Exercise 12 – Shifting Controls, an example from the Hoosic River

- Using the measurements shown in the table below, and the rating table, rating curve, and rectangular-grid paper for the Hoosic River on the following pages, develop shift-by-stage V diagram(s) for measurement nos. 774-786. A blank table is included to help you compute the shift associated with each measurement.

Measurement information

No.	Date	G.H.	Discharge	Meas. rated
774	8-19-87	3.82	859	G
775	10-6-87	3.49	614	G
776	11-12-87	7.77	5490	F
777	12-21-87	3.61	702	G
778	12-29-87	4.24	1160	G
779	2-2-88	2.70	229	G
780	3-14-88	3.20	449	G
781	3-23-88	3.19	441	G
782	5-5-88	2.66	208	G
783	6-20-88	4.48	1350	G
784	7-21-88	5.70	2570	F
785	9-8-88	5.04	1840	G
786	10-18-88	3.02	365	G

Shift computations

G.H.	Measured discharge	Rating discharge	% diff (error in measured Q)	Rating GH for measured discharge	Shift indicated by measurement
3.82	859	713	20.4	4.04	0.22
3.49	614	517	18.8	3.66	0.17
7.77	5490	5510	-0.4	7.76	-0.01
3.61	702	585	20.0	3.80	0.19
4.24	1160	1010	15.0	4.43	0.19
2.70	229	175	30.8	2.86	0.16
3.20	449	370	21.2	3.36	0.16
3.19	441	366	20.6	3.35	0.16
2.66	208	162.5	28	2.80	0.14
4.48	1350	1200	12.5	4.65	0.17
5.70	2570	2430	5.6	5.81	0.11
5.04	1840	1710	7.4	5.17	0.13
3.02	365	292	25.1	3.19	0.17

