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Idaho Department of Water Resources 2022 Rulemaking for the Safety of Dams and Mine Tailings Impoundment Structures

**Environmental Defense Institute
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IDWR rulemaking “dam safety” problems

- Rulemaking without adequate documentation of the changes made
- Rulemaking without disclosing the rationale or the impact of proposed changes
- Gyrrating changes during the process that tightened or reduced safety design criteria, without explanation

Problems (continued)

- Numerous errors in proposed drafts
- Ultimately combining “safety of dams” and “mine tailings impoundment structures” was abandoned
- Keeping the dams and MTIS rules separate is acceptable, but how IDWR failed to adequately update the MTIS rules is not

Problems (continued)

- No redline-strikeout of changes from August draft to published Bulletin draft, despite numerous changes and corrections from the proposed August draft
- No written response to comments for August draft
- No (or tardy) meeting transcripts for August meeting
- Deteriorating dams issues not even considered in the rulemaking

Key safety design requirements for dams and tailings dams

- Flood release capability
 - Requirement for the Inflow Design Flood (IDF)
 - Spillway capability
- Seismic design requirements

Design Requirements depend on assigned Hazard Category

- Both Hazard Categories of “High” and “Significant” for dams have very serious consequences
- “Significant” hazard dam design requirements inexplicably reduced
- “Significant” or “Low” hazard for MTISs likely to be selected in areas with no permanent residences even if significant & costly environmental damage may occur
- Lack of stated hazard classification criteria for mine tailing impoundment structures (MTISs) (or ‘tailings dams’)

IDWR proposed rules often do not establish minimum design safety criteria

- Extreme level of discretion given to the IDWR Director regarding choice of Hazard Category
- Extreme level of discretion given to the IDWR Direction regarding the selection of design requirements
- IDWR's rules do not provide Idaho citizens reasonable assurance of dam or tailings dam safety

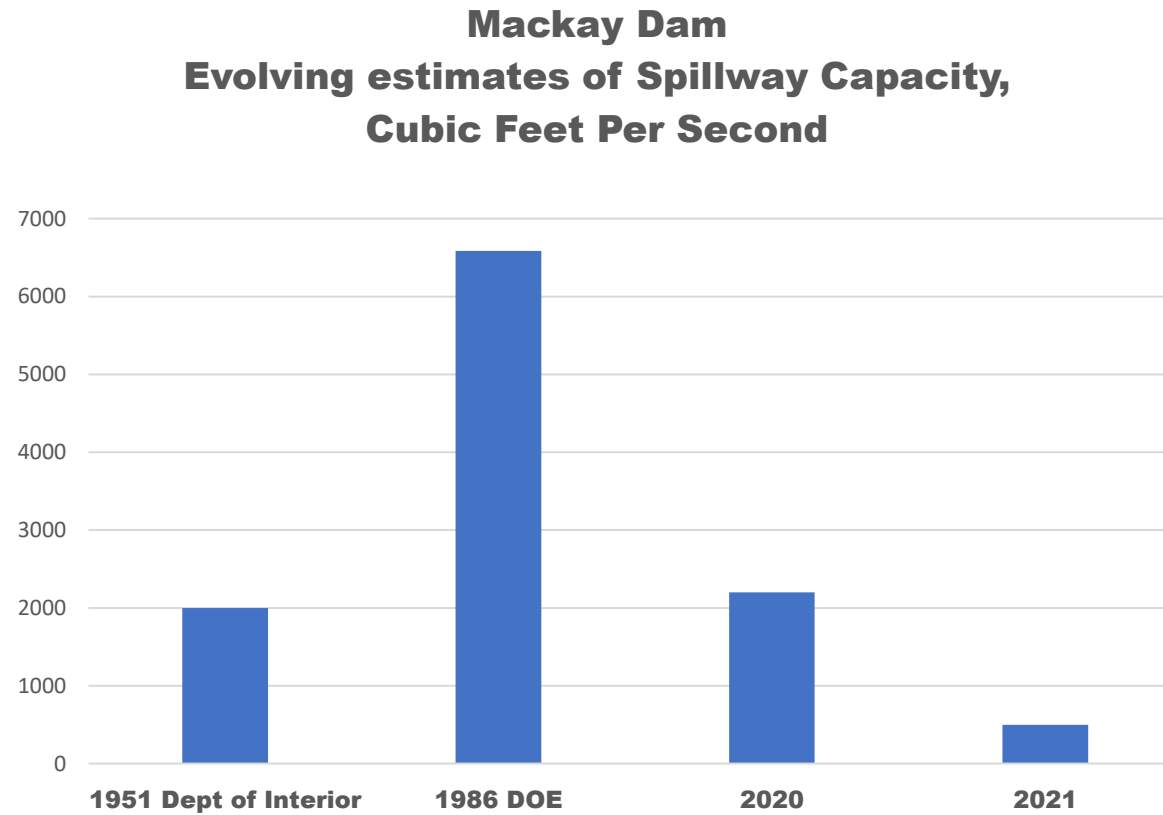
Flood Release Capability Requirements, generally reduced

