	1799.85	1800.09	1800.06	1799.67	1799.43	1799.18
12/5/1997	1798.92	1798.60	1798.28	1797.96	1797.91	1798.59	1799.23	1799.22	1799.63	1799.09	1799.22	1798.71	1798.43	1798.26	1797.98	1797.85	1798.25	1798.91	1799.06	1799.20	1799.08	1798.94	1798.59	1798.46
12/6/1997	1798.27	1798.10	1797.96	1797.70	1797.45	1797.46	1798.75	1799.72	1799.83	1799.61	1799.44	1799.12	1798.85	1798.68	1798.59	1798.54	1798.97	1799.02	1799.07	1799.39	1799.27	1799.11	1798.75	1798.58
12/7/1997	1798.39	1798.17	1797.97	1797.70	1797.49	1797.41	1797.70	1798.11	1798.38	1798.89	1798.96	1798.86	1798.62	1798.26	1797.79	1797.86	1799.29	1799.94	1799.90	1799.82	1799.46	1799.21	1798.98	1798.78
12/8/1997	1798.48	1798.18	1797.90	1797.58	1797.31	1797.73	1798.69	1798.88	1799.33	1799.40	1799.48	1799.00	1798.88	1798.81	1798.70	1798.86	1799.50	1799.89	1799.89	1799.80	1799.41	1799.21	1798.96	1798.68
12/9/1997	1798.35	1798.05	1797.75	1797.42	1797.28	1798.11	1799.43	1799.15	1798.80	1798.87	1798.73	1797.91	1797.88	1797.58	1797.32	1797.44	1799.12	1799.99	1799.95	1799.66	1799.86	1799.26	1798.79	1798.42
12/10/1997	1798.13	1797.82	1797.52	1797.28	1797.70	1798.25	1799.17	1799.08	1798.92	1798.88	1798.84	1799.00	1799.24	1799.19	1798.79	1798.59	1799.18	1799.63	1799.68	1799.61	1799.12	1798.75	1797.58	1797.50
12/11/1997	1797.33	1796.93	1796.83	1796.87	1797.74	1799.36	1799.91	1799.66	1799.25	1799.70	1799.63	1799.26	1799.11	1799.12	1799.20	1799.41	1799.34	1799.97	1799.92	1799.77	1799.71	1799.49	1798.54	1797.99
12/12/1997	1797.41	1797.15	1796.94	1796.68	1796.99	1798.43	1799.80	1799.72	1799.47	1799.46	1799.08	1799.26	1799.29	1799.35	1798.67	1798.45	1798.71	1799.82	1799.64	1800.03	1799.99	1799.88	1799.00	1798.53
12/13/1997	1798.21	1797.98	1797.65	1797.44	1797.20	1797.02	1798.68	1799.58	1799.49	1799.62	1799.82	1799.29	1798.83	1798.38	1798.58	1799.11	1799.60	1799.68	1799.44	1799.53	1799.51	1798.87	1797.56	1796.92
12/14/1997	1796.74	1796.79	1797.51	1797.47	1797.71	1798.14	1798.92	1799.47	1799.83	1799.96	1799.85	1799.62	1799.34	1799.13	1798.80	1798.52	1798.97	1799.09	1799.00	1799.01	1798.77	1798.75	1797.95	1797.49
12/15/1997	1797.11	1796.96	1796.95	1797.14	1797.22	1798.11	1798.99	1799.34	1799.38	1799.24	1799.04	1798.66	1798.05	1797.85	1797.98	1798.13	1799.05	1799.67	1799.64	1799.50	1799.55	1798.86	1797.90	1797.95
12/16/1997	1797.64	1798.43	1798.43	1798.16	1798.18	1798.67	1799.59	1799.78	1799.54	1799.51	1799.49	1799.41	1799.31	1799.00	1798.91	1799.15	1799.41	1799.58	1799.80	1800.06	1800.05	1799.69	1798.59	1798.40
12/17/1997	1798.20	1797.84	1797.41	1796.98	1796.88	1798.18	1798.70	1799.55	1799.33	1799.38	1799.59	1799.42	1799.22	1799.16	1799.04	1799.15	1799.63	1800.04	1799.92	1799.97	1800.10	1799.45	1798.60	1798.32
12/18/1997	1798.14	1797.96	1797.71	1797.45	1797.13	1797.39	1798.99	1799.21	1799.18	1799.77	1799.63	1798.65	1798.99	1799.04	1799.26	1799.20	1799.52	1799.79	1799.89	1799.98	1799.97	1799.28	1798.61	1798.34
12/19/1997	1798.06	1797.74	1797.35	1796.97	1796.86	1798.44	1799.54	1799.54	1799.05	1799.48	1799.65	1799.44	1799.47	1799.29	1799.23	1799.66	1799.71	1800.03	1799.94	1799.99	1799.99	1799.53	1799.07	1798.75
12/20/1997	1798.52	1798.34	1798.09	1797.73	1797.55	1797.86	1798.77	1799.75	1799.77	1799.48	1799.36	1799.14	1798.93	1799.08	1798.84	1799.10	1799.74	1799.87	1799.57	1799.28	1799.20	1798.97	1798.55	1798.16
12/21/1997	1797.70	1797.42	1797.25	1797.21	1797.11	1797.20	1797.65	1798.32	1798.25	1798.14	1797.77	1797.64	1797.83	1798.26	1798.27	1798.31	1799.08	1799.70	1799.73	1799.74	1799.69	1798.82	1798.10	1797.64
12/22/1997	1797.37	1797.08	1796.72	1796.38	1797.03	1799.27	1799.75	1800.01	1799.86	1799.63	1799.49	1799.66	1799.41	1799.07	1798.71	1798.66	1799.73	1800.03	1799.43	1800.07	1800.13	1799.81	1798.89	1798.60
12/23/1997	1798.28	1798.02	1797.83	1797.43	1797.09	1797.33	1798.90	1799.64	1799.53	1799.88	1799.68	1799.34	1798.84	1798.04	1797.64	1798.08	1798.31	1799.14	1799.30	1799.43	1799.28	1799.12	1798.37	1797.79
12/24/1997	1797.62	1797.23	1797.07	1796.88	1796.94	1798.20	1799.18	1799.78	1799.78	1799.46	1799.33	1798.98	1798.66	1798.50	1798.44	1798.67	1798.94	1799.06	1799.13	1799.38	1799.53	1799.54	1799.02	1798.70
12/25/1997	1798.41	1798.11	1797.77	1797.50	1797.18	1797.09	1797.69	1798.34	1798.32	1798.23	1798.21	1798.31	1797.69	1797.18	1797.67	1798.26	1798.90	1799.62	1799.76	1799.88	1799.55	1798.90	1798.60	1798.41
12/26/1997	1798.27	1798.06	1797.78	1797.40	1797.11	1796.93	1798.73	1799.70	1799.93	1799.86	1799.64	1799.61	1799.18	1798.78	1798.58	1798.35	1799.10	1799.54	1799.76	1799.71	1799.74	1799.63	1798.86	1798.55
12/27/1997	1798.20	1797.93	1797.72	1797.52	1797.29	1797.15	1798.04	1799.02	1799.46	1799.48	1799.02	1798.66	1798.22	1798.10	1798.00	1797.99	1798.70	1799.17	1799.56	1799.61	1799.63	1799.58	1798.82	1798.54
12/28/1997	1798.36	1798.21	1798.00	1797.81	1797.50	1797.13	1797.12	1797.49	1798.24	1798.51	1798.27	1798.11	1797.84	1797.79	1797.85	1797.67	1798.00	1798.14	1798.54	1798.69	1797.84	1797.83	1797.24	1796.96
12/29/1997	1796.78	1796.78	1796.97	1797.00	1796.84	1796.93	1798.91	1799.14	1799.80	1799.89	1799.80	1799.57	1799.63	1799.68	1799.49	1799.59	1799.64	1799.78	1799.71	1799.71	1799.36	1798.50	1798.03	1797.90
12/30/1997	1797.63	1797.31	1797.01	1796.83	1797.25	1797.78	1799.44	1799.79	1799.60	1799.50	1799.55	1799.65	1799.55	1799.45	1799.16	1799.41	1799.61	1800.10	1800.01	1799.98	1799.87	1799.54	1798.83	1798.53
12/31/1997	1798.20	1797.94	1797.72	1797.42	1797.13	1797.14	1799.39	1799.85	1799.74	1799.98	1799.93	1799.72	1799.59	1799.45	1799.11	1798.81	1799.12	1799.53	1799.72	1799.51	1799.48	1799.91	1799.24	1799.01

Gross Head

Brownlee Gross Head

Date	Hour Ending 1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00
3/1/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/2/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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3/5/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/6/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/7/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/8/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/9/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/10/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/11/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/12/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/13/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/14/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/15/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/16/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/17/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/18/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/19/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/20/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/21/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/22/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/23/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/24/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/25/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/26/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/27/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/28/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/29/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/30/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3/31/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/1/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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4/8/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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4/10/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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4/13/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/14/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/15/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/16/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/17/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/18/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/19/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/20/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/21/1997	---	---	---	---	---	---	---	---	---	---	---	---	---	---	191.17	190.90	190.92	191.02	190.95	190.87	191.17	191.27	191.15	191.21
4/22/1997	191.09	191.08	191.15	191.14	191.23	190.79	190.99	191.37	191.45	191.14	190.94	191.33	191.57	191.59	191.51	191.42	191.18	191.03	190.87	190.46	190.51	190.67	190.22	189.98
4/23/1997	189.93	189.81	189.62	189.82	189.85	189.57	189.63	189.76	189.88	190.05	190.20	190.09	189.97	189.82	189.66	189.82	189.71	190.11	190.22	190.13	190.23	189.89	190.07	190.03
4/24/1997	190.01	190.02	189.95	189.99	190.21	190.17	190.28	190.13	190.09	190.22	189.99	189.93	189.52	189.44	189.28	189.25	189.30	189.39	189.40	189.35	189.16	189.39	189.85	189.16
4/25/1997	188.96	188.81	188.86	189.62	189.53	188.89	188.39	188.58	188.35	188.23	188.29	188.22	188.27	188.38	188.26	188.30	188.45	188.51	189.14	188.67	188.77	189.36	189.44	188.41
4/26/1997	188.47	188.43	188.28	188.28	188.37	188.59	188.51	188.38	188.59	188.59	188.64	188.37	188.41	188.65	188.60	188.64	188.82	188.94	189.25	188.80	188.72	188.76	188.88	188.81
4/27/1997	188.90	188.75	188.89	188.86	188.95	189.09	188.83	188.52	188.46	188.33	188.38	188.58	188.56	188.63	188.62	188.62	188.55	188.51	188.66	188.56	188.73	188.80	188.56	188.50
4/28/1997	188.89	188.64	188.47	188.85	189.05	188.83	189.31	189.34	189.37	189.62	189.31	189.01	188.80	188.43	188.12	187.86	187.58	187.34	187.40	187.21	187.10	186.76	186.37	186.36
4/29/1997	186.18	186.00	185.81	186.06	185.93	185.51	185.31	185.43	185.10	184.71	184.47	184.42	184.03	183.95	184.00	184.06	184.00	184.18	184.32	183.78	183.90	183.77	183.61	183.53
4/30/1997	183.47	183.41	183.35	183.30	183.14	183.23	183.21	182.89	182.50	182.22	182.34	182.27	182.28	182.17	181.99	181.77	182.20	182.06	181.70	181.54	181.37	180.98	180.67	180.53
5/1/1997	180.16	180.01	179.74	179.66	179.35	178.95	179.28	179.10	178.94	178.86	178.97	178.58	178.64	178.75	178.48	178.02	177.84	177.56	177.51	177.01	176.83	176.83	176.79	176.45
5/2/1997	176.33	175.84	175.68	175.82	175.53	175.18	175.13	175.50	176.23	176.03	175.96	175.59	175.73	176.00	175.34	175.28	175.30	175.43	175.41	175.21	175.12	175.22	175.31	175.20
5/3/1997	175.28	175.14	175.20	175.11	175.06	175.35	175.07	175.24	175.23	175.12	175.54	175.54	175.72	175.76	175.74	175.55	175.63	175.64	175.73	175.65	175.53	175.60	175.71	175.79
5/4/1997	175.99	175.51	175.54	175.63	175.45	175.69	175.55	175.46	175.41	175.37	175.39	175.73	175.51	175.49	175.43	175.39	175.42	175.52	175.73	175.67	175.72	175.96	176.40	175.75
5/5/1997	175.58	175.34	175.91	176.07	176.25	175.84	175.84	175.83	175.75	175.85	175.90	175.90	175.89	175.94	176.20	176.04	175.88	176.13	175.82	175.63	176.11	176.00	175.66	175.68
5/6/1997	175.80	175.86	175.90	176.34	176.41	176.36	176.34	176.08	175.83	176.40	176.60	176.18	176.15	176.30	176.17	176.05	176.06	176.14	175.83	175.71	176.07	176.04	175.85	175.79
5/7/1997	175.77	175.64	175.59	175.77	175.69	175.52	175.89	175.92	175.79	175.90	175.98	176.06	175.79	175.56	175.84	176.19	176.30	176.15	175.88	175.85	176.16	175.99	176.00	175.73
5/8/1997	175.80	175.83	175.76	175.87	175.69	175.55	175.40	175.37	175.41	175.48	175.42	175.34	175.19	175.33	175.17	175.31	175.34	175.47	175.44	175.29	175.53	175.51	175.46	175.48
5/9/1997	175.42	175.56	175.62	175.80	175.56	175.25	175.38	175.24	175.18	175.21	175.10	175.23	175.46	175.26	175.48	175.49	175.69	175.73	175.90	175.86	175.68	175.83	176.05	175.74
5/10/1997	175.69	175.66	175.84	175.83	175.72	175.89	175.82	175.60	175.35	175.28	175.18	175.13	175.48	175.64	175.30	175.49	175.82	175.99	176.20	176.12	176.04	176.11	175.99	175.88
5/11/1997	175.66	175.74	175.89	175.73	175.73	175.70	175.75	175.92	175.91	175.85	175.87	175.86	175.83	175.75	175.70	175.77	175.90	175.82	175.72	175.89	176.12	176.29	175.97	176.32
5/12/1997	176.68	177.13	177.31	177.21	177.08	176.97	177.21	177.21	177.40	178.38	178.33	178.46	178.68	178.79	178.89	179.23	179.62	179.82	180.02	180.24	180.79	180.83	180.75	181.11
5/13/1997	181.42	181.45	181.43	181.75	181.83	182.20	182.22	182.29	182.35	183.13	182.47	182.66	182.82	182.83	182.85	183.17	183.39	183.73	184.05	183.95	184.42	184.66	184.58	185.23
5/14/1997	185.09	185.55	185.85	186.37	186.35	186.80	186.81	186.92	186.78	186.97	187.38	187.65	187.83	187.94	188.33	188.82	189.11	189.41	189.70	190.01	190.38	190.51	190.02	190.04
5/15/1997	189.85	190.15	189.97	190.39	190.69	190.39	190.50	190.73	190.85	190.94	190.70	190.94	191.41	191.67	191.75	192.27	192.51	193.13	193.49	193.61	193.02	193.02	193.56	193.12
5/16/1997	193.19	193.25	193.32	193.78	194.15	194.04	194.19	194.35	194.43	194.69	195.09	195.23	195.40	195.69	195.76	196.00	196.54	196.75	196.92	197.02	197.37	197.59	198.09	198.14
5/17/1997	198.24	198.39	198.50	198.85	199.21	199.64	199.13	199.32	199.32	237.96	217.70	199.82	200.12	200.19	200.63	200.69	200.80	201.17	201.17	201.27	201.62	201.99	202.27	202.30
5/18/1997	202.57	202.62	202.74	202.91	203.12	203.21	203.24	203.82	203.78	204.03	204.29	204.52	204.67	204.84	205.05	205.17	205.41	205.95	205.97	205.95	206.36	206.85	207.14	207.40
5/19/1997	207.64	207.83	207.92	208.13	208.38	208.75	209.30	209.48	209.63	209.76	210.05	210.75	210.66	210.80	211.08	211.14	211.36	211.52	211.71	211.76	211.87	212.03	212.27	212.37
5/20/1997	212.46	212.51	212.69	212.96	213.29	213.43	213.61	213.46	213.49	213.61	214.02	214.08	214.13	214.71	215.14	215.24	215.20	215.36	215.65	215.36	215.55	215.68	215.86	215.65
5/21/1997	215.75	215.94	216.08	216.06	216.16	216.23	216.87	216.93	216.90	216.87	217.20	217.16	217.24	217.51	217.56	217.53	217.70	218.09	218.27	218.43	218.77	219.31	219.01	219.28
5/22/1997	219.48	219.64	219.72	219.79	219.74	219.84	219.76	219.83	219.91	220.27	220.42	220.40	220.41	220.69	220.90	221.08	221.18	221.31	221.33	221.39	221.74	221.75	221.71	221.86
5/23/1997	221.96	222.26	222.44	222.47	222.56	222.55	222.55	222.84	223.08	223.22	223.18	223.35	223.58	223.77	224.07	224.30	224.56	224.62	224.99	225.51	225.63	225.77	225.88	226.10
5/24/1997	226.25	226.65	226.80	226.76	227.06	227.05	227.07	227.10	227.10	227.13	227.37	227.62	227.59	227.58	227.64	227.68	227.78	227.93	228.00	228.04	228.16	228.67	228.54	229.14
5/25/1997	228.77	228.82	228.89	228.98	229.15	229.74	229.33	229.53	229.32	229.42	229.54	229.54	229.74	229.90	230.02	230.10	230.38	230.53	230.49	230.61	230.61	230.79	230.99	231.70

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5/26/1997	231.33	231.37	231.56	231.69	231.99	232.12	232.25	232.31	232.29	232.45	232.66	232.77	232.96	233.05	233.19	233.36	233.38	233.52	233.75	233.87	234.06	234.23	234.44	234.53
5/27/1997	234.61	234.90	234.87	235.24	235.63	235.88	235.92	235.77	235.89	236.10	236.30	236.27	236.61	237.02	236.98	237.08	237.29	237.41	237.36	237.24	237.42	237.73	237.55	237.63
5/28/1997	237.85	237.98	237.96	238.04	238.33	238.36	238.55	238.77	238.74	238.94	239.27	239.43	239.82	239.60	239.30	239.36	239.47	239.79	239.91	239.79	240.00	240.12	240.21	240.56
5/29/1997	240.38	240.78	241.22	241.10	240.98	241.19	240.75	240.59	240.61	240.62	240.63	240.62	240.51	240.74	240.84	241.02	241.30	241.55	241.88	242.02	242.06	242.25	242.79	242.81
5/30/1997	243.61	243.84	243.92	244.40	244.63	244.15	243.57	243.61	243.61	243.99	243.79	243.86	243.84	244.12	244.06	243.99	243.81	244.15	244.06	244.29	244.37	244.45	244.49	245.47
5/31/1997	245.99	246.64	247.12	247.57	247.78	246.94	246.39	246.13	246.31	246.55	246.73	246.69	246.65	246.67	246.53	246.48	246.55	246.79	247.22	247.06	247.23	247.25	247.44	248.28
6/1/1997	248.63	248.99	249.31	250.10	250.44	250.21	249.37	249.00	249.21	249.35	249.36	249.24	249.36	249.50	249.51	249.31	249.50	249.74	249.93	250.00	250.16	250.54	251.12	251.75
6/2/1997	252.08	252.06	252.66	253.30	253.28	252.72	252.73	252.35	252.53	252.55	252.59	252.57	252.70	252.71	252.75	252.75	252.85	253.04	253.30	253.23	253.44	253.59	253.60	254.23
6/3/1997	254.81	256.10	256.94	257.06	256.37	255.94	255.34	255.49	255.60	255.67	255.80	255.88	255.88	256.00	256.13	256.28	256.19	256.13	256.14	256.27	256.36	256.51	256.52	257.26
6/4/1997	257.82	258.38	258.89	259.14	258.77	258.16	258.13	258.36	258.47	258.48	258.51	258.66	258.93	259.15	259.02	258.92	258.77	258.85	258.96	258.87	259.01	259.53	260.12	259.62
6/5/1997	259.34	259.39	259.47	259.58	259.81	259.97	259.74	259.56	259.60	259.64	259.67	259.80	259.92	259.99	260.09	260.09	260.14	260.22	260.15	260.14	260.07	260.47	260.97	260.87
6/6/1997	261.30	260.77	260.81	260.98	261.46	261.43	261.33	261.23	261.17	261.13	261.19	261.18	261.13	261.17	261.14	261.18	261.22	261.37	261.53	261.62	261.55	261.71	261.80	261.83
6/7/1997	261.89	261.92	262.26	262.46	262.67	262.53	262.46	262.53	262.67	262.76	262.81	262.78	262.85	262.89	262.83	262.89	262.85	262.97	263.22	263.14	263.18	263.42	263.41	263.35
6/8/1997	263.56	264.10	264.24	264.49	264.71	263.97	264.15	264.26	264.11	264.16	264.12	264.18	264.25	264.45	264.34	264.26	264.32	264.31	264.31	264.33	264.33	264.67	265.11	264.67
6/9/1997	264.92	265.61	265.71	265.60	265.73	265.92	265.76	265.72	265.82	266.00	265.83	265.70	265.71	265.73	265.64	265.66	265.49	265.44	265.43	265.52	265.44	265.54	265.40	265.49
6/10/1997	265.62	265.66	265.95	266.33	266.86	266.90	267.10	266.28	266.34	266.47	266.14	265.98	266.19	266.34	266.54	266.85	266.85	266.88	266.90	267.10	267.53	267.36	267.09	266.94
6/11/1997	267.14	267.79	267.97	267.76	267.23	267.35	267.91	267.25	267.03	267.16	267.25	267.39	267.37	267.58	267.63	267.70	267.70	267.77	267.91	268.17	268.11	268.16	268.27	268.14
6/12/1997	268.14	268.06	267.85	267.65	267.69	267.71	267.73	268.10	267.52	267.58	268.13	268.32	268.29	268.56	268.30	268.55	268.55	268.55	268.68	268.65	268.44	268.89	269.07	268.96
6/13/1997	269.06	269.30	269.22	269.30	269.66	269.63	269.31	269.54	269.53	269.50	269.72	269.79	269.60	269.92	270.15	270.18	270.12	270.21	269.88	269.82	269.70	269.72	269.87	270.03
6/14/1997	269.89	270.32	270.29	270.45	270.11	270.23	270.25	270.23	270.22	270.33	270.11	270.10	269.98	270.05	269.98	270.00	270.04	270.08	270.02	270.01	270.04	270.04	270.10	270.11
6/15/1997	270.46	271.27	270.97	271.29	271.34	270.65	269.53	269.44	269.59	269.68	269.67	269.66	269.86	269.87	269.74	269.82	269.85	269.92	269.98	270.02	269.99	269.94	269.92	270.46
6/16/1997	269.98	270.06	269.69	269.73	269.87	269.87	269.62	269.64	269.73	269.88	269.95	269.81	269.76	269.73	269.73	269.74	269.80	270.21	270.15	270.08	270.15	270.42	270.44	270.12
6/17/1997	270.14	270.28	270.18	270.26	270.42	270.29	270.35	270.46	270.25	270.28	270.46	270.50	270.47	270.43	270.44	270.65	270.72	271.09	270.96	271.02	271.02	271.63	271.09	270.75
6/18/1997	270.81	270.87	271.15	271.06	271.23	270.96	271.07	271.31	271.51	271.80	271.56	271.76	271.68	271.12	271.58	271.66	271.69	271.71	271.73	271.76	271.81	271.73	271.39	271.33
6/19/1997	271.38	271.52	271.57	271.56	271.69	272.03	271.67	271.56	271.51	271.64	271.86	271.65	271.67	271.70	271.49	271.55	271.49	271.80	271.95	271.92	271.88	272.14	272.04	271.88
6/20/1997	271.82	271.83	271.91	272.08	271.93	272.05	272.26	272.34	272.07	272.29	272.15	272.07	272.08	272.60	272.13	272.06	272.10	272.14	272.08	272.18	272.22	272.19	272.22	272.10
6/21/1997	272.01	272.07	272.10	272.20	272.42	272.44	272.40	272.34	272.20	272.20	272.35	272.16	272.11	272.06	272.14	272.15	272.11	272.18	272.44	272.29	272.39	272.43	272.38	272.65
6/22/1997	272.38	272.44	272.51	272.52	272.80	272.49	272.48	272.60	272.53	272.52	272.40	272.37	272.32	272.30	272.40	272.53	272.42	272.56	272.50	272.52	272.52	272.49	272.59	272.60
6/23/1997	272.63	272.50	272.47	272.58	272.96	272.49	272.75	272.69	272.39	272.51	272.61	272.45	272.43	272.54	272.74	272.41	272.17	272.21	272.38	272.35	272.30	272.36	272.27	272.42
6/24/1997	272.26	272.28	272.29	272.32	272.36	272.39	272.54	273.03	273.11	273.13	272.87	272.97	273.02	273.11	273.36	273.33	273.30	273.26	273.26	273.35	273.28	273.44	273.32	273.28
6/25/1997	273.39	273.43	273.68	273.97	274.03	274.15	274.24	274.09	273.73	273.80	273.83	273.67	273.63	273.66	273.66	273.62	273.63	273.57	273.61	273.67	273.75	273.98	273.97	273.80
6/26/1997	273.85	274.02	274.17	274.38	274.74	275.06	275.23	275.08	275.20	275.00	275.08	275.26	275.08	275.01	275.17	275.32	275.40	275.28	275.22	275.37	275.30	275.20	275.40	275.53
6/27/1997	275.32	275.25	275.31	275.40	275.63	275.69	275.33	275.38	275.24	275.57	275.36	275.58	275.48	275.31	275.27	275.02	275.23	275.33	275.41	275.36	275.51	275.64	275.31	275.44
6/28/1997	275.52	275.49	275.53	275.44	275.45	275.61	275.41	275.36	275.38	275.37	275.52	275.43	275.45	275.28	275.48	275.41	275.35	275.43	275.51	275.33	275.15	275.28	275.06	275.18
6/29/1997	275.19	275.28	275.52	275.77	276.00	275.57	275.26	275.11	275.03	275.04	274.94	274.85	274.87	274.98	274.93	274.88	274.95	275.04	275.00	275.03	275.02	275.19	275.28	275.50
6/30/1997	275.49	275.48	275.44	275.03	275.07	274.97	274.76	274.74	274.68	274.88	274.78	274.89	274.87	274.96	275.02	275.18	275.29	275.21	275.07	275.11	275.22	275.12	275.09	275.10
7/1/1997	275.12	275.20	275.29	275.20	275.27	275.53	275.63	275.54	275.36	275.71	275.49	275.79	276.00	275.82	275.80	275.80	275.65	275.60	275.59	275.55	275.63	275.54	275.62	276.05
7/2/1997	275.93	275.60	275.56	275.58	275.73	275.74	275.65	275.71	275.70	275.72	275.85	275.73	275.80	275.73	275.80	275.69	275.70	275.66	275.75	276.01	275.74	275.70	275.66	275.76
7/3/1997	275.95	275.93	275.87	275.88	275.93	275.95	275.96	275.96	276.37	276.15	276.11	276.08	276.16	276.10	276.14	276.17	276.09	276.03	276.13	276.18	275.99	276.08	276.15	276.23
7/4/1997	276.79	276.99	276.41	276.37	276.44	276.27	276.10	276.07	275.94	275.83	275.94	275.94	275.98	276.03	276.00	275.97	275.95	275.94	276.05	276.01	276.01	276.12	275.87	275.98
7/5/1997	275.90	275.95	275.94	275.91	275.87	275.98	276.02	276.08	276.01	275.97	275.91	275.90	275.92	275.92	275.87	275.81	275.80	275.77	275.79	275.79	275.62	275.53	275.81	276.17
7/6/1997	276.48	276.95	277.45	277.86	278.18	278.46	278.17	277.74	277.79	277.29	276.90	276.62	276.44	276.37	276.37	276.45	276.38	276.21	276.28	276.40	276.48	276.87	277.37	277.61
7/7/1997	277.93	278.24	278.25	278.27	277.84	277.66	277.52	277.21	277.14	277.08	276.94	276.86	276.79	276.73	276.58	276.47	276.19	276.14	276.14	276.14	276.14	276.15	276.34	276.44
7/8/1997	276.44	276.48	276.52	276.56	276.60	276.62	276.48	276.22	275.89	275.86	275.53	275.48	275.60	275.66	275.69	275.52	275.18	275.11	275.23	275.17	275.17	275.39	274.90	275.27
7/9/1997	275.90	275.94	275.99	276.04	276.09	276.14	276.19	275.92	275.59	275.50	275.57	275.54	275.39	275.33	275.28	275.08	275.07	275.07	275.37	275.23	275.13	275.17	275.17	275.16

