

# MCNARY SPILLWAY STATUS

FPOM  
5 October 2023



U.S. ARMY



US Army Corps  
of Engineers®



# MCNARY SPILLWAY

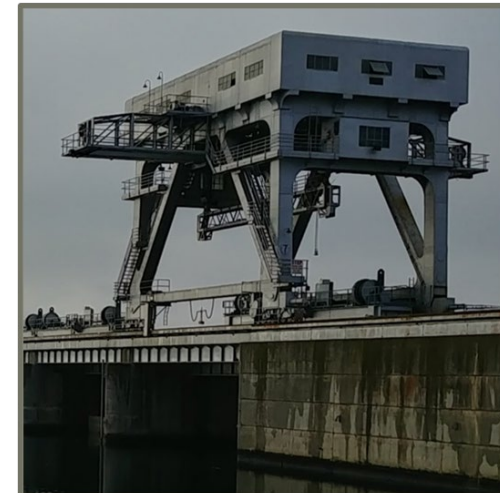
- Operational in 1954
- 22 Spillbays with double leaf vertical lift gates
- 2 Cranes (#6, #7) only initially,  
200 ton (400,000 lbs) capacity.  
Routinely operated gates in split leaf





# MCNARY CRANES 6 & 7

- Overloaded by estimated 20% according to BDI tests in 2003/05- not counting for lifting beam or frictional losses. – Violation of American Society of Mechanical Engineers (ASME) and Engineer Manual (EM) 385.
- Gantry crane frames do not comply with current American Institute of Steel Construction (AISC) codes - Under breakdown torque simulations, the downstream legs fail.
- The electrical system is outdated. Asbestos. DC hoist controls at risk of failure. Obsolete component replacement is becoming more challenging.
- Frequently down for weeks or months at a time – most recently a gantry drive gearbox failure required bearings that are no longer readily available.
- Recently had a main hoist gearbox replacement to address severe vibration issues, with mixed results.
- January 2023, Cranes 6 & 7 were limited to two engineered lifts (250 tons) per year.
  - Lifts that do not overload crane capacity are not limited





# MCNARY HOISTS

- 1976, 16 Ederer hoists added, 175 tons (350,000 lbs) capacity  
Flow deflectors added  
Spillway predominately operated as full gates
- 2002/2003, Four Transco hoists added.  
350,000 lbs capacity
- 2002, Failure of hoist gearbox coupler
- 2003-2005, Testing indicated all hoists were overloaded, 13 were > 125% overloaded  
Up to 480,000 lbs of load. Did not include sheave friction.
- 2004-2009, Rehab of some gates wheel bearings, guide slots, guide shoes, replaced seals  
Minor improvement only
- 2007, Hoist replacement project initiated
- 2020, Work restriction while hoists were under load implemented to reduce risk to health and human safety
- 2021, Load cell data collected on four hoists for prototype hoist project showed overload condition
- 2022, Hoist #6 failed, gears showed severe pitting due to material fatigue from high contact stresses, replaced with hoist from bay #16. Bay #16 RTS after about three month outage.  
Hoist #15 OOS for one week for repairs  
Hoist #20 taken OOS for repairs  
Hoist #21 gearbox coupler failed and brakes failed during closure causing gate to fall on sill
- October 2023, Hoist operations were limited to either no (13) or two (7) overload lifts per year





