

To: Parties to the CSKT Water Rights Settlement

From: CSKT-Montana Compact Implementation Technical Team

Date: DRAFT

Re: Amendment of Reservoir Capacity Table and Curve for Lower Crow Reservoir

This transmittal documents a formal amendment to the previously completed 2021 CITT Reservoir Capacity Results document created by the Compact Implementation Technical Team (CITT). This amendment is intended to update the SOD Restriction Level for Lower Crow Reservoir to reflect the removal of filling restrictions.

Summary of Issue: 2006 Lower Crow Reservoir Filling Restrictions

In 2021 the CITT completed a reservoir bathymetry project under Task Order 5. Deliverables from Task Order 5 included updated FIIP reservoir stage-storage curves capacity tables for each dam facility. Those tables also contain additional information for facility operators, including Safety of Dams (SOD) reservoir filling restriction levels. The 2021 CITT Reservoir Capacity Results document notes that “Safety of Dams restriction or operational levels apply to this version - August, 2021. The operational or restriction levels will likely change at certain reservoirs in the future.”

The BIA implemented a reservoir filling restriction at Lower Crow Reservoir in 2006 due to the deteriorated condition of the original spillway at Crow Dam. This filling restriction set a maximum water surface elevation of 2849.9 feet, which is 27 feet below the spillway crest elevation of 2877.0 feet.

Construction of a new spillway was completed in 2022 by CSKT and their subcontractors Stantec and Big Sky Civil/Montana Civil Joint Venture. Upon completion of the project, flood routing analysis was performed as part of the 2022 Comprehensive Review performed by the Bureau of Reclamation (BOR). Based on this analysis, BOR lifted the Lower Crow Reservoir filling restriction. Following the 2022 Comprehensive Review, First Filling Criteria recommendations and Routine Monitoring Checklist (RMC) guidelines were followed for the irrigation season of 2023. CSKT and FIIP are following the RMC guidelines, which establish the site monitoring protocols, for the 2024 irrigation season.

Recommendation

The CITT recommends that the Reservoir Capacity Results document be amended to reflect the removal of reservoir filling restrictions on Lower Crow Reservoir. The CITT recommends that the FIIP staff immediately discard all outdated versions of the Lower Crow Reservoir Capacity Tables and Rating Curves and replace them with the updated version of the official Reservoir Capacity Table for Lower Crow Reservoir (Appendix A).

This recommendation updates CITT’s work product to accurately reflect SOD filling restrictions and does not change FIIP’s operational requirements.

Appendix A

Lower Crow Reservoir Capacity Tables and Reservoir Capacity Curve

Flathead Indian Irrigation Project				Reservoir Capacity Table - prepared by CITT			
version: June 2024		Elev. reference: CSKT Local Datum (ft)		Storage: acre-feet			
Starting elev.: outlet sill elevation				Upper elev.: spillway crest			
Interim minimum pool level: 2,825.0 ft				Maximum normal WSEL: 2,877.0 ft			
Compact minimum pool level: 2,839.0 ft				SOD restriction level: 2,877.0 ft			
LOWER CROW RESERVOIR							
Elev.	Storage	Elev.	Storage	Elev.	Storage	Elev.	Storage
2800.0	0.0	2804.0	0.4	2808.0	19.7	2812.0	88.4
.1	0.0	.1	0.4	.1	21.0	.1	90.5
.2	0.0	.2	0.5	.2	22.2	.2	92.6
.3	0.0	.3	0.5	.3	23.5	.3	94.8
.4	0.0	.4	0.5	.4	24.9	.4	97.0
.5	0.0	.5	0.6	.5	26.2	.5	99.1
.6	0.0	.6	0.6	.6	27.6	.6	101.3
.7	0.0	.7	0.7	.7	29.0	.7	103.5
.8	0.0	.8	0.8	.8	30.4	.8	105.8
.9	0.0	.9	0.9	.9	31.9	.9	108.0
2801.0	0.0	2805.0	0.9	2809.0	33.4	2813.0	110.3
.1	0.0	.1	1.0	.1	34.9	.1	112.6
.2	0.0	.2	1.2	.2	36.5	.2	114.8
.3	0.0	.3	1.3	.3	38.0	.3	117.2
.4	0.0	.4	1.5	.4	39.6	.4	119.5
.5	0.0	.5	1.6	.5	41.2	.5	121.8
.6	0.0	.6	1.8	.6	42.8	.6	124.2
.7	0.0	.7	2.1	.7	44.5	.7	126.6
.8	0.1	.8	2.3	.8	46.2	.8	129.0
.9	0.1	.9	2.6	.9	47.9	.9	131.4
2802.0	0.1	2806.0	2.9	2810.0	49.6	2814.0	133.8
.1	0.1	.1	3.2	.1	51.3	.1	136.2
.2	0.1	.2	3.7	.2	53.1	.2	138.7
.3	0.1	.3	4.1	.3	54.9	.3	141.2
.4	0.1	.4	4.7	.4	56.7	.4	143.7
.5	0.1	.5	5.3	.5	58.6	.5	146.2
.6	0.1	.6	5.9	.6	60.4	.6	148.7
.7	0.1	.7	6.6	.7	62.3	.7	151.3
.8	0.1	.8	7.4	.8	64.2	.8	153.8
.9	0.2	.9	8.2	.9	66.1	.9	156.4
2803.0	0.2	2807.0	9.0	2811.0	68.0	2815.0	159.0
.1	0.2	.1	9.9	.1	70.0	.1	161.6
.2	0.2	.2	10.8	.2	72.0	.2	164.2
.3	0.2	.3	11.8	.3	74.0	.3	166.8
.4	0.2	.4	12.8	.4	76.0	.4	169.5
.5	0.3	.5	13.9	.5	78.0	.5	172.1
.6	0.3	.6	15.0	.6	80.0	.6	174.8
.7	0.3	.7	16.1	.7	82.1	.7	177.5
.8	0.3	.8	17.3	.8	84.2	.8	180.2
.9	0.4	.9	18.5	.9	86.3	.9	182.9