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7/10/1997	275.19	275.25	275.30	275.36	275.42	275.48	275.53	275.59	276.17	275.68	275.51	275.54	275.41	275.20	275.02	274.88	274.78	275.02	274.77	274.88	275.03	275.41	275.45	275.43
7/11/1997	275.57	275.76	275.85	275.98	276.22	276.68	277.12	277.08	276.95	276.12	276.13	276.09	275.91	275.77	275.90	275.90	275.64	275.63	275.51	275.35	275.54	275.46	275.73	275.87
7/12/1997	276.00	276.16	276.28	276.37	276.45	276.56	276.76	276.63	276.51	276.68	276.87	276.94	276.54	276.16	276.09	276.04	276.05	276.04	276.10	276.02	275.92	276.15	276.22	276.32
7/13/1997	276.51	276.65	276.80	277.06	277.29	277.31	277.19	276.40	276.31	276.28	276.07	276.10	276.25	276.03	275.98	276.20	276.17	276.38	276.72	276.73	276.82	277.90	278.38	278.83
7/14/1997	279.12	279.36	279.59	279.50	278.98	277.98	277.06	276.44	276.41	276.30	276.17	275.98	275.86	275.85	275.62	275.52	275.47	275.31	275.37	275.39	275.95	276.71	277.10	277.32
7/15/1997	277.46	277.68	277.95	278.16	278.46	278.12	276.90	276.67	276.10	275.91	275.63	275.56	275.67	275.52	275.24	275.29	275.03	274.96	274.97	275.00	275.14	275.57	276.08	276.47
7/16/1997	276.86	277.30	277.65	278.09	278.37	276.71	276.63	276.94	277.11	276.97	276.79	276.30	275.90	275.31	275.10	274.96	274.83	275.11	275.19	275.18	275.21	275.25	275.62	275.89
7/17/1997	276.16	276.51	276.86	277.27	277.49	275.98	276.02	276.42	276.03	275.12	275.78	275.89	276.10	275.71	275.50	275.39	275.41	275.41	275.29	274.90	275.10	275.46	275.75	276.11
7/18/1997	276.40	276.60	276.91	277.09	277.34	277.05	276.72	276.69	277.04	276.86	276.69	276.66	276.71	276.40	276.04	275.88	276.11	276.03	275.59	275.54	275.06	275.65	276.31	276.57
7/19/1997	276.81	276.87	277.11	277.40	277.66	276.92	276.82	277.07	277.07	276.86	276.84	276.60	276.28	276.22	276.09	275.97	275.89	275.82	275.89	275.65	275.32	275.24	275.90	276.35
7/20/1997	276.58	276.97	277.45	277.85	278.15	277.48	278.09	277.42	276.96	276.94	276.45	276.44	275.98	275.83	276.35	276.44	276.17	276.42	276.47	276.56	276.88	277.20	277.34	277.47
7/21/1997	277.65	277.85	277.90	278.02	277.79	277.50	276.81	277.02	276.79	276.52	276.51	276.29	276.14	275.70	275.68	275.80	275.73	275.52	275.39	275.20	275.37	275.86	276.05	275.98
7/22/1997	276.24	276.47	276.71	276.90	276.97	277.30	277.25	277.12	277.14	277.07	276.91	276.73	276.65	276.47	276.22	276.23	276.19	276.20	276.49	276.53	276.62	276.40	276.90	277.30
7/23/1997	277.49	277.70	277.85	278.04	278.35	278.36	278.18	276.89	276.99	277.08	276.93	276.29	276.11	275.95	275.56	275.68	275.32	275.13	275.11	275.29	275.35	275.20	275.25	275.86
7/24/1997	276.08	276.40	276.52	276.44	276.44	276.08	276.18	276.12	275.50	275.21	275.40	275.21	274.90	274.64	274.35	274.22	274.26	274.46	274.47	274.15	273.83	274.15	274.53	274.78
7/25/1997	275.16	275.45	275.74	275.99	276.27	276.53	276.23	276.43	275.48	275.25	275.02	275.14	275.37	274.87	274.48	274.40	274.17	274.42	274.47	274.35	273.77	273.92	273.98	274.40
7/26/1997	274.59	274.68	274.63	274.51	274.42	274.64	274.27	273.69	273.58	273.31	273.14	273.34	273.67	273.52	273.41	273.09	272.98	273.07	273.28	272.98	272.87	272.54	273.01	273.31
7/27/1997	273.50	273.72	273.69	273.95	274.06	274.02	274.19	273.72	273.59	273.60	273.36	272.78	272.48	272.26	272.17	272.22	272.27	272.36	272.49	272.63	273.10	273.42	273.51	273.84
7/28/1997	274.17	274.27	274.37	274.03	274.39	274.38	274.12	273.90	273.80	273.71	273.70	273.66	272.98	272.78	272.56	272.48	271.91	271.66	271.39	271.34	271.45	272.03	272.25	272.77
7/29/1997	273.19	273.66	274.01	274.02	273.88	273.71	273.18	272.92	272.91	272.93	272.76	272.32	272.00	271.52	271.72	271.55	271.53	271.42	271.43	271.17	271.32	271.93	272.32	272.61
7/30/1997	272.84	273.06	272.89	272.76	272.44	273.12	272.97	272.88	272.33	272.26	271.99	271.93	271.21	271.29	271.41	271.49	271.21	271.20	271.04	270.68	270.29	270.16	270.71	271.25
7/31/1997	271.42	271.58	271.56	271.74	271.88	272.11	271.90	271.62	271.32	271.03	270.88	270.66	270.57	270.76	270.47	270.40	270.43	270.30	270.14	270.03	269.99	270.17	270.56	270.35
8/1/1997	270.70	271.01	271.22	271.38	271.00	270.41	270.33	270.26	270.29	270.84	270.85	270.82	270.73	270.41	270.43	270.31	270.26	269.85	269.79	269.73	269.70	269.53	269.75	270.34
8/2/1997	270.65	270.93	271.08	271.50	271.51	271.60	271.62	271.55	271.51	271.40	270.73	269.89	269.69	269.64	269.88	269.91	269.69	269.71	270.17	270.46	270.52	270.39	270.35	270.29
8/3/1997	270.43	270.58	270.65	270.61	270.51	270.47	270.32	269.99	269.56	269.72	270.18	270.20	270.00	269.34	269.20	269.20	268.92	269.12	269.11	269.40	269.17	269.58	269.45	269.32
8/4/1997	269.79	269.84	269.92	269.95	269.87	269.68	270.19	270.49	269.98	270.06	270.05	269.76	269.12	268.75	268.68	268.72	268.47	268.71	268.74	268.43	268.53	268.65	268.10	268.79
8/5/1997	268.90	269.08	269.48	269.59	269.73	269.87	269.59	269.99	269.73	269.93	269.71	269.14	268.53	268.90	268.89	268.52	268.47	268.57	268.16	267.56	267.54	267.90	268.37	268.74
8/6/1997	269.17	269.64	269.98	270.36	269.22	268.69	268.80	268.52	269.15	268.49	268.72	268.80	268.38	268.18	267.65	267.72	267.51	267.25	266.74	266.51	266.47	266.92	267.31	267.81
8/7/1997	268.29	268.78	269.25	268.70	268.05	267.75	267.60	268.27	268.06	267.59	267.75	267.63	267.62	267.49	267.16	266.96	267.40	267.40	267.13	266.69	267.07	266.52	266.78	266.93
8/8/1997	267.19	267.45	267.71	267.81	268.00	267.96	268.03	267.82	267.68	267.63	267.72	267.57	267.15	266.78	266.35	266.18	265.97	265.85	265.81	265.75	265.86	265.48	265.35	265.58
8/9/1997	266.00	266.28	266.33	265.96	265.48	265.82	266.33	266.08	265.52	265.64	266.29	266.24	265.77	265.61	265.15	264.90	264.92	264.90	264.80	264.03	263.71	264.15	264.65	264.89
8/10/1997	264.89	265.01	265.21	265.23	265.18	265.41	265.47	265.16	265.08	265.22	265.21	265.12	264.72	264.10	264.19	264.14	263.98	263.83	263.68	263.45	263.28	264.27	264.64	265.00
8/11/1997	265.45	265.92	266.24	266.04	265.45	265.57	265.62	265.57	265.30	265.43	265.49	265.07	264.58	264.37	264.11	264.02	263.89	263.79	264.08	263.82	263.83	263.77	263.96	264.17
8/12/1997	264.27	264.43	264.46	264.08	264.11	264.61	264.48	264.29	264.03	263.81	263.42	263.27	262.89	262.69	262.49	262.73	263.06	262.84	262.69	262.26	262.31	262.53	262.80	263.01
8/13/1997	263.32	263.58	263.51	263.53	263.24	263.31	262.76	262.35	261.99	261.77	262.02	262.35	262.06	261.86	261.74	261.89	261.95	262.20	262.35	262.05	261.78	261.27	261.54	262.18
8/14/1997	262.57	263.03	263.11	262.89	262.37	262.53	262.23	262.14	262.19	262.03	261.81	261.76	261.64	261.43	261.19	261.30	261.08	260.90	260.95	261.04	260.89	260.89	260.86	261.55
8/15/1997	261.88	261.49	261.72	261.57	261.50	261.56	261.35	261.09	261.16	261.21	261.10	260.93	260.89	260.96	260.50	260.28	260.13	259.95	260.00	259.77	259.84	259.26	259.07	259.06
8/16/1997	259.61	259.87	260.17	260.59	260.16	260.09	260.12	259.89	259.64	259.37	259.39	259.29	259.26	259.37	259.13	258.90	258.81	258.53	258.39	258.29	258.85	259.31	259.54	259.07
8/17/1997	258.63	258.75	259.05	259.30	259.27	259.36	259.33	259.25	258.72	258.47	258.33	258.41	258.33	258.23	258.13	258.25	258.31	258.33	258.20	257.99	258.07	258.26	258.44	258.48
8/18/1997	258.48	258.49	258.53	258.66	258.43	259.13	259.34	259.20	258.30	258.11	257.86	257.66	257.55	257.45	257.37	257.29	257.13	257.13	257.12	257.01	257.22	257.24	257.14	257.76
8/19/1997	257.96	258.43	258.90	259.09	258.71	258.48	258.58	258.27	258.75	258.07	257.89	257.64	257.53	257.56	257.02	257.05	256.90	256.87	256.87	256.39	256.94	257.09	257.19	257.68
8/20/1997	258.22	258.56	258.12	257.35	257.24	257.30	257.75	257.47	257.03	256.41	256.31	256.35	256.70	256.57	256.15	255.90	256.04	256.16	256.18	256.10	256.28	256.19	256.27	256.53
8/21/1997	256.73	257.10	257.40	257.51	257.45	257.51	257.70	257.63	257.62	257.45	256.77	256.42	256.30	256.12	256.24	256.17	255.96	255.86	255.87	255.62	255.76	256.27	256.29	256.53
8/22/1997	256.66	257.10	257.35	257.45	257.34	257.40	257.54	257.08	257.13	256.39	256.25	256.07	255.41	255.87	255.64	255.60	255.47	255.40	255.67	255.86	256.10	255.93	255.82	255.82
8/23/1997	256.16	256.37	256.29	256.02	256.12	255.87	255.18	255.14	255.37	255.39	255.47	255.63	255.45	255.18	254.86	254.80	254.87	254.88	255.01	254.89	254.63	254.53	254.47	254.32

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8/24/1997	254.35	254.55	254.82	255.20	255.65	255.84	255.23	254.71	254.56	254.63	254.60	254.48	254.40	254.45	254.42	254.59	254.82	254.29	254.15	254.03	254.26	253.93	254.45	254.77
8/25/1997	255.21	255.64	256.07	256.15	256.03	255.70	255.19	255.15	254.96	255.11	255.03	254.85	254.41	254.23	254.06	253.93	253.66	253.49	253.61	253.50	253.50	253.53	253.70	253.97
8/26/1997	253.53	254.34	254.85	255.38	255.69	255.32	255.98	255.87	255.80	254.93	253.97	254.03	253.71	253.89	254.04	253.83	253.62	253.58	253.49	253.27	253.51	253.71	253.75	254.15
8/27/1997	254.46	254.73	255.08	255.59	255.33	255.25	255.27	255.01	255.01	254.92	254.50	254.36	254.14	253.90	253.70	253.80	253.55	253.30	253.39	253.44	253.61	253.04	252.84	253.32
8/28/1997	253.80	254.22	254.53	254.66	254.27	254.87	254.91	254.21	254.44	254.24	253.93	253.85	254.14	253.80	253.51	253.42	253.22	252.88	252.78	252.65	253.03	252.63	252.71	253.34
8/29/1997	253.85	254.37	254.84	255.05	254.59	254.49	254.34	253.86	253.52	253.38	253.58	253.66	253.31	252.84	252.66	252.78	252.86	252.82	252.83	252.78	253.27	252.96	252.80	252.46
8/30/1997	252.55	252.91	253.49	253.62	253.48	253.57	253.18	252.93	253.12	252.85	252.59	252.59	252.82	252.97	252.55	252.32	252.14	252.11	252.15	252.26	252.42	252.34	251.77	252.02
8/31/1997	252.22	252.42	252.49	252.69	252.80	253.33	253.35	253.21	252.81	252.79	252.61	252.56	252.61	252.26	252.00	251.38	251.61	251.84	251.89	251.65	251.86	252.10	252.03	252.25
9/1/1997	252.39	252.61	252.45	251.95	252.11	252.76	252.69	252.27	252.62	251.50	251.66	251.84	251.31	251.15	251.04	251.00	251.36	251.43	251.39	251.44	251.74	251.38	251.33	251.69
9/2/1997	252.07	252.37	252.64	252.68	252.86	253.13	252.76	252.45	252.13	252.03	251.84	251.59	251.32	251.39	251.22	251.27	251.43	251.35	251.24	251.06	251.64	251.83	252.16	252.29
9/3/1997	252.50	252.99	253.55	253.72	253.34	251.93	252.45	252.73	251.90	251.66	251.57	251.41	251.10	251.23	251.27	251.51	251.82	251.49	251.05	250.90	251.06	251.55	251.80	252.11
9/4/1997	252.55	252.85	253.06	253.27	253.20	252.13	252.19	251.93	251.72	252.37	252.30	251.61	252.00	252.12	251.59	251.48	251.29	251.35	251.37	251.38	251.85	250.91	250.81	251.68
9/5/1997	252.04	252.38	252.82	253.32	253.15	252.23	252.24	252.94	252.23	252.00	252.10	252.29	251.91	251.61	251.45	251.44	251.70	252.23	252.48	252.84	252.60	252.20	251.85	251.87
9/6/1997	251.57	251.95	251.92	251.90	251.97	252.35	252.09	251.96	251.87	252.25	252.25	252.00	251.47	251.16	251.26	251.19	251.02	250.95	251.03	251.00	251.12	250.68	250.87	251.38
9/7/1997	251.42	251.68	251.80	252.18	252.30	252.24	252.30	252.31	251.74	251.55	251.09	251.16	251.02	250.76	250.64	250.57	250.54	250.65	250.79	250.89	251.41	251.79	252.03	252.56
9/8/1997	253.01	253.33	253.29	253.15	252.56	253.04	252.39	252.10	252.05	251.96	251.89	251.85	251.65	251.26	251.02	251.41	251.35	251.56	251.46	250.93	251.44	251.27	251.15	251.89
9/9/1997	252.42	252.91	253.31	253.16	252.63	252.73	252.69	252.50	251.85	251.72	251.47	251.22	251.17	251.20	250.85	251.07	251.10	251.67	251.41	251.37	251.91	251.66	251.75	251.46
9/10/1997	251.60	251.83	252.10	252.30	252.38	252.38	252.39	252.23	251.78	252.18	251.88	251.61	250.75	250.93	250.88	250.99	250.73	250.54	250.65	251.02	251.69	251.43	251.23	251.63
9/11/1997	251.71	251.85	252.20	252.34	252.27	251.75	251.80	251.75	251.48	251.29	251.33	251.35	251.46	251.33	251.43	251.48	251.47	251.68	251.52	251.85	251.93	252.02	252.29	252.25
9/12/1997	252.66	252.52	252.48	252.65	252.67	252.31	252.52	252.19	252.15	251.15	251.49	251.32	250.55	250.57	250.27	250.45	251.23	251.36	251.23	251.32	251.77	252.16	252.34	252.01
9/13/1997	252.13	252.03	251.97	251.73	251.04	252.04	251.98	251.20	251.04	250.87	250.90	251.10	251.10	250.83	250.55	250.18	250.19	250.55	250.64	250.88	251.18	250.94	250.95	251.01
9/14/1997	251.25	251.67	252.13	252.26	252.49	252.26	252.29	251.90	251.70	251.53	251.13	251.24	250.87	250.67	250.56	250.57	250.50	250.55	250.32	250.31	250.76	251.02	251.31	251.67
9/15/1997	251.97	252.02	252.01	251.83	251.74	251.64	251.15	251.12	250.92	250.54	250.42	250.45	250.60	250.35	250.06	250.32	250.47	250.37	250.20	250.31	250.68	250.42	250.67	251.09
9/16/1997	251.31	251.34	251.50	251.50	250.58	250.28	249.87	249.90	249.65	249.57	249.65	249.50	249.57	249.58	249.44	249.36	249.05	249.16	249.09	249.11	249.33	249.70	250.17	250.90
9/17/1997	251.36	251.34	251.01	250.69	250.35	250.07	250.44	250.06	249.62	249.24	249.41	249.25	248.96	248.77	248.66	248.70	248.70	248.50	248.48	248.38	248.51	248.48	248.16	247.99
9/18/1997	247.77	247.75	247.71	247.59	247.64	247.49	247.50	247.41	247.24	247.45	247.25	247.11	247.15	247.39	247.26	247.28	247.48	246.90	246.51	247.27	247.64	246.97	246.57	246.76
9/19/1997	247.19	246.90	246.78	246.48	246.69	246.28	246.18	246.42	246.75	246.52	246.26	246.06	245.84	246.03	245.84	245.69	245.60	245.45	245.17	245.11	245.01	244.75	244.99	245.19
9/20/1997	245.23	245.22	245.05	244.84	244.57	244.52	244.34	244.08	244.03	243.76	243.62	243.47	243.38	243.45	243.22	243.04	242.82	242.77	242.71	242.87	242.83	242.76	242.47	242.48
9/21/1997	242.89	242.85	242.95	242.88	242.32	242.54	242.52	242.20	242.17	241.99	242.06	241.86	241.93	241.70	241.44	241.00	240.76	240.79	240.51	240.56	240.64	240.65	240.49	240.40
9/22/1997	240.26	240.19	240.10	239.98	240.23	240.45	240.28	240.10	239.71	239.64	239.82	239.63	239.56	239.33	239.11	238.99	238.87	238.71	238.55	238.77	238.89	238.59	238.44	238.32
9/23/1997	238.16	238.09	237.98	238.12	238.23	238.08	237.93	237.69	237.63	237.57	237.46	237.32	237.13	237.04	237.02	237.35	237.26	236.87	236.58	236.80	237.08	236.76	236.48	236.46
9/24/1997	236.75	236.87	236.77	236.45	236.45	236.17	236.11	235.99	235.89	235.80	235.72	235.62	235.48	235.23	235.15	235.02	234.99	235.00	234.83	235.24	235.01	234.97	234.89	234.90
9/25/1997	235.09	235.18	235.19	234.80	234.99	234.51	234.14	233.96	233.85	233.74	233.53	---	---	---	233.12	233.05	232.98	232.90	232.81	232.99	233.27	232.86	232.85	232.64
9/26/1997	232.76	232.90	232.85	232.75	232.65	232.52	232.25	232.24	232.23	231.96	231.87	231.77	231.88	231.65	231.32	231.47	231.37	231.36	231.24	231.38	231.24	231.00	230.88	230.89
9/27/1997	230.88	230.99	231.05	230.82	230.53	230.75	230.62	230.53	230.28	230.26	230.11	230.06	230.11	229.98	230.00	229.77	229.64	229.18	228.95	228.76	228.63	228.67	228.65	228.80
9/28/1997	228.95	229.10	229.35	229.32	229.17	229.19	228.62	228.36	228.19	228.19	228.20	227.94	227.86	227.76	227.76	227.80	227.48	227.30	227.23	227.32	227.55	227.54	227.47	227.32
9/29/1997	227.27	227.31	227.28	226.79	226.56	226.25	226.34	226.06	226.08	225.76	225.54	225.39	225.22	225.05	224.87	224.70	224.56	224.39	224.22	224.51	224.49	224.34	224.26	224.24
9/30/1997	224.39	224.43	224.18	224.01	224.24	224.21	224.01	223.70	223.46	223.43	223.39	223.27	223.05	223.04	222.95	222.90	222.69	222.65	222.49	222.46	222.35	222.19	222.39	222.17
10/1/1997	222.02	221.90	221.69	221.97	221.88	221.70	221.55	221.26	221.08	221.09	221.03	220.79	220.63	220.59	220.56	220.35	220.24	220.23	219.96	220.13	220.36	219.96	219.64	219.80
10/2/1997	219.61	219.76	219.62	219.68	219.83	219.30	219.18	219.08	219.08	219.63	219.45	219.60	219.61	219.29	219.47	219.35	219.11	218.68	218.55	218.72	218.81	219.19	219.04	218.93
10/3/1997	219.70	220.14	220.34	220.27	220.05	219.29	219.17	218.92	218.69	219.01	219.58	218.88	218.70	218.76	218.42	218.32	218.59	218.05	218.01	218.22	218.38	218.35	217.83	217.71
10/4/1997	217.84	218.39	218.21	218.26	217.39	217.65	217.71	217.08	216.87	217.00	217.11	216.78	216.82	216.73	216.42	216.28	216.05	215.89	215.85	215.87	216.01	215.89	215.82	216.06
10/5/1997	216.17	216.02	216.15	216.64	216.11	215.95	215.46	215.37	215.33	215.16	215.02	215.05	214.84	214.97	214.59	214.31	214.25	214.03	214.03	214.12	213.94	214.05	213.88	213.93
10/6/1997	214.01	213.78	213.60	214.12	213.93	213.59	213.79	213.62	213.53	213.79	213.57	213.46	213.27	213.39	213.10	212.66	212.25	212.13	212.10	212.14	212.12	211.83	211.74	211.85
10/7/1997	211.71	211.68	211.52	211.52	211.61	211.27	210.84	210.81	210.77	210.75	210.73	210.68	210.68	210.62	210.61	210.58	210.49	210.26	210.12	209.98	210.29	210.12	210.26	210.15

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10/8/1997	210.37	210.27	209.85	209.68	209.63	209.66	210.04	209.72	209.40	209.37	209.54	209.65	209.65	209.48	209.10	209.05	208.92	208.79	208.47	208.82	208.88	208.99	209.00	209.17
10/9/1997	209.11	208.71	208.44	208.60	208.56	208.06	208.03	207.78	207.61	207.84	207.71	207.58	207.43	207.36	207.09	206.94	206.86	207.18	207.05	207.07	207.17	207.11	207.11	206.79
10/10/1997	206.77	206.60	206.39	206.29	206.26	206.22	206.46	206.01	206.08	205.91	205.88	205.68	205.62	205.42	205.23	205.13	205.38	205.57	205.48	205.36	205.52	205.62	205.06	205.23
10/11/1997	204.92	205.14	204.96	204.82	204.72	204.72	204.42	204.45	204.33	204.22	204.43	204.18	204.36	204.48	204.67	204.55	204.21	204.03	204.05	204.04	203.97	204.12	204.00	204.70
10/12/1997	204.13	203.59	203.40	203.56	203.86	204.65	204.33	204.00	203.62	203.73	203.08	202.84	202.83	202.92	202.73	202.49	202.34	202.03	201.88	201.90	202.10	202.05	201.53	201.41
10/13/1997	201.34	201.19	201.10	200.99	201.04	201.10	201.11	201.11	200.72	200.80	200.77	200.59	---	---	200.49	200.20	200.31	199.95	199.80	199.93	199.99	199.75	199.54	199.74
10/14/1997	199.52	199.29	199.29	199.33	199.54	199.31	199.33	199.23	198.97	199.00	198.96	198.73	198.16	197.83	197.58	197.72	197.63	197.25	197.42	197.20	196.92	196.99	196.61	196.31
10/15/1997	196.07	196.01	195.85	196.03	196.01	195.67	196.09	195.87	195.86	195.89	195.72	195.44	195.29	195.32	195.14	194.98	194.85	194.69	194.83	194.56	194.36	194.28	194.09	194.39
10/16/1997	193.98	193.84	193.72	193.45	193.27	192.91	192.55	192.46	192.18	191.94	---	191.70	191.78	191.75	191.67	191.59	191.52	191.43	191.35	191.28	191.20	191.12	191.04	190.97
10/17/1997	190.88	190.81	190.73	190.66	190.57	190.50	190.42	190.35	189.95	189.72	189.60	189.48	189.28	189.08	189.05	188.94	188.80	188.54	188.41	188.15	188.12	187.88	187.61	187.59
10/18/1997	187.40	187.25	187.10	187.04	186.74	186.87	186.63	186.70	186.66	186.81	186.49	186.59	186.47	186.36	185.99	186.11	185.95	185.76	185.86	186.03	186.47	185.97	185.85	185.63
10/19/1997	185.66	186.22	186.69	187.10	187.27	187.68	187.50	187.12	187.05	187.48	187.24	187.30	187.53	187.56	187.63	187.85	187.95	187.94	188.04	188.26	188.69	188.89	189.18	189.19
10/20/1997	189.68	189.98	190.35	190.63	189.31	188.96	189.04	189.08	189.17	189.69	189.99	190.17	189.86	189.82	190.03	190.34	190.47	189.85	189.67	190.51	190.67	190.90	190.95	191.36
10/21/1997	191.68	192.03	192.45	192.77	192.77	191.17	191.23	191.94	192.13	192.34	192.66	192.77	193.01	193.20	193.37	193.45	193.31	193.10	193.05	193.52	194.09	194.38	194.76	195.20
10/22/1997	195.58	195.94	196.23	196.21	194.30	194.20	194.52	194.68	194.94	195.09	195.66	196.05	196.13	196.26	196.38	196.55	197.00	196.80	195.94	194.94	195.33	196.33	196.61	197.00
10/23/1997	197.38	197.82	198.28	198.62	198.33	197.45	196.85	197.30	197.97	198.22	198.54	198.53	198.76	199.11	199.44	199.20	198.48	197.79	197.99	198.44	199.14	199.28	199.57	199.96
10/24/1997	200.25	200.36	200.72	200.79	199.82	198.59	198.85	199.39	199.67	199.87	200.12	200.19	199.03	199.08	199.85	199.87	199.94	199.97	200.26	200.55	200.60	200.64	201.21	201.21
10/25/1997	201.73	201.96	202.07	201.99	201.39	201.06	200.55	200.57	200.96	201.40	201.55	202.08	202.30	202.53	202.74	203.01	203.19	202.51	202.26	202.40	202.59	202.97	203.12	203.49
10/26/1997	203.69	203.90	204.12	204.30	204.52	204.69	203.56	203.34	204.08	204.38	204.21	204.32	205.04	205.27	205.54	205.75	205.16	203.93	204.32	204.46	205.39	205.40	205.86	206.05
10/27/1997	206.40	206.85	207.31	207.33	207.20	205.71	205.38	206.07	205.87	205.76	206.02	206.83	206.85	206.84	206.81	206.66	206.20	205.23	205.34	205.30	205.95	206.35	206.60	206.93
10/28/1997	207.39	207.80	208.32	208.77	209.15	208.85	208.53	207.94	207.12	207.51	208.24	208.48	208.72	208.72	209.03	208.66	208.06	207.40	207.55	207.67	208.10	208.50	208.77	209.02
10/29/1997	209.42	209.85	210.30	210.73	211.08	210.98	210.02	209.67	209.82	209.90	209.84	210.76	210.84	210.80	210.97	210.92	210.45	209.97	209.55	209.83	210.50	210.71	211.01	211.28
10/30/1997	211.62	212.04	212.41	212.76	213.07	212.79	212.33	212.32	212.08	212.09	211.64	211.85	212.43	212.79	212.94	212.63	212.29	212.24	212.51	211.95	212.26	212.88	213.20	213.46
10/31/1997	213.80	214.21	214.67	214.92	215.15	214.95	214.41	214.62	214.40	214.41	214.78	214.45	214.65	214.87	215.27	214.91	214.56	214.49	214.67	214.83	214.49	214.91	215.30	215.53
11/1/1997	215.89	216.21	216.47	216.68	216.97	217.20	217.20	216.41	215.79	215.90	215.89	216.34	216.69	216.62	216.75	216.91	216.42	215.62	216.00	216.63	216.85	217.22	217.49	217.66
11/2/1997	217.94	218.19	218.55	218.97	219.27	219.29	219.02	218.59	218.36	219.49	219.63	220.11	219.72	219.84	220.26	219.77	218.63	217.83	218.38	218.58	218.96	219.54	219.87	220.21
11/3/1997	220.59	220.76	220.50	220.76	221.13	221.30	220.75	221.12	220.56	220.95	221.40	221.69	221.87	221.61	221.62	220.68	220.60	221.15	221.75	221.57	221.68	222.20	222.55	222.66
11/4/1997	222.94	223.14	223.43	223.70	223.80	223.54	222.89	223.31	223.20	223.00	223.17	223.56	223.35	223.55	223.47	223.44	223.19	223.06	223.46	223.18	223.61	223.91	224.30	224.54
11/5/1997	224.74	224.91	225.12	225.25	225.16	225.17	224.75	225.21	225.73	226.20	226.01	226.02	226.04	226.22	226.17	225.74	225.63	224.35	224.40	224.58	224.59	225.17	225.54	225.55
11/6/1997	225.60	225.82	225.83	226.32	226.41	225.91	224.71	224.77	225.17	225.34	225.52	225.54	225.78	226.06	226.08	225.96	225.74	224.80	224.80	225.35	225.77	226.02	226.17	226.40
11/7/1997	226.70	227.04	227.49	227.84	228.14	228.24	227.50	227.23	213.54	---	---	212.06	227.75	227.96	227.86	227.86	227.19	227.29	227.76	227.59	228.08	228.50	228.52	228.80
11/8/1997	229.13	229.24	229.43	229.53	229.59	229.71	229.72	228.90	228.69	228.84	229.04	229.59	229.93	229.78	229.44	229.25	229.02	228.54	229.05	228.95	229.46	229.41	229.60	230.04
11/9/1997	229.97	230.40	230.72	231.02	231.19	231.42	231.49	231.33	231.03	230.81	230.97	231.48	231.20	230.83	231.27	231.41	231.42	231.08	231.00	230.98	231.57	232.12	232.38	232.64
11/10/1997	233.01	233.30	233.45	233.69	233.72	232.62	231.13	231.05	231.05	231.01	231.40	231.70	231.84	231.88	232.25	232.09	231.73	230.97	230.81	231.30	231.33	231.65	231.77	231.94
11/11/1997	232.18	232.52	232.87	233.23	233.65	234.08	233.57	233.83	234.20	231.20	234.37	234.44	234.58	234.89	235.03	234.83	234.18	233.78	234.32	234.36	234.60	235.09	235.40	235.81
11/12/1997	236.05	236.24	236.45	236.65	236.73	235.50	234.94	235.47	236.25	236.05	236.08	235.71	235.71	235.90	235.79	235.45	235.45	234.87	235.21	235.44	235.67	236.08	236.45	236.75
11/13/1997	236.95	237.15	237.38	237.56	237.48	236.65	236.02	236.44	236.48	236.62	236.53	236.89	237.34	237.58	237.87	238.02	237.78	236.39	236.38	236.45	236.50	237.13	237.35	237.63
11/14/1997	237.94	238.27	238.62	238.94	238.84	237.92	237.69	237.78	237.53	237.77	237.62	237.91	238.48	238.71	238.95	238.99	237.84	237.29	237.56	237.86	238.22	238.70	238.89	239.18
11/15/1997	239.51	239.80	240.20	240.61	240.61	240.17	239.90	239.41	238.98	238.92	239.51	239.34	239.59	239.62	239.55	239.59	239.27	238.52	238.55	238.80	238.93	239.05	239.07	239.28
11/16/1997	239.56	239.89	240.15	240.46	240.78	240.99	241.23	240.08	240.01	240.29	240.48	240.55	240.57	240.56	240.74	240.59	239.74	239.65	240.02	240.03	240.02	240.32	240.57	240.84
11/17/1997	241.15	241.50	241.79	242.10	242.48	242.08	241.04	241.45	240.59	240.31	240.77	240.84	240.98	240.99	241.27	241.20	241.05	240.53	240.69	240.53	240.58	241.00	241.33	241.60
11/18/1997	241.95	242.26	242.52	242.77	242.95	242.31	241.71	241.94	242.41	242.46	242.61	242.76	242.39	242.51	242.71	242.84	242.41	241.63	241.60	241.49	241.66	242.07	242.36	242.55
11/19/1997	242.69	242.94	243.15	243.53	243.83	242.95	242.77	243.02	243.71	243.97	243.52	243.76	243.87	243.52	243.55	243.08	243.01	242.79	242.76	242.78	242.94	243.30	243.41	243.30
11/20/1997	243.49	243.61	243.71	243.89	244.05	242.98	243.12	243.29	243.49	243.61	243.58	243.58	244.01	244.23	244.52	244.76	244.19	243.25	243.39	243.72	243.90	244.22	244.53	244.84
11/21/1997	245.07	245.39	245.62	245.83	245.97	244.84	243.43	243.39	243.71	243.83	244.01	244.84	245.04	245.12	245.47	245.65	245.49	244.35	244.08	243.75	243.53	243.76	244.57	244.75

