

UPPER PAYETTE RESERVOIR

ACTIVE STORAGE

CALCULATION

IDAHO DEPARTMENT OF WATER RESOURCES

J. WESTRA & S. HORNBAKER

6/2/93

UPPER PAYETTE RESERVOIR

PURPOSE

The primary purpose of the project was to determine active storage volumes at any given reservoir level height. Allowances for evaporation, seepage and other sources of shrinkage were not considered in the calculations. The results will be utilized for future water management of the Payette River system.

BACKGROUND

The upper Payette Reservoir is a mountain reservoir located north of McCall in the Payette National Forest. Originally, the reservoir was part of a natural lake on the North Fork of the Payette River, draining into "Big" Payette Lake. A radial gate dam was constructed on the south end in 1953, raising the lake 8 feet in height. The active storage is utilized for irrigation in the lower Payette River Valley below.

PROCEDURE

Several sources of information and field data were incorporated into the volume calculations for the reservoir. Due to the natural lake (dead pool) portion of the reservoir, a detailed survey of the reservoir would have involved a great deal of time and resources. It was felt that by incorporating the use of existing contour maps, survey field data, and the computer, a credible calculation of volume could be found. USGS bench marks had been established on the right dam abutment and at the north road bridge, all elevations were referenced to these bench marks. The USGS contour maps of the reservoir also referenced the reservoir at the high water line elevation of 5555 ft., which outlined the reservoir border at full elevation. In late October of 1992 after several drought seasons, the reservoir had reached dead pool level. A field survey was completed at that time, tying the dead pool elevation and slope to the full reservoir elevation, 5555 ft.. Survey data was obtained at key geological features such as shore points, incoming creek tributaries, and bench marks that could be referenced on the USGS map. The data points were then plotted for the dead pool on an expanded version of the contour map. Data points from the reservoir full elevation and dead pool were loaded into the computer utilizing Surfer-Version 4 software, which inturn plotted a new contour map of the reservoir with contour elevations at 1 foot intervals. Surface areas were also calculated at each elevation of the reservoir as part of the software. The volume for each 1 foot of reservoir elevation was then computed by the pyramid frustrum equation:

$$V = h/3(A_1 + A_2 + \sqrt{A_1 A_2})^1$$

where V= Volume (Ac-Ft.)

h= contour height (ft.)

A = upper surface area (Ac-Ft)

A = lower surface area (Ac-Ft)

ACCURACY/ERROR

Although, the utmost care was taken in obtaining and collecting data, there is always some error involved in field data, maps, and computer plotting. Close attention was paid to the calmness of the dead pool during the survey to obtain accurate elevations, but some movement is unavoidable. At the reservoir dead pool level, the north end of the reservoir becomes a wetland grass habitat, and the ground surface is very uneven with several creek tributaries coming in. In being practical, some interpolation had to be done in plotting this particular area. By plotting the data manually on an expanded map, using a planometer, the surface areas found were reasonably close to the computer calculated areas. Generally, the accuracy of other types of water measurements are credible within 5 to 10 percent, the volumes determined in this case would safely fall within this percentage.

SPECIFICATIONS/FACTS

Reservoir Location: Parts of Sec. 36, 25, T21N, 3E
 Sec. 31, 30, 19, T21N, 4E
 Valley County, ID.

Dam: 4 - 8ft.(height) X 10 ft.(wide) radial gates.

Drainage: 42 square miles.

Surface Area: 321 acres

Water Right: #65-2918 (Decreed)

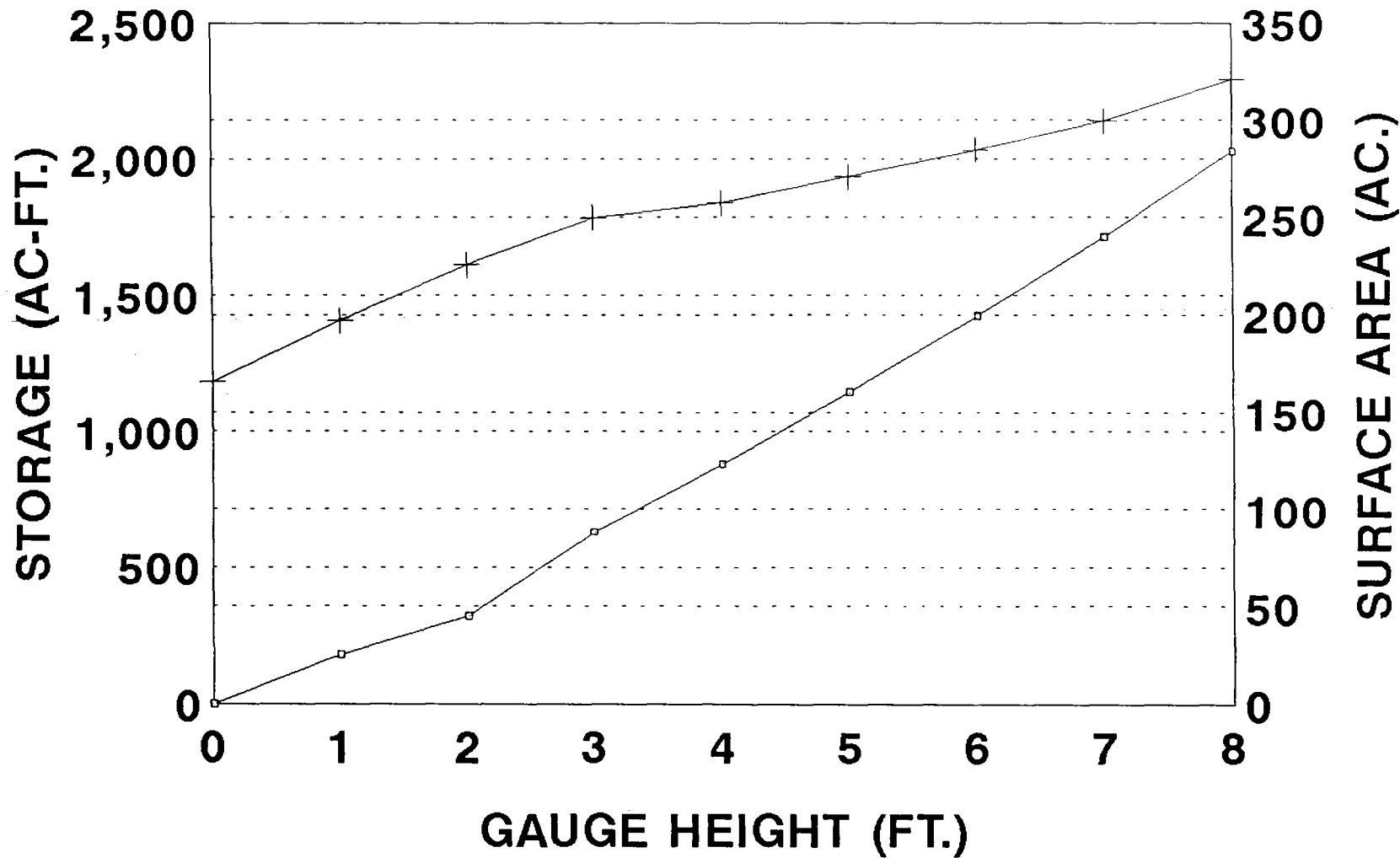
Owner: Lake Reservoir Co., Payette, ID.

