Public Comment on Draft 37.03.05 – Safety of Dams and Mine Tailings Impoundment Structures Rules, Strawman Draft V1.0., Docket No. 37-0305-2201 (IDAPA 37.03.05 & IDAPA 37.03.06)

Submitted by Tami Thatcher, June 10, 2022.

Comments are due June 17, 2022 and can be submitted by email to rulesinfo@idwr.idaho.gov

BACKGROUND

The May 4, 2022 Idaho Administrative Bulletin identified rulemaking for the Idaho Department of Water Resources and announced a May 27 meeting. [1]

The current regulations, "Safety of Dams Rules" (IDAPA 37.03.06) and "Mine Tailings Impoundment Structures Rules" (IDAPA 37.03.05), are being modified and combined into one single new rule chapter, "Safety of Dams and Mine Tailings Impoundment Structures Rules" (draft IDAPA 37.03.05).

The draft rule can be found at https://idwr.idaho.gov/wp-content/uploads/sites/2/legal/rule-37-03-05/rule-37-03-05-and-rule-37-03-06-202205223-strawman-v1.0.pdf (or link). The existing rules can be found at https://adminrules.idaho.gov/rules/current/37/ . The dam safety rulemaking webpage is located at this https://idwr.idaho.gov/legal-actions/rules/idwr-rulemaking-2022-2023/mine-tailings-impoundment-structure-safety-of-dams-rules/ .

A public (in person and virtual) meeting was held May 27, 2022. The IDWR briefly stated that the "strawman" newly drafted rule combines the existing "Safety of Dams Rules" and the "Mine Tailings Impoundment Structures Rules." No specific rationale for changes made to individual requirements in the rule was provided (other than abandonment plans and bonding for Mine Tailings Impoundment Structures) and no discussion of the ramifications of the changes was provided.

The only discussion of the reasons for the many changes to design requirements is that they thought it reduced regulation by combining two rules into one.

There was no mention of and no discussion of the reduced safety standards in the proposed draft rules. There are many substantial changes from the current rules to draft rule.

The "Zero-Based Regulation Prospective Analysis" form for Docket No. 37-0305-2201 states:

> *The proposed rule establishes processes for regulating the construction, maintenance, operation, and removal of all dams, reservoirs, and mine tailings impoundment structures as required to ensure the protection of public safety. Refer to I.C. § 42-1710. The proposed rule shall also require the owner(s) of mine tailings impoundment structures to develop an "abandonment plan" that assures they leave the site in a "safe maintenance-free condition" upon their completion of mining operations. Refer to I.C. § 42-1714. Further, the proposed rule requires owners of mine tailings impoundment*

[1] The May 4, 2022, Idaho Administrative Rules Bulletin, Volume 22-5, available in May 2022 at https://adminrules/idaho.gov/bulletin/2022/05.pdf

structures to provide to the Director of IDWR a "bond or other acceptable surety adequate to complete the abandonment plan if the owner abandons the [mining] site without conforming to the [abandonment] plan." Id.

IDWR does not believe it can carry out the intent of Idaho Code regarding the regulation of dams, reservoirs, and mine tailings impoundment structures with only non-regulatory measures. However, IDWR will seek public comment on whether it can implement less or different regulatory measures to meet the intent of Idaho Code and ensure the protection of public safety. Initially, IDWR proposes negotiated rulemaking to combine the existing IDAPA 37.03.05 Mine Tailings Impoundment Structures Rule ("Mine Tailings Rule") and IDAPA 37.03.06 Safety of Dams Rule ("Dam Safety Rule") into a single rule and eliminate redundant or unnecessary existing rules.

MANY ERRORS IN DRAFT RULE

In the draft rule, 37.03.05.001.01, the title is stated as "Safety of Dams Rules," and left out "and Mine Tailings Impoundment Structures Rules."

The draft rule, 37.03.05.040 (Rule 40) misspelled impoundment.

The draft rule, 37.03.05.055 states that it is "Rule 51." It should be "Rule 55."

The draft rule, 37.03.05.65.01, "Construction of Mine Tailings Impoundment Structures Storing Fifty Acre-Feet or More" states that Construction of dams intended to store water in addition to tailing material shall meet the requirements specified in Rules 40, 45, 50 and 55 of these rules. The Director may waive any of these requirements, if in the opinion of the Director, sound engineering design provided by the owner indicates such requirements are not applicable." The listed Rules 40, 45, 50 and 55 do not align with the current regulations, described below:

In the draft rules, Rule 40 is the MINE TAILINGS IMOUNDMENT [SIC] STRUCTURES BONDING (RULE 40). This would allow the Director to wave the Bonding requirement. IDWR has indicated that this is an error.

The existing regulation of the safety of dams, "Construction Plans, Drawings and Specifications (Rule 40)" was left out of the draft rule. There is no requirement to meet the corresponding draft Rule 35, "Design Reports, Drawings and Specifications."