Gross Head

11/22/1997	244.95	245.07	245.31	245.52	245.70	245.60	244.34	243.56	243.31	243.63	244.10	244.40	244.65	244.86	245.05	244.92	244.39	243.85	243.89	243.96	244.02	244.34	244.63	244.87
11/23/1997	245.11	245.37	245.58	245.82	246.11	246.27	246.21	245.17	244.75	244.38	245.37	245.67	245.96	245.93	246.09	246.05	245.52	245.33	245.38	245.50	245.78	246.21	246.50	246.75
11/24/1997	247.08	247.32	247.50	247.78	248.06	247.47	245.33	245.41	245.74	245.63	246.27	246.61	246.93	247.14	247.15	247.22	246.50	245.61	246.33	246.55	246.68	247.26	247.57	247.79
11/25/1997	248.04	248.34	248.53	248.73	248.92	248.94	247.91	247.37	247.72	247.46	248.25	247.75	247.35	247.89	248.45	248.17	247.69	246.71	246.48	247.16	247.09	247.44	247.70	247.93
11/26/1997	248.16	248.47	248.86	249.27	249.64	249.72	248.42	248.56	248.04	248.29	248.67	249.23	249.52	249.55	249.73	249.45	248.83	249.03	249.26	248.93	249.30	249.69	249.95	250.30
11/27/1997	250.54	250.79	251.00	251.30	251.60	251.81	251.10	250.41	249.97	250.20	250.70	251.09	251.47	251.39	251.57	251.76	251.63	250.99	250.18	249.36	249.23	249.36	250.06	250.50
11/28/1997	250.81	251.20	251.65	252.07	252.40	252.72	252.52	252.47	252.39	252.24	252.28	252.56	252.72	252.83	252.96	253.03	252.42	251.98	250.82	251.06	251.30	251.93	251.95	252.35
11/29/1997	252.59	252.84	252.90	253.13	253.43	253.75	253.48	253.19	252.60	252.46	252.69	252.94	253.19	253.24	253.53	253.34	253.30	253.04	252.14	251.93	252.16	252.39	252.60	252.95
11/30/1997	253.20	253.48	253.80	254.06	254.42	254.76	255.04	254.55	254.02	254.42	254.54	254.51	254.47	254.70	254.85	254.69	254.01	253.60	254.01	254.48	254.54	254.75	254.93	255.39
12/1/1997	255.70	255.91	256.25	256.51	256.48	256.13	255.22	254.76	255.02	255.22	255.39	255.95	256.21	256.55	256.56	256.38	255.37	254.72	254.76	254.81	254.99	255.36	255.68	255.78
12/2/1997	255.99	256.19	256.44	256.72	256.85	256.74	255.54	255.33	255.23	255.52	255.99	256.46	256.79	257.02	257.26	257.46	257.22	256.37	256.64	256.63	256.86	257.27	257.64	257.90
12/3/1997	258.25	258.60	259.04	259.46	259.67	258.23	256.96	257.32	257.80	258.10	258.39	258.42	258.91	259.21	259.22	259.03	258.63	257.48	257.62	257.98	258.03	258.28	258.54	258.81
12/4/1997	259.16	259.47	259.78	260.13	260.48	259.50	258.55	258.08	258.36	259.03	259.49	259.88	260.05	260.26	260.46	260.66	260.32	258.87	258.77	258.54	258.59	258.99	259.25	259.51
12/5/1997	259.79	260.16	260.54	260.92	261.02	260.40	259.82	259.89	259.54	260.14	260.08	260.66	261.00	261.24	261.59	261.78	261.45	260.83	260.72	260.62	260.78	260.96	261.36	261.53
12/6/1997	261.77	262.03	262.26	262.60	262.94	263.02	261.82	260.94	260.90	261.15	261.35	261.70	261.99	262.19	262.31	262.39	262.00	262.00	262.01	261.75	261.92	262.14	262.56	262.78
12/7/1997	263.04	263.36	263.66	264.03	264.35	264.53	264.34	264.03	263.83	263.35	263.31	263.44	263.71	264.10	264.60	264.56	263.16	262.53	262.59	262.69	263.07	263.34	263.60	263.82
12/8/1997	264.16	264.54	264.91	265.31	265.66	265.33	264.45	264.34	263.95	263.88	263.80	264.29	264.41	264.48	264.59	264.44	263.82	263.49	263.54	263.69	264.14	264.39	264.70	265.03
12/9/1997	265.43	265.82	266.20	266.62	266.84	266.10	264.86	265.23	265.65	265.64	265.84	266.72	266.81	267.17	267.49	267.43	265.79	264.92	264.97	265.26	265.06	265.66	266.14	266.51
12/10/1997	266.83	267.21	267.59	267.90	267.55	267.08	266.23	266.40	266.60	266.63	266.67	266.50	266.25	266.30	266.69	266.88	266.29	265.83	265.78	265.85	266.33	266.70	267.87	267.94
12/11/1997	268.13	268.57	268.70	268.70	267.86	266.28	265.77	266.05	266.46	265.96	265.99	266.32	266.43	266.38	266.26	266.00	266.05	265.40	265.43	265.56	265.60	265.80	266.73	267.26
12/12/1997	267.88	268.22	268.50	268.84	268.60	267.24	265.95	266.10	266.36	266.35	266.70	266.49	266.44	266.35	267.00	267.20	266.91	265.77	265.93	265.51	265.52	265.60	266.46	266.90
12/13/1997	267.26	267.57	267.98	268.26	268.58	268.84	267.26	266.43	266.53	266.38	266.15	266.65	267.09	267.51	267.29	266.73	266.22	266.12	266.35	266.24	266.24	266.87	268.16	268.79
12/14/1997	268.99	269.00	268.33	268.42	268.23	267.86	267.13	266.63	266.30	266.18	266.30	266.54	266.83	267.05	267.39	267.68	267.25	267.16	267.29	267.31	267.58	267.63	268.47	268.96
12/15/1997	269.40	269.61	269.69	269.57	269.56	268.74	267.93	267.65	267.63	267.77	267.97	268.35	268.96	269.15	269.02	268.87	267.94	267.31	267.32	267.45	267.38	268.06	269.00	268.94
12/16/1997	269.26	268.49	268.51	268.80	268.81	268.34	267.44	267.27	267.50	267.51	267.51	267.57	267.64	267.93	268.00	267.74	267.46	267.28	267.04	266.77	266.77	267.12	268.20	268.39
12/17/1997	268.66	269.10	269.61	270.12	270.30	269.08	268.64	267.86	268.07	267.99	267.75	267.90	268.07	268.10	268.20	268.06	267.55	267.11	267.20	267.12	266.96	267.58	268.40	268.67
12/18/1997	268.94	269.21	269.55	269.90	270.32	270.15	268.64	268.49	268.50	267.89	268.00	268.96	268.59	268.52	268.27	268.31	267.96	267.67	267.55	267.44	267.42	268.09	268.74	269.01
12/19/1997	269.37	269.77	270.24	270.70	270.89	269.40	268.38	268.44	268.89	268.42	268.21	268.38	268.31	268.45	268.47	268.01	267.93	267.58	267.64	267.57	267.54	267.97	268.40	268.72
12/20/1997	269.03	269.30	269.64	270.09	270.36	270.14	269.32	268.41	268.37	268.64	268.73	268.93	269.12	268.94	269.16	268.88	268.22	268.08	268.36	268.64	268.70	268.92	269.32	269.72
12/21/1997	270.27	270.64	270.90	271.03	271.22	271.22	270.86	270.27	270.38	270.53	270.93	271.10	270.95	270.55	270.58	270.57	269.78	269.14	269.09	269.06	269.09	269.95	270.65	271.10
12/22/1997	271.43	271.78	272.20	272.60	272.02	269.84	269.42	269.20	269.32	269.51	269.61	269.40	269.62	269.92	270.24	270.25	269.15	268.81	269.37	268.70	268.60	268.89	269.77	270.05
12/23/1997	270.44	270.79	271.06	271.54	271.97	271.81	270.32	269.63	269.74	269.37	269.56	269.89	270.37	271.16	271.55	271.10	270.85	270.01	269.83	269.69	269.82	269.96	270.70	271.29
12/24/1997	271.52	271.97	272.19	272.44	272.44	271.24	270.32	269.74	269.72	270.01	270.12	270.44	270.74	270.88	270.91	270.67	270.39	270.26	270.18	269.92	269.76	269.74	270.26	270.61
12/25/1997	270.99	271.38	271.81	272.17	272.57	272.75	272.24	271.65	271.71	271.83	271.89	271.82	272.47	273.02	272.56	271.98	271.33	270.59	270.43	270.30	270.61	271.25	271.53	271.75
12/26/1997	271.97	272.27	272.63	273.09	273.47	273.73	272.02	271.08	270.84	270.89	271.09	271.10	271.52	271.90	272.08	272.30	271.55	271.11	270.89	270.94	270.90	271.01	271.78	272.13
12/27/1997	272.58	272.95	273.25	273.55	273.87	274.11	273.32	272.39	271.96	271.94	272.40	272.77	273.21	273.33	273.44	273.45	272.73	272.26	271.87	271.81	271.79	271.84	272.59	272.92
12/28/1997	273.20	273.45	273.76	274.05	274.46	274.93	275.04	274.74	274.03	273.79	274.07	274.26	274.56	274.65	274.62	274.84	274.54	274.44	274.07	273.96	274.85	274.89	275.52	275.85
12/29/1997	276.09	276.15	276.03	276.06	276.28	276.25	274.34	274.11	273.38	273.23	273.25	273.42	273.29	273.18	273.30	273.16	273.08	272.91	272.95	272.92	273.24	274.07	274.51	274.65
12/30/1997	274.99	275.38	275.75	276.00	275.65	275.19	273.60	273.26	273.40	273.45	273.35	273.20	273.26	273.31	273.55	273.26	273.03	272.51	272.56	272.56	272.64	272.93	273.61	273.96
12/31/1997	274.37	274.71	275.02	275.40	275.78	275.85	273.68	273.22	273.27	272.98	272.98	273.13	273.21	273.30	273.59	273.86	273.53	273.11	272.90	273.10	273.11	272.67	273.33	273.61

IDAHO POWER COMPANY
BOISE, IDAHO

Boise, Idaho
Dec. 16, 1959

Brownlee Turbine Test

Mr. R. E. Alworth

The purpose of the index test made on #4 turbine was to verify the performance curve supplied by the manufacturer and to provide a reference point from which wear, pitting, or other changes may be evaluated.

This test was authorized verbally by M. C. Welsh, with Mr. R. E. Gale's approval, and confirmed by letter on 2-3-59 from Mr. Welsh to Mr. G. H. Voaden of S. Morgan Smith Co.

The test was performed on January 27, 28, and 29, 1959 on S. Morgan Smith Shop Order No. 970041 under the supervision of Mr. Luther P. Brown, Hydraulic Engineer, S. Morgan Smith Co.

Very truly yours,

T. R. Heikes
Power Plant Operating Supt.

TRH:MM

COPY

INDEX TEST

OF

BROWNLEE DEVELOPMENT, UNIT #4

FOR

IDAHO POWER COMPANY

BY

S. MORGAN SMITH COMPANY

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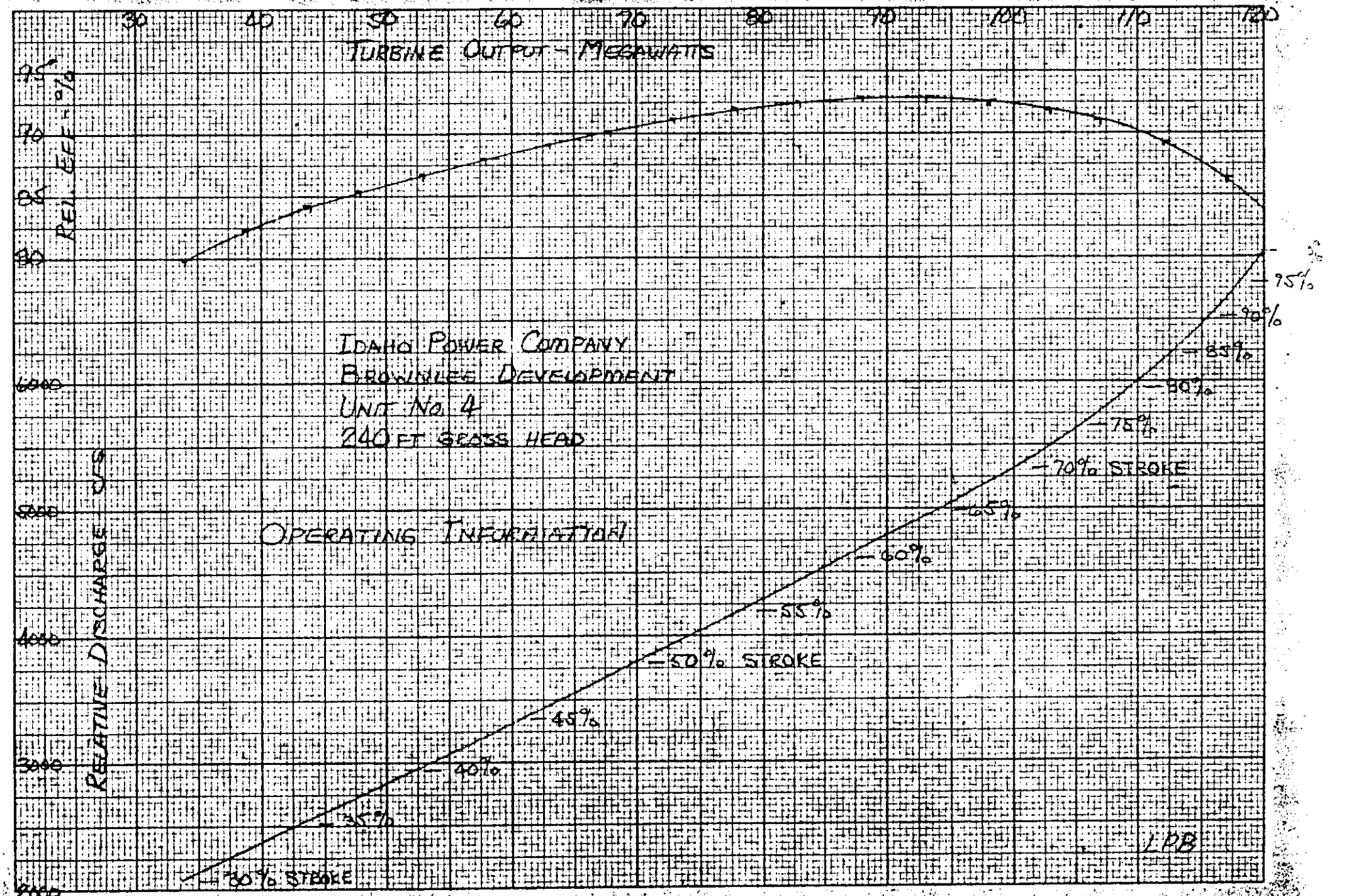
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ABSTRACT

This test was performed in accordance with the general procedures as outlined in the 1953 "Supplement to the Test Code for Hydraulic Prime Movers" (American Society of Mechanical Engineers PTC-18-1949) and "Index Testing of Hydraulic Turbines" by G. H. Voaden (Transactions ASME, Volume 73, 1951 - Pages 481 to 497). It reveals that at 240 feet gross head a maximum turbine output at full gate of 120,000 KW can be attained without vibration or undue noise; and the shape of the performance curve shows a general increase in off peak efficiency over that shown on the contract performance curves. An internal inspection of the turbine shows the unit to be in excellent condition with the normal discoloration and incipient pitting in the runner cavitation area. This incipient pitting is due to operating the unit above the cavitation limit for a long period of time.

NO. 2-1010 SEMCO-GRAPH PAPER
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INTRODUCTION:

According to the Code, the purpose of an index test is to determine the characteristics of a turbine for efficient operation and to provide a reference point from which wear, erosion or other changes may be evaluated.

The index method differs from the other methods described in the ASME Power Test Code in that the quantity of water is determined relatively instead of measured. The theory on which the method is based is fully described in I. A. Winter's Paper entitled "Improved Type of Flowmeter for Hydraulic Turbines".1

This paper claims that with piezometer openings located in the spiral case at different distances from the center of rotation the relative discharge is a straight line function of the square root of the differential head between these piezometers. Paragraph 27 of the Supplement to the 1949 ASME Power Test Code establishes this claim as a bonafide method of determining the relative discharge.

Complete descriptive matter for index testing of both Kaplan and Francis type turbines can be found in G. H. Voaden's Paper, "Index Testing of Hydraulic Turbines". 2 This paper also presents the experiences of Mr. Voaden and others in testing the several types of turbines over a wide range of heads thus making it an invaluable aid to testing by this method.

APPARATUS:

The specific test values required to derive the full measure of benefit from the work are head, output, relative discharge and servomotor stroke.

The gross head effective on the unit was determined by placing staff gauges in the forebay and tailrace. Each staff was located so as to be free as practicable from local disturbances and was established in elevation by a line of levels from a nearby bench mark. The zero mark of the forebay gauge is at elevation 2044.0 and that of the tailrace gauge is 1800.0. The staffs were located so as to measure the effective gross head on Unit #4.

1. ASCE Proceedings, Volume 59, #4, Part 1, April 1953, Pages 565 to 584.
2. Transactions ASME, Volume 73, 1951, Pages 481 to 497.

The switchboard integrating watt-hour meter was used for determining the generator output. Additional readings of power factor and exciter volts and amps were also taken from the control panel instruments. The watt-hour meter was calibrated prior to shipment to the job but not recalibrated after it was installed. None of the other instruments have been calibrated.

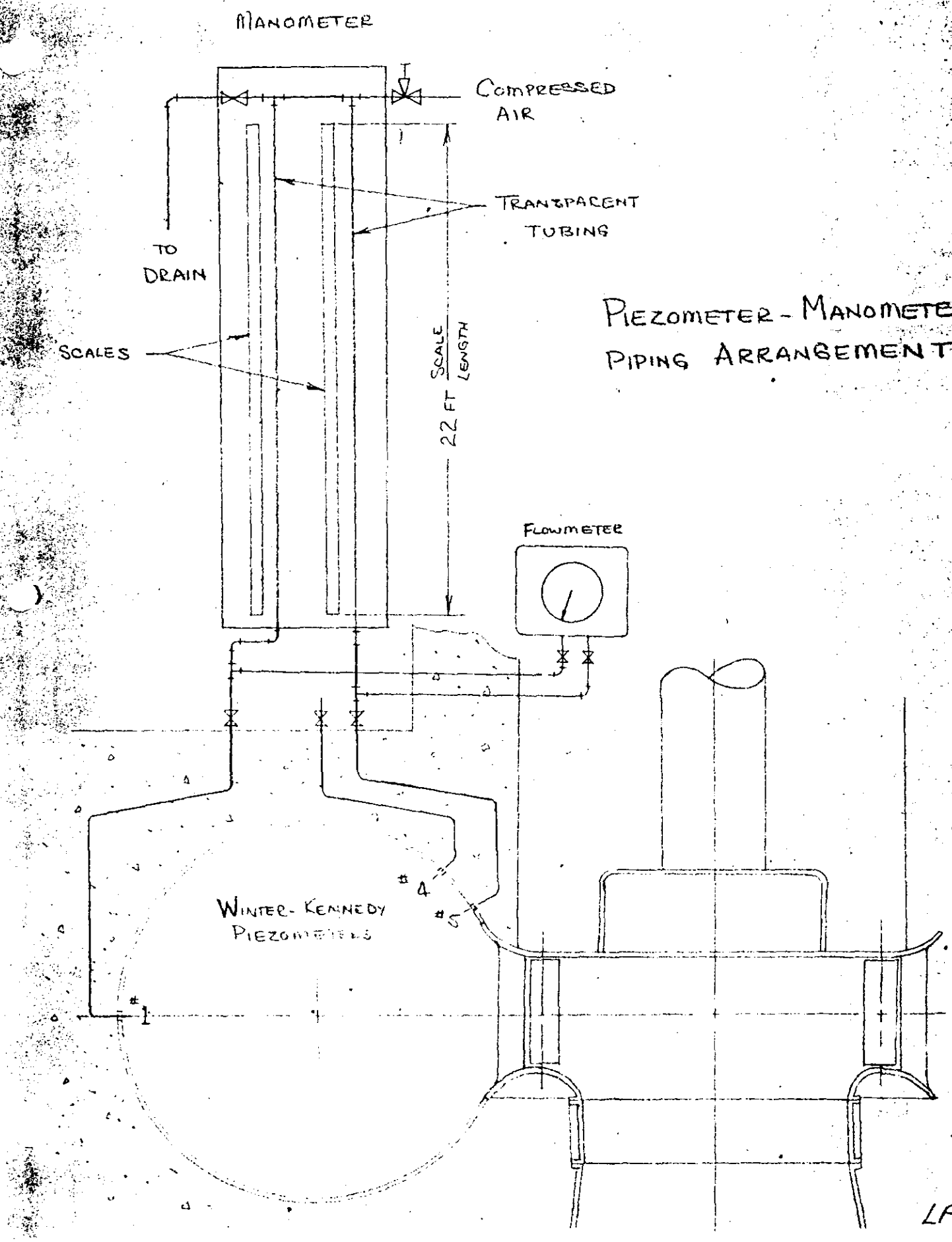
A Winter-Kennedy differential water manometer was constructed for measuring the relative discharge. This manometer consisted of two 24 foot long sections of translucent tubing mounted vertically on a board with a scale graduated in feet and hundredths of feet next to each leg. The bottom connection of one leg was connected to spiral case piezometer tap #1 while the other leg was connected to tap #5. The locations of these taps are shown on page 5 and drawing no. 5121-S-1. At the top of the manometer each leg was connected to a common manifold with valve arranged so that compressed air could be admitted to both legs simultaneously and each leg could be flushed independently. The flowmeter was also connected to these piezometers by parallel piping as shown on page 5.

A 24 inch machinist's scale was attached to the gate servomotor fork end and then an indicator was placed on the compensating cable sheath. Each was matchmarked so the gate settings could be accurately reproduced if necessary. This scale and pointer indicated the travel of the servomotor piston in inches and was permanently affixed to the unit for future reference.

PROCEDURE:

Prior to the test the spiral case was drained and the unit was thoroughly inspected. It was found to be in excellent condition and no adjustments were required. The surface surrounding the piezometer openings was sanded smooth for a distance of 18 inches upstream and 6 inches on the remaining three sides. Each of the openings showed a clear, sharp jet when reverse flushed with water.

Paragraph 40 of the Supplement to the ASME Power Test Code suggests that the gates be calibrated so that output and discharge may be plotted against gate opening. The smooth curves thus obtained form the foundation from which the performance curve is calculated. To satisfy this requirement the gate opening and servomotor stroke were measured at each 10% stroke from closed to full open. The stroke indicated on the governor gate limit control was also recorded during this calibration. Since the servomotor stroke and the governor dial indicated the same stroke it was decided to use the more convenient governor dial indication during the test.



PIEZOMETER-MANOMETER PIPING ARRANGEMENT

Also the plot of gate opening versus governor dial was a straight line above 20% stroke so that the output and discharge could be plotted against the governor dial reading of stroke. (pages 15 &16)

Each of the measured quantities was recorded at each 5% gate servomotor stroke from 30% to 100% stroke. The head and output were measured and calculated by conventional methods. The methods established by Messrs. Winter and Voaden were adopted for calculating the relative discharge and efficiency. The horsepower versus efficiency curve was drawn as explained hereinafter.

The gross head was taken as the arithmetic difference between the elevation of the forebay and tailrace as read on the respective staff gauges. The forebay level was observed to be nearly constant for 24 hours prior to the test. By holding the by-pass spillway discharge constant and a nearly constant plant output, the forebay level was held constant. Therefore a reading every five minutes during the test was considered sufficient. Actually the forebay level was steady within less than ±.05 feet during the test. The tailwater elevation was measured at approximately one minute intervals during each run until a minimum of five readings were obtained. These readings were averaged to find the tailwater elevation applicable to the run during which they were recorded.

The generator output was measured by counting the number of revolutions of the integrating watt-hour meter disc in a measured period of time. From this information the number of revolutions per second can be calculated. The product of this RPS value, the PT ratio, the CT ratio and the meter constant times 3.6 yields the generator output in kilowatts. A curve of generator losses versus output was plotted from the Westinghouse generator data manual. The main exciter voltage and amperage were recorded from the control panel instruments and the exciter power calculated as the product of these two. The only other auxiliary chargeable to the unit was the PMG which was assumed to absorb negligible power. The total turbine output was taken as the sum of the watt-hour meter power, the losses from the curve and the main exciter power. The unit was operated at unity power factor to eliminate calculating the reactive power in arriving at turbine output.

The differential water manometer was flushed for several hours to bring all lines to a constant temperature and to remove any air which might have collected at the high points in the line. Twice during the conduct of the test this flushing was repeated for several minutes. At the outset of the test, and whenever necessary thereafter, the needle valve was opened partially to admit compressed air to the top of the manometer legs. This air depressed the water in the columns so they could be read conveniently.

When a suitable elevation was reached the needle valve was closed. Without this method of depressing the water levels the manometer would have to be placed at an impossibly high elevation. Since the same air pressure is effective on each leg, the differential water pressure is unaffected; and any variation in the level caused by leakage of air pressure through an unsealed fitting, even if it occurs during a run, will still not affect the differential pressure. Ten simultaneous readings of the upper and lower legs were made at 15 second intervals during each run. These readings were averaged and the differential taken as the arithmetic difference between the upper and lower leg averages. One average reading per run of the Foxboro flowmeter was made in order to calibrate the meter as shown on pages 21 and 22.

A reading of the gate servomotor stroke in inches, as well as the gate limit dial reading, was taken for each run during the test so that the necessary curves could be plotted to check the continuity of the test.

DISCUSSION:

Prior to the test it was decided to correct all test values to the common gross head of 240 feet. Since it has been established by others that discharge is proportional to the square root of D* and it is known that discharge is proportional also to the square root of the head, the square root of D can be corrected to a common head by the square root of the ratio of the common head to the test head. Likewise, since output is proportional to the 3/2 power of the head, the output can be corrected by this head ratio to the 3/2 power. Curves of the correction factor versus gross head were plotted to facilitate this correction and are shown on page 8.

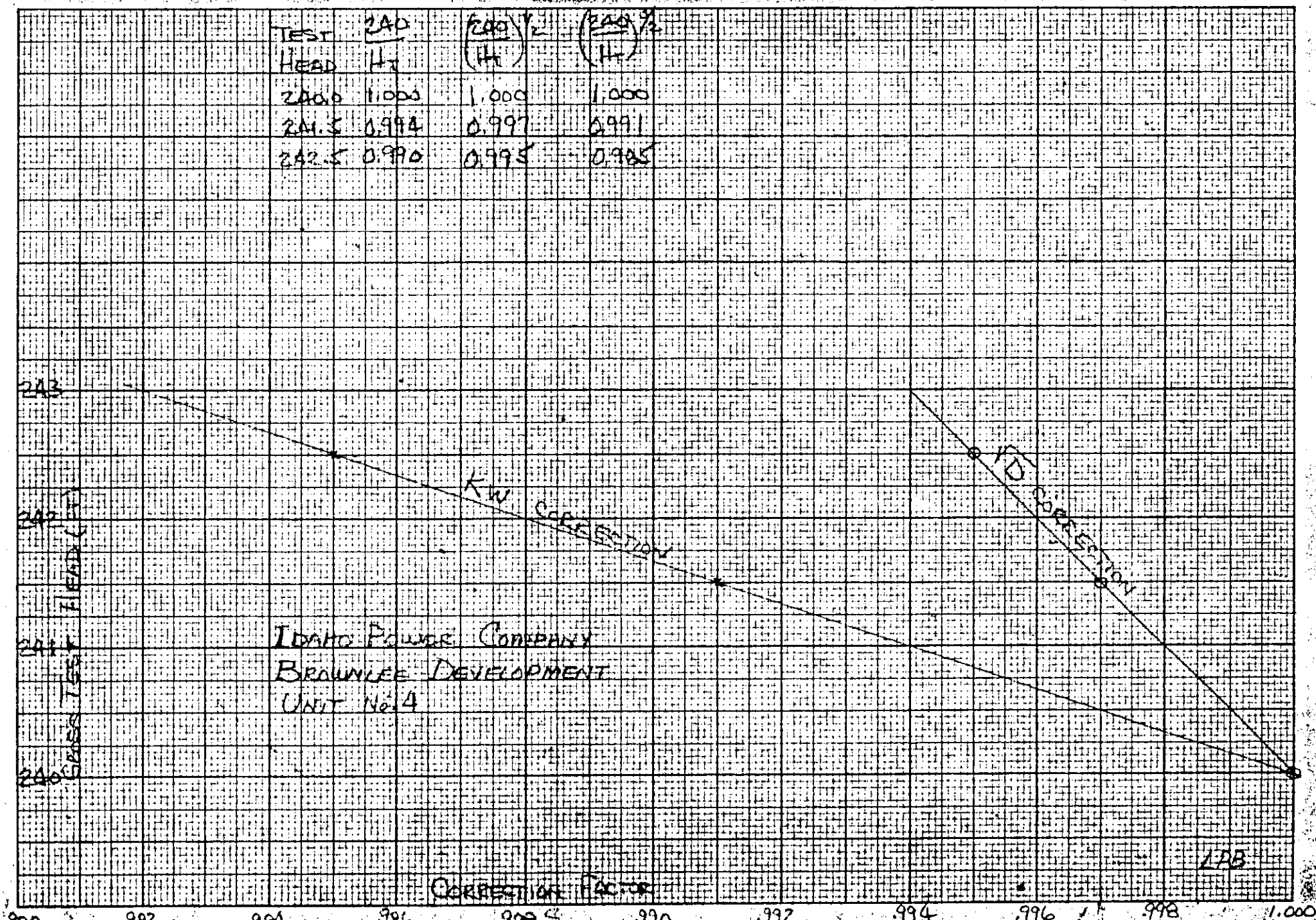
At the conclusion of each run the data were all reported to the test center, entered on the summary sheet, and corrected for head. These corrected values of output and $\sqrt{D}$ were plotted against stroke as the test progressed, smooth curves demonstrating the reliability of the individual test readings. If any run produced a point that did not plot as a continuation of the smooth curve thus far drawn the data were re-examined and if the source of the trouble was not found, the run was repeated later in the test.

After the test was completed values of KW and $\sqrt{D}$ at each 5% gate opening were tabulated from the smooth curves plotted during the test. With $\sqrt{D}$ serving as a measure of discharge the quotient of KW divided by $\sqrt{D}$ is a measure of efficiency. A relative performance curve could then be plotted and as shown at the bottom of

*D is the differential head from the Winter-Kennedy manometer.