BARC output showing %Differences

Copy to Rating C

Single Offse

Show

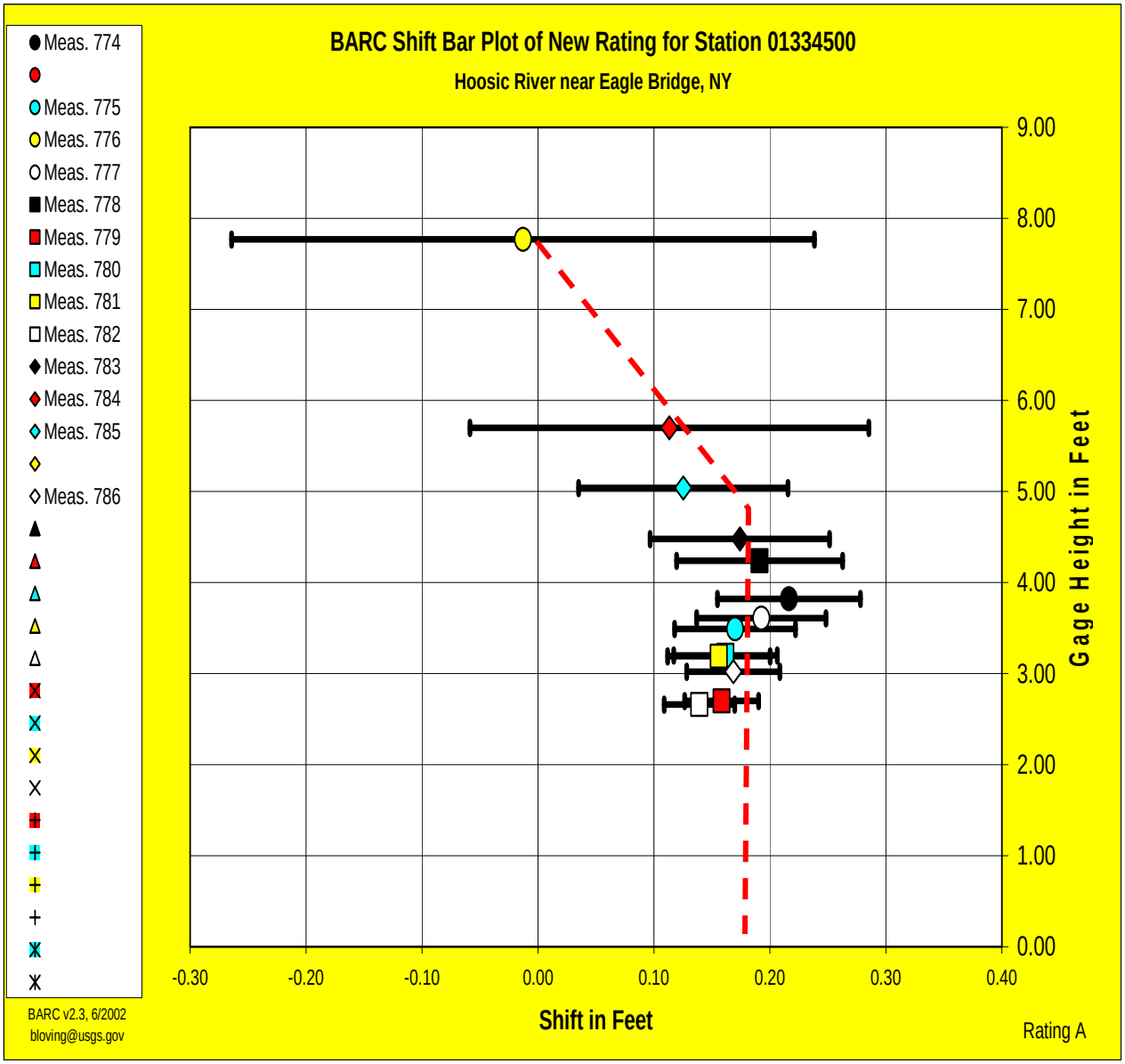
	Regression	Rating A
Enter the Rating Offset	1.26	1.60
Enter the Low Endpoint Gage Height	2.66	2.70
Enter the Low Endpoint Discharge	223.92	175
Enter a Breakpoint Gage Height (Optional)		
Enter a Breakpoint Discharge (Optional)		
Enter the High Endpoint Gage Height	7.77	8.00
Enter the High Endpoint Discharge	5872	5932

Sum of the Percent Differences	225.19
Percent Difference Furthest From Zero	30.86

Measurement Data

Use	Number	Gage Height	Discharge	Rated	Rating A % Diff.
☑	774	3.82	859	G	20.45
☐					
☑	775	3.49	614	G	18.80
☑	776	7.77	5490	F	-0.42
☑	777	3.61	702	G	20.09
☑	778	4.24	1160	G	15.00
☑	779	2.7	229	G	30.86
☑	780	3.2	449	G	21.24
☑	781	3.19	441	G	20.58
☑	782	2.66	208	G	28.00
☑	783	4.48	1350	G	12.45
☑	784	5.7	2570	F	5.60
☑	785	5.04	1840	G	7.42
☐					
☑	786	3.02	365	G	25.13

BARC Shift-bar output with possible V-diagram added.



UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

EXPANDED RATING TABLE

TYPE: LOG

DATE PROCESSED: 02-05-1988 @ 12:51 BY GHEBERT

~~01~~534500

HOOSIC RIVER NEAR EAGLE BRIDGE NY

OFFSET: (2.70,1.60)