In the existing regulation of the safety of dams, New Intermediate or Large Dams (Rule 50), the draft rule is now "New Dams and Reservoirs (Rule 50). The addition of the term "Reservoirs" does not seem to add clarity. The draft Rule 55 is "New Mine Tailings and Impoundment Structures." The problem is that there is no requirement for <u>existing</u> dams or impoundment structures in draft rule 37.03.05.65.01.

Draft Rule 60, "Existing Dams and Existing Mine Tailings Impoundment Structures" should be included in draft rule 37.03.05.65.01.

I have noted other errors which I describe in later sections below.

COMBINING THE TWO REGULATIONS CREATES ADDITIONAL COMPLEXITY

These rules are needed for setting and achieving the safely of dams and mine tailings impoundment structures in order to protect the public from the failure of these structures. These rules involve a mixture of disciplines including structural engineering and the regulation of new and existing structures.

Combining the two rules into one, while also making many content changes to the rules creates additional complexity overall, not clarity.

With the number of errors in the proposed regulation, it compounds the difficulty of trying to see what the IDWR is trying to achieve.

It appears that the IDWR has greatly underestimated the level of effort needed in order to provide a clear and defensible draft rule that is protective of citizens and of Idaho.

Also, please note that my review is limited, and does not include all facets of the draft rule.

NEEDS CLARIFYING TEXT TO DEFINE 'DAMS STORING TAILINGS AND WATER'

There needs to be a definition of what "dams storing tailings and water" is or at least the clarification that is provided in the current Mine Tailings Impoundment Structures Rules. The current rule 37.05.05.050 includes: "Construction of dams intended to store water in excess of the water being decanted in the tailing placement operation shall …." The removal of this clarification in the draft rule makes the draft rule for "Dams Storing Tailings and Water" in need of clarification as to what it actually pertains to.

DRAFT RULE EFFECTIVELY REDUCES DAM RELEASE CAPABILITY REQUIREMENT FOR NEW DAMS

Draft Rule 37.03.05.050.11 "Emergency Spillway Flow Capacity" is to replace existing Rule 37.03.06.050.11 "Release Capability." The wording of the draft rule is such that the title implies that it addresses only spillways and not total release capacity.

"Release Capability" is a defined term meaning "The ability of a dam to pass excess water through the spillway(s) and outlet works and otherwise discharge." The proposed draft rule subtitle is confusing.

Both the existing and draft rule contain a table of "Inflow Design Flood" values that a new dam needs to meet. The "Inflow Design Flood" is defined as "The flood specified for designing a dam, mine tailing impoundment structure, or appurtenant facility." But the draft rule separates the table of Inflow Design Flood values from the release capacity requirement and contributes to a lack of clarity, as the table states the "Inflow Design Flood" but is not clear at to whether that applies to the total release capacity or to only the spillway capacity.

I agree with the use of "Hazard Classification" in the draft (Rule 37.03.05.050.11) rather than the use of "Downstream Risk Category" in the current rule.

According to the 2018 Administrator's Memorandum, "…a High Hazard classification presumes that the downstream consequences of a dam failure and uncontrolled release of water will result in direct loss of human life. Significant Hazard implies that significant economic damage will occur to developed property, and includes also the potential for indirect loss of human life. A Low Hazard classification suggests that developed property may suffer minor damage, with a low potential for loss of life, or that damage will be limited to the dam owner's property." [2]

The release capability of a dam is defined in the draft rule as "The ability of a dam to pass excess water through the spillway(s) and outlet works and otherwise discharge." The "Inflow Design Flood" is defined in the draft rule as "The flood specified for designing a dam, mine tailing impoundment structure, or appurtenant facility."

When flooding inflows (the "Inflow Design Flood") exceed the release capability of a dam, the dam, if overtopped, will catastrophically fail. Because there may be failures of the outlet works, the spillway release capacity is essentially not only the circumstance of high flood inflows, but also in the event that the outlet works does not pass flow.

In the draft rule, for example, where the "Inflow Design Flood" design requirement for a large low hazard dam had, since at least 1993, been Q500, the 500-year return period flooding, the draft rule reduces it to Q100, the 100-year return period flooding. See Table 1a for the existing "Inflow Design Flood" requirement, Table 1b for the proposed range of requirements, and Table 1c for a summary of the reduced minimum "Inflow Design Flood" requirement in the draft rule.

Table 1a. Current "Inflow Design Flood" requirements in "Safety of Dams Rules."

Downstream Risk Category	Size Classification	Inflow Design Flood
Low	Small	Q50
Low	Intermediate	Q100
Low	Large	Q500
Significant	Small	Q100
Significant	Intermediate	Q500
Significant	Large	0.5 PMF
High	Small	Q100
High	Intermediate	0.5 PMF
High	Large	PMF

Note: Q50 is a 50-year flood. Q100 is a 100-year flood. Q500 is a 500-year flood. The flow waters of a 500-year flooding event exceed those of a 100-year flooding event. The Probable Maximum Flood (PMF) exceeds that of a 500-year flood.