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TEST HEAD	$\frac{2A0}{H_T}$	$\left(\frac{2A0}{H_T}\right)^{1/2}$	$\left(\frac{2A0}{H_T}\right)^{3/2}$
240.0	1.000	1.000	1.000
241.5	0.994	0.997	0.991
242.5	0.990	0.995	0.985



IDAHO POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT No. 4

page 20 the peak efficiency is reached at 93,500 KW. $\frac{93,500}{0.746}$ = 125,300 HP delivered by the turbine. 5000?

From the experience curves furnished with the proposal (page 19), the discharge required to deliver 125,300 HP under slightly less than 240 feet head is about 500 cfs.

According to Darcy the head lost in a full flowing pipe of circular cross section is $H_f = \frac{FL}{D} \times \frac{V^2}{2g}$ where for a steel pipe an average value of F of 0.011 may be assumed. L = 580 Ft.; D = 24 Ft.; area = 452.4 sq.ft.; vel. = $\frac{5000}{452.4}$ = 11.05 Ft/sec.

$$H_f = 0.011 \times \frac{580}{24} \times \frac{11.05^2}{64.4} = 0.504 \text{ feet; say 1/2 foot.}$$

Gross head assumed for the test was 240 feet. Therefore the apparent net head is equal to 240 - 0.5 which is 239.5 feet.

The performance curve on page 20 is plotted on the same basis as the curves on page 19 except it is for 239½ feet net head and indicates a peak efficiency of 93% at 125,300 HP. On a gross head basis this efficiency is reduced by the ratio of the net head to the gross head. Gross head efficiency is equal to 93.0 x $\frac{239.5}{240.0}$ = 92.8%.

The discharge then is; $Q = \frac{550}{62.4} \times \frac{HP}{H \times E} = 8.81 \times \frac{125,300}{240 \times 0.928} = \underline{4950}$ cfs.

From the smooth curves of output and $\sqrt{D}$ versus per cent stroke we find that the output of 125,300 HP or 93,500 KW occurs at a gate servomotor stroke of 64.6% where the $\sqrt{D}$ equals 3.010. Since discharge is proportional to the square root of the deflection, using the values of deflection and discharge we can now find the constant of proportionality.

$$Q \propto \sqrt{D}; \quad Q = K\sqrt{D}; \quad K = \frac{Q}{\sqrt{D}} = \frac{4950}{3.010} = 1645$$

The remaining values of relative discharge can be found by multiplying the K constant by the individual test values of the D.

From the discharge and horsepower (or kilowatts) we can calculate the relative efficiency for each test point and plot this efficiency against the output to obtain a performance curve at 240 ft. gross head.

$$\text{Eff.} = \frac{550}{62.4} \times \frac{HP}{\text{Disch.} \times \text{Head}}$$

SUMMARY:

The theory that flow in a spiral case creates a differential pressure which can be used as an index to the discharge through the turbine has been proved sufficiently to be included in the Power Test Code of the ASME as a means of measuring relative discharge. The Test Code also defines the means whereby head and output are to be determined. The combination of these measurements all corrected to a common gross head permits drawing a performance curve the efficiency of which appears in non-recognizable units. While the actual efficiency is not recognizable, a relationship of the efficiency from one test point to another is a direct proportion.

The degree of proportionality can be established by assigning a value of efficiency from previously established performance curves plotted from data derived by laboratory testing of a homologous model with absolute measurement methods under highly controlled conditions and with accurately calibrated measuring devices. Applying this constant of proportionality converts the relative efficiency to readily recognizable values and makes the performance curve suitable for comparison with the original experience curve (page 19).

The comparison of the index test curve with a curve drawn in the same manner as the experience curves, except to a more comparable head, shows the prototype turbine to be slightly more efficient over the entire range on both sides of the peak of the curve than predicted. In addition, the unit produces some 6% more power than shown on the experiance curve without vibration or undue noise. Note that the 1/5% difference in peak efficiency shown on page 20 is due to the difference between net and gross head.

By this comparison it can be seen that substantially large margins over all guarantees apparently would be attained at the heads for which guarantees were stipulated.

While the index test showed that there was no breakdown of performance due to cavitation there is a cavitation limit shown on the curve of page 20. This limit was shown only for the purpose of indicating the maximum output at this test head for the pitting guarantee as defined in article 5 of our specifications.

An important advantage of the index test is that it provides useful data to aid in operating the station at its optimum. The many curves appended hereto, especially the operating information curve of page 2, when compared with similar test curves performed under other heads will clearly define the number of units needed and the gate opening of each to most efficiently match any load requirement at any head.

The index test can be used as a reference parameter from which the effects of wear and cavitation or pitting may be evaluated. In addition, stretch in the governor compensating cable can be detected, and calibration of the flowmeter can be verified.

This test was authorized by Idaho Power Company and performed on January 27, 28 and 29, 1959 under S. Morgan Smith Shop Order Number 970041. The instruction and supervision of the test was assumed by Mr. Luther P. Brown, Hydraulic Engineer, S. Morgan Smith Company; while the station operation and safety were assumed by Mr. Maynard Welsh, General Superintendent, Idaho Power Company.

Submitted by,

Luther P. Brown

Luther P. Brown

LPB:dl

orm Eng. 023

S. MORGAN SMITH CO., YORK, PA.

INDEX TEST—FORM 5—SUMMARY SHEET

SHEET 2 OF 2

Operating Company IDAHO POWER COMPANY Plant BROWNLEE Unit No. 4 Date 1-29-59

At Constant Gross Head of 240 Ft.

1	2	3	4	5	6	7	8	9	10	11	12	From Smooth Curves				
Time	Run No.	SM Stroke %	Air B.V. Valve Deg.	Elevations Headwater Ft.	Elevations Tailwater Ft.	Gross Head Ft.	Generator Output K W	D Ft. Water	$\sqrt{D}$	Generator Output K W	$\sqrt{D}$	K W Generator Output	$\sqrt{D}$	K W / $\sqrt{D}$	Relative Cfs	K W / Cfs
:15	18	65.2	BLOCKED CLOSED	2044.2	1801.5	242.7	2,233 96,288	9.48	3.080	94,730	3.064	— THESE GATE OPENINGS WERE				
:23	19	55.1	OPEN	2044.2	1801.6	242.6	1,963 81,112	6.74	2.597	79,860	2.583	— REPEATED TO HELP DEFINE THE CURVES. THEREFORE				
:34	20	95.2	CLOSED	2044.2	1801.6	242.6	2,687 120,681	17.44	4.180	119,700	4.160	— THE SMOOTH CURVE DATA IS RECORDED WHERE THAT GATE OPENING APPEARS FIRST.				
) →	INDICATES WHERE W-K MANOMETER WAS FLUSHED.															

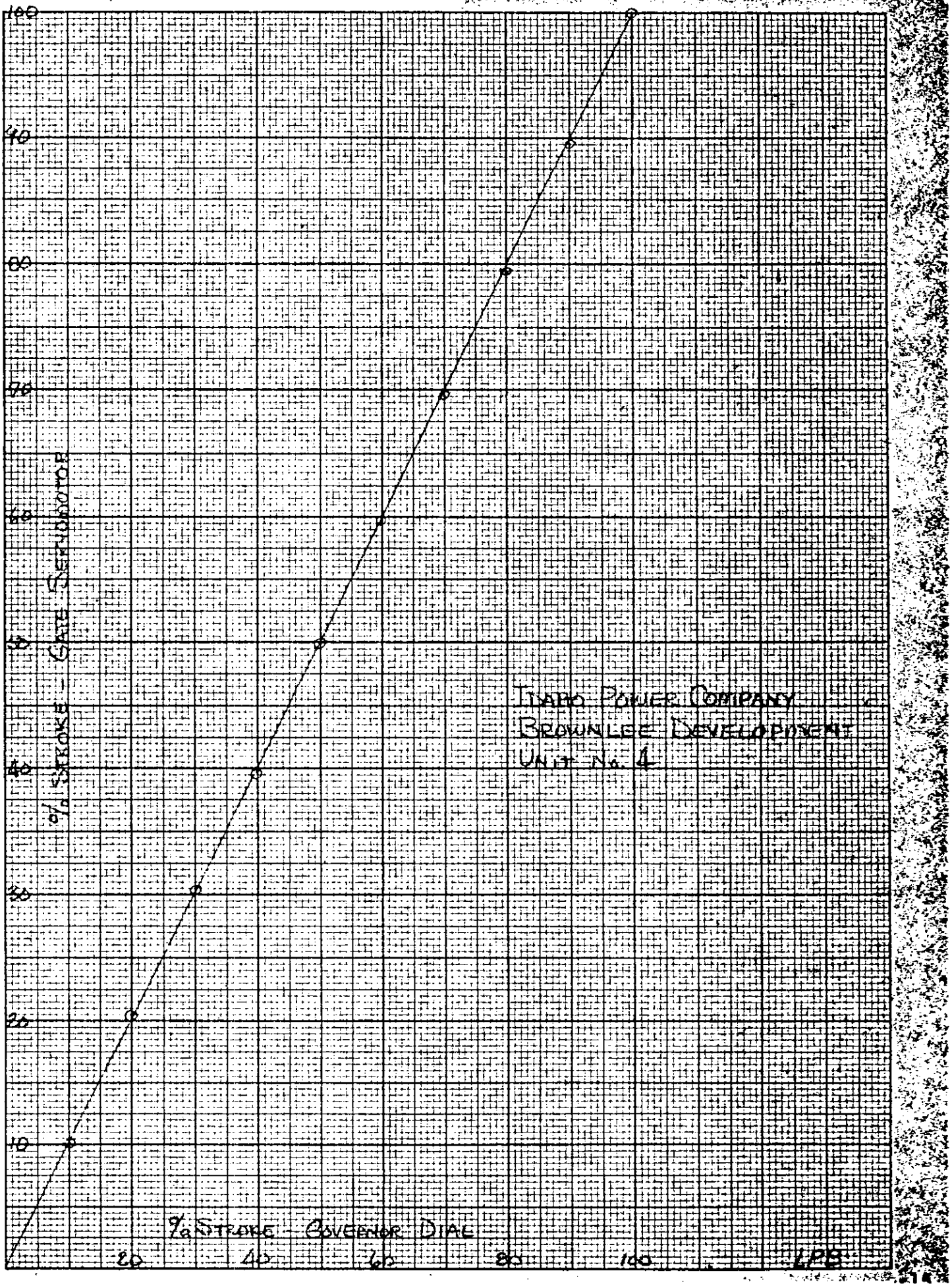
BROWNLEE
S.O. 77480 TURBINES
S.O. 970041 TEST

FROM PREVIOUS CALIBRATION BY D. M. ANDREWS SELECT GATES "B TO A" AS THE AVERAGE PAIR. "A" IS THE FIRST GATE TOWARD THE LARGE END OF THE SPIRAL CASE FROM THE "X" SIDE OF THE "X-Y" CENTERLINE.

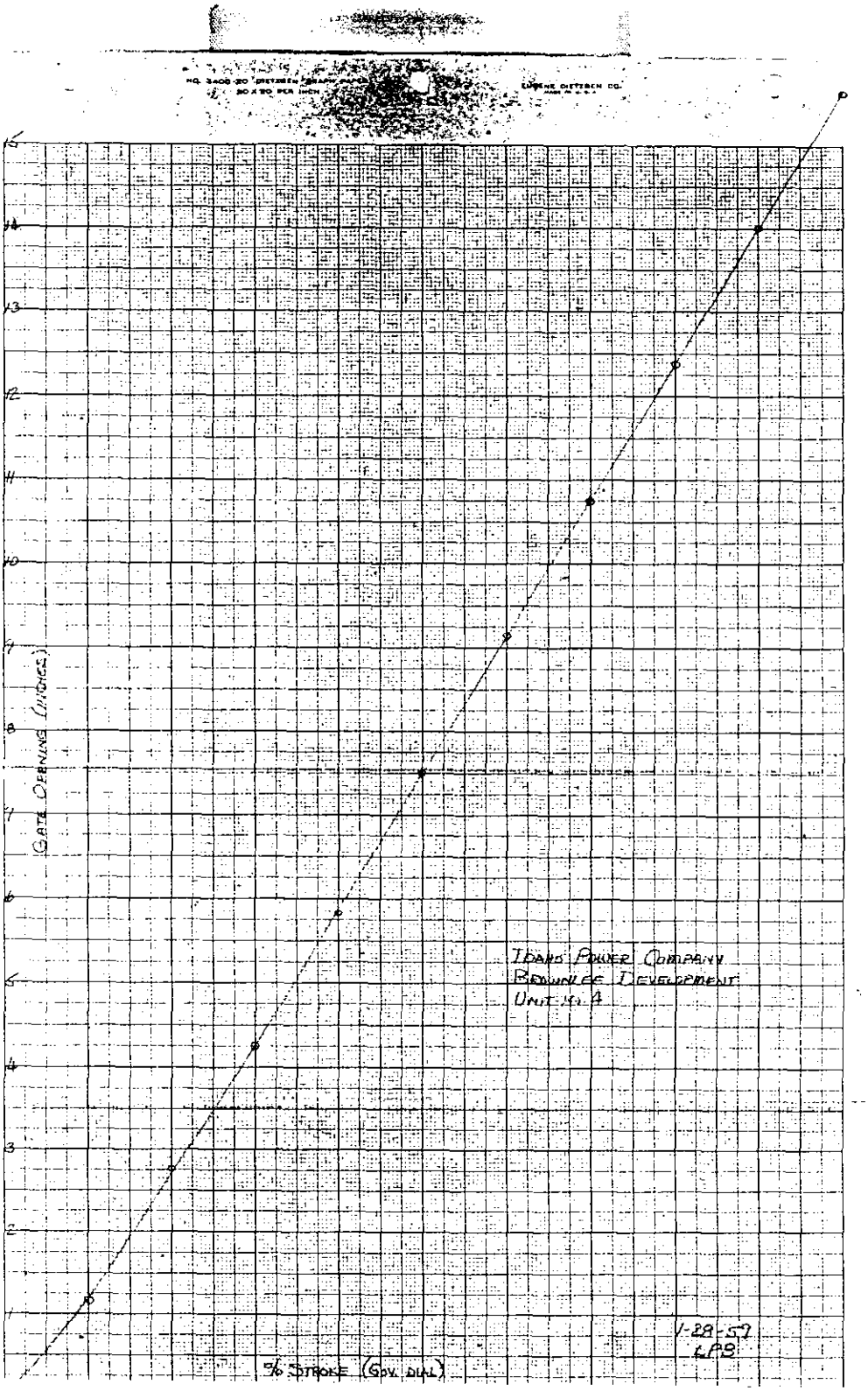
GOVERNOR DIAL %	SERVOMOTOR STROKE INCHES	GATE RING INDICATOR %	GATE OPENING TOP - CENTER - BOTTOM INCHES			AVG. INCHES
0	2	-3.0	0	0	0	0
10	4	+8.5	1 5/32	1 9/32	1 3/16	1.167
20	6 3/32	19.0	2 3/4	2 3/4	2 25/32	2.760
30	8 1/16	28.5	4 1/4	4 1/4	4 1/4	4.250
40	9 15/16	38.5	5 13/16	5 13/16	5 13/16	5.813
50	11 31/32	49.6	7 1/2	7 1/2	7 1/2	7.500
60	13 29/32	59.8	9 9/32	9 9/32	9 1/8	9.146
70	15 7/8	70.0	10 3/4	10 3/4	10 3/4	10.750
80	17 27/32	82.0	12 3/8	12 3/8	12 3/8	12.375
90	19 7/8	90.0	14	14	14	14.000
100	21 31/32	100.5	15 5/8	15 9/8	15 9/8	15.625
100.1	21 31/32	100.7	15 21/32	15 21/32	15 21/32	15.656

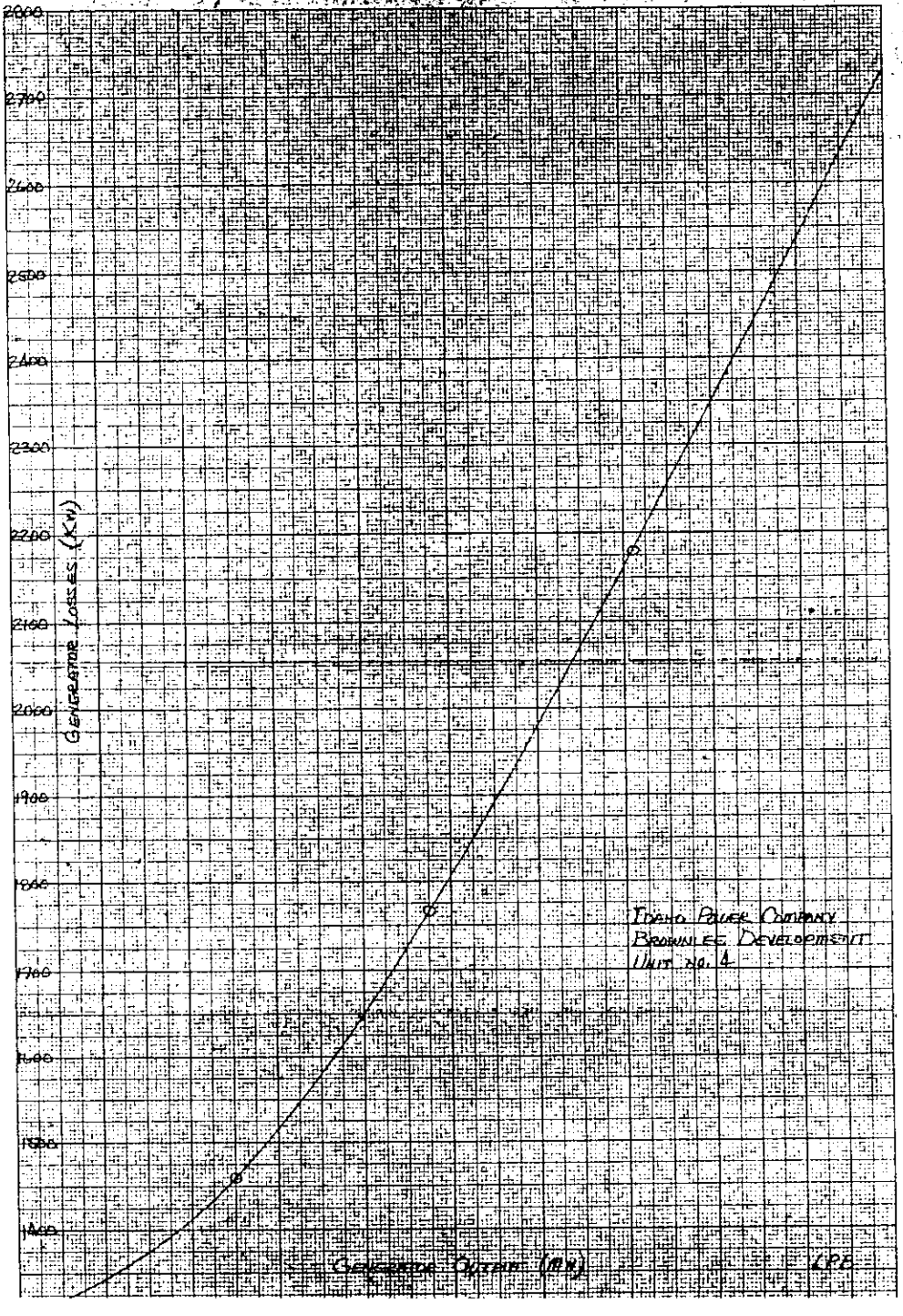
TOP = 14 INCHES DOWN FROM HEAD COVER.
CENTER = MIDWAY BETWEEN HEAD COVER & BOTTOM RING.
BOTTOM = 6 INCHES ABOVE BOTTOM RING.

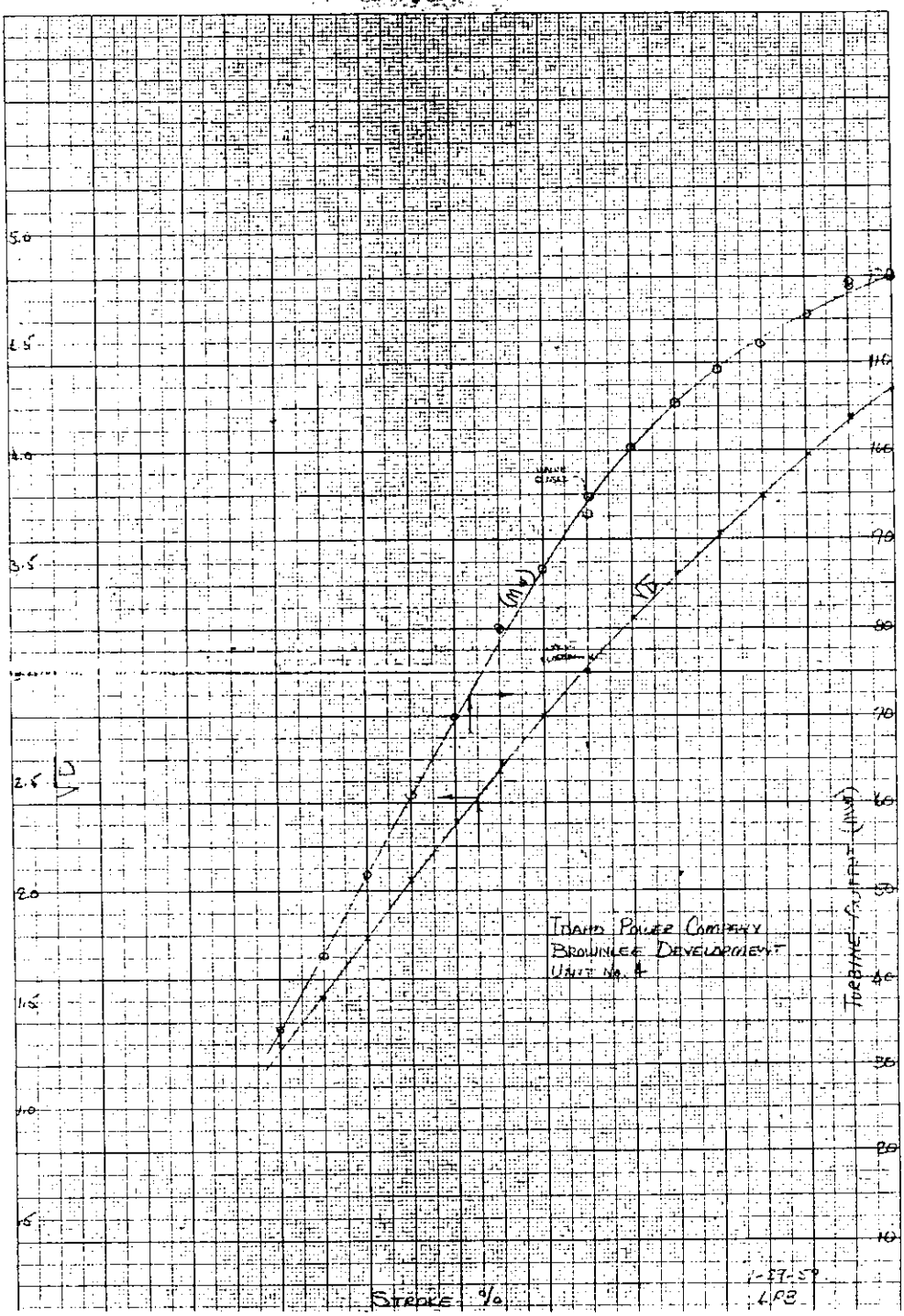
1-28-59
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GATE OPENING (INCHES)
% STROKE (GOV. DIAL)
IDAHO POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT NO. 4
1-28-57
LPS


2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
Generator Losses (KW)
Idaho Power Company
Brownlee Development
Unit No. 4
Generator Output (MW)
CPC


NO. 3400-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH
EUGENE DIETZGEN CO.
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
110
100
90
80
70
60
50
40
30
20
10
VALVE CLOSED
(MW)
VD
TURBINE OUTPUT (MW)
TRANS POWER COMPANY
BROWNLEE DEVELOPMENT
UNIT NO. 4
1-27-59
GRB
STROKE %

50
60
70
80
90
100
110
120
130
140
150
160
HORSEPOWER IN THOUSANDS
EFFICIENCY IN PERCENT
95
90
85
80
75
CAVITATION LIMIT AS DEFINED IN THE CONTRACT FOR THE FITTING GUARANTEE
= EXPERIENCE CURVE CORRECTED FROM MODEL TEST 1.5% M. ET HEAD
= PERFORMANCE CURVE FROM FIELD INDEX TEST 240 FT GROSS HEAD
30
40
50
60
70
80
90
100
110
120
TURBINE OUTPUT IN MEGAWATTS
KW AT
= RELATIVE EFFICIENCY FROM INDEX TEST 240 FT GROSS HEAD
FOR IDAHO POWER CO.
BROWNLEE DEV
SO 77480
TEST ORDER NO. 970041
S. MORGAN SMITH CO
YORK, PA
2-4-59
L&H & LPB

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BROWNLEE DEVELOPMENT
UNIT No. 4

FLOWMETER CALIBRATION

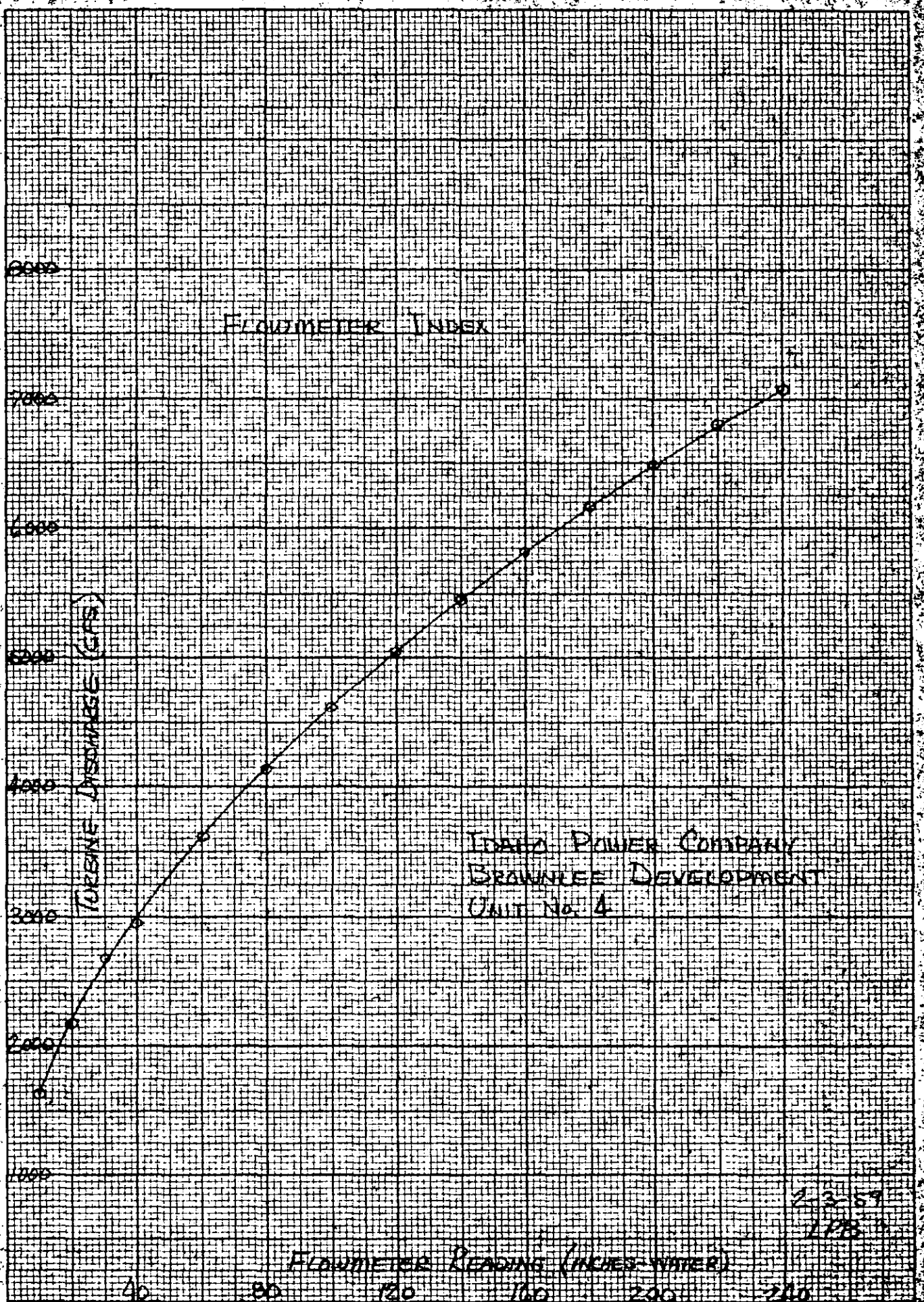
WATER MANOMETER DIFFERENTIAL (INCHES-WATER)

240
200
160
120
80
40

40 80 120 160 200 240

FLOWMETER READING (INCHES-WATER)

2-3-54
LPB



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BOSTON 10, MASS.

FORM ENG. -016

S. MORGAN SMITH CO., YORK, PA.

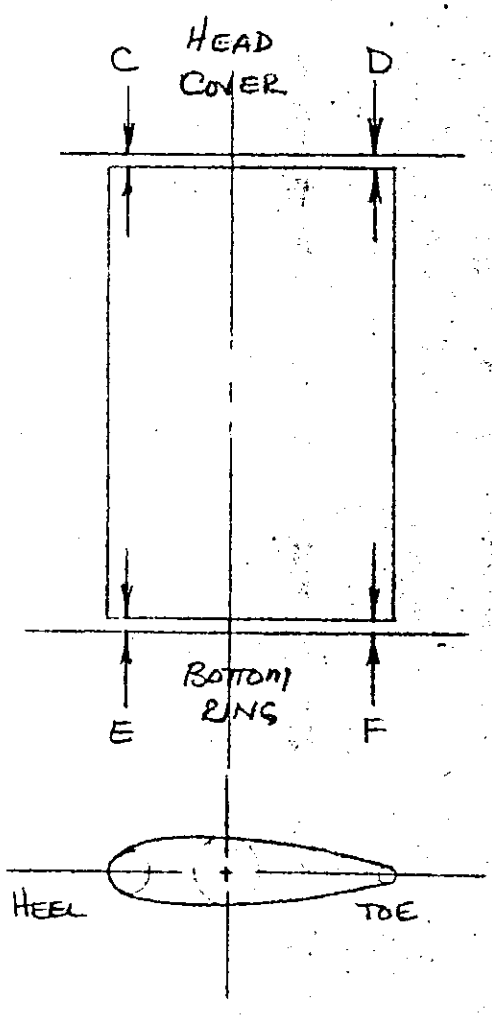
ENGINEERING DIVISION

INQ. NO.
ORDER NO. 970041 DATE: 1-29-59 BY: LPB SHEET NO.