Pitted north drum gear



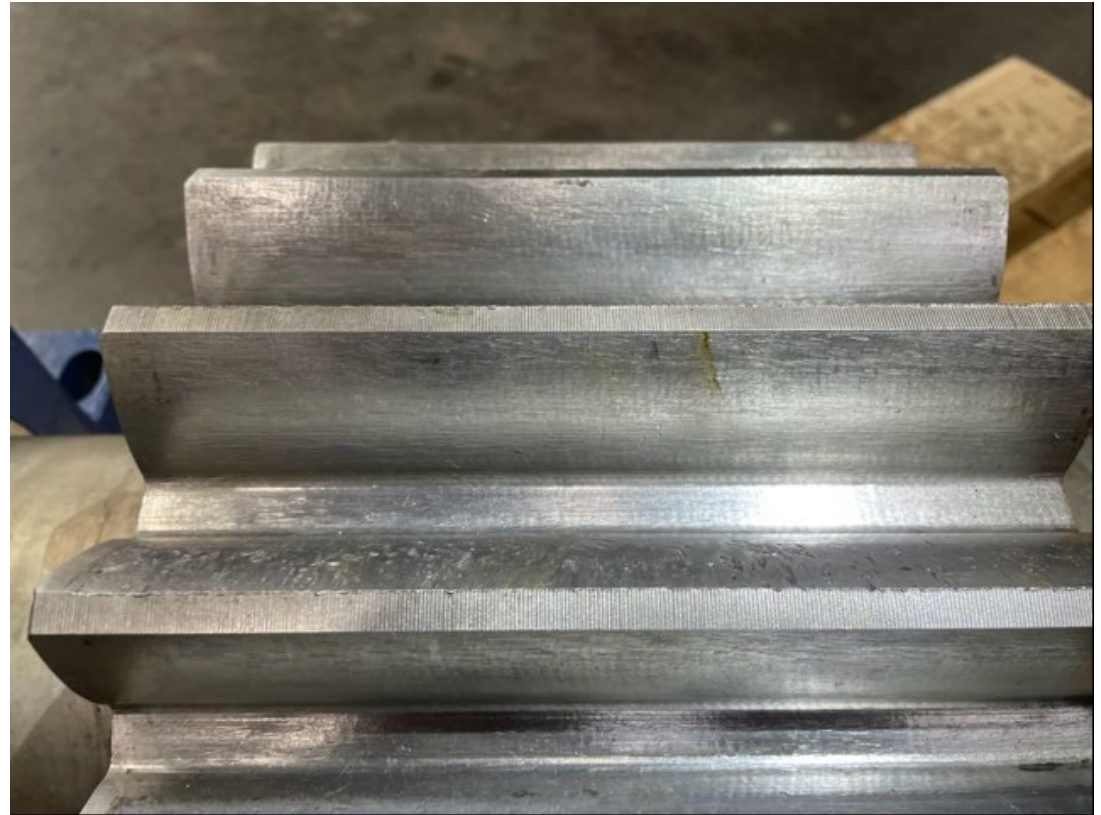
Unworn gear



# MCNARY HOISTS



Pitting on south pinion gear



Unworn pinion gear



# MCNARY SPILL GATES

- 2022, Testing of lifting eyes showed deterioration and overload of design capacity  
Gate girders; several were close to failure for normal operations, and many did not meet criteria for emergency operation
- 2023, Spillbay #16 closed to repair cracks in dogs and dog mounting points  
Bays #1, #3, #21 taken OOS to repairs dogs. Other bays to follow over the next year
- Result of structural analysis is that all 22 (+2 spares) spill gates should be replaced



# MCNARY SPILLWAY UPGRADE STATUS

## SCOPE OF SPILLWAY UPGRADES

### Spillway Gate Dogging Mechanism Repairs (NREX):

- Repair and restore dogging mechanisms to allow safe dogging of gates.

### Replace Spillway Cranes 6 & 7 (BPA Joint Capital):

- Replace spillway gantry cranes with updated (350 ton) cranes (**PRIORITY**)
- Replace spillway gate lifting beams with updated lifting beams

### Gate Hoist Replacements (BPA Joint Capital):

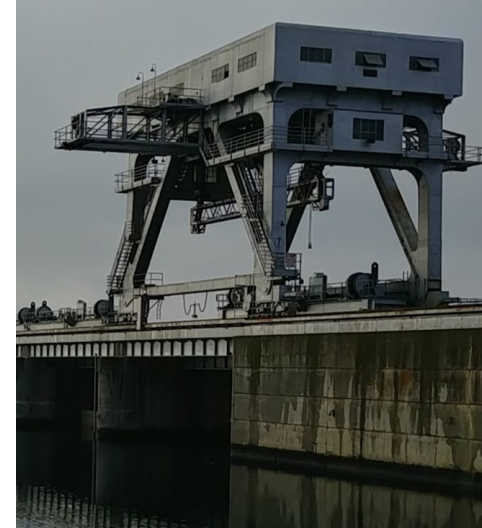
- Replace all 20 gate hoists (**PRIORITY**). **Add 2 new gate hoists** so each spill bay has a hoist. 350 ton capacity

### Spillway Gate Replacement (BPA Joint Capital):

- Based on 2023 structural analysis, we must replace all spillway gates with updated capacity for hydraulic down-pull forces.

### Spillway Gate Repair Pit Upgrade (BPA Joint Capital):

- Remove lead and asbestos.
- Add explosion-proof lighting, ventilation, doorways, electrical, pedestal upgrades, deck slab repairs and handrail upgrades, and fire protection.







- **McNary Spillway Working Schedule**

- MCN Replace Spillway Cranes 6 & 7
  - Phase 1a underway. FY23-24 Funding in place.
  - Design FY24-25? (pending appropriated \$\$s)
  - Award 1 crane (pending appropriated \$\$s):
  - Start fabrication crane 1:
  - Award 2<sup>nd</sup> crane (pending appropriated \$\$s):
- MCN Spillway Major Rehab Evaluation Report (MRER)
  - Creating new project for FY24-25 budget request
- MCN Spillway Hoist Replacements
  - First hoist in final design
  - Award prototype early FY24
  - Award follow-on contract for remaining hoists: three per year?
- MCN Spillway Gate Replacements
  - Not underway yet; working on creating new project and incorporating into SAP
  - Likely Phase 1a in FY25
  - Phase 1 design in FY26-27?
  - Award:
  - New spillway gates delivered:
- MCN Spillway Gate Dogging Mechanism Repair underway with FY23 NREX funds.
  - Funded. Repairs to occur in FY25 and complete in FY26
- MCN Spillway Gate Repair PIT Upgrade
  - Phase 1a has been approved, but no appropriated match
  - Lower priority since gates are to be replaced
  - Repair pit will likely be used for storage when new spillway gates start to be delivered.
- Modeling – Latest estimate, \$1.5M to create new model
  - If CRFM funds available, modeling fall 2024



# MCNARY SPILLWAY CRANE MILESTONES

Kick off	30 Aug 2023
Phase 1 Authority	Apr 2024
Ready to Advertise	September 2024
Award	Summer 2025
Onsite Construction	Summer 2027