UPPER PAYETTE RESERVOIR LAKE STORAGE CHART

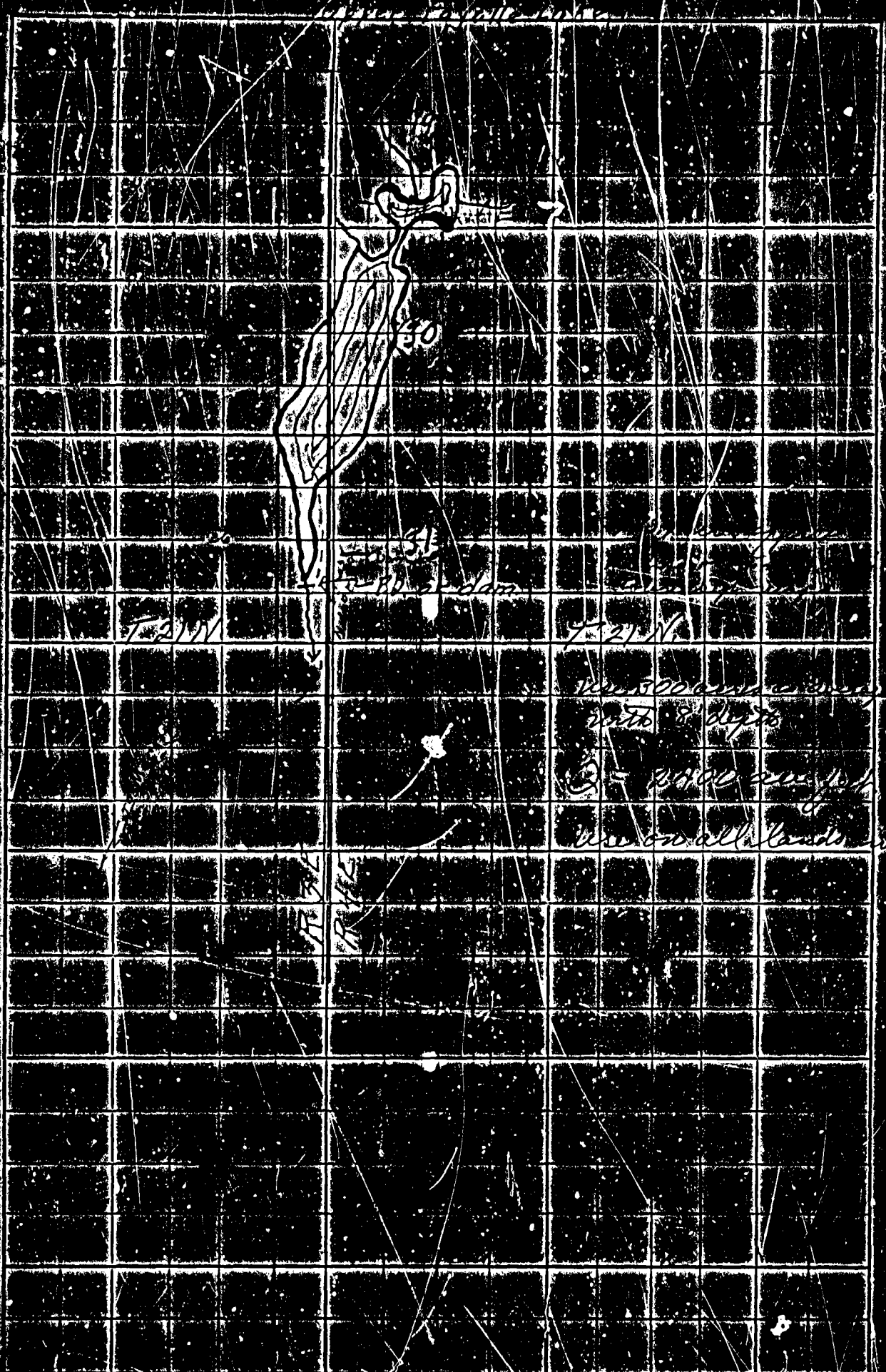
Gauge Height (Ft.)	Remaining Active Storage (Ac-Ft.)	Surface Area (Acres)
0.0	0.0	165.5
1.0	181.0	197.0
2.0	320.0	225.6
3.0	629.0	249.6
4.0	882.0	257.2
5.0	1146.0	270.8
6.0	1423.0	284.6
7.0	1715.0	299.4
8.0	2026.0	321.2