[2] Administrator's Memorandum, Dam Safety No. 1, From Jeff Peppersack, Water Allocation Bureau Chief to Water Allocation Bureau and Regional Offices, May 11, 2018.

Table 1b. Draft "Inflow Design Flood" requirements of new combined rule.

Hazard Classification	Size Classification	Inflow Design Flood
Low	Small	Q100
Low	Intermediate	Q100
Low	Large	Q100
Significant	Small	Q100
Significant	Intermediate	Q100 to Q500
Significant	Large	Q500
High	Small	Q100
High	Intermediate	Q100 to Q500
High	Large	Q500 to PMF

Note: Q50 is a 50-year flood. Q100 is a 100-year flood. Q500 is a 500-year flood. The flow waters of a 500-year flooding event exceed those of a 100-year flooding event. The Probable Maximum Flood (PMF) exceeds that of a 500-year flood.

Where the draft rule *states a range*, from Q100 to Q500, for example as shown in Table 1b, the draft rule (37.03.05.050.11 on page 13 of the draft rule) would apparently be met by the lowest specified value and so no one should expect that the higher value would ever be enforced. The range being specified may amount to window dressing.

Table 1c. Summary of reduced minimum "Inflow Design Flood" requirements.

Risk Category or Hazard Classification	Size Classification	Inflow Design Flood, rules since at least 1993	New Proposed Inflow Design Flood. Reduced minimum requirement shown in Bold
Low	Small	Q50	Q100
Low	Intermediate	Q100	Q100
Low	Large	Q500	**Q100**
Significant	Small	Q100	Q100
Significant	Intermediate	Q500	**Q100**
Significant	Large	0.5 PMF	**Q500**
High	Small	Q100	Q100
High	Intermediate	0.5 PMF	**Q100**
High	Large	PMF	**Q500**

Note: Q50 is a 50-year flood. Q100 is a 100-year flood. Q500 is a 500-year flood. The flow waters of a 500-year flooding event exceed those of a 100-year flooding event. The Probable Maximum Flood exceeds that of a 500-year flood. See draft rule under "Emergency Spillway Flow Capacity." See existing dam safety rule under "Release Capability."

The IDWR must provide the technical justification for the reduced minimum "Inflow Design Flood" design requirement for new structures in the draft rule.

The draft rule, 37.03.05.050.11 "New Dams and Reservoirs" now requires the minimum spillway flow capacity to meet the 100-year flood (Q100). This is an improvement over the existing rules which provided no guidance whatsoever on the sizing of spillways. The draft rule, 37.03.05.055.07(b), offers a similar requirement but is worded differently. The wording should be made as consistent as possible to avoid confusion.

DRAFT RULE, BY ALLOWING A RANGE OF "INFLOW DESIGN FLOOD" DESIGN VALUES AND YET NOT PROVIDING CRITERIA FOR REQUIRING VALUES ABOVE THE MINIMUM, FAILS TO ESTABLISH A SCRUTIBLE GUIDELINE FOR THE SAFETY OF NEW DAMS.

See the table in draft rule 37.03.05.050.11 and the range of acceptable "Inflow Design Flood" Q values. For a large, high hazard dam, the "inflow design flood" values deemed acceptable are the range from Q500 to Probable Maximum Flood (PMF). This implies that only the minimum value would be enforceable for new designs or for upgrades to existing dams or mine tailing impoundment structures.

A variety of flood inflow values have been assumed over time for the Mackay Dam. The values for predicted surface inflows to the Mackay reservoir from a 1986 study are shown in Table 2. Note how the Probable Maximum Flood peak flow is over 14 times higher than the 500-year flood (Q500).

Table 2. Predicted surface inflows to the Mackay reservoir from the 1986 report by Koslow and Van Haaften.

Recurrence Interval (Years)	Peak Flow (cfs)
25	4,030
100	4,870
500	5,760
1000	6,800
Probable Maximum Flood	82,100

Table notes: Source: K. N. Koslow and D. H. Van Haaften, Idaho National Engineering Laboratory managed by the U.S. Department of Energy, *Flood Routing Analysis for a Failure of Mackay Dam*, EGG-EP-7184, June 1986. Note that flood inflow estimates and the PMF estimate evolve over time and a variety of values have been used. I provide these values as examples, not as preferred values.

There may be valid reasons for reduction of the design criteria and the IDWR needs to communicate what those reasons are in this rulemaking effort.

This issue of design criteria for existing dams and for modifications to existing dams is addressed in comments further on.