- Reduced Inflow Design Flood (IDF) requirement
- IDWR's focus on reducing requirements, and not prevention of dam/tailings dam failure
- IDWR does not appear to consider the increases in flooding hazard posed by climate change that are widely recognized
- History of IDWR failure to adequately assess IDF capacity for existing dams

Example of IDWR not assessing IDF

- 1986 Department of Energy funded study estimated that the Mackay Dam could withstand 1000-year flooding, cited by IDWR
- 2020 McMillen Jacobs study estimated Mackay Dam could only withstand 500-year flooding
- 2021 McMillen Jacobs study found that the Mackay Dam would not withstand sustained 50-year flooding (only 25-yr flooding, 95% confidence) (1-in-50 year is an outrageously high risk of dam failure)

Mackay Dam Spillway Capacity Estimates



Mackay Dam spillway estimates (details)

- 1951 Bureau of Reclamation estimated 2000 cfs
- 1986 Department of Energy funded study by Koslow and Van Haaften state that the Mackay Dam spillway capacity was 6,588 cfs (by assuming the entrance width rather than the narrower width and by ignoring that this estimate overtopped the spillway walls)
- 2020 McMillen Jacob estimate spillway capacity of 2,200 cfs (using 24-ft spillway width rather than 75-ft entrance width)
- 2021 McMillen Jacob study concluded that the degraded condition of the spillway walls would cause failure of the spillway and then the dam if spillway flows sustained at 500 cfs (or 50-year flood)

Mackay Dam Spillway concrete deterioration

- The spillway was never of adequate width
- The spillway crosses over the embankment
- The spillway crosses over the outlet tunnel
- The spillway experiences rockfall
- The spillway walls are cracked and buckling



Mackay Dam vulnerabilities

- Undersized and deteriorating spillway
- Rockfall from the limestone cliff compromises spillway and can partially block lower outlet gates
- Deteriorating outlet control tower and unreliable outlet gate control
- Deteriorating outlet tunnel and apron at outlet
- Embankment is not earthen, but is a “sandy gravel”
 - Steps to seal the upstream side of dam with “clayey” material never taken
 - Sandy gravel not compacted
 - Dam is subject to earthquake induced liquefaction (yet no analysis for IDWR)
- Foundation of dam never to bedrock or solid base

IDWR dam inspections subjective and tend to be superficial

- No detailed documentation of degradation trends
- No detailed, documented inspection criteria
- No use of outside experts, even for High Hazard dams
- Lack of verification of dam flood release capability (IDF) and seismic capability for existing dams
- Lack of resources

IDWR's rulemaking chose to not update seismic design criteria for 'tailings dams'

- After developing updates, IDWR then backed off on needed updates for the seismic design criteria for mine tailing impoundment structures
- IDWR's proposed rules for MTISs now ignore seismic design criteria, especially for the western half of the State of Idaho, without scientific basis
- IDWR then went further, stating no updates of the seismic design criteria would occur for years