UPPER PAYETTE RESERVOIR

ACTIVE STORAGE



—□— STORAGE + SUR. AREA



30

T-21

T-21

1000000
 with 8 digits
 3 = 300000000
 use on all lands

STATE OF IDAHO
DEPARTMENT OF RECLAMATION
BOISE, IDAHO
REPORT OF ENGINEER

Permit No. B-111

This proof is for Completion of Works & Beneficial Use in Water District No.

- 1. Name of applicant: C. G. Fickens, Prase Lake Reservoir Company
- 2. Source of water supply: No. 12, Payatta River
- 3. Location of point of diversion: Is in the NE 1/4 of Section 31 T. 21 N. R. 11 E. B. 1 E. County of Valley

4. Describe works as they exist, giving dimensions and capacities of same: a concrete structure has been placed across the channel some distance below the lake pool. It has an overflow spillway as indicated on the plan. Structure is 45 feet bank to bank with earth embankments extending to high ground on each side. Storage depth is 8' high. Water level area is 1150 sq ft reported by Forest Service in No. 12 Call Idaho

- 5. Water is used for: irrigation, domestic and power purposes
- 6. State whether or not water has been turned into works of diversion: Yes

7. List legal subdivisions of lands to be irrigated. If proof is for beneficial use, give exact number of acres under cultivation in each forty-acre tract. (Describe manner and place of use if other than irrigation):

All lands lying under and being irrigated by Emmet Irrigation District, Acton Irrigation Co., Enterprise Ditch Co., Farmers Cooperative Irrigation Co., Lower Payatta Ditch Co., and Payatta Heights Irrigation District, embracing approximately 68,500 acres.

The description made of lands irrigated 6-11-37
(Submit map on attached plat, showing location and details of above description.)

8. What large stream would the water here appropriated finally reach?

Remarks:
Structure in good shape. Winter gates open no water being stored on this date.
This was inspected & reported made Sept 7-35
Wm. H. Peterson

This examination was made on the 26 day of Oct 1937
(signed) C. H. Thompson

STATE OF IDAHO
DEPARTMENT OF RECLAMATION
BOISE, IDAHO
REPORT OF ENGINEER

Permit No. 5711

This report is for a permit for the construction of works of diversion in Water District No. 1

1. Name of applicant: *Idaho Reservoir Company*

2. Source of water supply: *Payette River*

3. Location of point of diversion: Is in the *NW 1/4* of Section 31

T12N R10E County of *Valley*

4. Describe works as they exist, giving dimensions and capacities of same: *See plan attached to this report for details of works. The works consist of a dam, a spillway, a powerhouse, and a transmission line.*

The dam is 100 feet high and 100 feet wide at the top. The spillway is 100 feet wide at the top and 100 feet wide at the bottom. The powerhouse is 100 feet wide and 100 feet high. The transmission line is 100 feet wide and 100 feet high.

5. Water is used for: *irrigation, domestic, and power purposes.*

6. State whether or not water has been turned into works of diversion: *Yes*

7. List legal subdivisions of lands to be irrigated. If proof is for beneficial use, give exact number of acres under cultivation in each forty-acre tract. (Describe manner and place of use if other than irrigation.)

The lands to be irrigated are in the following districts: Snake River Irrigation Co., Enterprise Ditch Co., Farmers Cooperative Irrigation Co., Lower Payette Ditch Co., and Payette Heights Irrigation District, embracing approximately 60,500 acres.

Approximate number of acres irrigated: 60,500

(Submit map on attached part showing location and details of above description.)