DRAFT RULE NEEDS TO REVISIT HAZARD CLASSIFICATION, PARTICULARLY FOR LONG-LIVED CONTAMINATION POSED BY A MINE TAILINGS IMPOUNDMENT RELEASE

Repeating from above, according to the 2018 Administrator's Memorandum, "…a High Hazard classification presumes that the downstream consequences of a dam failure and uncontrolled release of water will result in direct loss of human life. Significant Hazard implies that significant economic damage will occur to developed property, and includes also the potential for indirect loss of human life. A Low Hazard classification suggests that developed property may suffer minor damage, with a low potential for loss of life, or that damage will be limited to the dam owner's property." [3]

If damage were to undeveloped property and rendered a significant amount of land or watershed to be highly contaminated, apparently according to the above memo, it would be a Low Hazard. Thus, the poisoning and long-term contamination of land is to use the lowest design criteria for mine tailings impoundment structures. The IDWR should provide hazard criteria that address how long term the poisoning of the environment may be from a release from a mine tailings impoundment structure.

DRAFT RULE GIVES LOOPHOLE TO EXISTING MINE TAILINGS IMPOUNDMENT STRUCTURES FOR TOXIC, TURBID, RADIOACTIVE, OR OTHERWISE HAZARDOUS DISCHARGES

Draft rule 37.03.05.055.07(d) states: "Outlet systems will not be approved for construction if their use would release toxic, turbid, radioactive, or otherwise hazardous discharge from the impoundment. In such instances, the impounded contents must either be contained by the perimeter embankment, or runoff must be entirely diverted around the reservoir."

Current rule 37.033.05.045.06(d) states: "Outlet systems will not be allowed if their use would release toxic, highly turbid, radioactive or otherwise hazardous flows from the reservoir. In these cases the design inflow must either be entirely stored or diverted around the reservoir.

The current rule would not allow existing systems to release the toxic material, but the draft rule only addresses issue only in regard to approval for construction. Effectively, the draft rule appears to have eliminated the requirement to not allow the impoundment structures that would release toxic, highly turbid, radioactive or otherwise hazardous flows. This is unacceptable.

THE DRAFT RULE CREATES CONFUSION ABOUT MINE TAILINGS IMPOUNDMENT DESIGN REQUIREMENTS

Does draft Rule 37.03.05.050 "New Dams and Reservoirs" apply to mine tailings impoundments? It would seem not, but it is confusing. The draft Rule 37.03.05.060 "Exiting Dams and Existing Mine Tailings Impoundment Structures" refers to the "New Dams and Reservoirs Rule" in many places that apply to both dams and mine tailings impoundment

[3] Administrator's Memorandum, Dam Safety No. 1, From Jeff Peppersack, Water Allocation Bureau Chief to Water Allocation Bureau and Regional Offices, May 11, 2018.

structures. I honestly can't tell if the hazard and size criteria of 37.03.05.050.11 (unlabeled table) apply to mine tailings impoundment structures for new or for existing structures.

The current rule for mine tailings impoundment structures did not have both a new and an existing set of design requirements. Both are now needed; however, it is very difficult to understand what the draft rule means, throughout the draft rule, due to the tangle of the two conjoined rules.

IWDR RULES NEED TO DEFINE ITS JARGON, SUCH AS WHAT Q100 MEANS

The proposed rule is even more vague about undefined terms such as "Q100" "Q500" and PMF than the current rules. While Probably Maximum Flood (PMF) may be familiar to some people, the Q100 term is not. The draft rule should also be consistent in how it expresses the one percent flood and its relationship to Q100. The inflow design flood of one percent (1%) probability of occurrence (i.e., Q100) is now less described in the draft rule than in the existing Safety of Dams rule. See examples of peak flood recurrence intervals and associated annual exceedance probability in Table 4.

Table 4. Peak Flood and Annual Exceedance Probability.

Peak Flood Recurrence Interval	Annual Exceedance Probability	Q is the flow rate corresponding to the peak flood recurrence interval
2 Year Peak Flood	50%	
5 Year Peak Flood	20%	
10 Year Peak Flood	10%	
20 Year Peak Flood	5%	
50 Year Peak Flood	2%	Q50
100 Year Peak Flood	1%	Q100
200 Year Peak Flood	0.5%	
500 Year Peak Flood	0.2%	Q500

Table notes: the Q50, Q100 and Q500 notations shown are those used in the draft rule.

While IDWR may know what these initialisms mean, the Idaho regulations or "rules" should provide a definition of these initialisms for "the rest of us." The IDWR should also acknowledge that estimates of the PMF and Q100, etc. also differ depending on when and how the values were estimated.

PROBABLE MAXIMUM FLOOD ESTIMATES TEND TO CHANGE OVER TIME, THE RULE OR RULEMAKING EFFORT NEEDS TO PROVIDE GUIDANCE ON SELECTION OF THE PMF

The source of the appropriate document for expressing the applicable PMF has not been stated and there are a variety of vintages of methods for determining the PMF. Similarly, the Inflow Design Flood, which is a flow rate that would be exceeded as determined at a specific recurrence period, i.e., 50 years, 100 years, or 500 years, can have estimates that evolve over time. More information should be provided about where and how these are estimated.