IDWR chose only to reduce requirements for 'tailings dams' or MTISs

- Tailing's dams (or MTISs) have continued failing, around the world.
- Tailings dams can devastate the environment, even if there is no permanent residence or industry damaged by failure.
- If the tailing dam fails, the State or citizens end up footing the bill because IDWR's bonding requirements are so lax and are based on ideal closures, not failures.
- Refusing to update seismic criteria for MTISs esp. for the west half of the State of Idaho, without scientific basis, puts Idaho citizens and environment at risk

IDWR management of the Mackay Dam

- State oversight failings since Mackay Dam was being built have continued (many decades)
- Public safety at risk
- Idaho National Laboratory nuclear facilities at risk since 1952
- IDWR **had not required adequate assessment** of the flood release capability nor the seismic adequacy
- Deficiencies are now found in studies to rehabilitate Mackay Dam – studies not requested by IDWR

“What’s Mackay Dam got to do with the INL?”

- Failure of Mackay Dam can cause 4 to 5 ft flood depths at some INL facilities including INTEC, ATR Complex and NRF
- DOE stores a variety of radioactive materials including spent nuclear fuels and high-level waste (HLW). There is an operating nuclear reactor at the ATR Complex.
- Chloride in flood water can cause chloride induced stress corrosion cracking in stainless steel INTEC’s liquid HLW or dry calcine HLW storage. Tank floating can break piping.
- Even if radiological release is avoided, the costs of repairs and of complications due to flood waters would be high
- INL facilities, esp. if built prior to 1986 generally did not address flooding
- **Despite extremely high consequence, IDWR continued to certify dam and failed to request adequate analyses for flood/seismic capability**

IDWR's decisions make sense and only make sense when you understand that...

- By Idaho Statute, Title 42-1717, no legal action can be brought against the state or IDWR for failure of dams or tailings dams, due to IDWR's failure to issue or enforce effective rules, and
- You follow the \$\$ to Idaho political campaigns from the mining industry

What needs to happen at IDWR?

- Current seismic design standards for new MTISs (tailings dams) must be required, despite the outdated and not updated rules
- Current seismic design standards are needed to assess existing dams and MTISs
- Criteria for seismic design need to be selected based on the standard, and not by lowering the standard so some structures can meet it

What needs to happen at IDWR?

- Criteria for Hazard Classification need to be clearly described in the MTIS rules, or exactly where these criteria are to be found
- No dam or MTIS should be “Low Hazard” when the environmental damage exceeds bonding or puts tax payers on the hook for damages

What needs to happen at IDWR?

- High Hazard and Significant Hazard dams and MTISs need more rigorous inspections and periodic independent expert assessment
- Actions to lower the reservoir level, such as remove the weir, ought to have been considered and implemented when the 2021 findings obtained

What needs to happen at IDWR?

- Mackay Dam's Certification must be revoked this year unless funding for adequate upgrades is secured and rehabilitation can be completed within a few years.
- Revoking Mackay Dam's Certification must be accompanied by funding to put the dam in a safe condition, i.e., remove the dam

What needs to happen at IDWR?

- Transparency about deficiencies for existing dams and tailings dams is needed
- Transparency about circumstances where the IDWR Director has lowered design standards is needed
 - When current design standards are not met, citizens should know
 - When design standards or seismic hazard increase, citizens should know
 - When no valid analysis exists, citizens should know



Thank you

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References

- Environmental Defense Institute website at environmental-defense-institute.org, with many references in the September 2022 newsletter
- The dam safety rulemaking webpage, which includes previous comment submittals, is located at this <https://idwr.idaho.gov/legal-actions/rules/idwr-rulemaking-2022-2023/mine-tailings-impoundment-structure-safety-of-dams-rules/>
- Maya Wei-Haas, National Geographic, “The problem America has neglected for too long: deteriorating dams,” May 27, 2020.
<https://www.nationalgeographic.com/science/article/problem-america-neglected-too-long-deteriorating-dams>
- Roche, C. Thygesen, K., Baker, E. (Eds.) *Mine Tailings Storage: Safety Is No Accident*. A UNEP Rapid Response Assessment. United Nations Environmental Programme and GRID-Arendall, Nairobi and Arendal, www.grida.no. 2017. ISBN: 978-82-7701-170-7