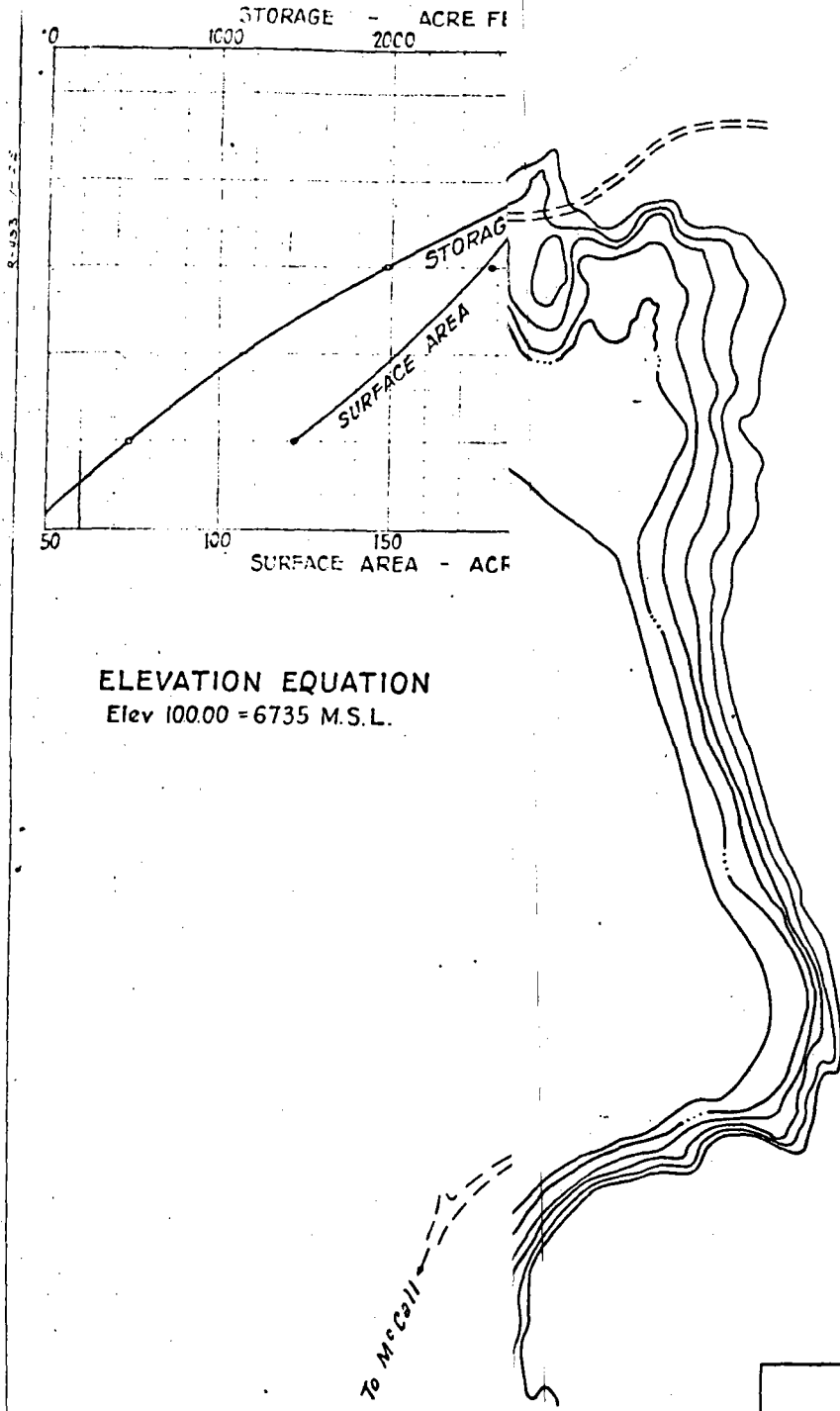
8. What large stream would the water here appropriated finally reach?

Remarks: *The works are located on the Payette River, and the water will be used for irrigation, domestic, and power purposes.*

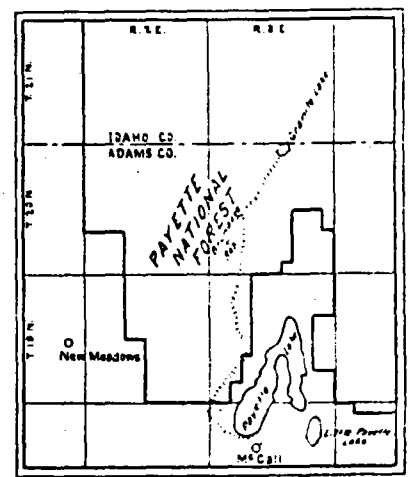
The works are located on the Payette River, and the water will be used for irrigation, domestic, and power purposes.

This examination was made on this *10th* day of *April*, 1915.
(Signed) *W. H. ...*

Granite Lake.



ELEVATION EQUATION
Elev 100.00 = 6735 M.S.L.