SUBJECT: INDEX TEST CALCULATIONS CUSTOMER: IDAHO POWER - BROWNLEE

WICKET GATE CLEARANCE MEASUREMENTS FROM 'ERECTION REPORT'

GATE NO.	CLEARANCE IN INCHES C	D	E	F
A	.011	.012	.011	.012
B	.010	.011	.010	.010
C	.011	.008	.012	.012
D	.014	.015	.009	.009
E	.013	.013	.016	.011
F	.013	.014	.008	.008
G	.013	.016	.010	.015
H	.010	.016	.010	.008
I	.012	.014	.008	.008
J	.013	.016	.008	.008
K	.012	.012	.013	.013
L	.016	.017	.014	.015
M	.011	.015	.012	.010
N	.013	.015	.010	.010
O	.013	.016	.013	.011
P	.011	.012	.012	.015
Q	.017	.018	.008	.008
R	.013	.015	.010	.010
S	.011	.014	.015	.011
T	.013	.013	.008	.014
AVG	.0125	.0141	.0109	.0109



UNIT No. 4

MEASUREMENTS MADE JULY 11, 1958

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF

INDEX TEST—FORM 2— HEADWATER and/or [redacted] ELEVATIONS

Operating Company IDAHO POWER

Plant BROWNLEE Unit No. # 4

Observer [redacted] MAINTENANCE Date 1-29-57

Time							
1:00 PM	2044.2	3.20	2044.2				
1:05	2044.2	3.25	2044.2				
1:10	2044.2	3.30	2044.2				
1:15	2044.2	3.35	2044.2				
1:20	2044.2	3.40	2044.2				
1:25	2044.2	3.45	2044.2				
1:30	2044.2	3.50	2044.2				
1:35	2044.2	3.55	2044.2				
1:40	2044.2	4.00	2044.2				
1:45	2044.2						
1:50	2044.2	4.05	2044.2				
1:55	2044.2	4:10	2044.2				
2:00	2044.2	4:15	2044.2				
2:05	2044.2	4:20	2044.2				
2:10	2044.2	4:25	2044.2				
2:15	2044.2	4:30	2044.2				
2:20	2044.2	4:35	2044.2				
2:25	2044.2	4:40	2044.2				
2:30	2044.2	4:45	2044.2				
2:35	2044.2	4:50					
2:40	2044.2	4:55					
2:45	2044.2	5:00					
2:50	2044.2						
2:55	2044.2						
3:00	2044.2						
3:05	2044.2						
3:10	2044.2						
3:15	2044.1						

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1

INDEX TEST—FORM 2— [redacted] and/or TAILWATER ELEVATIONS

OF 2

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4

Observer Verne C. Miller Associate Engineer Date Jan. 29, 1959

Time			Time			Time	
1:11	1801.3		2:01	1801.4		3:17	1801.5
1:12	1801.2		2:02	1801.6		3:18	1801.7
1:12.5	1801.3	1801.3	2:02.5	1801.6	1801.5	AV	1801.6
1:13	1801.3		2:03.5	1801.6			
1:14	1801.4		2:04.5	1801.5		3:21	1801.7
1:22	1801.3		2:24	1801.4		3:?	1801.6
1:23	1801.5		2:24.5	1801.7		3:23	1801.7
1:23.5	1801.4	1801.4	2:25	1801.4	1801.5	AV	1801.5
1:24	1801.5		2:26	1801.5			
1:24.5	1801.4		2:27	1801.5		3:30	1801.5
1:25	1801.4		2:35	1801.5		3:31	1801.5
1:35	1801.4		2:37	1801.5		3:32	1801.5
1:35.5	1801.3		2:38	1801.5	1801.5	3:33	1801.5
1:36	1801.4	1801.4	2:39	1801.4	75 %	Estimate	1801.4
1:37	1801.4		2:40	1801.5			
1:37.5	1801.5		2:46	1801.6		3:47	1801.5
1:38	1801.5		2:47	1801.4		3:48	1801.4
1:47	1801.4		2:47.5	1801.5	1801.5	3:48.5	1801.4
1:48	1801.4		2:48	1801.6		3:49	1801.5
1:48.5	1801.5	1801.5	2:49	1801.5		3:50	1801.5
1:49	1801.5		2:57	1801.6		AV	1801.5
1:50	1801.6		2:58	1801.6	1801.6		
1:59	1801.5		2:59	1801.6		3:54	1801.5
2:00	1801.4		3:09.5	1801.5		3:57	1801.5
2:00.5	1801.5	1801.5	3:10.5	1801.6	1801.6	3:58	1801.5
2:01	1801.5		3:12	1801.6		3:59	1801.5
2:02	1801.5						

Form Eng. 020 S. MORGAN SMITH CO., YORK, PA. SHEET 2

INDEX TEST—FORM 2— [redacted] and/or TAILWATER ELEVATIONS OF 2

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4

Observer Verne C. Miller : Associate Engineer Date Jan. 29, 1959

Time							
4:05.5	1801.6						
4:06.5	1801.6						
4:07	1801.5	1801.5					
4:08	1801.4						
4:09	1801.5						
4:15	1801.6						
4:16	1801.5	1801.5					
4:16.5	1801.4						
4:18	1801.5						
4:24	1801.6						
4:25	1801.6						
4:26	1801.7	1801.6					
4:27	1801.5						
4:27.5	1801.6						
4:35	1801.6						
4:36	1801.5	1801.6					
4:37	1801.6						
4:37.5	1801.8						
4:38.5	1801.7						

Form Eng. 021

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 of 1

INDEX TEST—FORM 3—GENERATOR OUTPUT DATA

Operating Company IDAHO POWER COMPANY

P.T. Ratio 14400/120 C.T. Ratio 5000/5 Plant Brownlee

Meter Constant (K) 0.6 Test 72000 Pri. Unit No. 4

$KW = \frac{P.T. \times C.T. \times K \times 3600 \times Rev.}{1000 \times Sec.} = 25920 \times \frac{Rev.}{Sec.}$

Observer Gailen Soule - Sr. Engr.

Date 29 January

Meter No 30 769 545

Time	Run No.	No. of Revs.	Time Secs.	Output K W	Time	Run No.	No. of Revs.	Time Secs.	Output K W
1:10	1	10	14.5	17,880	3:17	12	20	43.2	118,360
1:12		3	43.2		3:20	13	20	44.2	
1:23	2	10	62	41,800	3:23	13	20	43.2	118,360
1:24	2	5	31		3:24	13	10	21.8	
1:35	3	10	43	60,250	3:29	14	20	43.2	120,000
1:36	3	5	21.6		3:31	14	10	21.8	118,800
1:47	4	10	32.6	79,500	3:32	14	20	43.6	
1:49	4	5	17		3:46	15	10	77.4	
1:52	4	10	33.2	78,200	3:49	15	5	38.6	
1:54	5	10	30.4	85,300	3:55	16	10	50.8	54,000
2:01	5	20	60.2	86,100	3:58	16	10	50.6	
2:11	6	20	56.0	92,600	4:05	17	10	37.6	69,120
2:12	6	10	28.1		4:07	17	5	19.2	
2:14	6	10	27.9		4:14	18	20	55.2	93,600
2:24	7	10	26.0	99,600	4:24	19	10	32.8	79,020
2:25	7	20	52.1		4:25	19	10	32.8	
2:34	8	20	49.6	104,516	4:35	20	20	44.	117,600
2:36	8	10	24.8			20	10	22.	
2:45	9	20	47.8	108,452					
2:46	9	10	23.6						
2:47	9	20	47.8						
2:56	10	20	46.6	111,244					
2:57	10	20	46.6						
3:08	11	20	45.1	114,690					
3:09	11	10	22.6						

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF 3

INDEX TEST—FORM 4—ELECTRICAL DATA

Operating Company IDAHO Power Co. Plant Brownlee Unit No. 4

Observer GENE C. ADSMOND - operator Date Thurs. Jan. 29, 195

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
1:10.45	14.0	700	17,000		1.0		160	565		
	14.0	700	17,000		1.0		160	570		
	14.0	700	17,000		1.0		165	565		
AVG.	14.0	700	17,000		1.0	1293	162	567	92	1385
1:22.33	14.0	1725	43,000		1.0		165	595		
	14.0	1725	43,000		1.0		168	595		
	14.0	1725	43,000		1.0		168	595		
AVG	14.0	1725	43,000		1.0	1428	167	595	99	1527
1:35.02	14.0	2475	62,000		1.0		175	625		
	14.0	2475	62,000		1.0		175	625		
	14.0	2475	62,000		1.0		175	625		
AVG	14.0	2475	62,000		1.0	1651	175	625	109	1760
1:46.33	14.0	3175	80,000		1.0		185	665		
	14.0	3175	80,000		1.0		185	665		
	14.0	3175	80,000		1.0		185	665		
AVG	14.0	3175	80,000		1.0	1970	185	665	125	2095
1:57.01	13.8	3575	92,000		1.0		191	680		
	13.8	3550	88,000		1.0		191	680		
	13.8	3550	88,000		1.0		192	680		
AVG.	13.8	3550	88000		1.0	2090	191	680	130	2220
2:08.51	13.8	3850	97,500		1.0		193	695		
	13.8	3850	97,500		1.0		193	695		
	13.8	3850	97,500		1.0		193	695		
AVG.	13.8	3850	97,500		1.0	2210	193	695	138	2348
2:23.45	13.75	4075	101,000		1.0		202	715		
	13.75	4075	101,000		1.0		203	715		
	13.75	4075	101,000		1.0		204	715		
						2343			145	2488

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

SHEET 2 OF 3

INDEX TEST—FORM 4—ELECTRICAL DATA

Operating Company IDAHO POWER CO. Plant BROWNLEE Unit No 4

Observer GENE C. ADSMOND - OPERATOR Date Jan. 29, 1959 - Thurs

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
2:34:20	13.75	4325	107,000		1.0		211	740		
	13.75	4325	107,000		1.0		211	740		
	13.75	4325	107,000		1.0		210	735		
Ave	13.75	4325	107,000		1.0	2434	211	738	156	2590
2:45:13	13.8	4500	110,500		1.0		215	750		
	13.8	4500	110,500		1.0		215	750		
	13.8	4500	110,500		1.0		215	750		
Ave.	13.8	4500	110,500		1.0	2509	215	750	161	2670
3:36:18	13.8	4675	113,500		1.0		220	760		
	13.8	4650	113,500		1.0		220	760		
	13.8	4650	113,500		1.0		220	760		
Ave.	13.8	4658	113,500		1.0	2563	220	760	167	2730
3:06:45	13.8	4825	117,500		1.0		226	775		
	13.8	4825	117,500		1.0		226	775		
	13.8	4825	117,500		1.0		226	775		
Ave.	13.8	4825	117,500		1.0	2628	226	775	175	2803
3:16:07	13.75	4925	119,000		1.0		229	780		
	13.75	4925	119,000		1.0		229	780		
	13.75	4925	119,000		1.0		229	780		
Ave.	13.75	4925	119,000		1.0	2698	229	780	179	2877
3:30:08	13.75	5000	121,000		1.0		232	790		
	13.75	5000	121,000		1.0		233	790		
	13.75	5000	121,000		1.0		232	790		
Ave.	13.75	5000	121,000		1.0	2708	232	790	183	2891
3:46:35	13.9	1375	34,000		1.0		169	580		
	13.9	1375	34,000		1.0		168	580		
	13.9	1375	34,000		1.0		168	580		
Ave.	13.9	1375	34,000		1.0	1365	168	580	97	1462

Form Eng. 022

S. MORGAN SMITH CO., YORK, PA.

SHEET 3 OF 3

INDEX TEST—FORM 4—ELECTRICAL DATA

Operating Company IDAHO POWER CO. Plant BROWNLEE Unit No 4

Observer GENE C. ADSHEAD - OPERATOR Date THURS. JAN. 29, 1932

Time	Generator						Main Exciter			Total Losses KW
	Indicated			Calculated			Indicated		Losses KW	
	KV	Amps.	KW	KVA	PF	Losses KW	Volts	Amps.		
3:55:51	13.9	2125	53,000		1.0		172	605		
	13.9	2125	53,000		1.0		172	605		
	13.9	2125	53000		1.0		171	605		
AVE.	13.9	2125	53,000		1.0	1526	172	605	104	1630
4:05:13	13.9	2875	71,000		1.0		181	640		
	13.9	2875	71,000		1.0		181	640		
	13.9	2875	71,000		1.0		181	640		
AVE	13.9	2875	71,000		1.0	1792	181	640	116	1908
4:14:15	13.8	3900	95,500		1.0		201	705		
	13.8	3900	95,500		1.0		201	705		
	13.8	3900	95,500		1.0		201	705		
AVE	13.8	3900	95,500		1.0	2233	201	705	142	2375
4:23:47	13.8	3275	81,000		1.0		189	660		
	13.8	3275	81,000		1.0		189	660		
	13.8	3275	81,000		1.0		189	660		
AVE.	13.8	3275	81,000		1.0	1963	189	660	125	2088
4:34:44	13.7	4915	119,500		1.0		225	730		
	13.7	4950	119,500		1.0		224	780		
	13.7	4950	119,500		1.0		225	780		
AVE	13.7	4958	119,500		1.0	2687	225	790	176	2863

Form Eng. 019

Reading every 15 min.

S. MORGAN SMITH CO., YORK, PA.

SHEET 1 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Idaho Power Co.

Plant Brownlee Dam Unit No. 4 Date Jan 29 58

Observers: R_1 _____ R_2 Charles Kistler Melvin Peterson

	Run No. 1	Time 1:16 PM		Run No. 2	Time 1:22 PM		Run No. 3	Time 1:28 PM	
	R_1	R_2		R_1	R_2		R_1	R_2	
		20.05			21.98			21.80	
		20.05			21.97			21.80	
		20.10			21.97			21.87	
		20.10			22.10			21.87	
		20.11/2			22.10			21.90	
		20.11/2			22.10			21.90	
		20.20			22.10			21.92	
		20.20			22.10			21.93	
		20.21/2			22.10			21.93	
		20.21/2			22.10			21.94	
Averages		20.11/2		19.72	22.05		17.66	21.88	
Differential		.73			2.33			4.22	

	Run No. 4	Time 1:46 P		Run No. 5	Time 1:52 P		Run No. 6	Time 2:00 P	
	R_1	R_2		R_1	R_2		R_1	R_2	
		17.20			19.25			21.13	
		17.24			19.25			21.15	
		17.25			19.27			21.17	
		17.30			19.29			21.18	
		17.30			19.31			21.20	
		17.30			19.35			21.20	
		17.34			19.41			21.23	
		17.35			19.43			21.25	
		17.40			19.44			21.28	
		17.45			19.46			21.32	
Averages	10.78	17.31		11.43	19.36		12.06	21.21	
Differential		6.53			7.93			9.15	

	Run No. 7	Time 2:23 P		Run No. 8	Time 2:34 P		Run No. 9	Time 2:45	
	R_1	R_2		R_1	R_2		R_1	R_2	
		19.98			21.85			19.67	
		19.99			21.86			19.67	
		20.00			21.89			19.70	
		20.00			21.90			19.75	
		20.04			21.92			19.78	
		20.07			21.96			19.78	
		20.11			21.98			19.82	
		20.15			22.04			19.84	
		20.18			22.06			19.88	
		20.22			22.12			19.93	
Averages	9.45	20.07		9.92	21.92		6.54	19.79	
Differential									

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET 2 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Pa. Power Co.

Plant Bonnie Dam Unit No. 1 Date Jan 29, 39

Observers: R_1 _____ R_2 Charles Rittle Melvin Ritter

	Run No. 10 Time 2:06 P		Run No. 11 Time 2:10 P		Run No. 13 Time 2:20 P	
	R_1	R_2	R_1	R_2	R_1	R_2
		21.08		20.85		22.15
		21.15		21.15		22.32
		21.24		21.81		22.34
		21.55		21.54		22.42
		21.72		21.70		22.38
		21.94		21.85		22.14
		22.08		22.05		22.86
		22.28		22.22		22.93
		22.50		22.42		23.05
		22.65		22.57		23.08
Averages	7.33	21.82	5.26	21.77	5.30	22.63
Differential		14.49		16.51		17.35

	Run No. 14 Time 2:30 P		Run No. 15 Time 2:46 P		Run No. 16 Time 2:55 P	
	R_1	R_2	R_1	R_2	R_1	R_2
		20.95		21.35		21.45
		20.98		21.37		21.46
		20.60		21.38		21.53
		20.67		21.41		21.62
		20.88		21.43		21.67
		21.00		21.47		21.71
		21.15		21.48		21.75
		21.21		21.50		21.78
		21.21		21.52		21.84
		21.30		21.55		21.88
Averages	2.46	20.90	19.73	21.46	18.46	21.69
Differential		18.44		1.73		3.21

	Run No. 17 Time 4:05 P		Run No. 18 Time 4:14 P		Run No. 19 Time 4:23	
	R_1	R_2	R_1	R_2	R_1	R_2
		17.18		19.35		18.68
		17.21		19.37		18.72
		17.25		19.46		18.78
		17.32		19.50		18.85
		17.34		19.51		18.93
		17.38		19.59		18.98
		17.44		19.66		19.06
		17.53		19.78		19.10
		17.58		19.80		19.15
		17.70		19.85		19.20
Averages	11.98	17.39	10.21	19.69	12.20	18.94

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET 3 OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Idaho Power Co.

Plant Brownlee Dam Unit No. 4 Date Jan 29, 69

Observers: R_1 _____ R_2 Charles Ruffin Willard Wilkinson

Run No. 20	Time 4:35 P	Run No.	Time	Run No.	Time
R_1	R_2	R_1	R_2	R_1	R_2
	21.05				
	21.07				
	21.07				
	21.10				
	21.10				
	21.10				
	21.09				
	21.07				
	21.10				
Averages 3.64	21.08				
Differential	17.44				

Run No.	Time	Run No.	Time	Run No.	Time
R_1	R_2	R_1	R_2	R_1	R_2
Averages					
Differential					

Run No.	Time	Run No.	Time	Run No.	Time
R_1	R_2	R_1	R_2	R_1	R_2
Averages					
Differential					

Form Eng. 019 — S. MORGAN SMITH CO. YORK, PA. — Sheet 1 of 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company: Idaho Power Co.

Plant: Brownlee — Unit No. 4 — Date: 11/29/59

Observers: R1 Carroll H. Thompson — Tax. Equipment Operator

	Run No. 1	Time 1:10		Run No. 2	Time 1:22		Run No. 3	Time 1:35	
	R_1	R_2		R_1	R_2		R_1	R_2	
	19.35			19.55			17.50		
	19.35			19.55			17.55		
	19.40			19.55			17.60		
	19.40			19.60			17.65		
	19.40			19.60			17.70		
	19.40			19.65			17.70		
	19.45			19.65			17.70		
	19.45			19.70			17.70		
	19.45			19.75			17.75		
	19.50			19.80			17.75		
Averages	19.42			19.72	22.05		17.66	21.89	
Differential	.73				2.33			4.22	

	Run No. 4	Time 1:46		Run No. 5	Time 1:58		Run No. 6	Time 2:	
	R_1	R_2		R_1	R_2		R_1	R_2	
	10.65			11.30			11.90		
	10.70			11.80			11.95		
	10.70			11.35			12.00		
	10.75			11.40			12.00		
	10.75			11.45			12.05		
	10.80			11.45			12.10		
	10.85			11.50			12.10		
	10.85			11.50			12.15		
	10.85			11.50			12.15		
	10.90			11.55			12.20		
Averages	10.78	17.31		11.43	19.36		12.06	21.21	
Differential		6.53			7.93			9.15	

	Run No. 7	Time 2:23		Run No. 8	Time 2:34		Run No. 9	Time 2:	
	R_1	R_2		R_1	R_2		R_1	R_2	
	9.30			9.80			6.40		
	9.35			9.80			6.45		
	9.40			9.85			6.45		
	9.45			9.85			6.50		
	9.45			9.90			6.55		
	9.45			9.95			6.60		
	9.50			9.95			6.60		
	9.50			10.00			6.60		
	9.55			10.05			6.60		
	9.55			10.05			6.65		
Averages	9.45	20.07		9.92	21.92		6.54	19.77	
Differential		10.62			12.00			13.23	

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

SHEET 1 OF 3

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4 Date 1/29/59

Observers: R₁ Carroll L. Thompson - Aux. Equipment Operator

	Run No. 10	Time 2:56		Run No. 11	Time 3:08		Run No. 13	Time 3:20	
	R_1	R_2		R_1	R_2		R_1	R_2	
	6.50			5.00			4.70		
	6.60			5.05			4.90		
	6.90			5.20			5.00		
	7.05			5.45			5.15		
	7.25			5.65			5.20		
	7.40			5.85			5.35		
	7.60			6.10			5.50		
	7.80			6.25			5.60		
	8.00			6.40			5.70		
	8.20			6.65			5.85		
Averages	7.33	21.82		5.76	21.77		5.80	22.65	
Differential		14.49			16.01			17.35	

	Run No. 14	Time 3:30		Run No. 15	Time 3:46		Run No. 16	Time 3:55	
	R_1	R_2		R_1	R_2		R_1	R_2	
	1.95			19.65			18.20		
	2.05			19.65			18.25		
	2.20			19.65			18.30		
	2.30			19.70			18.35		
	2.40			19.70			18.40		
	2.50			19.75			18.50		
	2.60			19.75			18.60		
	2.70			19.80			18.60		
	2.85			19.80			18.65		
	3.00			19.80			18.75		
Averages	2.46	20.90		19.73	21.46		18.46	21.67	
Differential		18.44			1.73			3.21	

	Run No. 17	Time 4:05		Run No. 18	Time 4:14		Run No. 19	Time 4:22	
	R_1	R_2		R_1	R_2		R_1	R_2	
	11.70			9.90			11.90		
	11.75			10.00			11.95		
	11.80			10.00			12.05		
	11.90			10.10			12.15		
	12.00			10.20			12.20		
	12.05			10.30			12.25		
	12.10			10.35			12.30		
	12.10			10.35			12.35		
	12.20			10.40			12.40		
	12.30			10.50			12.45		
Averages	11.98	17.39		10.21	19.69		12.20	18.94	
Differential		5.41			9.48			6.74	

Form Eng. 019

S. MORGAN SMITH CO., YORK, PA.

SHEET #3
OF 3

INDEX TEST—FORM 1—DIFFERENTIAL MANOMETER DATA

Operating Company Idaho Power Co.

Plant Brownlee Unit No. 4 Date 1/29/59

Observers: R_1 Carroll R. Thompson R_2 - Aux. Equipment Operator

	Run No. 20	Time 4:35	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
	3.55					
	3.65					
	3.60					
	3.60					
	3.60					
	3.65					
	3.70					
	3.70					
	3.65					
	3.65					
Averages	3.64	21.08				
Differential		17.44				

	Run No.	Time	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
Averages						
Differential						

	Run No.	Time	Run No.	Time	Run No.	Time
	R_1	R_2	R_1	R_2	R_1	R_2
Averages						
Differential						

Form Eng. 020

S. MORGAN SMITH CO., YORK, PA.

SHEET 1

INDEX TEST—FORM 2— HEADWATER and/or GENERAL DATA ~~TAILWATER SURFACES~~

OF 4

Operating Company Idaho Power Company

Plant Brownlee H.E. Unit No. 4

Observer Frank E. Myers, Operating Engr. Date 22 January 1958

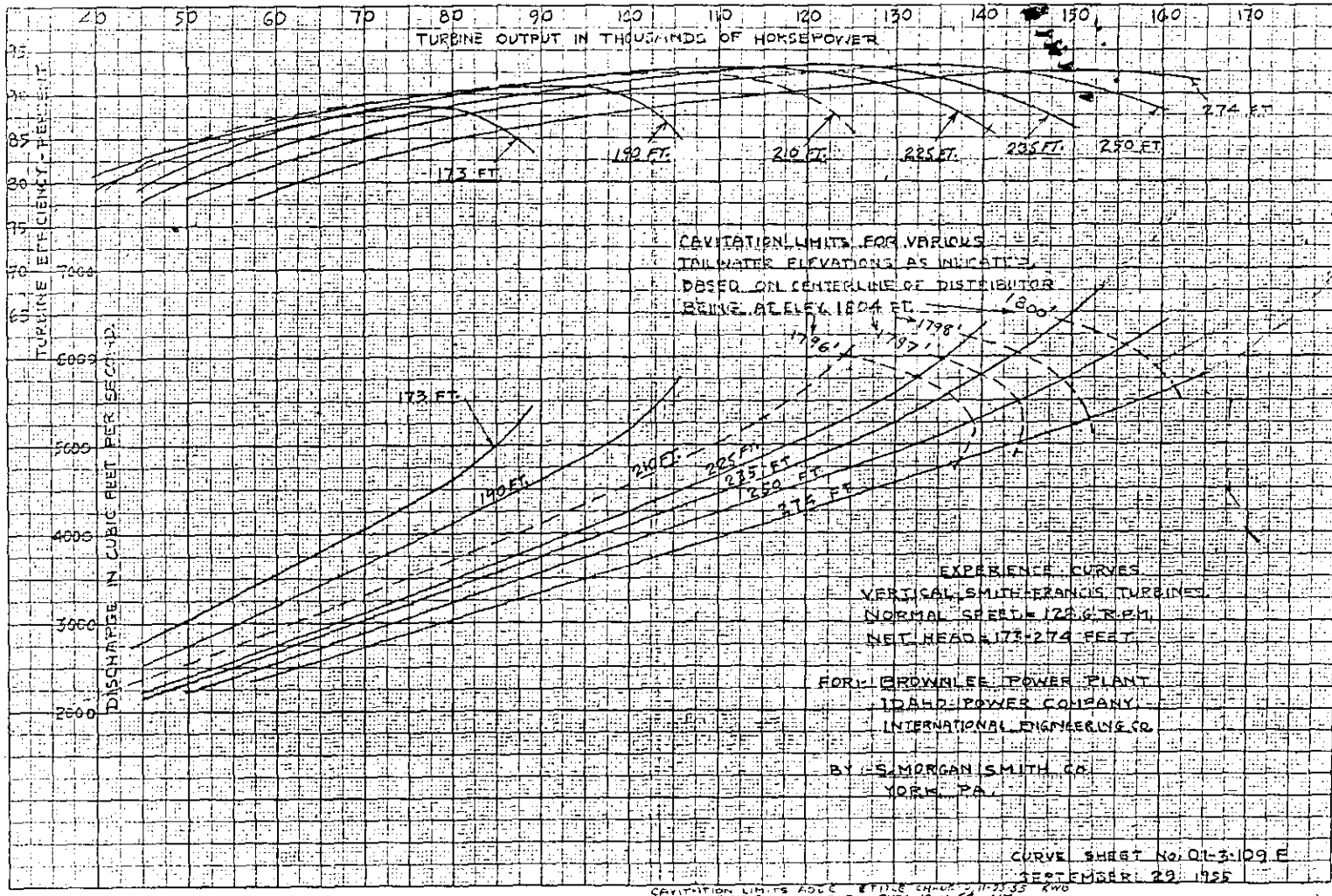
Time	(A) Gov. Set	(B) Stroke	(C) Foxboro	(D) Pressure Gg.			
1 11 PM	2.01	6 3/32"	7	243			
1 23	3.50	8 5/16"	27	241			
1 35	4.50	10 21/32"	51	240			
1 47	5.49	12 27/32"	81	240			
1 59	6.0	13 27/32	100	238			
2 11	6.5	14 27/32	118	237			
2 24	7.0	15 7/8	136	236			
2 35	7.52	16 15/32	152	235			
2 45	8.0	17 27/32	170	235			
2 57	8.49	18 27/32	184	234			
3 09	9.01	19 31/32	205	232			
3 21	9.51	20 15/16	220	231			
3 33	9.51	20 15/16	220	231			
3 45	10.0	21 31/32	237	230			
3 57	2.77	7 3/32	20	242			
4 09	4.0	10 1/32	40	241			
4 21	5.0	11 31/32	67	240			
4 33	6.52	15 0	120	237			
4 44	5.51	13 1/32	85	239			
4 55	9.52	20 31/32	222	231			

A = GOVERNOR GATE LIMIT INDICATOR IN TEN PERCENT.

B = GATE SERVOMOTOR STROKE IN INCHES.

C = FLOW METER DIFFERENTIAL IN INCHES OF WATER.

D = PRESSURE AT NET HEAD PIEZOMETERS IN FEET OF WATER.



CAVITATION LIMITS ADDED & TITLE CHANGED 11-23-55 RWD
ADDED 225, 210, 190 FT. HEAD CURVES, 12-16-55 WVM

RWD

IDAHO POWER COMPANY
WAREHOUSE RECEIVING REPORT

SHIPPED BY: Oregon Portland Cement co. ORDER No. MK-822

SHIPPED FROM: Portland, Oregon DATE: Nov. 25, 1957

SHIPMENT (PARTLY)(########) FILLS ABOVE ORDER.