As an example, the Probable Maximum Flood (PMF) estimated in 1978 for the Mackay Dam was 41,000 cfs based on US Bureau of Reclamation (USBR) experience curves. [4] The PMF value estimated in 1986 was 82,100 cfs as noted above. (See Table 5.) The design value recommended by McMillen-Jacobs in conjunction with a FEMA sponsored Hazard Mitigation Grant is reduced to 20,000 cfs on the basis of an argument that allows using Procedures outlined in the Federal Energy Regulatory Commission Chapter 2 Guidelines that state that "an IDF [Inflow Design Flow] may be selected by evaluating the point where incremental flood damage no longer results in an additional impact to downstream life or property." [5]

Table 5. A variety of Mackay Dam Probable Maximum Flood (PMF) estimates for Mackay Dam.

Source of Probable Maximum Flood (PMF) Estimate	PMF, cfs	PMF release capacity met?
1978 Estimate using USBR curves	41,000 cfs	No
1986 Estimate by Schreiber in Koslow and Van Haaften INEL report	82,100 cfs	No
2020 Adjusted "Inflow Design Flow" (IDF) value recommended by McMillen-Jacobs Associates which is really not a PMF estimate but could be used in state dam safety design requirements.	Not a PMF but recommended IDF, 20,000 cfs	No
Implied flood inflow with dam overtopping (when the dam where full)	Dam overtopping, 5,200 cfs	Overtopping of dam by 0.5 feet may fail the dam*

Table notes: Source: The 1978 PMF was 41,000 cfs as estimated from US Bureau of Reclamation (USBR) experience curves (see State of Idaho, Department of Water Resources, *Phase I Inspection Report, National Dam Safety Program, Mackay Dam*, September 1978). The 1986 PMF is reported in Appendix B of the report by K. N. Koslow and D. H. Van Haaften, Idaho National Engineering Laboratory managed by the U.S. Department of Energy, *Flood Routing Analysis for a Failure of Mackay Dam*, EGG-EP-7184, June 1986. Time to failure is assumed 1 hour. Probable Maximum Flood as estimated by Dr. David L. Schreiber, P.E., Schreiber Consultants, Inc., in 1986 and included in Appendix B of the 1986 Koslow and Van Haaften report. The 2021 IDF recommendation is by McMillen-Jacobs Associates, *Potential Failure Mode Analysis and Risk Assessment Report – Mackay Dam*, State Dam Identification D34-2225, National Inventory of Dams ID 00181, Revision 1, June 25, 2021. (Appendix F of 2021 FEMA report.) The Mackay dam release capacity, outlet works (3000 cfs) and spillway chute (2,200 cfs) for a total release capacity of 5,200 cfs is based on the McMillen-Jacobs Associates values described in the 2021 FEMA report. The water height about the dam for overtopping is based on D. H. Van Haaften et al., EG&G Idaho, Inc., *Hydrologic Analysis of a Mackay Dam Failure During a Probable Maximum Flood on Big Lost River*, Idaho, SE-A-84-018, May 1984. This EG&G report was performed for the proposed Department of Energy plutonium production reactor which was not built, called the

[4] State of Idaho, Department of Water Resources, *Phase I Inspection Report, National Dam Safety Program, Mackay Dam*, September 1978. (See page 14.)

[5] McMillen-Jacobs Associates, *Potential Failure Mode Analysis and Risk Assessment Report – Mackay Dam*, State Dam Identification D34-2225, National Inventory of Dams ID 00181, Revision 1, June 25, 2021. (Appendix F of 2021 FEMA report.) See page 7.

"New Production Reactor." Selection of appropriate reactor siting sought to avoid any area flooded by a Probable Maximum Flood event.

THE DRAFT RULE REDUCES DESIGN REQUIREMENTS, REDUCING SAFETY OF EXISTING DAMS AND MINE TAILINGS IMPOUNDMENT STRUCTURES

The current rule 37.03.06.055.01(a) was "For large, significant or high-risk dams, the release capability required by Rule 050.11 shall be evaluated and applied to the structure. Dams of other size and risk are required to provide the release capability of Rule Subsection 050.11 but are not required to conduct the analyses." This rule was not included in the draft rule.

The draft rule (Rule 60) only requires existing dams to meet the Q100, 100-year flood, no matter the size or hazard of the dam [see Draft 060.01(a)]. This is a large reduction in safety which the IDWR must explain and justify.

THE DRAFT RULE REDUCES DESIGN REQUIREMENTS, REDUCING SAFETY STANDARDS AND PROVIDES LESS CLARITY CONCERNING THE DESIGN STANDARDS FOR MODIFICATION OF EXISTING DAMS AND MINE TAILINGS IMPOUNDMENT STRUCTURES

Here is another error in the draft rules. Draft rule 37.03.05.060.01 (h) [of Rule 60] states "Within thirty (30) days after completing the analyses required in Rule 055.01.a or Rule 055.01.g, …" However, in the previous Rule 55, this called out Rule 055.01.a or Rule 055.01.g and so it appears that the draft Rule 60 is incorrectly calling out the current Rule 55 sections.