VICINITY MAP
SCALE 1" = 4 MILES

APPROVED
JUL 1 1961

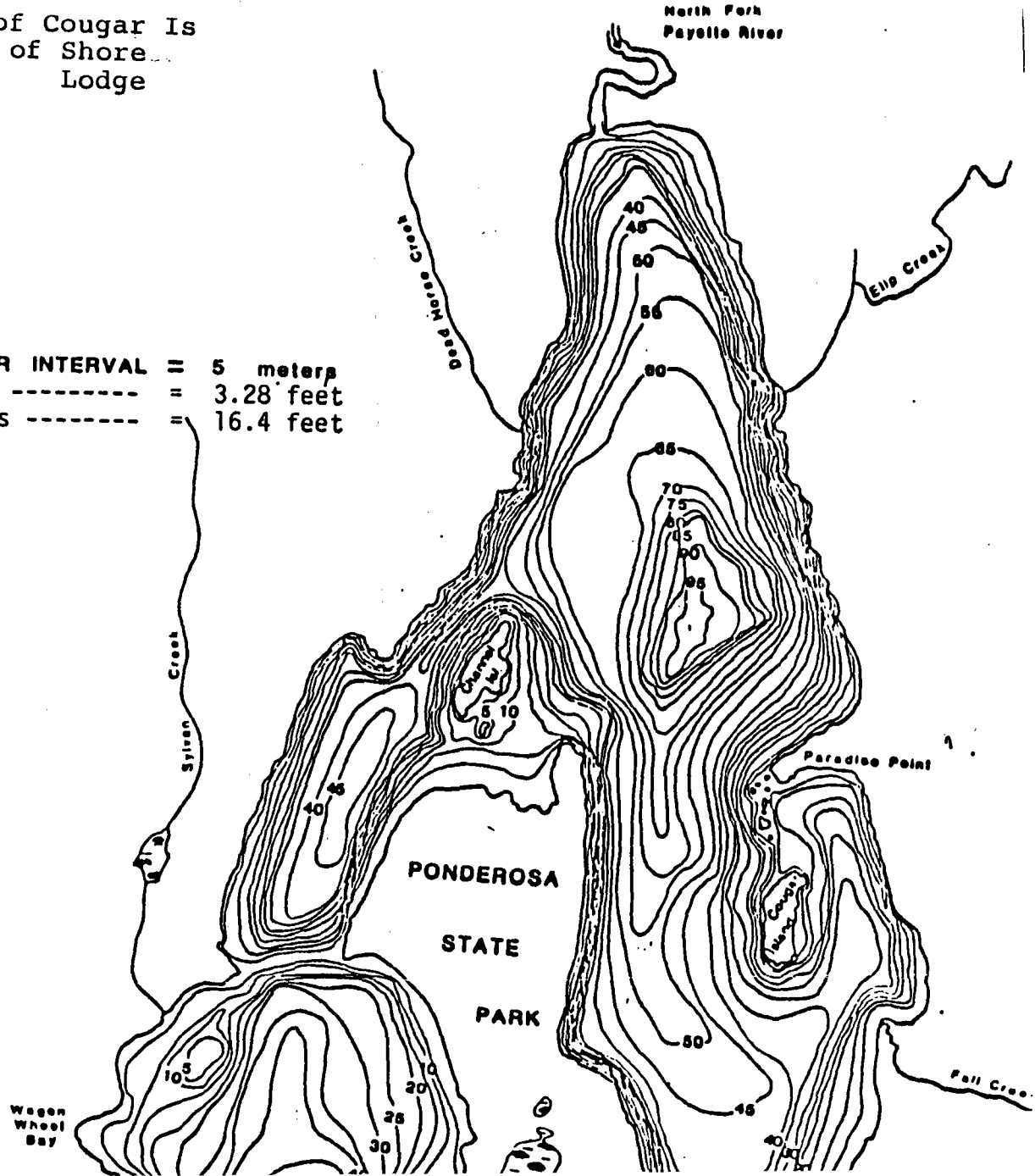
[Handwritten signature]
10/17/60

LAKES RESERVOIR CO. RECONSTRUCTION GRANITE LAKE DAM	
TOOTHMAN-CHRONIC & ASSOCIATES CONSULTING ENGINEERS 1802 N. 33rd ST. BOISE, IDAHO	
APPROVED	
LAKES RESERVOIR CO. <i>[Signature]</i> President	Date 5/15/60
IDAHO DEPARTMENT OF RECLAMATION	
Engineer U.S. FOREST SERVICE	Date
Date	
DESIGNED BY <i>N.W.</i>	DRAWN BY <i>[Signature]</i>
CHECKED BY <i>D.C.T.</i>	DATE 10/3/60
SHEET 1 OF 4	REVISED 11/10/60 12/30/60

Big
PAYETTE LAKE DEPTH

327' deep - E. of Cougar Is
 229' deep - (NE of Shore
 Lodge

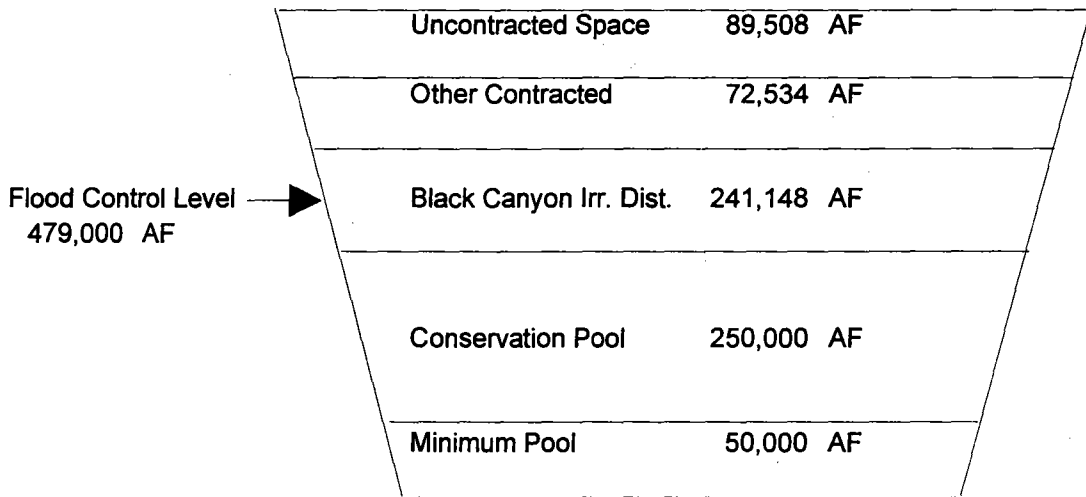
CONTOUR INTERVAL = 5 meters
 1 Meter ----- = 3.28 feet
 5 Meters ----- = 16.4 feet



Cascade Reservoir
Storage Space and Possible 1995 Scenario

Possible 1995 Scenario:

	Acre Feet		Acre Feet
Minimum Pool	50,000	Full Reservoir Space	703,190
Conservation Pool	250,000	Irrigation Needs	(88,000)
Black Canyon Preferred	125,000	Fish Flush	(96,726)
Black Canyon Regular	116,148	Evaporation	<u>(29,394)</u>
Other Contractors	72,534		
Uncontracted Space	<u>89,508</u>	Possible Reservoir Level - 10/95	<u><u>489,070</u></u>
 Total Space	 <u><u>703,190</u></u>		



Cascade Reservoir										
Possible Refill Scenarios										
Given Certain Assumptions										
			1995	1995	1995	1995	1996	1977	1977	
		Totals	In Basin	Out Basin	Evap. Chg	Carryover	Space	Refill	Refill	1996*
								1st Fill	Last Fill	Fill
Dead Pool		50,000				50,000				50,000
Conservation Pool		250,000				250,000				250,000
Black Canyon Preferred		125,000				125,000	0			125,000
Uncontracted		89,508		74,230	15,278	0	89,508	15,278		15,278
Black Canyon		116,148	88,000		10,852	17,296	98,852	14,559		31,855
Farmer's		38,893		13,012	1,750	24,131	14,762	1,750		25,881
Noble		10,050		4,417	452	5,181	4,869	452		5,633
Lower Payette		10,050		5,067	452	4,531	5,519	452		4,983
Emmett		10,050			452	9,598	452	452		10,050
Other		3,491			157	3,334	157	157		3,491
Total Space		703,190	88,000	96,726	29,394	489,070	214,120	33,100	0	522,170
Active Capacity		653,190				439,070				472,170

Note: Evaporation charges are proportionately distributed according to total space.

* Assuming a 1977 snow pack during the winter of 1995-96, this would be the 1996 storage accounts as of 6-1-96

Cascade Reservoir										
Possible Refill Scenarios										
Given Certain Assumptions										
			1995	1995	1995	1995	1996	1994	1994	1996*
		Totals	In Basin	Out Basin	Evap. Chg	Carryover	Space	Refill	Refill	Fill
								1st Fill	Last Fill	
Dead Pool		50,000				50,000				50,000
Conservation Pool		250,000				250,000				250,000
Black Canyon Preferred		125,000				125,000	0			125,000
Uncontracted		89,508		74,230	15,278	0	89,508	15,278	28,093	43,371
Black Canyon		116,148	88,000		10,852	17,296	98,852	98,852		116,148
Farmer's		38,893		13,012	1,750	24,131	14,762	1,750	4,925	30,805
Noble		10,050		4,417	452	5,181	4,869	452	1,672	7,304
Lower Payette		10,050		5,067	452	4,531	5,519	452	1,918	6,900
Emmett		10,050			452	9,598	452	452		10,050
Other		3,491			157	3,334	157	157		3,491
Total Space		703,190	88,000	96,726	29,394	489,070	214,120	117,393	36,607	643,070
Active Capacity		653,190				439,070				593,070
Note: Evaporation charges are proportionately distributed according to total space.										
* Assuming a 1994 snow pack during the winter of 1995-96, this would be the 1996 storage accounts as of 6-1-96										

Cascade Reservoir										
Possible Refill Scenarios										
Given Certain Assumptions										
			1995	1995	1995	1995	1996	1992	1992	
		Totals	In Basin	Out Basin	Evap. Chg	Carryover	Space	Refill	Refill	1996*
								1st Fill	Last Fill	Fill
Dead Pool		50,000				50,000				50,000
Conservation Pool		250,000				250,000				250,000
Black Canyon Preferred		125,000				125,000	0			125,000
Uncontracted		89,508		74,230	15,278	0	89,508	15,278	54,723	70,001
Black Canyon		116,148	88,000		10,852	17,296	98,852	98,852		116,148
Farmer's		38,893		13,012	1,750	24,131	14,762	1,750	9,593	35,473
Noble		10,050		4,417	452	5,181	4,869	452	3,256	8,889
Lower Payette		10,050		5,067	452	4,531	5,519	452	3,735	8,718
Emmett		10,050			452	9,598	452	452		10,050
Other		3,491			157	3,334	157	157		3,491
Total Space		703,190	88,000	96,726	29,394	489,070	214,120	117,393	71,307	677,770
Active Capacity		653,190				439,070				627,770
Note: Evaporation charges are proportionately distributed according to total space.										
* Assuming a 1992 snow pack during the winter of 1995-96, this would be the 1996 storage accounts as of 6-1-96										

Cascade Reservoir										
Possible Refill Scenarios										
Given Certain Assumptions										
			1995	1995	1995	1995	1996	1988	1988	1996*
		Totals	In Basin	Out Basin	Evap. Chg	Carryover	Space	Refill	Refill	Fill
								1st Fill	Last Fill	
Dead Pool		50,000				50,000				50,000
Conservation Pool		250,000				250,000				250,000
Black Canyon Preferred		125,000				125,000	0			125,000
Uncontracted		89,508		74,230	15,278	0	89,508	15,278	56,795	72,073
Black Canyon		116,148	88,000		10,852	17,296	98,852	98,852		116,148
Farmer's		38,893		13,012	1,750	24,131	14,762	1,750	9,956	35,837
Noble		10,050		4,417	452	5,181	4,869	452	3,380	9,012
Lower Payette		10,050		5,067	452	4,531	5,519	452	3,877	8,860
Emmett		10,050			452	9,598	452	452		10,050
Other		3,491			157	3,334	157	157		3,491
Total Space		703,190	88,000	96,726	29,394	489,070	214,120	117,393	74,007	680,470
Active Capacity		653,190				439,070				630,470
Note: Evaporation charges are proportionately distributed according to total space.										
* Assuming a 1988 snow pack during the winter of 1995-96, this would be the 1996 storage accounts as of 6-1-96										