INTENDED USE: Brownlee Dam

ACCOUNT NUMBER	STORES CLASS	QUANTITY	UNIT	ITEM NO.	DESCRIPTION	UNIT WT.	WHSE LOC.
ER 891 1000	2500	140,000	Lbs.		Sun Brand Bulk Cement		Jet
					Car# U.P. 133		

DISTRIBUTION
PURCH DEPT
ENGINEERS
WAREHOUSE
SALES
CONTRACTOR
1 McC Bae
2 Acctng

COMMON CARRIER DATA
CARRIER; UPRR
FRT OR EXP BILL NO. 1218 DATED 11/15/57
AMOUNT $ 151.41 (PAID)(########)

FREIGHT DISTRIBUTION IF PAID

ACCT	AMOUNT	ACCT	AMOUNT	ACCT	AMOUNT
ER 891-1000		2500	151.41		

PACKAGING
COILS ____ CRATES ____ BOXES ____
REELS ____ BARRELS ____ BUNDLES ____

HAULED BY: MK Co.
FROM: Robinette, Oregon TO: Robbie

CHECKED BY Rwm

SHEET 1 OF 1 . WAREHOUSE REGISTER NO. 3415

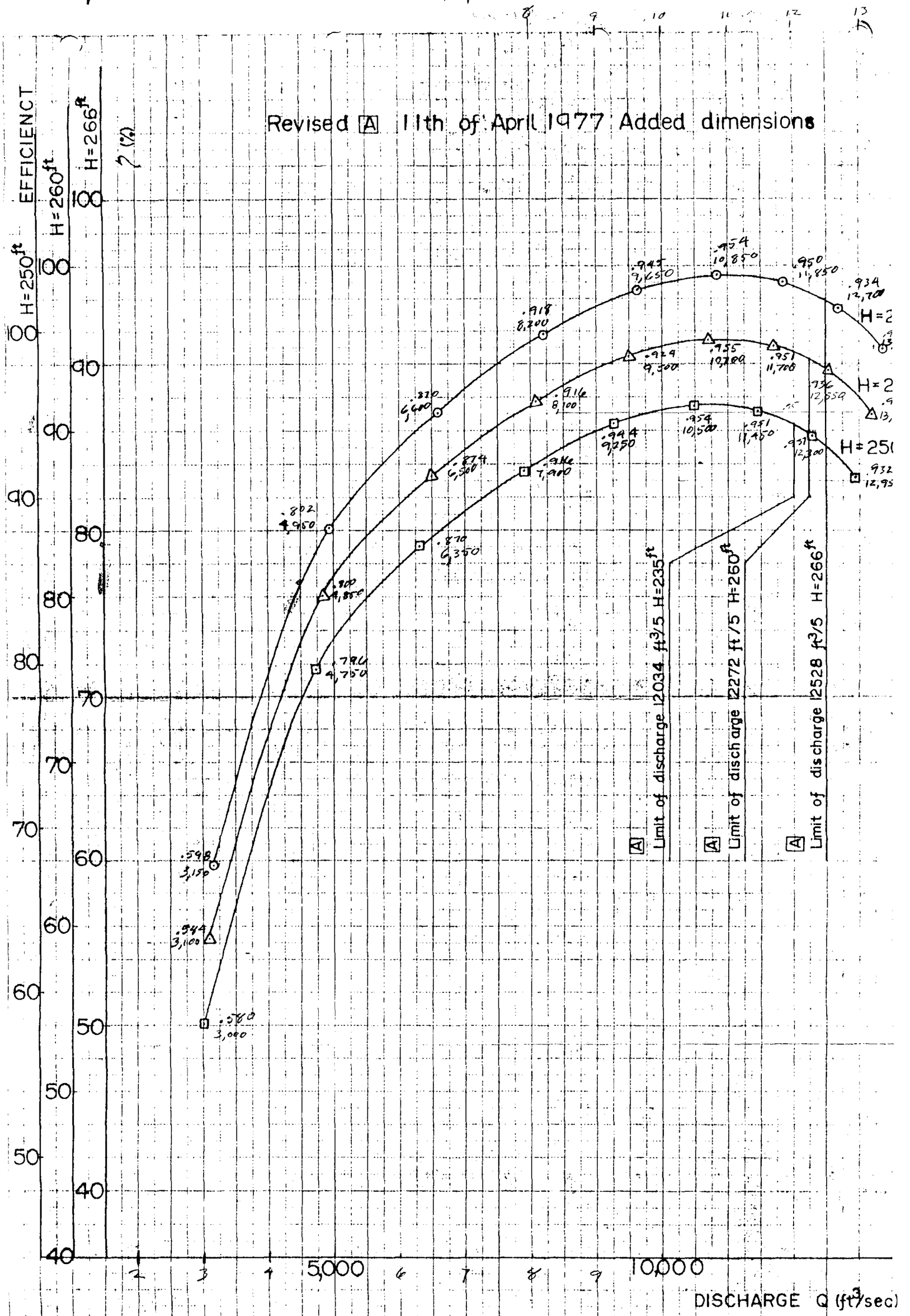
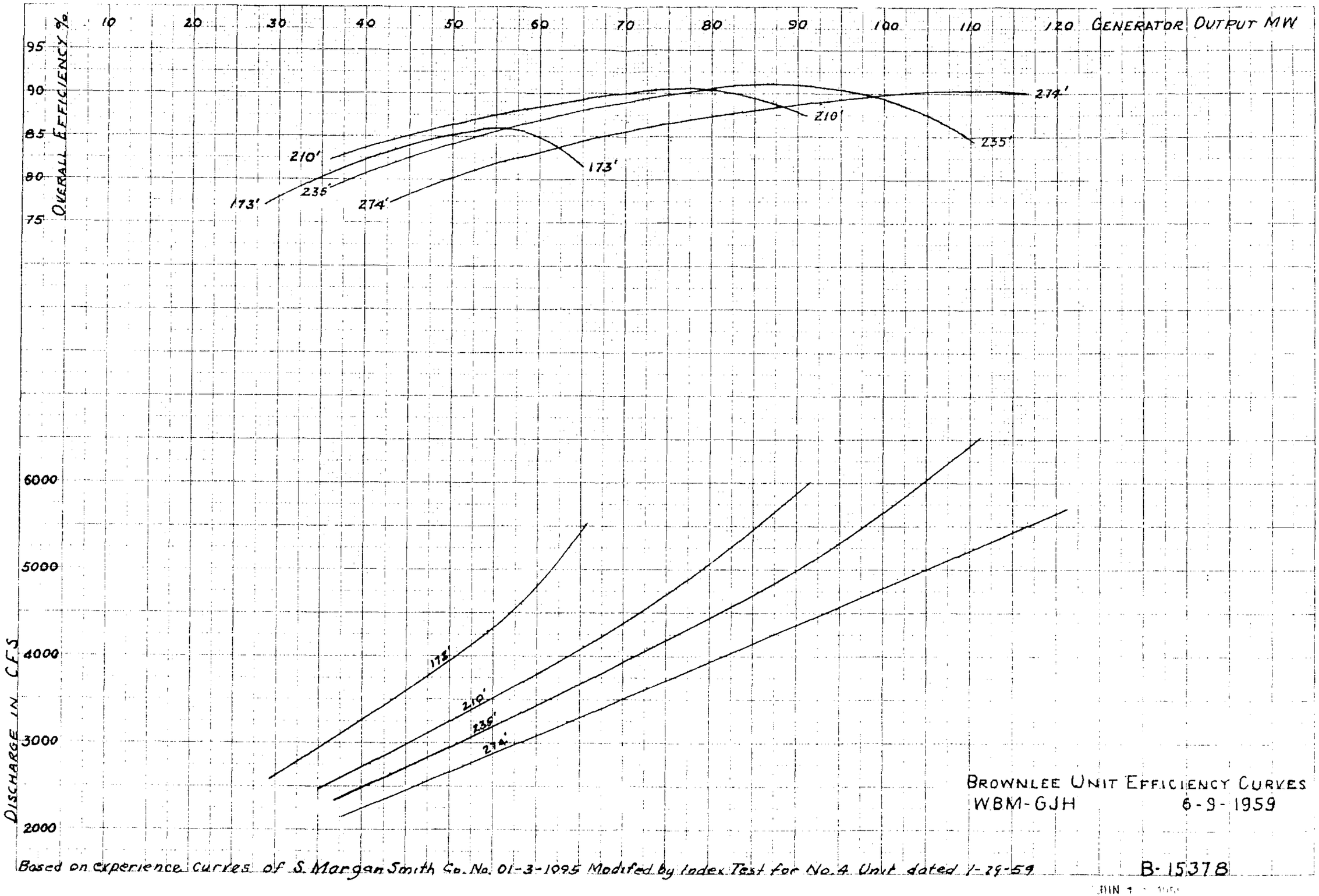


Fig 11—(3) Expected efficiency curves of prototype turbine (3)

file



BROWNLEE UNIT EFFICIENCY CURVES
WBM-GJH 6-9-1959

Based on experience curves of S. Morgan Smith Co. No. 01-3-1095 Modified by Index Test for No. 4 Unit dated 1-29-59

B-15378

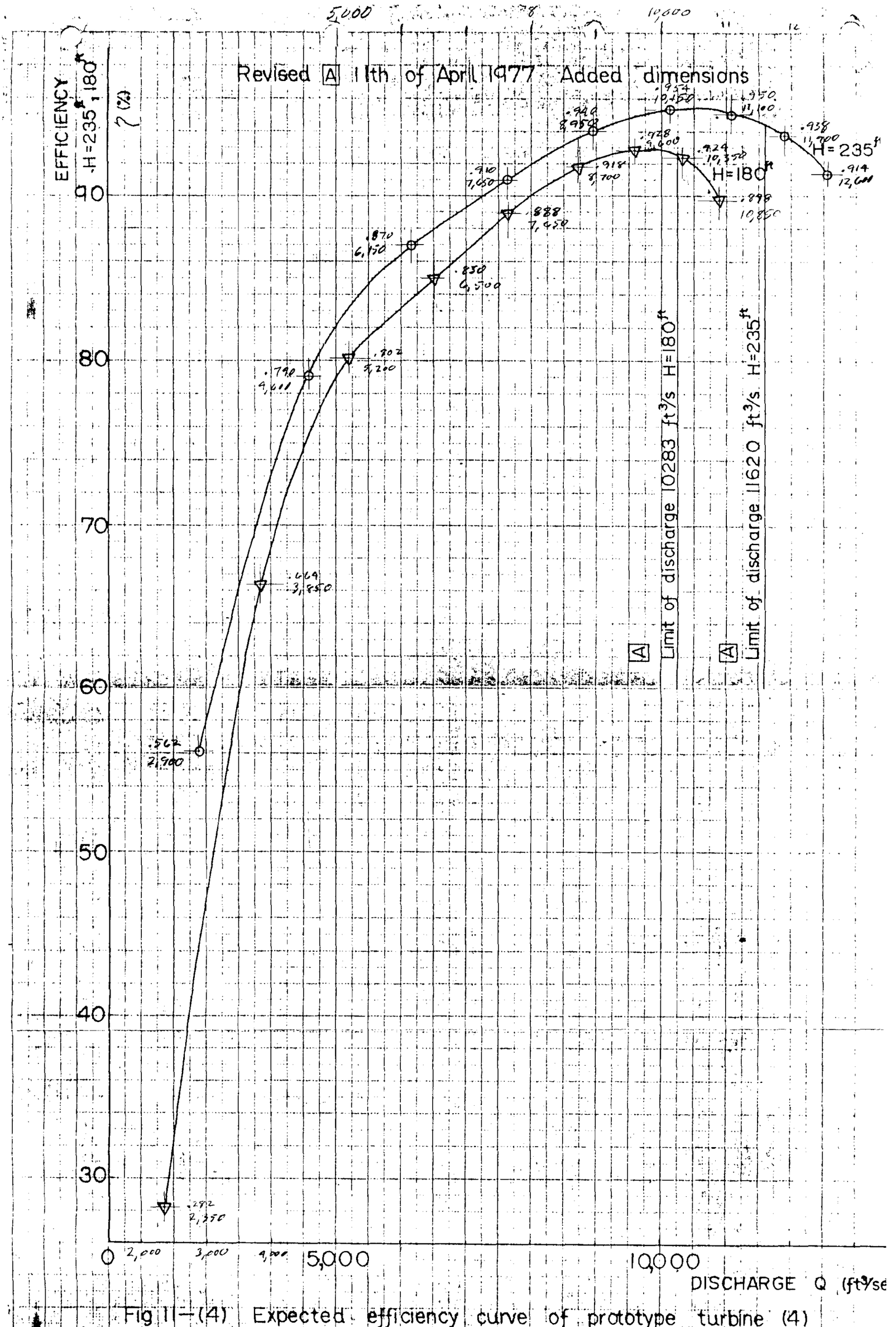


Fig 11—(4) Expected efficiency curve of prototype turbine (4)

BEFORE THE FEDERAL POWER COMMISSION
APPLICATION FOR ORDER DIRECTING INSTALLATION
OF FIFTH GENERATING UNIT
IN BROWNLEE HYDROELECTRIC UNIT
LICENSED UNDER PROJECT NO 1971

By order adopted July 27, 1955, and issued August 4, 1955, the Federal Power Commission licensed to applicant the Brownlee Hydroelectric Unit, a part of a project designated by the Commission as Project No 1971. Such order provided for the installation of four turbines connected to four 90,100 kilowatt generators at the Brownlee Unit with a provision for future installations of two similar units. Article 40 of the license provides that "At such time as the Commission may direct and to the extent that it is economically sound and in the public interest to do so, after notice and opportunity for hearing, the licensee shall install additional generating units at the Brownlee, Oxbow, and/or low Hells Canyon units."

Pursuant to license issued for Project No 1971 and Article 40 thereof, licensee files the following application.

1. The Idaho Power Company, a corporation organized and existing under the laws of the State of Maine, licensee for a power project, designated as Project No 1971 in the records of the Federal Power Commission, issued on the 5th day of August, 1955, hereby makes application to said Commission for an Order Directing the Installation of a Fifth Generating Unit with a nameplate rating of 225,000 kilowatts in the Brownlee Hydro-electric Unit licensed under Project No 1971, in the manner and to the extent described herein.

2. The name, title and post office address of the person to whom correspondence in regard to this application shall be addressed is as follows:

Lee S Sherline
Leighton & Sherline
Suite 406
1701 K Street N W
Washington, D C 20006

The Commission is also respectfully requested to mail copies of all correspondence in regard to this application directly to:

William R Fleming
General Counsel
Idaho Power Company
1220 Idaho Street
P O Box 70
Boise, Idaho 83721

3. Applicant desires to install a fifth turbine and generator together with associated equipment and lines to operate said turbine and generator and to connect the generator to the substation and switchyard at the Brownlee Hydroelectric Unit on the Snake River licensed as a part of Federal Power Commission Project No 1971. Said turbine, generator, associated equipment and lines are to be installed in the Counties of Washington and Adams, State of Idaho.

4. The proposed installation is now economically feasible and its installation is in the public interest. The additional generating unit will provide additional energy for distribution by applicant for residential, farm, commercial, industrial, municipal, public utility and interchange uses and purposes on and through the interconnected system of applicant.

In addition, said unit will provide additional peaking power for applicant and the Northwest region.

5. The following exhibits are filed herewith and are hereby made a part of this application:

EXHIBIT A	- Certified copy of Restated Articles of Incorporation, Certified copy of By-laws, and Certificate of Good Standing in Idaho.
EXHIBIT B	- Certified copy of resolution of Board of Directors, supplementing original Exhibit B.
EXHIBITS C, D and E	- Statement Pertaining to Water Rights, supplementing original Exhibits C, D and E.
EXHIBIT G	- Statement of Applicant's Financial Ability, supplementing original Exhibit G.
EXHIBIT H	- Statement of Proposed Operation, supplementing original Exhibit H.
EXHIBIT I	- Estimate of Dependable Capacity and Average Annual Energy Output, supplementing original Exhibit I, together with Sheet 1 of 1 of Exhibit I drawing.
EXHIBIT L	- General Design Drawings, Revised Sheet 1 of original Exhibit L and supplemental Sheets 1 through 3, supplementing original Exhibit L.
EXHIBIT M	- General Description of Equipment, supplementing original Exhibit M.
EXHIBIT N	- Cost Estimate, supplementing original Exhibit N.
EXHIBIT O	- Statement of Time Desired for Beginning and Completing Construction, supplementing original Exhibit O.
EXHIBIT U	- Statement of Utilization of Power and Energy, supplementing original Exhibit U.

EXHIBIT W - A Report on Environmental Factors.

Economic Feasibility Study - Cost Comparison - Peak Resources

IN WITNESS WHEREOF, the applicant has caused its name to be hereunto signed by James E Bruce, its President and its corporate seal to be hereunto affixed by Paul L Jauregui, its Secretary, thereunto duly authorized this 8th day of October, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

(CORPORATE SEAL)

ATTEST:

/s/ Paul L Jauregui
Secretary

VERIFICATION

STATE OF IDAHO)
) ss
County of Ada)

JAMES E BRUCE, being first duly sworn, deposes and says: That he is the President of the Idaho Power Company, the applicant for Order Directing Installation of Fifth Generating Unit in Brownlee Hydroelectric Unit of Project No 1971, that he has read the foregoing application and knows the contents thereof; that the same are true to the best of his knowledge and belief.

PROPOSED OPERATION OF BROWNLEE HYDROELECTRIC DEVELOPMENT

The Brownlee Hydroelectric Development of Project No 1971 presently consists of four units which are operated to supply energy to the applicant's system. In addition, the Brownlee Development supplies both regulating and reserve capacity for the applicant's system. Operation of the Brownlee Development is coordinated with the Northwest Power Pool in accordance with Article 39 of the license. Seasonal preflood drawdown and refill periods of the Brownlee Reservoir are made in conformance with Article 42 of the license in cooperation with and in accordance with instructions from the United States Corps of Engineers. River flows below the Hells Canyon Development of Project No 1971 are regulated in accordance with Article 34 of the license. The operation of the proposed fifth unit of the Brownlee Development will not change the seasonal operation of the Brownlee Reservoir or alter the present flow conditions below the Hells Canyon Development. In addition, the operation of a fifth unit will not change the Brownlee Reservoir fluctuation appreciably.

The fifth unit is being added to provide additional generating capacity for peak loads, for outage of other generating units and to increase energy production during periods of high river flow. The addition of the fifth unit, at rated head, will increase the powerhouse discharge capability at the Brownlee Development by approximately 11,000 cfs. The total powerhouse discharge capability of the development would be approximately

35,000 cfs at maximum capability. The increase in the turbine flow will provide a more flexible and coordinated operation of and a more efficient utilization of water through the three power plants of Project No 1971 by more nearly equalizing their discharge capacities. At present, the Brownlee Development has the highest head but has the smallest plant discharge capacity.

The additional power capacity of the fifth unit will also provide greater flexibility in increasing the range or enlarging the scope of possible operation by the amount of peaking power it will provide.

For river flow exceeding the hydraulic capacity of the existing Brownlee Development, up to about 225 megawatts could be generated with the proposed fifth unit at the Brownlee Development from water which may otherwise be spilled. During periods of high flow, all units could be run at full gate opening, and during low flows, the maximum draft of the Brownlee Reservoir is limited by the ability to refill the reservoir and still matinain the flow requirements below the Hells Canyon Development. In general, with the operation of the proposed fifth unit in the Brownlee Development, the need to fluctuate the Oxbow and Hells Canyon Reservoirs will be less than the present operation because the hydraulic capacity of the Brownlee Development will be more nearly equalized with the capacity of the Oxbow and Hells Canyon power plants. The operation will have no more effect on the aquatic environments or recreational activities than the current operation.

Each company in the interconenncted power system is responsible for the regulation of its generation to meet the needs of its load requirements and its interchanges to or from other companies in the system. The applicant utilizes an automatic computer load control system in which the Brownlee, Oxbow and Hells Canyon Developments serve as the generation-regulation stations. The largest portion of regulation, especially large load fluctuations, is assigned to the Brownlee units due to the flow restrictions below the Hells Canyon Development and the smaller generating capacity at Oxbow. In order to maintain an adequate power supply at all times for the applicant's load, the regulating stations must have sufficient reserve capacity, even during peak load hours, to meet this need. Generation from various generating sources may be interrupted at any time due to equipment failure or transmission line faults. In such event, the regulating stations must compensate as soon as possible to meet the resultant change. The proposed fifth unit at the Brownlee Development will provide needed reserve capacity to meet such emergencies and being larger will improve the regulating ability of the station.

This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 8th day of October, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

EXHIBIT I
Supplementing Original
Exhibit I
Sheet 1 of 2

DEPENDABLE CAPACITY AND AVERAGE ANNUAL ENERGY OUTPUT

With the installation of the proposed fifth unit at the Brownlee Hydroelectric Development of Project No 1971, it is estimated that the dependable capacity of the fifth unit will be 225 megawatts. This estimate is based on the net plant capability at the time of the most probable occurrence of the applicant's peak load in the summer months of July and August. During these months, the reservoir is scheduled to be at full capacity with an elevation of 2,077 feet for all years. The size of this reservoir when full (14,000 acres with approximately 1,000,000 acre-feet of usable storage) will add dependable generating capacity. The graph exhibit set forth in the Exhibit I drawing indicates the estimated increase of capability based upon performance of the existing units and the expected performance of the fifth unit. The graph also indicates that the increase in plant capability will be approximately 140 megawatts when the effective head is reduced by 90 feet, which is near maximum drawdown of the Brownlee Reservoir.

The increase in the average annual energy output from the Brownlee Development with the addition of the fifth unit is estimated to be approximately 215,000 MWH. The increase would be obtained by utilizing water normally spilled during periods of high water flow. The increase in average annual energy is based upon historical flows for a period of 40 years (1928-1968) with depletion allowance for irrigation at the 1970 level.

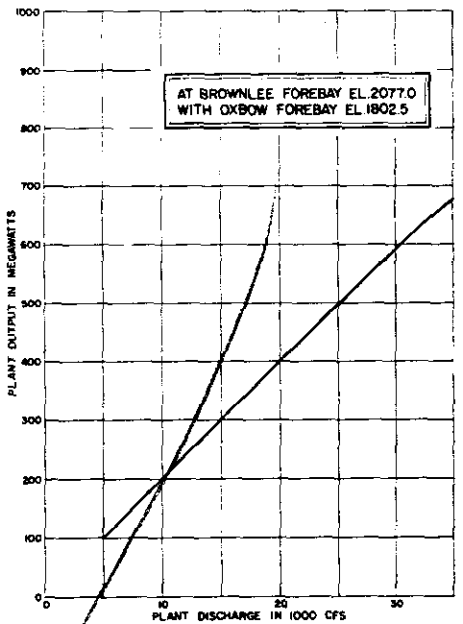
The flow duration curve set forth in the Exhibit I drawing is based upon the same 40-year adjusted historical flows. Monthly average flows were used rather than daily average flows. Therefore, the maximum peak flow which occurred during the period is not indicated.

The tailwater rating curve set forth in drawing Exhibit I is based on maintaining the forebay at Oxbow Power Plant at an elevation of 1,802.5 feet. Actual water level of the Oxbow forebay is normally varied between elevations of 1,800 feet and 1,805 feet. The average of 1,802.5 feet was utilized to obtain a single curve for tailwater rating purposes.

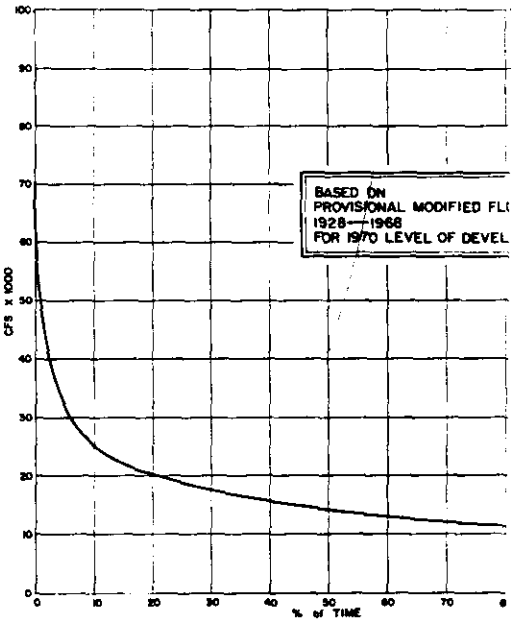
This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 8th day of October, 1975.

IDAHO POWER COMPANY

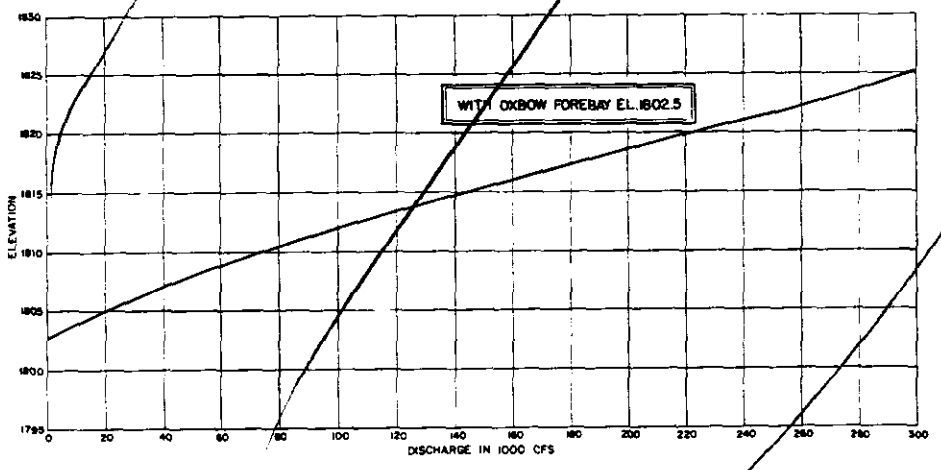
By /s/ James E Bruce
President



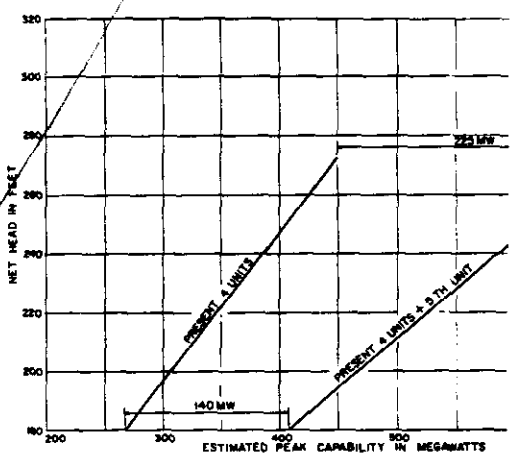
POWER DISCHARGE CURVE



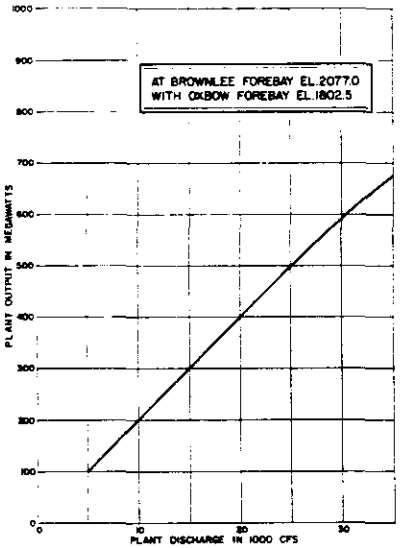
BROWNLEE INFLOW DURATION CURVE



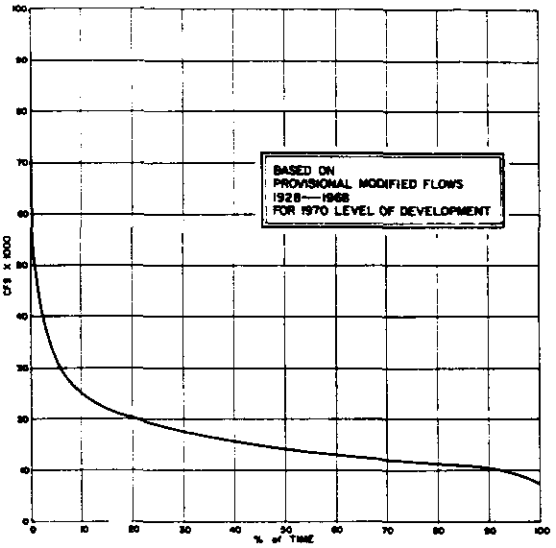
TAILWATER RATING CURVE



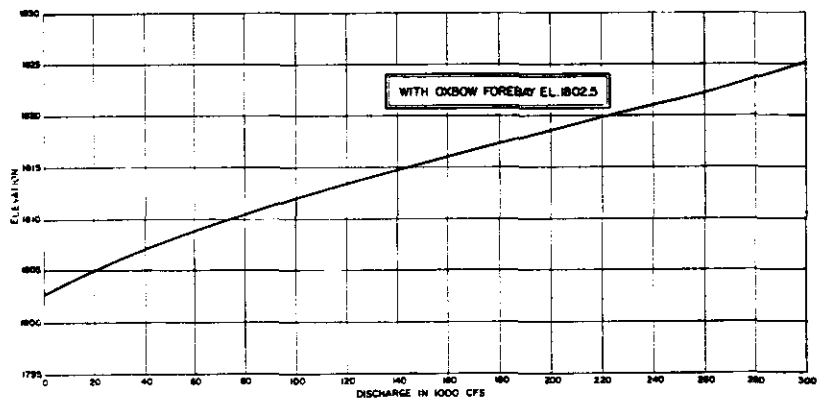
ESTIMATED PEAK CAPABILITY VS NET HE



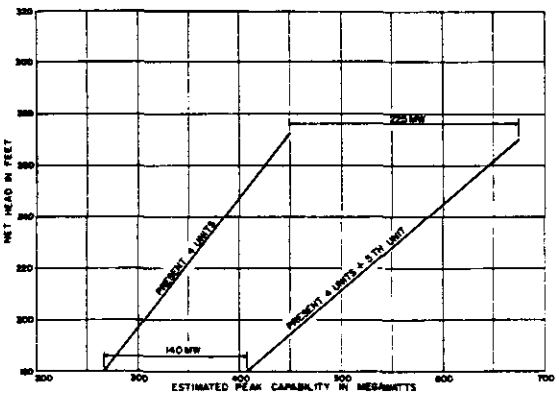
POWER DISCHARGE CURVE



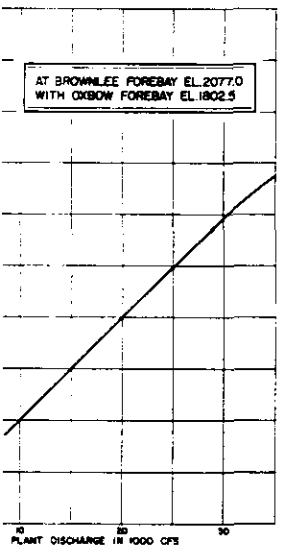
BROWNLEE INFLOW DURATION CURVE



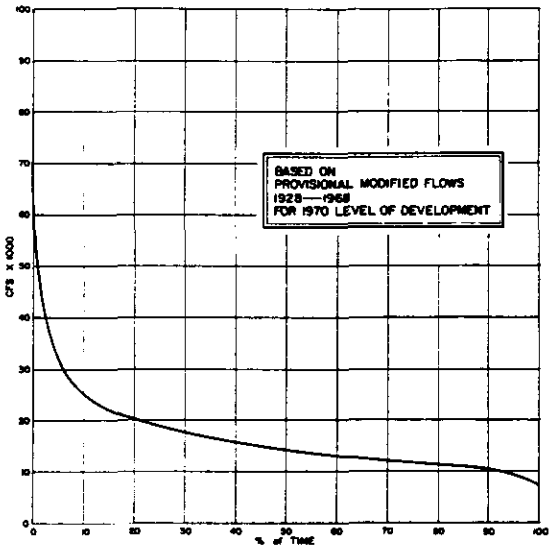
TAILWATER RATING CURVE



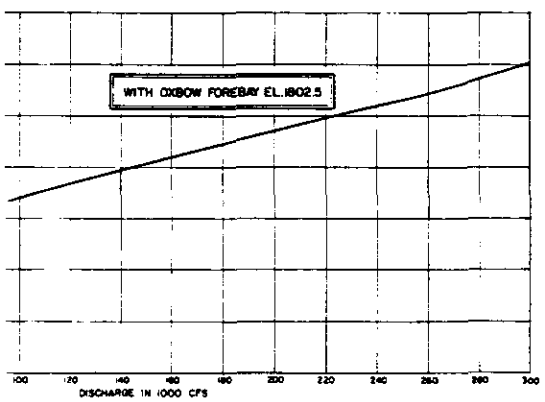
ESTIMATED PEAK CAPABILITY VS NET HEAD



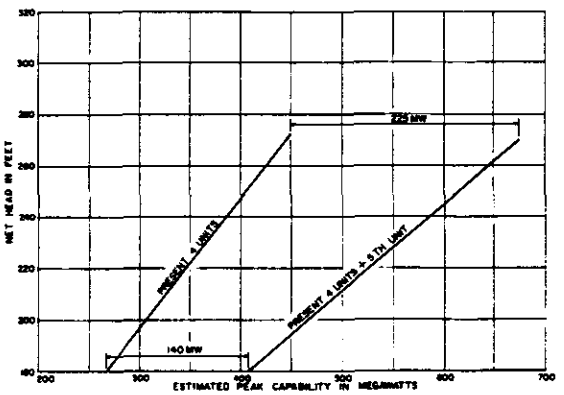
POWER DISCHARGE CURVE



BROWNLEE INFLOW DURATION CURVE



TAILWATER RATING CURVE



ESTIMATED PEAK CAPABILITY VS NET HEAD

THIS DRAWING IS FILED PURSUANT TO ARTICLE 30 OF LICENSE FOR PROJECT 1971 ISSUED AUGUST 4, 1955.