Furthermore, the draft rule is still calling out existing Rule 055.01(a), [or 37.03.06.055.01(a)] even though the draft rule deleted Rule 055.01(a) in the draft rule 60 for existing dams and mine tailings impoundment structures (MTIS). Oh, how complicated it is with some numbering staying the same and other numbering changing!

The current rule which was removed from the draft rules is existing rule 37.03.06.055.01.(a) states: "For large, significant or high-risk dams, the release capability required by Rule Subsection 050.11 shall be evaluated and applied to the structure. Dams of other size and risk are required to provide the release capability of Rule subsection 050.11 but are not required to conduct the analyses." The removal of this rule greatly reduces dam and MTIS release capability requirements of existing dams and MTIS.

THE DRAFT RULE DOES NOT ADDRESS THE LONGSTANDING ISSUE OF DAMS (OR MINE TAILINGS IMPOUNDMENT STRUCTURES) THAT DO NOT MEET THE REQUIREMENTS FOR EXISTING DAMS OR STRUCTURES.

This is a request for explanation of how existing dams and structures continue, often year after year, to not meet the regulations.

The longstanding problem of dams, like the Mackay Dam, put in operation around 1917, that have never met the requirements for existing dams. The draft rule provides the hint of a new possible excuse: draft rule 37.03.05.060.01(c) (ii) : "A showing acceptable to the Director that

potential failure of the dam or mine tailings impoundment during a flood of the specified magnitude described in Rule 05.011 would be incrementally small in comparison to the flood being considered, and that the release of reservoir would not substantially increase downstream damages to life and property which are anticipated to result from any natural flood equal to or exceeding that magnitude."

The IDWR needs to provide examples of what they mean. When I have listened to some discussions in this area, it would appear that sometimes various flood inflows are compared, yet the added flow from failure of the dam is far higher than the flood inflows being considered.

The failure of a dam causes the entire storage of the reservoir to flow downstream in addition to the reservoir inflows, and the dam's failure far exceeds the "inflow design flood" flow rates.

Is two feet of slow flooding considered as damaging as a sudden 20 ft high wall of water as long as the inundation map seems about the same? The IDWR needs to provide some criteria for how draft rule 37.03.05.060.01(c) (ii) would be applied.

Not only the "inflow design flood" flow rates but also **the flood wave due to the failure of the dam must be considered** when discussing release capacity and design requirements of the dam. See examples in Table 3.

Table 3. Four cases of peak flood flow to the Mackay Dam from the 1986 report by Koslow and Van Haaften.

Dam Failure Case	Breach Type	Estimated Peak Reservoir Inflow, cfs	Estimated Peak Flow Below Dam, cfs (Total Reservoir Release, acre-feet)
No failure, maximum flow from Mackay Dam in 2017	No breach	Howell Gage, 3,160 to 4,200 cfs reported	2,200 cfs
Seismic failure (characterized by assuming during 25-year flood inflow)	Trapezoid	4,030 cfs	107,480 cfs (44,830 acre-feet release)
Internal piping failure (characterized by assuming 100-year flood inflow)	Triangle	4,870 cfs	57,740 cfs (41,850 acre-feet)
Internal piping failure (characterized by assuming 500-year flood inflow)	Trapezoid	5,760 cfs	106,680 cfs (44,710 acre-feet)
Probable Maximum Flood (PMF) with dam overtopping	Trapezoid	82,100 cfs	306,700 cfs (142,330 acre-feet)

Table notes: Source: K. N. Koslow and D. H. Van Haaften, Idaho National Engineering Laboratory managed by the U.S. Department of Energy, *Flood Routing Analysis for a Failure of Mackay Dam*, EGG-EP-7184, June 1986. Time to failure is assumed 1 hour. Probable Maximum Flood as estimated by Dr. David L. Schreiber, P.E., Schreiber Consultants, Inc., in 1986 and included in Appendix B of the 1986 Koslow and Van Haaften report. The previous PMF was 41,000 cfs as estimated from US Bureau of Reclamation (USBR) experience curves (see State of Idaho, Department of Water Resources, *Phase I Inspection Report, National Dam Safety Program, Mackay Dam*, September 1978).

THE RULES LACK A PROCESS FOR ADDRESSING NEW INFORMATION CONCERNING INADEQUACY OF PREVIOUSLY RELIED UPON CALCULATIONS

When a previously accepted design is later found to underestimate the design adequacy, such as a spillway capacity minimum flow capacity being found to have been under estimated, there appears to be no guidance for addressing such problems. This is especially important for large, high hazard dams. While it is difficult to address such problems, there appears to be no requirement to document, plan and make a schedule for addressing such issues when they arise.