DD: 2 TYPE: 001 RATING NO: 58.0

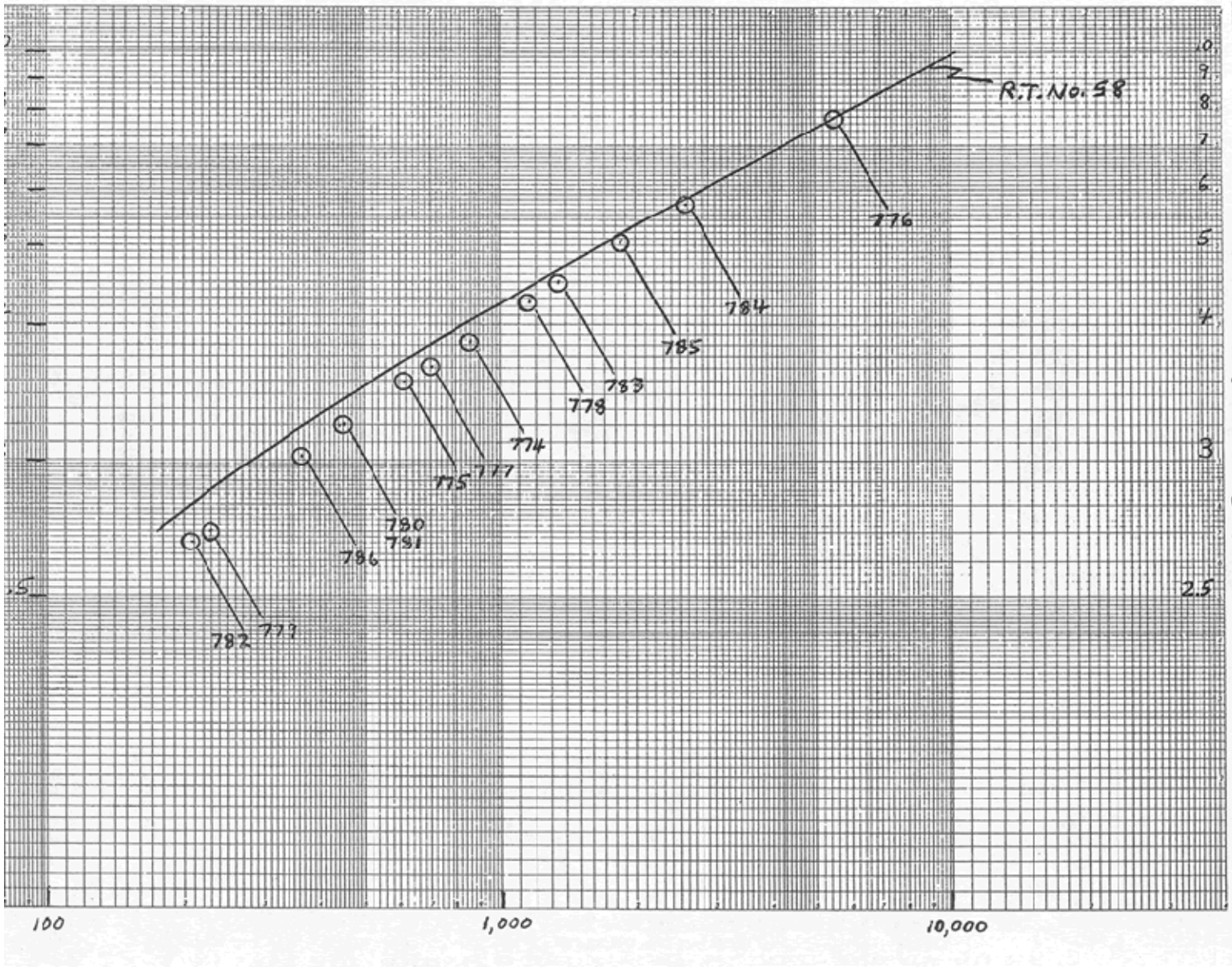
START DATE/TIME: 01-26-86 (1030)

BASED ON _____ DISCHARGE MEASUREMENTS, NOS _____, AND _____, AND IS _____ WELL DEFINED BETWEEN _____ AND _____ CFS

COMP BY _____ DATE _____ CHK. BY _____ DATE _____

DISCHARGE IN CUBIC FEET PER SECOND (EXPANDED PRECISION)

