

$$V = \frac{1.5}{n} \left(R^{\frac{2}{3}} S^{\frac{1}{2}} \right)$$

MUDFLOW OBSERVATIONS

$\downarrow \frac{1}{2}$

\times

$\downarrow \frac{1}{2}$ =

date	stream	location	slope	depth	width	area	n v	Q	R	Notes
7/27/46	Mt. Pleasant	Straight Fork 1/4 mi. above upper power plant	7%	1' ±	30' ±			1 ±		Bypassed mudflow Sample #1
" "		Straight Fork 1/2 mi. ups. Forest Camp	30%	20'	35-50	840	.070 33	850	11.0	Solid Rock
" "	" "	" "	13%	20'	20-50	700	.070 27	700	10.0	" "
" "		at Forest Camp.	13%	16'	12-25	300	.070 27	8,000	6.5	sand + boulders
" "		at Power plant.	4%	8'	40-45	340	.065 15	5,100	6.0	gravel banks
" "		At upper dam below spillway	3%	8'	15-30	180	.050 15.0	2700	4.9	sand banks + 4' in mud.
" "		At upper dam, 500' in basin upstream	2 1/2 h.w. 3.5-4.0	43-90	245	.050 8.8	2150	2.5		
" "		At lower dam, 500' in basin upstream	1/2 h.w. 3.5	25-100	220	.050 5.4	1190	2.2		
" "		At upper dam spillways	14' clear, 5 1/2' drop 12' clear, 3 1/2' drop.			10/8.5 × 14 = 26 1/2 sec. 10/8.5 × 12 = 30 1/2 sec.				Hydraulic jump.
8/12/46	" "	Upper dam 100' ups.	+%	2.7		715	.065 4.0	2250	2.25	Velocity approach survey
" "		Lower dam 100' ups.	0.65% 2.4			2140	.065 4.1	2300	3.22	" " "
8/11/46	" "	South Fork 400' ups. Xing	6%	8'	24	192	.065 16.2	3100	4.8	Boulders $\frac{1}{2}$ cm. bottom
" "		South Fork. #16 ob channel west	7%	4'	100-125	450	Deposition	3.7	Boulders, no gravel $10'' \text{ to } 8''$ $= 10.2 \text{ acft}$ av. 24"	
" "		South Fork	7%	8' 3" 75	225	450	" "	3.0	Cobbles to boulders 9" 5" $= 6.2 \text{ acft}$ av. 8-12"	
" "		Straight Fork vicinity #5, power plant	4%	7'	24-33	235	.065 14.8	3500	5.7	Rock 8" x 6" x 10" On bar 15' above creek bottom
" "		" vicinity #5, power plant	4 1/2 %	10'	50-56	425	.065 16.6	7050	6.3	Three boulders 10' sq. into channel 30' upstream
1941	" "	Straight Fork upper riverbank	5%	4'	10-27	58	.050 7.3	425	1.9	
1941	" "	Straight Fork at power plant	3%	3'	15	45	.050 8.6	390	2.1	Section of mudflow riddled
		South Fork 1/4 mi. ups. below basin	3 1/2	3'	17	51	.050 9.4	480	2.2	" 1941 Flood.
		(over)	25% 1.2 h.w.	40'	48	7.0	350	1.1 (?)	" "	
				-1-						