THE DRAFT RULE REDUCES THE SEISMIC DESIGN LOADS TO BE EVALUATED

And the previous rule was "For large, high-risk dams, the seismic design loads shall be evaluated and applied to dams located east of Range 22E, B.M. [Boise Meridian]. The evaluation shall use the maximum ground motion/acceleration generated by the maximum credible earthquake."

In the draft rule, it appears that the seismic loads may be reduced by choosing a reduced return interval that is not specified. The IDWR needs to provide more clarity, explanation and justification.

THE DRAFT WORSENS THE PROBLEM OF OPEN-ENDED COMPLIANCE PERIODS

The draft rule worsens the existing problem of existing dams (and probably mine tailings impoundment structures) not meeting established rules for safe design.

In draft rule 37.03.05.060.01 items (f) and (g) allow a completely unspecified, undetermined, and effectively remove any compliance period from the regulation of existing dams and mine tailings impoundment structures. This is not protective of Idaho's environment and citizens and does not support getting needed repairs and improvements performed.

It allows the owners unlimited time to put off fixing a problem.

Draft rule item (f) states: "The Director may allow the owner of an existing dam a compliance period to complete structural modifications or implement other improvements deemed necessary to provide the necessary hydraulic capability." The current rule (37.03.06.055.01 (g) would allow ten years. No guidance is provided on how long the Director should consider reasonable to the time to complete modifications or improvements. Also, draft rule item (f) and (h) says "dams" and not "dams and mine tailings impoundment structures" as is generally used throughout Rule 60. Do rule items (f) and (h) also apply to mining tailings impoundment structures?

Draft rule item (g) states: "The Director may allow the owner of an existing dam or mine tailings impoundment a compliance period to complete structural modifications or implement other improvements deemed necessary to resolve seismic stability or safety concerns." The current rule (37.03.06.055.01 (h) would require filing within 30 days after completing the analyses, to file a schedule for the dates work will be completed.

Why is the new proposed rule making it more difficult for the IDWR to promote timely completion of needed safety structural modifications or improvements? The IDWR needs to explain and justify the draft rule and explain what is needed to improve safety of dams and mine tailings impoundment structures in Idaho.

Federal agencies such as FEMA apparently do not see urgency to assist unsafe large, high hazard dams in a timely manner. The IDWR is assisting the dysfunction and the ongoing failure to timely address serious safety deficiencies. The reduction of compliance period development does not protect citizens.

TRANSPARENCY ABOUT COMPLIANCE STATUS

I do recognize that the IDWR does provide information on request. However, the IDWR should make tracking the status of dam (and mine tailings impoundment structures) inspection recommendations and the completion of those recommendation and any deficiencies easier for citizens to see. Many defects and longstanding problems may too often be kept under the radar, enabling the problems to continue indefinitely.

DRAFT RULE "INFLOW DESIGN FLOOD" REQUIREMENTS FOR EXISTING LARGE, HIGH HAZARD DAMS IS INADEQUATE, SEE MACKAY DAM

"Inflow Design Flood" requirements are a matter of life and death for high hazard dams and the proposed draft not only reduces these requirements for new dams and mine tailings impoundment structures and with no explanation whatsoever, the proposed draft eliminates all design criteria for the "Inflow Design Flood" for existing dams and mine tailings impoundment structures with no explanation whatsoever.

Dams fail when overtopped and so estimation of the maximum inflow to the dam called the "Inflow Design Flood" and the dam's release capability is very important to dam safety – especially during high water years.

IDWR's proposed rule changes reduced the safety standards for existing dams and for improvements to those dams because it basically only requires the 100-year flood (Q100) to be met for existing dams for the spillway, unless waived by the Director. **Specifically, rule 055.01(a) of the current rules was deleted from the draft rules and this eliminates all requirements for the release capacity of existing dams and mine tailings impoundment structures.**

The current rule 37.03.06.055.01(a) states: "For large, significant or high-risk dams, the release capability required by Rule 050.11 shall be evaluated and applied to the structure. Dams of other size and risk are required to provide the release capability of Rule Subsection 050.11 but are not required to conduct the analyses." The current rule requires that for large, high-risk dams, the required design criteria for the dam's release capability was required to be the Probable

Maximum Flood. The Probable Maximum Flood is identified as 82,100 cfs based on a report prepared for the Idaho National Laboratory in 1986 by Koslow and Van Haaften. [6]

This rule, current rule 37.03.06.055.01(a), was not included in the draft rule. The draft rule (Rule 60) only requires existing dams to meet the Q100, 100-year flood, no matter the size or hazard of the dam [see Draft 060.01(a)]. This is a very large reduction in safety which the IDWR must explain and justify.