IDAHO POWER COMPANY

By _____ PRESIDENT

DATED OCTOBER 8, 1973

PROJECT 1971 EXHIBIT I

BROWNLEE H.E. DEVELOPMENT

UNIT NO. 5

HYDRAULIC & POWER DATA

IDAHO POWER COMPANY
BOISE, IDAHO

NO SCALE E-36177

FPC-1971-266 38-3

GENERAL DESCRIPTION OF EQUIPMENT

The principal features of major items of equipment to be installed as part of the proposed project modification are as follows:

Turbine

Rated net head	250 feet
Power output at rated generating head	322,000 horsepower
Rated speed	100 rpm
Generating direction of rotation	counterclockwise

Generator

Generating rating, nominal at 0.9 pf	250 MVA
Voltage	13.8 KV

Main Transformer

Rating	285 MVA
Voltage ratio	13.8/230 KV

Transmission Line

230 KV steel tower transmission line from powerhouse to switchyard	1,500 feet

Switchyard

Circuit breaker	230 KV

EXHIBIT ..
Supplementing Original
Exhibit M
Sheet 2 of 2

This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 5th day of December, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

EXHIBIT U
Supplementing Original
Exhibit U
Sheet 1 of 1

STATEMENT OF UTILIZATION OF POWER AND ENERGY

The increased capacity of the Brownlee Hydroelectric Unit will be utilized to meet power load requirements on applicant's system and for generation during periods of high water flow. As shown on the Attachment to Exhibit U, the annual peak load requirements exceed available and proposed capacity for eight of the ten years. The fifth unit will assist in reducing the anticipated peak deficiencies.

Since energy generation will not be increased under median and critical water conditions, the increase in average annual generation will not be relied upon to meet system firm energy loads. The energy, however, will reduce the use of high incremental cost resources to serve applicant's load.

This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 8th day of October, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

ESTIMATED LOADS AND RESOURCES AT TIME OF
SYSTEM PEAK LOAD (JULY) IN MEGAWATTS

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Net System Load	2137	2175	2334	2381	2549	2606	2784	2854	3044	3123
Forced Outage Reserve	207	222	233	250	263	281	295	315	331	353
Resources	2257	1982(1)	2133(2)	2371(3)	2529	3029(3)	3029	3029	3029	3529(4)
Surplus (Deficiency)	(87)	(415)	(434)	(260)	(283)	142	(50)	(140)	(346)	53
Brownlee Unit #5		258	258	258	258	258	258	258	258	258
Surplus (Deficiency)	(87)	(157)	(176)	(2)	(25)	400	208	118	(88)	311

(1) New American Falls Power Plant (Project No 2736) Added November 1979.

(2) Applicant's Share of Jim Bridger Unit #4 (167 MW) Added June 1980.

(3) Proposed Pioneer Plant (2-500 MW Units) Added April 1981 and April 1983.

(4) Additional 500 MW Unit Added in May 1987.

Note: Applications have been filed for the Jim Bridger Unit #4 and for the Pioneer Plant, but approvals have not yet been obtained.

REPORT ON ENVIRONMENTAL FACTORS

The Brownlee Hydroelectric Development was licensed by the Federal Power Commission as a part of Project No 1971 by order issued August 4, 1955. The dam of the Brownlee Development creates a reservoir with a top elevation of 2,077 feet, with usable storage capacity of about 1,000,000 acre-feet at a drawdown of 101 feet. The reservoir extends approximately 57½ miles upstream. Pursuant to Federal Power Commission license, applicant installed four generators in the Brownlee Hydroelectric Development and constructed a fifth penstock intake structure for future installation of a fifth unit. The following is a statement on the environmental effects of the proposed action. The proposed action, the issuance by the Commission of an Order Directing the Installation of a Fifth Unit at the Brownlee Hydroelectric Unit licensed under Project No 1971, will authorize the applicant to install said fifth unit as contemplated in Article 40 of said License No 1971. The fifth unit's rated capacity will be 225 megawatts.

This report is in accordance with the guidelines contained in Appendix A of the Commission's Order Number 485. This project involved only the construction and installation of an additional generating unit contemplated at the time of the issuance of the Commission's order for Project No 1971. It is judged not to involve major federal actions, and we believe will not significantly affect the existing quality of the environment.

PURPOSE

The purpose of the proposed action is to authorize applicant to increase its generating capacity at the Brownlee

Hydroelectric Development by the construction and installation of a fifth generating unit with appurtenant facilities to provide additional generating capacity for peak loads, for outage hours of other generating units, and to increase energy production during periods of high river flow. It will provide additional energy for distribution by applicant for residential, farm, commercial, industrial, municipal, public utility and interchange uses and purposes on and through the interconnected system of applicant. In addition, said unit will provide additional peaking power for applicant and the Northwest region. It is estimated that the addition of a 225 megawatt unit will produce approximately 215,000 MWH per year.

LOCATION

The site of the proposed action is the existing Brownlee Hydroelectric Development plant site on the Snake River in the counties of Washington and Adams, State of Idaho.

LAND REQUIREMENTS

The original plans for the Brownlee Dam and development anticipated the future construction of a fifth unit. Consequently, no new land requirements will be necessary.

PROPOSED FACILITIES

The proposed facilities to be installed for the fifth unit are as follows:

Turbines	- One Francis Turbine rated at 322,000 horsepower at 250 feet net head and 100 rpm will be provided.

Generators	- One 250 MVA, 0.9 pf, 13.8 KV vertical shaft generator will be provided.
Transformer	- One transformer connected to the generating unit, of 285 MVA capacity which will step up the voltage from 13,800 to 230,000 volts for transmission.
Transmission Line	- The fifth unit will be connected to the existing Brownlee Switchyard by a 230 KV steel tower transmission line approximately 1,500 feet in length.
Switchyard Facilities	- A 230 KV circuit breaker and appurtenant equipment will be provided in the existing Brownlee switchyard.

CONSTRUCTION WORK

Preparatory work would consist of placement of stoplogs for closure of the existing unit five untake, placement of a cofferdam at the extremity of the existing diversion outlet, construction of a ramp from the top of the cofferdam to the existing diversion outlet channel, and to pump out and clean up the existing diversion tunnel for approximately 800 feet. Primarily construction for the powerhouse would consist of excavation of substructure for unit five, driving the power tunnel to the existing unit five intake gate, placing the steel penstock liner, placing the concrete penstock encasement, constructing the concrete powerhouse and installing the powerhouse equipment. The aggregate for concrete will be obtained at or near the source site from which aggregate was obtained for the concrete for the existing Brownlee Power Plant. The final construction stage would be the removal of the cofferdam, the construction of the 230 KV steel transmission line from the

powerhouse to the existing Brownlee switchyard and the installation of switching equipment in the existing Brownlee switchyard.

OPERATIONAL EFFECTS

The operational plan with the proposed unit installed is described in Exhibit H. For river flows exceeding the hydraulic capacity of the existing Brownlee Development, up to about 225 megawatts could be generated with the fifth unit utilizing water which may be otherwise be spilled. During periods of high flow, all units could be run at full gate opening. In general, with the operation of the proposed fifth unit in the Brownlee Development, the need to fluctuate the Oxbow and Hells Canyon Reservoirs will be less than the present operation because the hydraulic capacity of the Brownlee Development will be more nearly equalized with the capacity of the Oxbow and Hells Canyon power plants. Reservoir elevation changes at Brownlee will be similar to present operation. The operation will not affect the recreational use, nor will it change any other environmental condition in any measureable degree. In addition, the operation will have no more effect on the aquatic environment than the current operation.

This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 8th day of October, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

Economic Feasibility Study

Cost Comparison - Peak Resources
(1975 Price Levels)

	Brownlee Fifth Unit	*Combustion Turbine
Installed Capacity	225 MW	250 MW
Maximum Capability	~~258 MW~~	250 MW
Total Project Capital Cost	$34,517,000	$42,467,000
Allowance for Funds Used During Construction (AFDC)	5,043,000	1,286,000
Total Project Cost With AFDC	$39,560,000	$43,753,000
Annual Costs		
Levelized Annual Capital Factor	11.70%	12.15%
Levelized Annual Capital Cost	$ 4,629,000	$ 5,316,000
Operation, Maintenance and Fuel	75,000	2,192,000
Credit for Firm Energy Generated		(453,600)
Credit for Secondary Energy Generated	(645,000)	
Net Annual Cost for Capacity	$ 4,059,000	$ 7,054,400
	$15.73/kw	$28.22/kw

*Note: With the projected deficiencies of firm power in the Northwest, combustion turbines are the only currently existing feasible alternate to the Brownlee Fifth Unit for supplying the peaking capacity required to supply the Applicant's load in the operating year 1979.

This statement is a part of the application for Order Directing Installation of a Fifth Generating Unit made by the undersigned this 8th day of October, 1975.

IDAHO POWER COMPANY

By /s/ James E Bruce
President

IDAHO DEPARTMENT OF WATER RESOURCES

MEMO-REPLY | **Date** 11/28

To Ralph Mollby — Received 12/1/97

From [signature]

- [x] **Take Appropriate Action**
- [ ] **Draft A Reply**
- [ ] **Action Required By** _____
- [ ] **See Me**
- [ ] **Call Me**
- [ ] **Return To Me**
- [ ] **For Your Information**
- [ ] **For Your Approval**
- [ ] **For Your Comments**
- [ ] **As You Requested**
- [ ] **Copy (_____ Copies)**
- [ ] **File**

Comments

Reply

Signed _____ **Date** _____

MEMORANDUM

TO: Glen and Norm + WAYNE

FROM: Jim Johnson

DATE: November 25, 1997

RE: Request for Ralph Mellin's Assistance with Licensing Idaho Power Company's Permit No. 03-07018

I have an Idaho Power permit in the process to be licensed. However, I need help to resolve questions concerning flows, capacity of the power plant and interpretation of data collected with the exam.

Ralph Mellin recently inventoried all of the Snake River power plant facilities and has become very familiar with the power plants on the river. I believe Ralph, with his knowledge about the plants, could assist me in finalizing this license. I have talked to Ralph and he indicated that he could help, if so authorized, considering that he works within a different bureau.

The purpose of this memorandum is to seek proper approvals. I would plan to work closely with Ralph so that we could use our time efficiently and complete the project as fast as possible. This matter has been waiting action for a considerable amount of time (the exam was conducted in 1985).

Norm —

I have checked w/ Bill Graham who supervises Ralph. Bill had no problem w/ Ralph helping us. Ralph wanted some tracks left w/ Wayne Haas, however

11-25-97

OK Wayne 11/26/97

Form 219A
2/84

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

BENEFICIAL USE FIELD REPORT

RECEIVED
OCT 8 1985
Department of Water Resources

Permit No. 03-7018

1. Owner: Idaho Power Company Phone No. _____
   Current Address: P.O Box 70 Boise, Idaho 83721

2. Accompanied by: C.W. Mock EXAM. DATE: 9/18/85
   Address: _____ Phone No. _____
   Relationship to Permit Holder: Brownlee Dam manager.

3. Source: Snake River tributary to Columbia River

4.

Well/Diversion* No.	Motor Make	HP	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size

*Code with points of diversion, system diagram & photos on reverse side. Disregard if only one.

5. System Description (As operating at time of measurement. Indicate pressure, number of sprinklers, etc.)

See exhibit "D" showing generating units & dam etc. this permit is for unit #5.

6.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
See exhibit "C" for Brownlee station Record						

7. Measurements ☐ Additional data/computation sheets attached

See exhibit "E" for calculations 12,538.81 CFS for unit #5 generator
Total capacity of dam 1-5 is 35,059.05 CFS
Recommend 6,000 CFS

03-2021: 10,000
03-7018: 5,310
Total 35,059

8. Point(s) of Diversion: Indicate Method of Determination

Ident #	1/4	1/4	1/4	Sec.	Twp.	Rge.	Survey Information from Known Corner	County	Remarks
Lot 3		SE	SE	2	17N	5W		Washington	

9. Place(s) of Use: Irrigation - give acres served by system at time of exam.
   Indicate Method of Determination _____

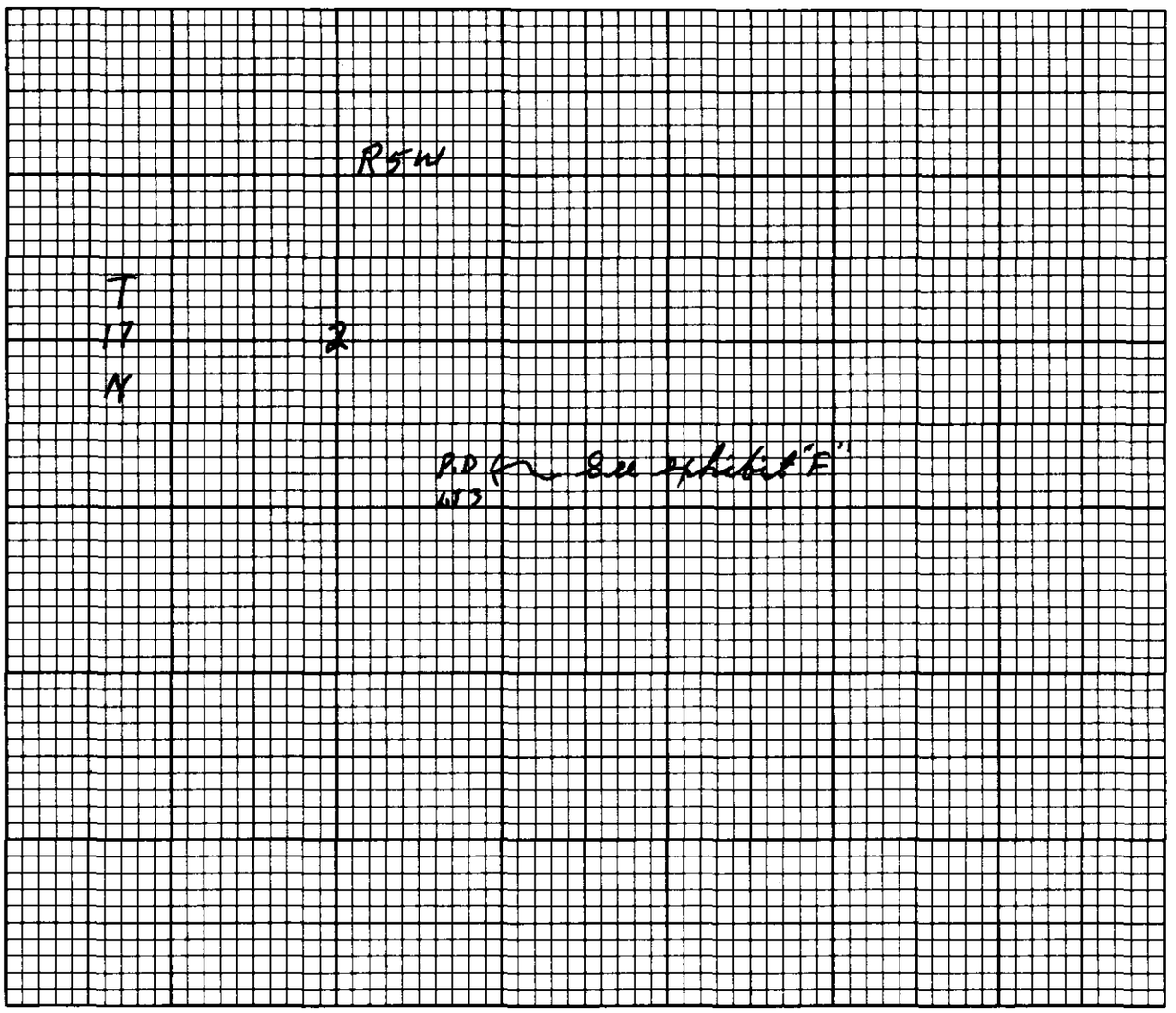
Twp.	Rge.	Sec.	NE 1/4				NW 1/4				SW 1/4				SE 1/4				Totals
			NE1/4	NW1/4	SW1/4	SE1/4	NE1/4	NW1/4	SW1/4	SE1/4	NE1/4	NW1/4	SW1/4	SE1/4	NE1/4	NW1/4	SW1/4	SE1/4	
																		Lt3	
17N	5W	2																X	

Total Acres _____

10. Other water rights on these lands _____

11. Other water right diverted from same p.d. 03-2023 & 03-2074

12. **Diversion and Delivery System Diagram**: Indicate all major components and distances between components. Indicate ditch size/pipe i.d. as applicable. Indicate on systems with measurement port the distance between the port and the nearest component/pipe bend/restriction both upstream and downstream, and the inside pipe diameter at the measurement port. On multiple diversion systems indicate how diversion systems are connected.



13. ☐ **Photo of Diversion & System Attached** ☐ **Aerial Photo of Place of Use Attached or Map of Irrigated Acreage Attached**

14. Remarks Exhibits A thru F. for supporting data.

15. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☑ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

16. Examiner's/Consultant's Signature John K. Noyes Date 10/8/95

Consultant's License Number _____

IDWR Director's Authorization to Conduct

Beneficial Use Examination _____

Date

CONSULTANT SEAL

Form 219B
5/84

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
LICENSING REPORT

RECEIVED
OCT 8 1985
Department of Water Resources

03-7018
Permit No.

1. **Measurement Calculations**
   a) Field Measurement Calculations (Include theoretical capacities and system capacity)

See exhibit "E" for calculations 12,538.31 cfs for unit #5. Total capacity for generators 1-5 is 35,059.05 cfs

Theoretical
See exhibit "A"
head of 260 ft = approx 13,000 cfs
expected performance chart of unit #5

RT	cfs
03-2023	20,000
03-2024	10,000
03-7018	5000
	35,000

Recommend 6,000 cfs as per permit

   b) Volume Calculations for Irrigation:

$V_{I.R.}$ = (Acres Irrigated) x (Irrigation Requirement) = _____
$V_{D.R.}$ = [Diversion Rate (cfs)] x (Days in Irrigation Season) x 1.9835 = _____
V = Smaller of $V_{I.R.}$ and $V_{D.R.}$ = _____

   c) Volume Calculations for Other Uses:

2. **Overlap Review**

   a) Other water rights with same place of use: _____

   b) Other water rights with same point of diversion: 03-2023 & 03-2024

   c) Analysis:

RECOMMENDED AMOUNTS

3.

Permit No.	Priority	Amount	App. Date	Date Proof Submitted	System Capacity
03-7018		5,000			12,538.31

4. Permit Holder: Idaho Power Company

Address: P.O Box 70 Boise, Idaho 83721

5. Source: Snake River tributary to Columbia River

6.

Beneficial Use	Period of Use From	Period of Use To	Rate of Diversion Q (cfs)	Annual Volume V (afa)
Hydroelectric generation	1/1	12/31	5000	N/C.
Allowable Maximums:			5000	

7. Point(s) of Diversion:

No.	Govt. Lot	¼	¼	¼	Sec.	Twp.	Rge.	County
	3		SE	SE	2	17N	5W	Washington

8. Place(s) of Use

Twp.	Rge.	Sec.	NE I/4				NW I/4				SW I/4				SE I/4				Totals
			NE I/4	NW I/4	SW I/4	SE I/4	NE I/4	NW I/4	SW I/4	SE I/4	NE I/4	NW I/4	SW I/4	SE I/4	NE I/4	NW I/4	SW I/4	SE I/4	
																		43	
17N	5W	2																X	
Total Acres																			

9. Recommended Conditions/Remarks:

The rights herein granted are subject to the condition that the project shall be operated in such manner as will not conflict with future depletion in flow of the waters of Snake River and its tributaries, or prevent or interfere with the future upstream diversion and use of such waters for the irrigation of lands and other beneficial consumptive uses in the Snake River watershed.

10. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☑ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

11. Examiner's Signature John K Mozer Date 10/8/85

Checked in Regional Office by _____ Date _____

Approved in State Office by _____ Date _____

Exhibit A

Revised [A] 11th of Apr. 1977 Added Dimension

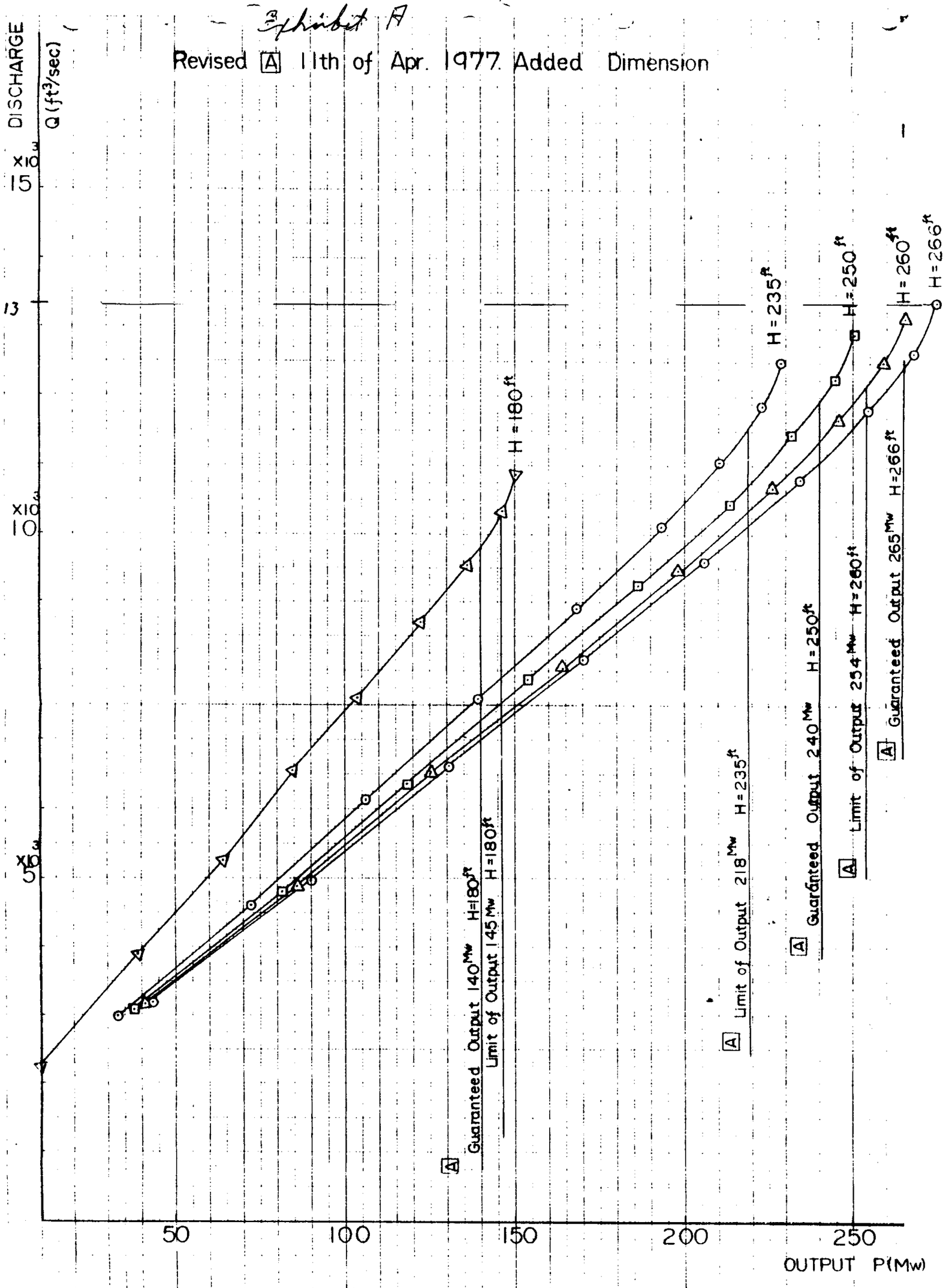
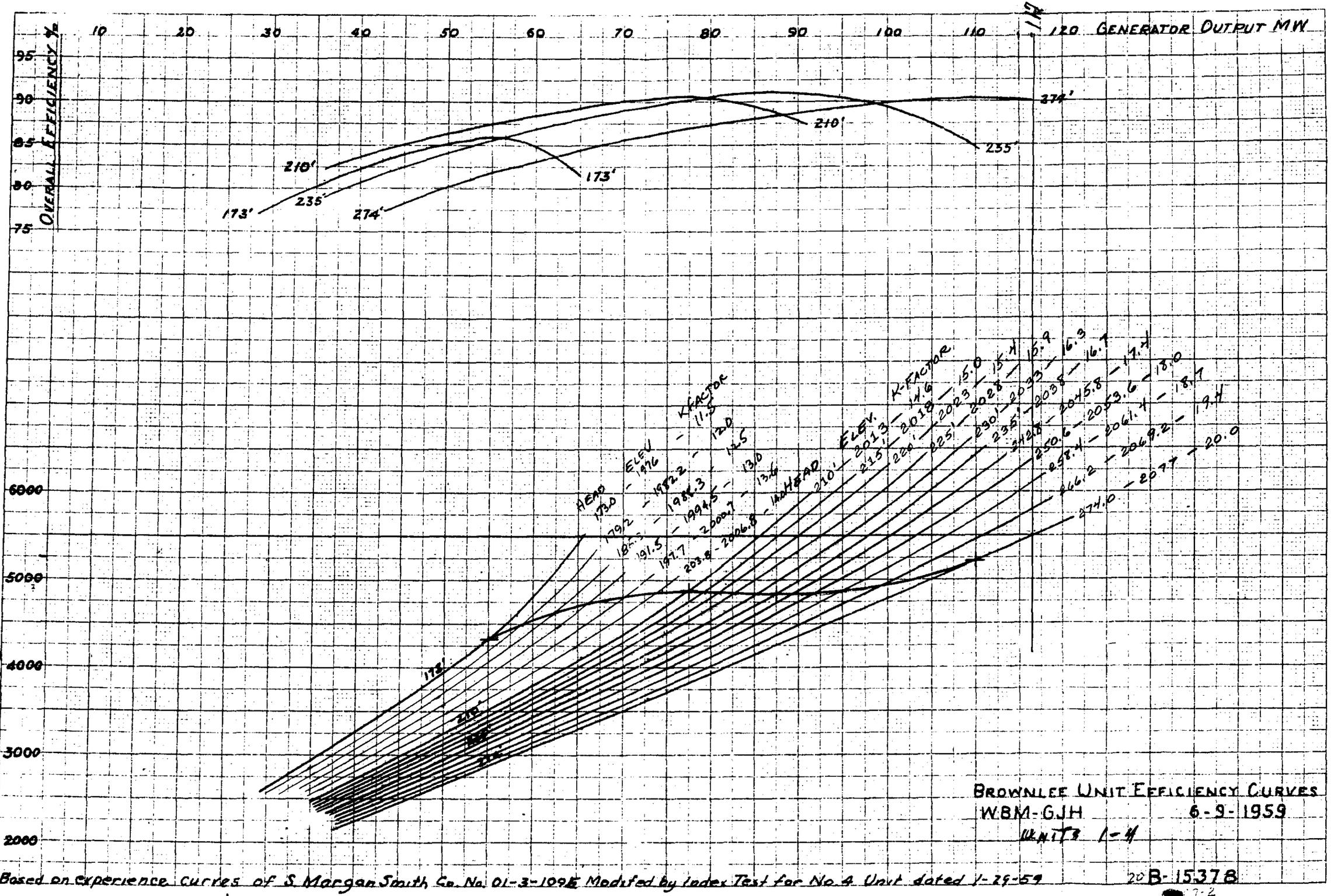


Fig 11-(5) Expected performance curve of prototype Turbine (1)

BROWNLEE #5 unit

Exhibit B



BROWNLEE UNIT EFFICIENCY CURVES
WBM-GJH 6-9-1959
UNITS 1-4

Based on experience curves of S. Morgan Smith Co. No. 01-3-109E Modified by Index Test for No. 4 Unit dated 1-29-59

B-15378

10 X 10 TO THE ½ INCH
359-11L

For 5th Turbines
Chart - Maximum head = 266
Actual Data " " = 271.88
@ maximum generation

Turbine flow not greatly mismatching tailwater levels ratio for many dates

Generation / name plate
$\frac{737}{585}^{10} = 124\%$

Is head loss through turbine incl in overall plant efficiency?