Flathead Indian Irrigation Project				Reservoir Capacity Table - prepared by CITT			
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LOWER CROW RESERVOIR							
Elev.	Storage	Elev.	Storage	Elev.	Storage	Elev.	Storage
2816.0	185.7	2820.0	307.8	2824.0	477.0	2828.0	701.7
.1	188.4	.1	311.3	.1	481.9	.1	708.0
.2	191.2	.2	314.9	.2	486.9	.2	714.4
.3	193.9	.3	318.4	.3	491.9	.3	720.8
.4	196.7	.4	322.0	.4	496.9	.4	727.3
.5	199.5	.5	325.6	.5	502.0	.5	733.7
.6	202.3	.6	329.3	.6	507.1	.6	740.3
.7	205.2	.7	333.0	.7	512.2	.7	746.9
.8	208.0	.8	336.7	.8	517.4	.8	753.6
.9	210.9	.9	340.5	.9	522.6	.9	760.3
2817.0	213.7	2821.0	344.3	2825.0	527.8	2829.0	767.1
.1	216.6	.1	348.1	.1	533.1	.1	773.9
.2	219.5	.2	352.0	.2	538.4	.2	780.8
.3	222.5	.3	355.9	.3	543.8	.3	787.8
.4	225.4	.4	359.9	.4	549.1	.4	794.8
.5	228.4	.5	363.9	.5	554.5	.5	801.8
.6	231.3	.6	367.9	.6	560.0	.6	808.9
.7	234.3	.7	372.0	.7	565.5	.7	816.1
.8	237.3	.8	376.1	.8	571.1	.8	823.3
.9	240.3	.9	380.3	.9	576.7	.9	830.6
2818.0	243.4	2822.0	384.5	2826.0	582.3	2830.0	837.9
.1	246.4	.1	388.7	.1	587.9	.1	845.2
.2	249.5	.2	393.1	.2	593.7	.2	852.6
.3	252.6	.3	397.4	.3	599.4	.3	860.1
.4	255.6	.4	401.8	.4	605.2	.4	867.5
.5	258.8	.5	406.2	.5	611.0	.5	875.0
.6	261.9	.6	410.7	.6	616.8	.6	882.6
.7	265.0	.7	415.2	.7	622.7	.7	890.2
.8	268.2	.8	419.8	.8	628.6	.8	897.8
.9	271.4	.9	424.4	.9	634.5	.9	905.5
2819.0	274.6	2823.0	429.0	2827.0	640.5	2831.0	913.1
.1	277.8	.1	433.6	.1	646.5	.1	920.9
.2	281.0	.2	438.3	.2	652.5	.2	928.7
.3	284.3	.3	443.0	.3	658.5	.3	936.5
.4	287.6	.4	447.8	.4	664.6	.4	944.3
.5	290.9	.5	452.6	.5	670.7	.5	952.2
.6	294.2	.6	457.4	.6	676.8	.6	960.2
.7	297.6	.7	462.2	.7	683.0	.7	968.1
.8	301.0	.8	467.1	.8	689.2	.8	976.2
.9	304.4	.9	472.0	.9	695.5	.9	984.2