Cascade Reservoir										
Possible Refill Scenarios										
Given Certain Assumptions										
			1995	1995	1995	1995	1996	1987	1987	
		Totals	In Basin	Out Basin	Evap. Chg	Carryover	Space	Refill	Refill	1996*
								1st Fill	Last Fill	Fill
Dead Pool		50,000				50,000				50,000
Conservation Pool		250,000				250,000				250,000
Black Canyon Preferred		125,000				125,000	0			125,000
Uncontracted		89,508		74,230	15,278	0	89,508	15,278	59,558	74,836
Black Canyon		116,148	88,000		10,852	17,296	98,852	98,852		116,148
Farmer's		38,893		13,012	1,750	24,131	14,762	1,750	10,440	36,321
Noble		10,050		4,417	452	5,181	4,869	452	3,544	9,177
Lower Payette		10,050		5,067	452	4,531	5,519	452	4,065	9,048
Emmett		10,050			452	9,598	452	452		10,050
Other		3,491			157	3,334	157	157		3,491
Total Space		703,190	88,000	96,726	29,394	489,070	214,120	117,393	77,607	684,070
Active Capacity		653,190				439,070				634,070
Note: Evaporation charges are proportionately distributed according to total space.										
* Assuming a 1987 snow pack during the winter of 1995-96, this would be the 1996 storage accounts as of 6-1-96										

WATER DISTRICT 65 - PAYETTE RIVER DIVERSION DATA - AUG 27, 1995

28-AUG-95

DIVERSION	CFS DIVN	CFS STOR	AF USED	AF RMNG	DIVERSION	CFS DIVN	CFS STOR	AF USED	AF RMNG	DIVERSION	CFS DIVN	CFS STOR	AF USED	AF RMNG
1 S DOBSON	1	1	78	-78	31 CURTIS-MCCONNELL	1	1	39	-39	61 PATTON-RIGGS	2	0	0	0
2 E K ALLEN	0	0	11	-11	32 D HEFFNER	0	0	35	-35	62 NOBLE	175	0	43	-43
3 DBL DIAMOND #1	1	1	62	-62	33 R HUNTER	0	0	15	-15	63 ROSEBURY	10	0	0	0
4 HEFFNER	1	1	54	-54	34 MACGREGOR #4	0	0	0	0	64 STEWART	18	0	0	0
5 DOBSON-OLIVER	2	2	107	-107	35 MACGREGOR #3	0	0	0	0	65 NICHOLS	14	6	364	-364
6 J HASBROUCK	0	0	11	-11	36 MACGREGOR #2	0	0	0	0	66 PULLEY	4	0	0	0
7 D & L REAY	0	0	6	-6	37 MACGREGOR #1	0	0	0	0	67 PULLEY PUMP	1	0	2	-2
8 DRAKE #1	1	1	27	-27	38 EMNETT IRR DIST	366	0	99	-99	68 RASMUSSEN	32	1	105	-105
9 DRAKE #2	0	0	16	-16	39 SS EMNETT ID (1)	72	0	0	0	69 COOPER	4	0	0	0
10 DBL DIAMOND #2	2	2	104	-104	40 BLACK CANYON IRR	1151	827	38303	-38303	70 UPPER ACCORD	9	1	82	-82
11 FRY & SONS	2	2	93	-93	41 LAST CHANCE	96	0	0	0	71 ACCORD PUMP	2	0	0	0
12 BOISE CASCADE P	2	1	70	-70	42 FOWLER	0	0	0	0	72 LOWER ACCORD	14	0	0	0
13 CITY OF HS BEND	2	2	89	-89	43 HODGINS	0	0	19	-19	73 NESBITT-MCFARLAND	17	6	353	-353
14 DBL DIAMOND #3	2	2	85	-85	44 BROWN #1	1	0	0	0	74 BARKER	3	0	0	0
15 J FRY	0	0	1	-1	45 BROWN #2	0	0	0	0	75 WOOKEY-BURT	2	0	0	0
16 C COOPER	0	0	6	-6	46 FARMERS COOP	379	0	0	0	76 PENCE	4	0	0	0
17 D SHOEMAKER	0	0	7	-7	47 NEBEKER-STOKELY	0	0	19	-19	77 LOWER PAYETTE	267	0	0	0
18 C BROWN	0	0	1	-1	48 GILL SLOUGH	10	0	0	0	78 EAGLE ISL FARMS	30	0	16	-16
19 MONTOUR FARMERS	20	0	0	0	49 BOISE CASCADE	5	0	0	0	79 JOHNSON-NIGBY	25	0	0	0
20 B JENKINS SOUTH	0	0	24	-24	50 SMITH	8	6	342	-342	80 SIMPLOT	50	0	0	0
21 E GATFIELD	0	0	33	-33	51 ENTERPRISE	45	0	0	0	81 FISH AND GAME	0	0	0	0
22 L MCCONNELL	0	0	27	-27	52 BILBREY	17	0	0	0	82 SHELTON	0	0	0	0
23 B JENKINS NORTH	0	0	10	-10	53 ROGERS	0	0	0	0	83 B MAY	3	0	0	0
24 W SHOBEL	0	0	9	-9	54 REED	44	0	182	-182	84 FOILES	0	0	0	0
25 MCCONOUGH-NEWELL	0	0	15	-15	55 KESGARD-TSCHUDY	14	2	196	-196	85 MOGENSEN	1	0	0	0
26 N CANADAY	1	1	39	-39	56 O'TURLEY	4	0	0	0	86 JACKSON	1	0	0	0
27 J SAAD	0	0	6	-6	57 SEITZ	17	0	0	0	87 DAVIS	1	0	0	0
28 H GATFIELD	0	0	33	-33	58 WOODS	4	0	1	-1	88 SWANSON	0	0	0	0
29 H FROST	0	0	0	0	59 PAYETTE R RANCH	2	0	0	0	89 WASHOE	28	0	0	0
30 F CHARTERS	0	0	1	-1	60 399 PUMPS (2)	44	44	0	0					