Idaho Power

BROWNLEE STATION RECORD No. 1

Exhibit C

DAY TUESDAY DATE JUN 4 1985 19

TUESDAY JUN 4 1985

	HOUR OF DAY	GENERATOR NO. 1 MWH READING		GENERATOR NO. 2 MWH READING		GENERATOR NO. 3 MWH READING		GENERATOR NO. 4 MWH READING		GENERATOR NO. 5 MWH READING		TOTAL GEN. MWH	SPILL CFS
AF 1421120													
	2400	10398	89	7939	90	1 5177	89	1 4820	81	536700	230	567	
	2300	1-0309	108	7848	109	1-5088	109	1-4631	108	536470	240	694	
10398	2200	1-0201	111	7739	112	1-4979	112	1-4523	113	536230	260	708	
NO. 1 1667	2100	1-0090	108	7627	108	1-4867	108	1-4410	107	535970	260	691	
8731	2000	9982	103	7519	105	1-4759	104	1-4309	104	535710	260	676	
	1900	9879	99	7414	100	1-4655	100	1-4200	99	535450	260	658	
	1800	9780	106	7314	108	1-4555	107	1-4006	106	535190	260	687	
7938	1700	9674	105	7206	106	1-4448	105	1-3998	105	534930	260	681	
NO. 2 0928	1600	9569	108	7100	109	1-4343	109	1-3889	108	534670	260	694	
7110	1500	9461	108	6991	109	1-4234	109	1-3781	108	534410	260	694	
	1400	9353	117	6882	115	1-4126	116	1-3673	114	534150	260	722	
	1300	9236	117	6767	114	1-4009	115	1-3559	112	533890	250	708	
15177	1200	9119	114	6653	111	1-3894	113	1-3447	111	533640	260	709	
NO.3 7194	1100	9005	117	6542	118	1-3781	117	1-3336	115	533380	260	727	
7983	1000	8888	110	6424	110	1-3664	110	1-3221	110	533120	260	700	
	0900	8778	113	6314	113	1-3554	113	1-3111	112	532860	260	711	
*	0800	8665	97	6201	100	1-3441	93	1-2999	98	532600	250	638	
14772	0700	8568	98	6101	34	13348		12901	99	532350	220	451	
NO. 4 5605	0600	8470	70	6067		13348		12802	71	532130	120	261	
9115	0500	8400	50	6067		13348		12731	58	532010		108	
	0400	8350		6067		13348		12673	69	532010		69	
	0300	8350		6067		13348		12604	85	532010		85	
536700	0200	8350		6067		13348		12519	84	532010		84	
NO.5 520940	0100	8350		6067		13348	59	1-2435	63	532010		121	
15760	2400	8350		6067		13290		1-2372		532010			
TOTAL	TOTAL	2048		1871		1887		2348		4690		12844	
48699	PREV	6683		5239		6096		6767		11070		35855	
	MONTH	8731		7110		7983		9115		15760		48699	

BROWN ELEV.	VOLTS 230KV	GENERATOR MVAR BN	OX-HC	BN OX-HC	BROWNLEE ELEVATIONS H.W.	T.W.	EFF. HD.	TURB FLO CFS	SPILL CFS	TOTAL BY-PASS CFS
0800	234	-70			[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
HW 7276	234	-48	-25	-73	7688	0565	27123	32,700	–	32.700
TW 560	234	-58	[illegible]	-83	76.90	05.95	270.95	34,460		34.460
HD 2716	234	[illegible]	-25	-83	76.97	05.75	271.22	33.550		33.550
1600	234	-65	-25	-90	77.03	05.60	271.43	32.800		32800
HW 72.17	234	-70	-25	-95	77.05	0545	271.60	31,980	x	31.980
TW 0548	235	-20	[illegible]	-20	77.10	0560	271.50	[illegible]		33.330
HD 27169	235	-14	0	-14	77.10	0552	271.59	33,040		33.040
2400	235	-14	0	-14	77.17	05.48	271.69	33.700		33700
HW 7689	235	-15	0	-15	77.20	0541	27179	33,700		33700
TW 0570	235	-10	0	-10	77.23	0560	271.63	35380		35380
HD 27173	235	-10	0	-10	77.30	0555	271.75	34630		34630
	235	-5	0	-5	77.32	0550	271.82	34,500		34,500
	235	-5	0	-5	77.36	0548	271.88	35725		35725
	236	+14	0	+14	77.42	0528	272.14	34000		34000
	234	-54	-20	-74	77.42	0530	272.12	34575		34575
	234	-50	-20	-70	77.46	0500	272.46	31,000		31,000
	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	-100	[illegible]	[illegible]		13600		[illegible]
	[illegible]	[illegible]		-110	7235	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	-120	[illegible]	-100	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	-150	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
AVG.								[illegible]		[illegible]

LOCAL SERVICE	
NO. 1	
MDT	80190
MDT	79950
TOTAL	240
NO. 2	
MDT	7290
MDT	7212
TOTAL	78
NO. 3	
MDT	8806
MDT	8624
TOTAL	182
NO. 4	
MDT	6495
MDT	6463
TOTAL	32
NO. 5	
MDT	8044
MDT	8044
TOTAL	
STANDBY	
MDT	2020
MDT	2020
TOTAL	
TOTAL:	3160
PREV:	2320
TODAY:	840

UNIT AVAILIBILITY

UNIT STATUS	UNIT 1 TODAY	PREV	MONTH	UNIT 2 TODAY	PREV	MONTH	UNIT 3 TODAY	PREV	MONTH	UNIT 4 TODAY	PREV	MONTH	UNIT 5 TODAY	PREV	MONTH
OPERATION	20:00	71:20	91:20	17:30	52:50	70:20	18:00	63:50	81:50	24:00	72:00	96:00	18:40	50:10	68:50
DEP. TIME	4:00	40	4:40	6:30	19:10	25:40	6:00	8:10	14:10				5:20	21:50	27:10
RESERVE OUT															
PLANNED OUT															
MAINT. OUT															
FORCED OUT															
TOTAL TODAY	24:00			24:00			24:00			24:00			24:00		
TOTAL MONTH		72:00	96:00		72:00	96:00		72:00	96:00		72:00	96:00		72:00	96:00

DEP. KWH	TIME	REMARKS
UNIT #1		All units in oper. Bn on load control
DAY	Mdt	No1+5 unit depressed
MONTH 00236	0000	#2 depressed
TOTAL	0100	#3 depressed
UNIT #2	0400	#1 to gen
DAY	0520	#5 To gen
MONTH 00493	0630	#2 To gen
TOTAL	0700	#3 To gen
UNIT #3		
DAY		
MONTH 00369		
TOTAL		
UNIT #4		
DAY		
MONTH 00067		
TOTAL		
UNIT #5		
DAY		
MONTH 00992		
TOTAL		

CHECKED BY:

TOTAL LOCAL SERV.	
BL #1	240 MWH
BL #2	780 MWH
BL #3	1820 MWH
BL #4	320 MWH
BL #5	[illegible] MWH
[illegible]	[illegible] MWH

TRANSF. ENERGIZED FROM

BNK	GEN	LINE
1	9120	440
2	7020	2540
3	815	1410
4	[illegible]	
5	685	2710

SUMMARY OF OPERATIONS
BROWNLEE

TOTAL GENERATED FOR DAY	12844	MWH
PREVIOUSLY REPORTED	35855	MWH
TOTAL FOR MONTH	48699	MWH
TOTAL LOCAL SERVICE	31600	MWH
AVERAGE HOURLY OUTPUT	535.16	MWH
MAXIMUM HOURLY OUTPUT	727	MWH
MINIMUM HOURLY OUTPUT	64	MWH
RESERVOIR STORAGE	1-433170	AF
24-HOUR NET CHANGE	+ 6,440	AF
NET CHANGE TO DATE	+ 12,020	AF
TOTAL HEADWATER	[illegible]13	ELEV.
AVERAGE HEADWATER	[illegible]	ELEV.
MAXIMUM HEADWATER	2077.46	ELEV.
MINIMUM HEADWATER	2076.85	ELEV.
MAXIMUM TAILWATER	1805.60	ELEV.
MINIMUM TAILWATER	1798.10	ELEV.
AVERAGE EFFECTIVE HEAD	271.[illegible]	ELEV.

WEISER FLOW 25,398 WILDHORSE FLOW

OPERATORS	ON	OFF
[illegible]	MDT	0800
Kirtley	0800	1600
Clark	1600	MDT

SWITCHYARD READINGS

	IN	OUT
LAGRANDE PRESENT	93278	1-03770
LAGRANDE PREVIOUS	93278	1-01089
DIFFERENCE	-0-	2681
OXBOW PRESENT	11473	45926
OXBOW PREVIOUS	09497	45926
DIFFERENCES	1976	-0-

CHECK TOTAL	
0600:	728
1400:	6094
2200:	11583
RS:440	

TIME	REMARKS
Mdt	Swyd Battery Ground
	Gov air comp #2 has bad pop off value. Tabele
	Spillgate #4 indicator meter has no power
	Gen #1 Transf bank #3 out of service - bad oil p
	R.S. 32 Osc. out of service
	Station air comp #1 out of service - Not loading
	A bouy is in the intake.
0830	John Bergh repaired Station air comp #1
1030	Simpson reports Swyd battery grd is no
	longer present

Exhibit D

IDAHO

SNAKE RIVER

OREGON

Access Road

EL 17900 VALVE STRUCTURE
12-102" Howell-Bunger Valves

POWERHOUSE

20,000 cfs
03-2023
03-2024
10,000 cfs

POWER HOUSE INTAKE

EL 19310

DRAWDOWN INTAKE

EL 18650

DIVERSION INTAKE
60,000 cfs

EL 1800.0

Cofferdam El 18300

Cofferdam El 18800

Slope 1 on 1.4

Slope 1 on 2.5

Top of dam El 20900

SPILLWAY
5 Gates
42' wide by 5' high

EL. 2000.0

N. 1,198,800

N. 1,197,300

N. 1,196,800

N. 1,195,900

E. 202,000

E. 201,000

E. 199,800

E. 199,000

GENERAL PLAN

100 0 100 200 300 400 500

SCALE 1" = 100'-0"

THIS DRAWING IS FILED PURSUANT TO
ARTICLE 29 OF LICENSE FOR PROJECT
1971 ISSUED AUGUST 4, 1955

IDAHO POWER COMPANY
BY R. B. Jeman
VICE PRESIDENT
DATED September 1, 1955

PROJECT 1971 EXHIBIT L

BROWNLEE H.E. DEVELOPMENT

GENERAL PLAN

IDAHO POWER COMPANY
BOISE, IDAHO
SCALE AS SHOWN SHEET 1 OF 5

REVISED AUG 1955

23925

F-140647

Calculations For Maximum Flow At Brownlee Dam For Idaho Power's Permit

Exhibit E

The Primary Interest Is In Output & Flows For 5th Generator. However, Calculations For Other 4 Generators Are Included To Get Total Flow For Comparison With Idaho Power's Reported Flow Of 35725 Cfs.

The Calculations Are Based On Equation $Q = \frac{P_{KW}(11.8)}{H\,e}$, Where Q = Flow In Cfs, P_{KW} = Power In Kilowatts, 11.8 = Constant For Conversion, H = Head In Feet, e = Efficiency As A Decimal.

Reported Maximum Output Occurred At 1100 Hours On June 4, 1985, With An Effective Head Of 271.88', & 727 MW

Generator #

#1 P_{KW} = 117,000 Kw — $Q = \frac{117{,}000 \times 11.8}{271.88 \times .90} = \frac{1{,}380{,}600}{244.69} = 5642.24$ Cfs.
H = 271.88' — × .89 — 241.97 = 5705.67 "
e = .90, .89, .88 — × .88 — 239.25 = 5770.53 "

#2 P_{KW} = 118,000 Kw — $Q = \frac{118{,}000 \times 11.8}{271.88 \times .90} = \frac{1{,}392{,}400}{244.69} = 5690.47$ Cfs.
H = 271.88' — × .89 — 241.97 = 5754.43 "
e = .90, .89, .88 — × .88 — 239.25 = 5819.85 "

#3 P_{KW} = 117,000 Kw — $Q = \frac{117{,}000 \times 11.8}{271.88 \times .90} = \frac{1{,}380{,}600}{244.69} = 5642.24$ Cfs.
H = 271.88' — × .89 — 241.97 = 5705.67 "
e = .90, .89, .88 — × .88 — 239.25 = 5770.53 "

#4 P_{KW} = 115,000 Kw — $Q = \frac{115{,}000 \times 11.8}{271.88 \times .90} = \frac{1{,}357{,}000}{244.69} = 5545.79$ Cfs
H = 271.88' — × .89 — 241.97 = 5608.13 "
e = .90, .89, .88 — × .88 — 239.25 = 5671.89 "

#5 P_{KW} = 260,000 Kw — $Q = \frac{260{,}000 \times 11.8}{271.88 \times .90} = \frac{3{,}068{,}000}{244.69} = 12{,}538.31$ Cfs.
H = 271.88' — × .89 — 241.97 = 12,679.26 "
e = .90, .89, .88 — × .88 — 239.25 = 12,823.41 "

Totals 727,000 Kw

@ .90 Eff. 35059.05 Cfs
@ .89 " 35453.16 "
@ .88 " 35856.21 "

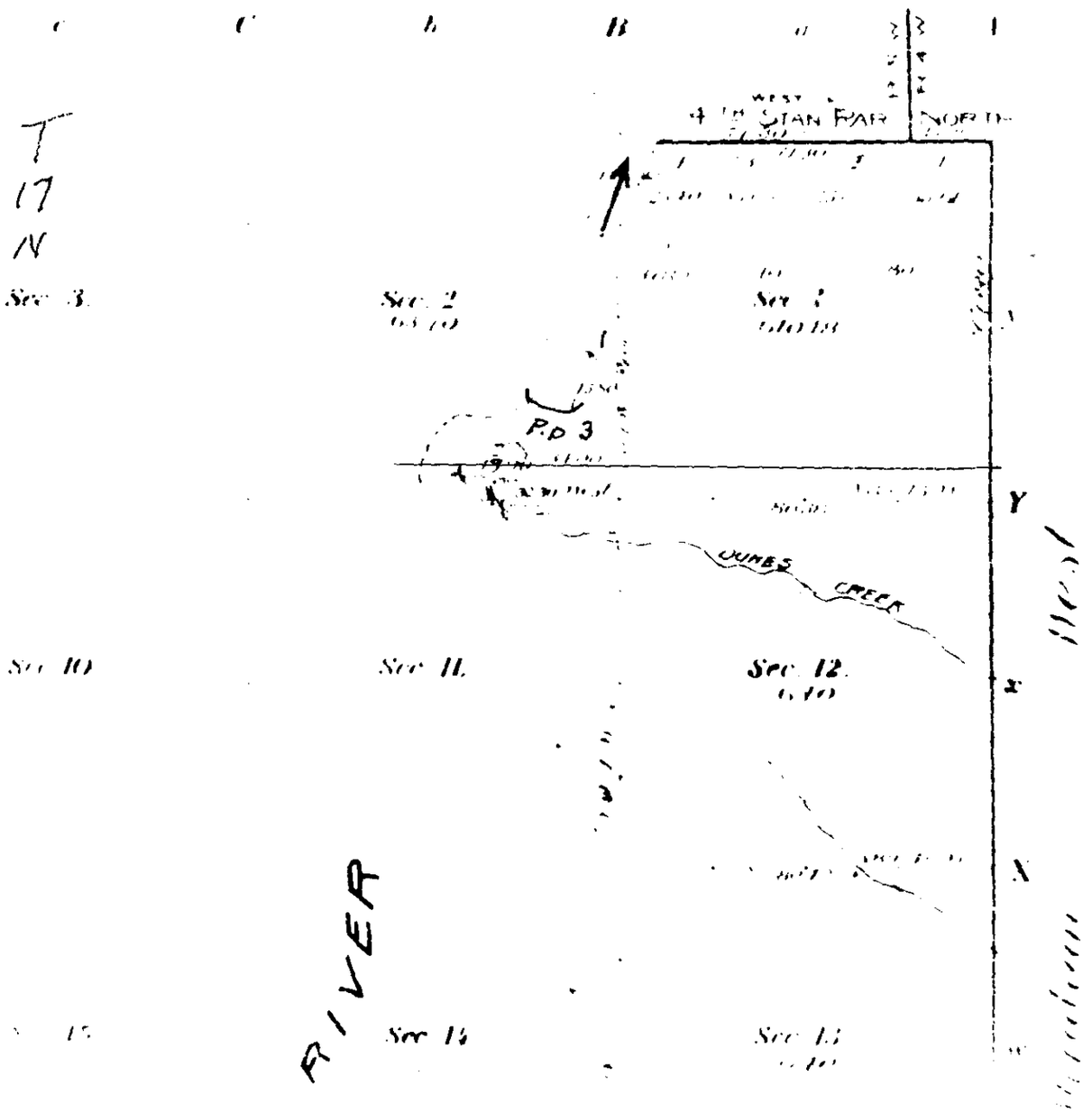
At Total Reported Flow Of 35725 Cfs $P = \frac{QHe}{11.8}$ Produces

@ .90 Eff. $\frac{35725 \times 271.88 \times .90}{11.8} = 740.8$ Mw
@ .89 " = 732.6 Mw
@ .88 = 724.4 Mw

Exhibit F

R6W

For the Boise Meridian, Idaho.



State of Idaho
DEPARTMENT OF WATER RESOURCES
WESTERN REGION, 92 South Cole Road, Boise, Idaho 83709

JOHN V. EVANS
Governor

C. STEPHEN ALLRED
Director

(Office at the corner of
Franklin and Cole Roads)

(208) 384-2190

August 27, 1980

Idaho Power Company
1220 Idaho Street
P.O. Box 70
Boise, ID 83707

RE: Permit No. 03-7018

Dear Sirs:

We acknowledge receipt of your statement submitted as proof of beneficial use for the above referenced permit.

Before a license can be issued, a field examination must be made by a representative of this Department.

☐ A field examination of your system has been scheduled for

_____.

If this time and date is not convenient for you, please contact this office as soon as possible.

☒ A field examiner will contact you to arrange to examine your system.

If you have any questions regarding the field examination, please contact this office.

Sincerely,

Kay Walker

Kay Walker
Secretary

MICROFILMED

DEPARTMENT OF WATER RESOURCES

The Idaho Department of Water Resources will consider this card as a statement that the permit holder(s) has completed development to the extent shown below of Permit No. 03-7018.

Name(s) of Permit Holder: IDAHO POWER COMPANY

Post Office Address: 1220 Idaho Street (P O Box 70)

Boise, Idaho 83707 Tel. No. 383-2676

Source of Water: Snake River (tributary to Columbia River)

Extent of Use:
- ☐ Domestic _____ (number of households)
- ☐ Stockwater _____ (number and type of stock)
- ☐ Irrigation _____ (acres)
- ☒ Other Power Generation

Measuring Device: Required? ☐ Yes ☒ No Installed? ☐ Yes ☐ No

Access Port: Required? ☐ Yes ☒ No Installed? ☐ Yes ☐ No

The above information is a true statement of the extent to which the above numbered permit has been developed.

August 7, 1980 C. E. Bissell

Date Signature of Permit Holder

MICR

IDAHO POWER COMPANY

P O Box 70

Boise, ID 83707

PLACE
TEN CENT
STAMP
HERE

RECEIVED
AUG 8 1980
Department of Water Resources

IDAHO DEPARTMENT OF WATER RESOURCES
STATEHOUSE
BOISE, IDAHO 83720

SNAKE RIVER

HYDRO POWER

CLIFFORD E. BISSELL
Vice President

IDAHO POWER COMPANY

BOX 70 • BOISE, IDAHO 83707

(208) 383-2421

August 7, 1980

Idaho Department of Water Resources
Statehouse
Boise, Idaho 83720

TO WHOM IT MAY CONCERN:

Forwarded herewith is the Idaho Department of Water Resources' card indicating that Idaho Power Company has completed installation of its Brownlee Unit No 5 which was the subject of Permit No 03-7018.

It is our understanding proof of beneficial use is satisfied when the Department is satisfied that the necessary facilities have been installed and are operating or have operated, based upon past records of the Company.

I would appreciate it if you would advise me several days in advance of your intended inspection.

Very truly yours,

C. E Bissell

C E Bissell
Vice President -
Power Operations

CEB/RWS:slp

Enclosure

APPROVED

February 22, 1980

Robert W. Stahman, Attorney
Idaho Power Company
P. O. Box 70
Boise, ID 83707

Dear Mr. Stahman:

Re: Permit No. 03-7018

Enclosed is a copy of the Order extending the time within which to submit proof of beneficial use to February 1, 1985.

Sincerely,

JAN GROVER
Water Rights Supervisor

JG:rf

Enclosure

SNAKE RIVER



HYDRO POWER

IDAHO POWER COMPANY

RECEIVED
DEC 12 1979
Department of Water Resources

BOX 70 • BOISE, IDAHO 83707

December 10, 1979

CERTIFIED MAIL

State of Idaho
Department of Water Resources
Statehouse
Boise, Idaho 83720

Re: Water Permit No 03-7018
Held by Idaho ~~Power~~ Company
(the "Permit")

Dear Ms Fleck:

Pursuant to Idaho Code 42-204, Idaho Power Company (the "Company") hereby requests that the Idaho Department of Water Resources grant the Company an extension of time for a period of five (5) years beyond February 1, 1980, in which to complete the work and apply that water which is the subject of the Permit to beneficial use.

The project to which the permit relates is the Company's Brownlee Unit No 5. The Company commenced construction on October 18, 1976, and it is expected that the project will be completed sometime during the fall or early winter of 1980. The request for an extension of five years is a precautionary measure in case of unforeseen construction delays.

Very truly yours,

Robert W. Stahman

Robert W Stahman
Attorney

RWS:slp

IDAHO POWER COMPANY
P. O. BOX 70 ★ BOISE, IDAHO 83707

CERTIFIED MAIL

CERTIFIED
No. 754231
MAIL

State of Idaho
Department of Water Resources
Statehouse
Boise, ID 83720

MICROFILMED

STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

STATEHOUSE
BOISE, IDAHO 83720
(208) 334-4440

IDAHO POWER COMPANY
P.O. BOX 70
BOISE, ID 83721

101526

NOVEMBER 30, 1979

DEAR PERMIT HOLDER:

ONE OF THE CONDITIONS OF APPROVAL OF YOUR WATER PERMIT NO. 03-7018 WAS THAT EVIDENCE OF THE EXTENT OF DEVELOPMENT MUST BE SUBMITTED TO THIS OFFICE ON OR BEFORE FEBRUARY 01, 1980. (SEE LAST PAGE OF YOUR APPROVED PERMIT). ENCLOSED IS A POST CARD WHICH MAY BE USED TO SUBMIT THE REQUIRED PROOF OF BENEFICIAL USE.

IF YOU HAVE NOT FULLY COMPLETED YOUR PROJECT, AND YOU HAVE NOT PREVIOUSLY RECEIVED AN EXTENSION OF TIME, YOU MAY REQUEST AN EXTENSION OF TIME PROVIDED THE DELAY IS FOR REASONABLE CAUSE AS INDICATED IN SECTION 42-204, IDAHO CODE, AMENDED. IF YOU HAVE BEEN PREVENTED FROM PROCEEDING BY A GOVERNMENTAL AGENCY OR BY LITIGATION, MORE THAN ONE EXTENSION OF TIME CAN BE GRANTED.

EITHER THE BENEFICIAL USE POST CARD OR A REQUEST FOR AN EXTENSION OF TIME MUST BE RECIEVED BY THIS DEPARTMENT ON OR BEFORE THE ABOVE MENTIONED DATE, OTHERWISE, THE PERMIT WILL LAPSE AND BE OF NO FURTHER FORCE OR EFFECT WITHIN 60 DAYS.

SINCERELY,

RITA FLECK
SR. SECRETARY

ENC: 1

MICROFILMED

03-7018

November 9, 1978

Mr. Harold C. Miles
Utility Committee Chairman
Idaho Consumer Affairs, Inc.
316 - 15th Avenue South
Nampa, ID 83651

Dear Mr. Miles:

Re: Water Right Documents, Nos. 02-7185, 03-7018, 02-7250, and 02-7251

In reply to your letter of November 2, 1978, with reference to the coal fired plant in the area of Orchard, Idaho, I am enclosing a copy of Permit No. 02-7185. The application was received in our office January 3, 1975.

Between Milner and Hells Canyon Snake River reach, as related in our phone conversation, three applications have been received since the date of filing for the coal fired plant: Permit No. 03-7018 and Application for Permit Nos. 02-7250 and 02-7251. The information contained on the copies should be of aid in answering your questions.

Also enclosed, at no cost, are copies of the State Water Plan legislation. The fee for the copies of permits and application for permits is $3.75 which you may remit to this office.

If we can be of further assistance, please feel free to contact us.

Sincerely,

Roberta Garrett
Records Supervisor

Enclosures

MICROFILMED

UTILITY COMMITTEE--Chairman

Idaho Consumer Affairs, Inc.

Harold C. Miles
316 - 15th Ave. So.
Nampa, Idaho 83651
345-3554

November 2, 1978

RECEIVED
NOV 3
Department of Water Resources

Mr. C. Stephen Allred, Director
Department of Water Resources, State of Idaho
Statehouse Mailing Room
Boise, Idaho 83720

Dear Mr. Allred:

May Idaho Consumer Affairs, Inc. be supplied the following information:

The number of the water permit or permits issued to the Idaho Power Co. since a permit was issued them for use by the Orchard Idaho located Pioneer Coal fired plant; also dates issued.

The amount of water in cfs or acre feet firm annual amount, covered by each permit.

The streams or watersheds these permits cover, and information as to whether the permits cover surface water only or whether these permits also cover underground stream flows. If so, into which river, stream or watershed drainage area do these permits cover.

Would later filings for stream flows such as from the Snake, Boise, Payette Rivers or their tributaries be affected by these Idaho Power Co. filings; also would filings for drilling a well in the drainage area of these streams be affected by such an issued water permit to the Idaho Power Co., prior to another filing.

Thanking you for past cooperation and looking forward to your response with anticipation, at your first convenience,

Respectfully submitted,

Harold C. Miles

Harold C. Miles-Chairman
Power-Utility Committee
Idaho Consumer Affairs, Inc.

P.S.
May we be supplied a copy of any printed current information the Idaho Department of Water Resources may have on hand pertaining to the above subjects, in a general or specific way.

May we be supplied a copy of the State Water Plan legislation as finalized into law by the last session of the State Legislature.

MICROFILMED

January 30, 1976

Re: Permit No. 03-7018

Idaho Power Company
P. O. Box 70
Boise, ID 83721

Gentlemen:

Enclosed is a copy of your approved Application for Permit No. 03-7018. We direct your attention to the conditions of approval as listed on the fourth page.

Sincerely,

BOBBY D. FLEENOR
Chief, Water Rights

BDF:jfr

Enclosure

The rights for the use of the waters under this permit shall ~~not~~ be subordinate to and not prevent or interfere with ~~impair~~ any future upstream diversion and use of the waters of the Snake River and its tributaries for the irrigation of lands or other consumptive beneficial uses in the Snake River ~~Watershed~~

DEPARTMENT OF WATER RESOURCES
- STAFF ANALYSIS -

Item	Initial	Date	
			Application No. 03-7018
			✓ Source
			✓ Point of Diversion
			✓ County
			✓ Quantity of Water and Period of Use
			✓ Description of Diverting Works
			✓ Time required for B/U of water
			✓ Place of Use or Acres Irrigated
			✓ Map
			✓ Signature
			✓ Fee
(1)	PJC	12-29-75	In form to receipt
(2)	PJC	12-29-75	Send Copies to: Idaho State Health Department ✓ Idaho Fish and Game Department Bureau of Land Management
(3)	PJC	12-29-75	Request Special Use Permit from U.S.F.S. Request Easement from B.L.M. Request Information from Applicant
(4)	PJC	12-29-75	In form for advertising
(5)			Platted on Map No.
(6)			Located within Water District No.
(7)			Critical groundwater area: yes no
(8)			Groundwater levels: Declining, Stable, Increasing (comment)
(9)			Other rights on the same place of use N/A
(10)			Comments:
(11)	CLS	1-16-76	Affidavit of Publication received(date)
(12)			Final date for protests Protests received: yes no ✓
(13)			All requested information received from agencies or applicant: yes no
(14)			Action recommended: ✓ Approve Deny Proposed Priority Reason for Reduction Measuring device required ✓ See attached sheet for other conditions of approval No special conditions for approval
(15)	District W		By JJS Date 1-26-76

No BDF ask BDF ? →

Subordinate to irrigation upstream



Department of Water Resources

CECIL D. ANDRUS, Governor
COMMISSION
ROBERT G. KALB, Sandpoint
PAUL C. KEETON, Lewiston
JOHN EATON, Cascade
JACK HEMINGWAY, Sun Valley
H. JACK ALVORD, Pocatello

IDAHO FISH AND GAME DEPARTMENT

JOSEPH C. GREENLEY
Director

POST OFFICE BOX 25
600 SOUTH WALNUT STREET
BOISE, IDAHO 83707

January 19, 1976

Mr. R. Keith Higginson, Director
Idaho Department of Water Administration
Statehouse - Annex 2
Boise, Idaho 83707

Dear Mr. Higginson:

Reference: Application No. 03-7018, Snake River, Washington County

Fish and Game personnel have reviewed and approve of the above referenced application with the following provisions:

We have no objection to issuance of this permit. I am concerned that if the water applied for is used to increase the winter peaking operation, the downriver fishery could be hurt. However, if Idaho Power used this water to generate power during the summer, it could enhance the fishery.

Sincerely,

IDAHO FISH AND GAME DEPARTMENT

Will W. Reid

Regional Fishery Biologist

cc: Fisheries Division
District Conservation Officer

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WESTERN DISTRICT — ANNEX 3

Cecil D. Andrus
Governor

R. Keith Higginson
Director

Statehouse
Boise, Idaho 83720
(208) 384-2190

January 5, 1976

Will Reid
Idaho Fish & Game Department
Statehouse
Boise, ID

RE: Application for Permit No. 03-7018 - Idaho Power Company

Dear Mr. Reid:

We are enclosing a copy of the above referenced application for permit which may be of interest to your agency. Please review the application and if you have any comments, please submit them to our department as soon as possible.

We normally complete the processing of an application within a six week period and we are required to take final action shortly thereafter.

If we may be of any assistance to you in the meantime, please do not hesitate to contact this department.

Sincerely,

Cathy L. Shaw

CATHY L. SHAW
Senior Clerk

CLS:cs

Enclosure

MICROFILMED

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WESTERN DISTRICT — ANNEX 3

Cecil D. Andrus
Governor

R. Keith Higginson
Director

Statehouse
Boise, Idaho 83720
(208) 384-2190

December 31, 1975

Upper County News Reporter
Box 98
Cambridge, ID 83610

RE: Application for Permit No. 03-7018 - Idaho Power Company

Gentlemen:

Enclosed you will find a legal notice which we wish to have published once a week for two consecutive weekly issues of your newspaper. We have inserted the publication dates allowing ample time for you to submit us a galley proof for review before publication.

After sending us a galley proof, proceed with the publication on the dates we have inserted, assuming the notice is correct. If we have any corrections, we will notify you before the first publication. If you cannot publish the notice on the proposed dates, please contact us immediately.

An affidavit of publication must be submitted to the Department along with the publication bill. In order to receive payment, the following certification must appear in the bill:

> "I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid."

(Signature of Claimant)

Bill submitted
1-16-76 cls

Sincerely,

NOTICE OF APPLICATION FOR WATER PERMIT

Notice is hereby given that IDAHO POWER COMPANY

P.O. Box 70, Boise, ID

has on Dec. 24, 1975 submitted Application No. 03-7018

for a permit to appropriate 5000 cubic feet per second ~~acre feet~~ XXXXXXXX ~~per second~~ XXXXXXXX of water from the Snake River, trib. to Columbia River

by means of existing gated intake structure and penstock

within ~~the~~ XXX Lot 3, Sec. 2, T. 17 N, R. 5 W, B.M. Washington County

to be used from Jan. 1 to Dec. 31

for hydroelectric generation

within the NE¼SE¼, Sec. 2, T. 17 N, R. 5 W, B.M.

.

If issued, this permit will be subject to all prior water rights. Protests against the granting of the permit must be filed with the Idaho Department of Water Resources, Statehouse, Boise, Idaho, 83720, on or before Jan. 26, 1976.

R. KEITH HIGGINSON

Director

Published in the Upper County News Reporter, Cambridge, ID

on Jan. 8, 1976 and Jan. 15, 1976.

SNAKE RIVER



HYDRO POWER

IDAHO POWER COMPANY

BOX 70 • BOISE, IDAHO 83721

December 24, 1975

Idaho Department of Water Resources
Statehouse
Boise, Idaho 83720

Gentlemen:

Enclosed is Idaho Power Company's Application for Permit to appropriate 5,000 cfs of the waters of the Snake River for use in the Company's fifth generating unit to be erected at Brownlee Hydroelectric Project. My agent's check in the amount of $ 1465.00 to cover filing fees is also enclosed.

Should further information be required, please advise.

Very truly yours,

Gale C. Farley

Gale C Farley, Manager
Land & Right of Way

GCF:sc

Enclosures