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LOWER CROW RESERVOIR							
Elev.	Storage	Elev.	Storage	Elev.	Storage	Elev.	Storage
2832.0	992.3	2836.0	1357.7	2840.0	1801.7	2844.0	2333.6
.1	1000.5	.1	1367.8	.1	1814.0	.1	2348.0
.2	1008.7	.2	1378.0	.2	1826.3	.2	2362.6
.3	1017.0	.3	1388.2	.3	1838.8	.3	2377.1
.4	1025.3	.4	1398.5	.4	1851.2	.4	2391.7
.5	1033.7	.5	1408.8	.5	1863.7	.5	2406.4
.6	1042.1	.6	1419.1	.6	1876.3	.6	2421.1
.7	1050.6	.7	1429.6	.7	1888.9	.7	2435.9
.8	1059.1	.8	1440.0	.8	1901.5	.8	2450.7
.9	1067.7	.9	1450.5	.9	1914.2	.9	2465.6
2833.0	1076.3	2837.0	1461.1	2841.0	1927.0	2845.0	2480.5
.1	1084.9	.1	1471.7	.1	1939.8	.1	2495.5
.2	1093.6	.2	1482.3	.2	1952.6	.2	2510.5
.3	1102.4	.3	1493.0	.3	1965.5	.3	2525.6
.4	1111.2	.4	1503.7	.4	1978.4	.4	2540.8
.5	1120.0	.5	1514.4	.5	1991.4	.5	2555.9
.6	1128.9	.6	1525.3	.6	2004.4	.6	2571.2
.7	1137.9	.7	1536.1	.7	2017.4	.7	2586.5
.8	1146.9	.8	1547.0	.8	2030.6	.8	2601.8
.9	1155.9	.9	1558.0	.9	2043.7	.9	2617.2
2834.0	1165.0	2838.0	1569.0	2842.0	2056.9	2846.0	2632.7
.1	1174.2	.1	1580.0	.1	2070.1	.1	2648.2
.2	1183.4	.2	1591.2	.2	2083.5	.2	2663.7
.3	1192.7	.3	1602.4	.3	2096.9	.3	2679.3
.4	1202.0	.4	1613.7	.4	2110.3	.4	2695.0
.5	1211.4	.5	1624.9	.5	2123.8	.5	2710.7
.6	1220.8	.6	1636.3	.6	2137.3	.6	2726.4
.7	1230.3	.7	1647.7	.7	2151.0	.7	2742.2
.8	1239.8	.8	1659.2	.8	2164.7	.8	2758.1
.9	1249.4	.9	1670.7	.9	2178.4	.9	2774.0
2835.0	1259.0	2839.0	1682.3	2843.0	2192.2	2847.0	2789.9
.1	1268.6	.1	1694.0	.1	2206.1	.1	2805.9
.2	1278.4	.2	1705.7	.2	2220.1	.2	2821.9
.3	1288.1	.3	1717.5	.3	2234.1	.3	2838.0
.4	1297.9	.4	1729.3	.4	2248.1	.4	2854.1
.5	1307.8	.5	1741.2	.5	2262.2	.5	2870.3
.6	1317.7	.6	1753.2	.6	2276.4	.6	2886.5
.7	1327.6	.7	1765.2	.7	2290.6	.7	2902.8
.8	1337.6	.8	1777.3	.8	2304.9	.8	2919.2
.9	1347.6	.9	1789.5	.9	2319.2	.9	2935.5