GAGE HEIGHT (FEET)	.00	.01	.02	.03	.04	.05	.06	.07	08	.09	DIFF IN Q PER TENTH FT
2.70	175.0*	178.2	181.4	184.7	188.0	191.3	194.6	198.0	201.4	204.8	33.30
2.80	208.3	211.8	215.3	218.8	222.4	226.0	229.6	233.3	237.0	240.7	36.20
2.90	244.5	248.2	252.0	255.9	259.7	263.6	267.5	271.5	275.5	279.5	39.00
3.00	283.5	287.6	291.7	295.8	300.0	304.1	308.4	312.6	316.9	321.2	42.00
3.10	325.5	329.8	334.2	338.6	343.1	347.6	352.1	356.6	361.1	365.7	44.90
3.20	370.4	375.0	379.7	384.4	389.1	393.9	398.7	403.5	408.3	413.2	47.70
3.30	418.1	423.0	428.0	433.0	438.0	443.1	448.2	453.3	458.4	463.6	50.70
3.40	468.8	474.0	479.2	484.5	489.8	495.2	500.6	505.9	511.4	516.8	53.50
3.50	522.3	527.8	533.4	539.0	544.6	550.2	555.8	561.5	567.2	573.0	56.50
3.60	578.8	584.6	590.4	596.3	602.2	608.1	614.0	620.0	626.0	632.1	59.30
3.70	638.1	644.2	650.3	656.5	662.7	668.9	675.1	681.4	687.7	694.0	62.30
3.80	700.4	706.7	713.2	719.6	726.1	732.6	739.1	745.7	752.2	758.9	65.10
3.90	765.5	772.2	778.9	785.6	792.4	799.2	806.0	812.8	819.7	826.6	68.00
4.00	833.5	840.5	847.5	854.5	861.6	868.6	875.8	882.9	890.1	897.3	71.00
4.10	904.5	911.7	919.0	926.3	933.7	941.0	948.4	955.9	963.3	970.8	73.80
4.20	978.3	985.9	993.4	1001	1009	1016	1024	1032	1039	1047	76.70
4.30	1055	1063	1071	1079	1087	1094	1102	1110	1119	1127	80.00
4.40	1135	1143	1151	1159	1167	1176	1184	1192	1200	1209	82.00
4.50	1217	1226	1234	1243	1251	1260	1268	1277	1285	1294	86.00
4.60	1303	1311	1320	1329	1338	1346	1355	1364	1373	1382	88.00
4.70	1391	1400	1409	1418	1427	1436	1445	1455	1464	1473	91.00
4.80	1482	1491	1501	1510	1519	1529	1538	1548	1557	1567	94.00
4.90	1576	1586	1595	1605	1615	1624	1634	1644	1654	1663	97.00
5.00	1673	1683	1693	1703	1713	1723	1733	1743	1753	1763	100.0
5.10	1773	1783	1794	1804	1814	1824	1835	1845	1855	1866	103.0
5.20	1876	1886	1897	1907	1918	1929	1939	1950	1960	1971	106.0
5.30	1982	1992	2003	2014	2025	2036	2047	2057	2068	2079	108.0
5.40	2090	2101	2112	2124	2135	2146	2157	2168	2179	2191	112.0
5.50	2202	2213	2225	2236	2247	2259	2270	2282	2293	2305	114.0
5.60	2316	2328	2340	2351	2363	2375	2386	2398	2410	2422	118.0
5.70	2434	2445	2457	2469	2481	2493	2505	2517	2530	2542	120.0
5.80	2554	2566	2578	2590	2603	2615	2627	2640	2652	2664	123.0
5.90	2677	2689	2702	2714	2727	2740	2752	2765	2777	2790	126.0
6.00	2803	2816	2828	2841	2854	2867	2880	2893	2906	2919	129.0
6.10	2932	2945	2958	2971	2984	2997	3011	3024	3037	3050	132.0
6.20	3064	3077	3090	3104	3117	3131	3144	3158	3171	3185	134.0
6.30	3198	3212	3226	3239	3253	3267	3281	3294	3308	3322	138.0
6.40	3336	3350	3364	3378	3392	3406	3420	3434	3448	3462	140.0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