					R	
Kanara	Debris basin Canyon mouth	5%	$4' \times 28' = 112$	$n = .065$ $V = 12.0$	1350 cfs	3.1
"	Old fill	3%	$1' \times 75/2 = 38$		1.0	$Vol. = 0.2 \text{ ac-ft bypass}$
"	Channel ups.	2%	$4' \times 12 \frac{1}{2} = 64$	$n = .065$	2.8	Channel above overflow
"	Overflow	1%	$1\frac{1}{2}' \times 150 = 225$		1.5	$Vol. = 2.5 \text{ ac-ft bypass}$
"	"	1%	$1' \times 30 = 30$		1.0	" (incl.)
"	"	1%	$\frac{1}{2}' \times 75 = 38$		0.5	$Vol. = 1.8 \text{ ac-ft bypass}$
"	"	1%	$\frac{1}{3}' \times 75 = 25$		0.5	" (incl.)
"	Channel wetting	1%	$3.5' \times 8 \frac{1}{2} = 38'$		2.1	Channel below fan
"	Overflow	1%	$0.5' \times 150 = 45$		0.3	$Vol. = 4.9 \text{ ac-ft bypass}$
						<u>Total = 9.4 ac-ft.</u>
Anakella	$\frac{1}{2}$ mi. above fan	8%	$5' \times 6 \frac{1}{2} = 53$	$n = .065$ $V = 15$	800	3.3
	overflow	9%	$0.75 \times 325 = 240$		0.75	$Vol. = 2.9 \text{ ac-ft bypass}$
	mid fan	10%	$5' \times 3 \frac{1}{2} = 20$		200	1.5
	overflow	8%	$1.5' \times 115 = 170$		1.5	$Vol. = 2.1 \text{ ac-ft.}$
	"	8%	$1.0 \times 50 = 50$		1.0	" = 0.9 "
	Channel below	9%	$4' \times 15' = 60$		900	2.6
Parowan	Hwy bridge	2%	$4.5 \times 30 \frac{1}{2} = 107$	$n = .035$ $V = 11$	1200	2.8
	Sill below dam	2%	$2.0 \times 20 \frac{1}{2} = 52$		1.6	
	$\frac{1}{2}$ mi. up. dam	2%	$3.0 \times 10 = 30$		1.9	
Paragonah	1 mi. up. bridge	2%	$4.0 \times 10 = 40$	$n = .035$ $V = 11$	440	2.2
Richfield	1 mi. up.	3%	$1.5 \times 10 = 15$	$n = .035$ $V = 9$	150	1.2
Dermark Wash	Side wash above dam	3%	$3.5 \times 20 \frac{1}{2} = 80$	$V = 11$	880	2.9
Willow Cr.	"	4%	$3.5 \times 15 \frac{1}{2} = 61$	$n = .065$ $V = 12$	730	2.7
	0.7 mi. W. N.F.	7%	$2.5 \times 5 \frac{1}{2} = 31$	$n = .065$ $V = 7$	220	1.2
Coal Cr.	South Fork	5%	$5' \times 150 = 750$		5.0	Boulders $Vol. = 43 \text{ ac-ft.}$
	#1 mouth	4%	$2 \times 50 = 100$		2.0	
	#2 "	7%	$5 \times 50 = 250$		4.2	
	#3 "	10%	$5 \times 60 = 300$		4.3	
	#4 "	7%	$5 \times 30 = 150$		3.8	
	#5 above canyon.	5%	$5 \times 30 = 150$		3.8	bridge, no cutting.

Mud Flow Observations

$$V = \frac{1.5}{n} (R^{2/3} S^{1/2})$$

Date	Stream	Location	S $\frac{1}{2}$	A	R	B	(R $^{2/3}$ S $^{1/2}$)	X-Sect Area (sq. ft.)	Texture max.	Notes	
7/27/46	Min Pleasant	straight Fork 1/4 mi above upper power Plant	7%	2.65	1	1		2.65		M. sandy loam - bypassed flow #1	
"	"	straight Fork 1/8 mi ups. Forest Camp	30%	5.48	11	4.95		27.13	840	boulders - on solid rock cut.	
"	"	"	13%	3.61	10	4.64		16.75	700	" " "	
"	"	at Forest Camp	13%	3.61	6.5	3.48		12.56	300	5" - on sand & boulders	
✓	"	at Power Plant	4%	2.00	6	3.3		6.60	340	8" - on gravel banks	
✓	"	at upper dam below spill way	3%	1.73	4.9	2.89		5.00	180	Mud - on sand banks	
✓	"	At upper dam, 500' in basin upstream	2 1/2 hr	1.6	2.5	1.84		2.94	245	2' rocks - settled out @ 50' ups.	
8/2/46	"	At Lower Dam, 500' in basin upstream	1 hr	1.0	2.2	1.69		1.69	220	2' rocks - " " @ 150' "	
8/12/46	✓	Upper Dam 100' ups	2.7%	1.64	2.25	1.72		2.82	715	" " "	
✓	"	Lower Dam 100' ups	2.4%	1.54	3.22	2.18		3.36	2140	" " "	
8/1/46	✓	South Fork 400' ups. Xing	6%	2.45	4.8	2.85		6.98	192	1 1/2' rocks - settled out below	
✓	"	South Fork #16 Old Channel West	7%	2.65	3.7	2.39		6.33	450	10"-8" boulder (ave=24") settled	
"	"	South Fork #18	7%	2.65	3.0	2.1		7.84	450	8"-5" boulder (ave=10") settled	
✓	"	Straight Fork Vicinity #5, PowerPlant	4%	2.00	5.7	3.19		6.38	235	8'-10' boulder settled	
✓	"	Vicinity #F, PowerPlant	4 1/2%	2.1	6.3	3.41		7.16	425	10' boulders 300' ups. settled	
1941	✓	"	Straight Fork at power Plant	3%	1.73	2.1	1.64		2.84	45	2' boulders, mudflow settled above.
✓	"	South Fork 1/4 mi ups	3 1/2%	1.86	2.2	1.69		3.14	51	2' boulders, settled below of ridge	
✓	"	Straight Fork at upper plant	5%	2.23	1.9	1.53		3.40	58	2' boulders, mudflow settled here	