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LOWER CROW RESERVOIR							
Elev.	Storage	Elev.	Storage	Elev.	Storage	Elev.	Storage
2848.0	2952.0	2852.0	3645.5	2856.0	4412.1	2860.0	5250.5
.1	2968.5	.1	3663.8	.1	4432.2	.1	5272.6
.2	2985.0	.2	3682.0	.2	4452.3	.2	5294.7
.3	3001.6	.3	3700.4	.3	4472.5	.3	5316.9
.4	3018.2	.4	3718.7	.4	4492.8	.4	5339.1
.5	3034.9	.5	3737.1	.5	4513.0	.5	5361.3
.6	3051.6	.6	3755.6	.6	4533.4	.6	5383.7
.7	3068.4	.7	3774.1	.7	4553.7	.7	5406.1
.8	3085.2	.8	3792.7	.8	4574.1	.8	5428.6
.9	3102.1	.9	3811.3	.9	4594.6	.9	5451.1
2849.0	3119.0	2853.0	3829.9	2857.0	4615.1	2861.0	5473.7
.1	3135.9	.1	3848.6	.1	4635.6	.1	5496.3
.2	3152.9	.2	3867.4	.2	4656.2	.2	5519.1
.3	3169.9	.3	3886.3	.3	4676.8	.3	5541.9
.4	3187.0	.4	3905.1	.4	4697.4	.4	5564.8
.5	3204.1	.5	3924.0	.5	4718.1	.5	5587.7
.6	3221.2	.6	3943.0	.6	4738.8	.6	5610.7
.7	3238.4	.7	3962.0	.7	4759.6	.7	5633.7
.8	3255.7	.8	3981.1	.8	4780.4	.8	5656.9
.9	3273.0	.9	4000.2	.9	4801.3	.9	5680.0
2850.0	3290.3	2854.0	4019.4	2858.0	4822.2	2862.0	5703.3
.1	3307.6	.1	4038.6	.1	4843.2	.1	5726.5
.2	3325.0	.2	4057.9	.2	4864.2	.2	5749.9
.3	3342.5	.3	4077.2	.3	4885.2	.3	5773.3
.4	3360.0	.4	4096.5	.4	4906.3	.4	5796.8
.5	3377.5	.5	4115.9	.5	4927.5	.5	5820.3
.6	3395.0	.6	4135.3	.6	4948.6	.6	5843.9
.7	3412.6	.7	4154.8	.7	4969.8	.7	5867.6
.8	3430.3	.8	4174.4	.8	4991.1	.8	5891.4
.9	3448.0	.9	4193.9	.9	5012.4	.9	5915.2
2851.0	3465.7	2855.0	4213.5	2859.0	5033.7	2863.0	5939.0
.1	3483.5	.1	4233.2	.1	5055.1	.1	5963.0
.2	3501.3	.2	4252.9	.2	5076.6	.2	5987.1
.3	3519.2	.3	4272.6	.3	5098.1	.3	6011.2
.4	3537.1	.4	4292.4	.4	5119.6	.4	6035.3
.5	3555.1	.5	4312.2	.5	5141.2	.5	6059.6
.6	3573.1	.6	4332.1	.6	5162.9	.6	6083.9
.7	3591.1	.7	4352.0	.7	5184.7	.7	6108.2
.8	3609.2	.8	4372.0	.8	5206.6	.8	6132.7
.9	3627.4	.9	4392.0	.9	5228.5	.9	6157.1

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LOWER CROW RESERVOIR							
Elev.	Storage	Elev.	Storage	Elev.	Storage	Elev.	Storage
2864.0	6181.7	2868.0	7213.3	2872.0	8349.7	2876.0	9606.1
.1	6206.3	.1	7240.3	.1	8379.6	.1	9639.1
.2	6230.9	.2	7267.5	.2	8409.5	.2	9672.1
.3	6255.6	.3	7294.6	.3	8439.6	.3	9705.1
.4	6280.4	.4	7321.9	.4	8469.7	.4	9738.2
.5	6305.2	.5	7349.2	.5	8499.9	.5	9771.4
.6	6330.1	.6	7376.5	.6	8530.1	.6	9804.6
.7	6355.0	.7	7404.0	.7	8560.5	.7	9838.0
.8	6380.1	.8	7431.5	.8	8590.9	.8	9871.3
.9	6405.2	.9	7459.1	.9	8621.4	.9	9904.7
2865.0	6430.3	2869.0	7486.7	2873.0	8652.0	2877.0	9938.2
.1	6455.5	.1	7514.4	.1	8682.6		
.2	6480.8	.2	7542.2	.2	8713.4		
.3	6506.2	.3	7570.1	.3	8744.2		
.4	6531.6	.4	7598.0	.4	8775.1		
.5	6557.1	.5	7625.9	.5	8806.1		
.6	6582.6	.6	7654.0	.6	8837.2		
.7	6608.2	.7	7682.2	.7	8868.4		
.8	6633.9	.8	7710.4	.8	8899.7		
.9	6659.6	.9	7738.6	.9	8931.0		
2866.0	6685.3	2870.0	7767.0	2874.0	8962.4		
.1	6711.2	.1	7795.4	.1	8993.8		
.2	6737.1	.2	7824.0	.2	9025.4		
.3	6763.0	.3	7852.6	.3	9057.1		
.4	6789.0	.4	7881.2	.4	9088.8		
.5	6815.1	.5	7909.9	.5	9120.6		
.6	6841.2	.6	7938.7	.6	9152.4		
.7	6867.4	.7	7967.7	.7	9184.4		
.8	6893.6	.8	7996.6	.8	9216.4		
.9	6919.9	.9	8025.7	.9	9248.5		
2867.0	6946.3	2871.0	8054.7	2875.0	9280.6		
.1	6972.7	.1	8083.9	.1	9312.9		
.2	6999.2	.2	8113.2	.2	9345.2		
.3	7025.7	.3	8142.5	.3	9377.6		
.4	7052.3	.4	8171.9	.4	9410.0		
.5	7078.9	.5	8201.3	.5	9442.5		
.6	7105.7	.6	8230.9	.6	9475.1		
.7	7132.5	.7	8260.5	.7	9507.8		
.8	7159.4	.8	8290.2	.8	9540.5		
.9	7186.3	.9	8319.9	.9	9573.3		

RESERVOIR CAPACITY CURVE: LOWER CROW RESERVOIR

prepared by CITT
version: June 2024

