CENWW-ODM **09/22/2021**

MEMORANDUM FOR RECORD - 21 MCN 09

SUBJECT: Main Unit 5 operating derated with fixed turbine blades.

Narrative: Unit 5 was originally removed from service on December 7, 2020 for thrust bearing upgrades. After this work was completed, the unit remained out of service for blade seal replacement. Acquiring new seals and installation took longer than estimated. Once the seals were installed, every avenue was exhausted to try to operate the unit with adjustable blade angles, but every attempt resulted in leaking oil. The only alternative to return the unit to service was to run it with a fixed blade angle of 22.5º, the same angle used for unit 6. Index testing has been completed but results are not yet available. The operating ranges for unit 5 are expected to be similar to that for unit 6, see below. Unit 5 returned to service on August 18, 2021.

Table MCN-6-A. Temporary Operating Range Values for McNary Unit 6 with Locked Runner Blades (Non-Adjustable). [a]

Project	MCN Unit 6 (Blades Locked at 22°) – With STS						MCN Unit 6 (Blades Locked at 22°) – No STS					
Head	Lower Limit		Peak		Upper Limit		Lower Limit		Peak Efficiency		Upper Limit	
(feet)	MW	cfs	MW	cfs	MW	cfs	MW	cfs	MW	cfs	MW	cfs
85	46.8	10,665	49.1	11,130	49.8	11,345	47.6	10648	49.9	11,078	50.5	11,289
86	47.5	10,659	50.1	11,175	50.9	11,405	48.4	10641	50.9	11,122	51.6	11,348
87	48.3	10,652	51.2	11,218	52.0	11,462	49.2	10635	52.0	11,165	52.8	11,405
88	49.1	10,645	52.2	11,259	53.1	11,517	50.0	10,628	53.0	11,205	53.9	11,460
89	49.9	10,647	53.1	11,255	54.0	11,511	50.9	10,631	53.9	11,202	54.8	11,455
90	50.8	10,649	54.0	11,251	54.9	11,505	51.7	10,633	54.8	11,198	55.7	11,449
91	51.7	10,650	54.9	11,246	55.8	11,498	52.6	10,634	55.7	11,194	56.6	11,443
92	52.5	10,650	55.8	11,241	56.7	11,491	53.5	10,635	56.6	11,189	57.5	11,436
93	53.4	10,650	56.6	11,235	57.6	11,484	54.4	10,635	57.5	11,184	58.4	11,429
94	54.5	10,697	57.6	11,256	58.5	11,497	55.5	10,682	58.5	11,205	59.4	11,443
95	55.6	10,742	58.7	11,275	59.5	11,509	56.6	10,728	59.6	11,225	60.4	11,455
96	56.6	10,785	59.7	11,294	60.5	11,521	57.7	10,771	60.6	11,244	61.4	11,467
97	57.7	10,827	60.7	11,311	61.5	11,531	58.8	10,813	61.6	11,262	62.4	11,478
98	58.8	10,866	61.7	11,328	62.5	11,541	59.9	10,853	62.6	11,279	63.4	11,488
99	59.8	10,888	62.8	11,368	63.6	11,587	60.9	10,875	63.7	11,319	64.6	11,534
100	60.7	10,909	63.8	11,407	64.7	11,631	61.8	10,896	64.8	11,357	65.7	11,578
101	61.6	10,929	64.9	11,444	65.8	11,674	62.8	10,916	65.9	11,395	66.8	11,620
102	62.6	10,949	66.0	11,481	66.9	11,715	63.7	10,936	67.0	11,431	67.9	11,662
103	63.5	10,968	67.0	11,516	68.0	11,755	64.7	10,955	68.1	11,466	69.1	11,702
104	64.4	10,991	68.0	11,529	69.0	11,765	65.6	10,978	69.0	11,479	70.0	11,712
105	65.4	11,013	68.9	11,541	69.9	11,775	66.6	11,000	70.0	11,492	71.0	11,721

a. Unit 6 has hydraulically locked runner blades to prevent oil leaks and is restricted to a smaller operating range until the unit is repaired. Values provided by HDC based on the abbreviated index test in Jan 2019.

Location: McNary Dam Main Unit 5.

Method: After blade seal replacement run the unit with a Blocked Hydraulic Valve to operate as a fixed blade angle generator to avoid oil leaks.

Timeline - Duration: At this time, indefinitely, until turbine is replaced during McMod Turbine replacement.

A. Species: NA

B. Origin: NA

C. Length: NA

D. Marks and Tags: NA

E. Marks and Injuries Found on the Carcasses: NA

F. Future and Preventative Measures: Replace Turbine during McMod Turbine replacement contract.

G. Photos Taken: None.

Sincerely,

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