

September 14, 2011
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Mackay Dam: A Preventable Disaster

Dear Governor Otter, Mr. Spackman and Attorney General Wasden,

We are requesting that your offices take preventative action to protect the town of Mackay, Idaho from the collapse of Mackay Dam. Pursuant to Idaho Code Title 42 Chapters 1701-1721, we are requesting that an inspection and administrative enforcement action be commenced for Mackay Dam.

Mackay Dam is in poor condition, in an unsafe location and is a clear and present danger to the town of Mackay, Idaho. At risk are 600 residents and their property that is in close proximity to the dam. Mackay residents will have no advanced warning of an imminent dam collapse; even with warning evacuation could be difficult or impossible. At this time, there is no electronic or human warning system in place to allow evacuation.

Mackay Dam was built nearly a century ago without any thought given "to conform to seismic or hydrologic design criteria." The Utah Construction Co. had no previous experience in reservoir construction. No one knows how safe the dam will be during the next earthquake or major flood. Mackey Dam lies 11 miles from the Borah earthquake fault that caused a 7.3 earthquake (1983).

The State of Idaho classifies Mackay Dam as a Category 1 "high hazard." The dam receives safety inspections every two years. Since the last inspection was in 2009, the Idaho Department of Water Resources report does not reflect that Mackay Dam was overtopped in 2010 and 2011 from high run-off. (See photos of Mackay Dam Running Over Spillway on April 26 2010 and on June 26, 2011:

http://mackayidaho1.blogspot.com/2010/04/mackay-dam-running-over-spillway-april_27.html

[Mackay Dam began going over the spillway today June 26 2011](#))

The 2009 recommendation of the dam inspector annual inspections to be made has not been followed. Other recommendations have been ignored for years by the Mackey Dam owner, the Big Lost River Irrigation District. These include failure to:

- Maintain a record of the amount of flowing water through the base of the dam.
- Issue storage authorization for one-year intervals
- Update emergency action/operation plan to keep it current
- Monitor all leaking water through the base of the dam, and to keep a comprehensive record of flow quantities for future reference and evaluation
- Install a log-boom or similar floating barrier at the entrance to the emergency spillway to help prevent boaters from accidental entry when reservoir is experiencing full-pool runoff conditions .

The Idaho 2009 dam inspection report states:

“Much about this dam is not known due to poor documentation during initial construction and subsequent modifications. The amount of leakage observed at the right-center toe of the dam is cause for concern despite claims by the owner that ‘it has always leaked like that’.”

The flow of water from the base of the middle of the dam is now leaking at a rate greater than 1 cu ft per second, enough water to fill a backyard swimming pool about every 30 minutes.

Mackay Dam, should it not hold, threatens to send an 80 ft wall of water towards the town of Mackay within 6 minutes. The dam face is 67 ft high and the reservoir covers 1392 acres with a storage capacity of approximately 45,000 acre feet of water.

On the west side of the dam, the emergency spillway lies beneath a large mass of rock with a continuous crack from top to bottom. This area is susceptible to massive rock movement should an earthquake occur. The steep cliff above the spillway constantly sheds rock into the spillway channel. There is no abutment on the east side of the dam. The concrete spillway channel has numerous cracks throughout.

The State of Idaho has a history of ignoring potential disasters. In 1976, the earthen Teton Dam began eroding due to a leak at its base, then burst, resulting in 11 deaths and over a billion dollars in property damage. Teton Dam, built during the same era and of similar design, was only 125 miles away from Mackay Dam.

Dam failures can result from any one, or a combination, of the following causes:

- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.
- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Landslides into reservoirs, which cause surges that result in overtopping;
- Freezing and thawing causing changes in soil density and shrinkage of embankments in contact with bedrock abutments that might adversely affect the safety of earth dams.
- High winds, which can cause significant wave action and result in substantial erosion; and,
- Destructive acts of terrorists; (NOTE: In the spring of 1933, during a drought, farmers desperate for water to irrigate their crops, dynamited the head house tower at the dam releasing all impounded waters, and destroyed diversion equipment at the Blaine Diversion. A week later they also blew up the diversion gates at Darlington. More threats of dynamiting caused the Utah Construction Co. to considerably reduce the asking price for its interest.)

All of the above causes for potential dam failure exist at Mackay Dam.

Can a similar occurrence be prevented? Recommendations to consider are:

- Install an electronic warning system and 24 hour monitoring
- Create an emergency plan for evacuation
- Make annual inspections and an action plan to correct deficiencies
- Repair leakage
- Spillway repairs
- The federal government should take over ownership of Mackay Dam due to national security issues,
- The current owner must carry adequate liability insurance for loss of life and property damage
- Access to the dam should be blocked to prevent sabotage

Respectfully submitted,

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