(1) STORAGE USE COMBINED WITH NS ENNETT

(2) STORAGE USE COMBINED WITH SS BLACK CANYON

08/28/95 13:50 01 208 327 7866 ID WATER RESOURS 0008

WATER DISTRICT 65 - PAYETTE RIVER FLOW ACCOUNTING - AUG 27, 1995

28-AUG-95

REACH FLOWS IN CFS	ACTUAL DATE	NATURAL FLOW	ACTUAL FLOW	REMAINING NAT FLOW	POWER FLOW	STORED FLOW	RESRVOIR EVAP	NATURAL FLOW DIV	TOTAL RCN DIV	REACH GAIN	LAST RIGHT
1 SOUTH FORK AT LOWMAN	AUG 25	512.	512.	512.	0.	0.	0.	0.	0.	512.	19380919
2 DEADWOOD BLW DEADWOOD	AUG 25	117.	556.	117.	0.	439.	20.	0.	0.	117.	19380919
3 PAYETTE NR BANKS	* AUG 26	969.	1408.	969.	0.	439.	0.	0.	0.	340.	19380919
11 UPPER NORTH FORK	* AUG 24	20.	20.	20.	0.	0.	0.	0.	0.	20.	19380919
4 NORTH FORK AT MCCALL	AUG 24	100.	157.	100.	0.	57.	0.	0.	0.	80.	19380919
5 AT MCCALL TO CASCADE	AUG 25	324.	782.	124.	200.	458.	174.	0.	0.	224.	19380919
6 N FORK CASCADE TO BANKS	* AUG 26	456.	914.	456.	0.	458.	0.	0.	0.	132.	19380919
7 BANKS TO HORSESHOE BEND	AUG 26	1460.	2352.	1460.	0.	892.	0.	0.	6.	36.	19380919
8 HORSESHOE BEND TO EMMETT	AUG 26	1529.	796.	746.	0.	50.	0.	783.	1622.	68.	19380919
9 EMMETT TO MID SLOUGH	* AUG 26	1729.	350.	309.	0.	41.	0.	638.	647.	201.	19380919
13 COMBINED WASTE	AUG 26	75.	31.	75.	0.	-44.	0.	0.	44.	75.	19380919
12 BELOW 7 MILE SLOUGH	* AUG 26	1804.	169.	0.	135.	34.	0.	249.	256.	0.	19380919
10 LETHA TO PAYETTE	AUG 27	2607.	468.	485.	0.	-17.	0.	453.	461.	803.	19990102

* - INDICATES FLOW ESTIMATED, NOT MEASURED

TOTALS 2122. 3034. 2607.

RESERVOIR	PREV CONT (AF)	CURR CONT (AF)	CHNG CONT (CFS)	ACCR STOR (CFS)	TOTL STOR (AF)	TOTL EV (AF)	PRIORITY	RESERVOIR	RIGHT (AF)	STORED (AF)
1 DEADWOOD	133251.0	132292.0	-483.5	0.0	161900.0	960.4	1	PAYETTE	27750.0	26470.0
2 UPPER LAKES	6500.0	6500.0	0.0	0.0	6500.0	0.0	2	DEADWOOD	116800.0	116800.0
3 PAYETTE	35300.0	35000.0	-151.2	0.0	26470.0	0.0	3	UPPER LAKES	2400.0	2400.0
4 CASCADE	628054.0	626200.0	-934.7	0.0	653190.0	10596.3	4	UPPER LAKES	2600.0	2600.0
5 BLACK CANYON	30456.0	30445.0	-5.5	0.0	0.0	0.0	5	UPPER LAKES	1300.0	1300.0
							6	CASCADE	570439.0	570439.0
							7	UPPER LAKES	200.0	200.0
							8	DEADWOOD	45100.0	45100.0
							9	CASCADE	82751.0	82751.0
TOTAL	833561.0	830437.0	-1575.0	0.0	848060.0	11556.8		TOTAL	849340.0	848060.0

CHANGE IN CONTENT	ABV LETHA STORAGE USED	PASSING LETHA STORED	ABV LETHA DIVERTED	UNACCT STORED
YEAR-TO-DATE AF	458652.0	40792.9	4970.5	159714.7

7 MILE SLOUGH AT HEAD CFS - 343. AT END CFS - 47.
 COMBINED WASTE TO 7 MILE SLOUGH CFS - 31.
 COMBINED WASTE BLW 7 MILE SLOUGH CFS - 11.
 UPPER 7 MILE COEF - 1.02 LOWER 7 MI COEF - 1.02