Mud Flow Observations
 $V = \frac{LS}{n} (R^{\frac{2}{3}} S^{\frac{1}{2}})$

Date	Stream	Location	S	$S^{\frac{1}{2}}$	R	$R^{\frac{2}{3}}$	R	$(R^{\frac{2}{3}} S^{\frac{1}{2}})$	X-Sect. Area (sq.ft.)	Texture	Notes
	Kanara	Debris Basin Canyon Mouth	5%	2.24	3.1	2.13		4.77	112	" rocks, few in mudflow	
		Old Fill	3%	1.73	1.0	1.0		1.73	38	1" gravel, sandy clay loam #2 $\sigma_g = 1.5$ Mud bypassed on fill, settled	
		Channel Ups	2%	1.41	2.8	1.99		2.81	64	" , channel above fan	
✓		Overflow	1%	1.0	1.5	1.31		1.31	225	9" bar, overflow settled	
		"	1%	1.0	1.0	1.0		1.0	30	" , overflow settled along road	
✓		"	1%	1.0	.5	.63		.63	38	Sandy clay loam #1 $\sigma_g = 1.5$ dry wind, overflow settled	
✓		"	1%	1.0	.5	.63		.63	25	" " "	
		channel West Hwy	1%	1.0	2.1	1.64		1.64	38	Mud channel capacity	
✓		Overflow	1%	1.0	0.3	.45		.45	45	Mud, overflow settled	
	Anabella	Channel 1/2 mi. above fan	8%	2.83	3.3	2.22		6.28	53	6" rocks, above 4' headcut	
✓		overflow	9%	3.0	.75	.83		2.49	245	Sandy loam #3 $\sigma_g = 1.4$ dry, wind settled, dry sand	
		Mid fan channel	10%	3.16	1.5	1.31		4.14	20	Mud, channel flow	
		overflow	8%	2.83	1.5	1.31		3.71	170	Mud settled, bypassed	
✓		"	8%	2.83	1.0	1.0		2.83	50	" "	
?		Channel below	9%	3.00	2.6	1.89		5.67	60	Muddy water, channel below fan	
Parowan		Channel of Hwy Bridge	2%	1.41	2.8	1.99		2.81	107	Muddy water, channel below	
		Sill below Dam	2%	1.41	1.6	1.37		1.93	52	" " "	
		1/2 mi. Ups. Dam	2%	1.41	1.9	1.53		2.16	30	" Channel above, dry washes	

Mud Flow Observations
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Date	Stream	Location	S	$S\frac{1}{2}$	R	$R\frac{2}{3}$	($R\frac{2}{3}S\frac{1}{2}$)	Area	Text	Notes
1945	Rich Crk	Paragonah 1 mi. Upst. Bridge	2%	1.41	2.2	1.69		2.38	40	3" gravel channel above
1945	Richfield	1 mi. Upst.	3%	1.73	1.2	1.13		1.95	15	gravel " settled
"	Denmarkwash	Side wash above dam	3%	1.73	2.9	2.03		3.51	80	6" rocks settled
"	" ✓	" "	4%	2.00	2.7	1.94		3.88	61	" carried above
"	Willow Crk.	0.7 mi. w., N.F.	7%	2.65	1.2	1.13		2.99	31	" settled
	Coal Crk	South Fork	5%	2.24	5.0	2.92		6.54	750	3' boulders settled
✓	#1	on " " "	4%	2.00	2.0	1.59		3.18	100	3" " , below fan
	#2	on " " "	7%	2.65	4.2	2.60		6.89	250	5" " , above it's eroded canyon
	#3	on " " "	10%	3.16	4.3	2.64		8.34	300	" " " "
	#4	on " " "	7%	2.65	3.8	2.44		6.47	150	" " " "
?		#5 above canyon	5%	2.24	3.8	2.44		5.47	150	No cutting at bridge.