A failure-mode analysis performed by McMillen-Jacobs in September 2020 in conjunction with a FEMA sponsored Hazard Mitigation Grant for the Mackay Dam found that the spillway capacity is actually far less than has usually been assumed, see Appendix F of the study. [7]

The spillway capacity was calculated to be limited by the chute of the spillway rather than the entrance to the spillway and was limited to 2,200 cubic feet per second (cfs). The outlet works capacity was estimated as about 3000 cfs. The total release capacity is then about 5,200 cfs.

The 2021 inspection report for the Mackay Dam states the assumed "Inflow Design Flood (Q=cfs)" as the hundred-year flooding inflow of Q100 = 4870 cfs.

The most recent assessment of outlet flow capacity (3000 cfs) and spillway capacity (2,200 cfs) indicate a total release capacity of about 5,200 cfs. [8] This would indicate that the Mackay Dam could survive a 100-year flood, but would not survive a 500-year flood. It appears that the Mackay Dam would probably fail at roughly the 200-year flood.

The historical maximum known outflow of 2,990 cfs occurred on June 10, 1921. The maximum known inflow to the reservoir occurred recently, in 2017. The resulting maximum outflow at the dam was 2,200 cfs occurring in early June 2017. [9]

The Department of Energy's previous studies have assumed a far higher dam release capacity and far higher spillway capacity than is currently estimated for the Mackay Dam. The Department of Energy's previous studies of the hazard posed by a Mackay Dam failure have found significant flooding of various nuclear facilities at the Idaho National Laboratory. These nuclear facilities include an operating nuclear reactor, multiple buried waste facilities, liquid high-level waste, highly soluble calcine high-level waste and spent nuclear fuel.

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[6] K. N. Koslow and D. H. Van Haaften, Idaho National Engineering Laboratory managed by the U.S. Department of Energy, *Flood Routing Analysis for a Failure of Mackay Dam*, EGG-EP-7184, June 1986.

[7] McMillen-Jacobs Associates, *Potential Failure Mode Analysis and Risk Assessment Report – Mackay Dam*, State Dam Identification D34-2225, National Inventory of Dams ID 00181, Revision 1, June 25, 2021. (Appendix F of 2021 FEMA report.) The study was performed in September 2020 according to the May 12, 2021 inspection report.

[8] McMillen-Jacobs Associates, *Potential Failure Mode Analysis and Risk Assessment Report – Mackay Dam*, State Dam Identification D34-2225, National Inventory of Dams ID 00181, Revision 1, June 25, 2021. (Appendix F of 2021 FEMA report.)

[9] McMillen-Jacobs Associates, *Potential Failure Mode Analysis and Risk Assessment Report – Mackay Dam*, State Dam Identification D34-2225, National Inventory of Dams ID 00181, Revision 1, June 25, 2021. (Appendix F of 2021 FEMA report.)

The DOE studies have likely assumed that that they would meet the 1995 Idaho Settlement Agreement milestones for removal of high-level waste and spent nuclear fuel from the Idaho National Laboratory's Idaho Nuclear Technology and Engineering Center (INTEC).

But the Department of Energy will not meet the Idaho Settlement Agreement milestone schedules for the removal of spent nuclear fuel and high-level waste, including highly soluble calcine and liquid sodium-bearing waste. There is no disposal facility to send this spent nuclear fuel and high-level waste to. The Department of Energy is pressing to store more nuclear waste at INTEC, as it is also promoting permanent storage at INL in Mackay Dam flood vulnerable locations. I see no evidence of an adequate review of safety (an "Unreviewed Safety Question") pertaining to the 2020 finding of far reduced Mackay Dam spillway capacity.

Law makers ought to understand the full extent of radiological hazards associated with failure of the Mackay Dam and they ought to know that there is no secured funding for improvements to the Mackay Dam, no schedule for improvements, and with the draft rule, no adequate design criteria for upgrades to the Mackay Dam.

SUMMARY

There are likely various needed updates to the regulations for dams and mine tailings impoundment structures. However, the updating of the requirements combined with meshing the two regulations together, (combining the regulations for dams with the regulations for mine tailings impoundment structures) has created so many opportunities for confusion that the draft regulation is not only confusing, it contains numerous errors. **The IDWR has not provided sufficient resources for the development of the draft rule so that the rule is protective of Idaho citizens.**

The proposed draft rule changes undermine the safety of dams and mine tailings impoundment structures by reducing the design criteria for dams and impoundment structures.

The proposed rule not only reduces the requirements for <u>new dams</u>, it reduces the requirements for <u>existing dams</u> (or tailings impoundments.) The IDWR has not provided the needed technical basis for the reduction in safety design requirements.

The IDWR has not provided anywhere the rationale for reducing safety design requirements for dams and mine tailings impoundment structures.

Those dam and mine tailings impoundment structure owners are unlikely to comment on the need for safety as they will likely be focused solely on reducing short term costs to themselves.

The problem of longstanding uncorrected safety problems to existing dams (and probably mine tailings impoundment structures) has not been addressed or improved by the draft rule.