

Responding to Deficiencies

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Deciding When and How to Respond to Deficiencies

- You will see photos of various deficiencies and dam safety threats that can be identified via visual inspections
- Work to place each photo into 1 of 3 categories:
 - **Minor** = action needed within next year(s)
 - **Moderate** = action needed within weeks/months (or sooner if rising reservoir expected)
 - **Major** = immediate action needed
- Suggest how you would respond

Urgency

Guidelines for urgency of action exist elsewhere

For the exercise, use your own criteria to place photos into the 3 categories

Table 3.1 - USACE Dam Safety Action Classification Table - 27 Jan 2014*

URGENCY OF ACTION (DSAC)	ACTIONS FOR DAMS IN THIS CLASS***	CHARACTERISTICS OF THIS CLASS
VERY HIGH (1)	Take immediate action to avoid failure. Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite investigations to support remediation using all resources and funding necessary. Initiate intensive management and situation reports.	CRITICALLY NEAR FAILURE: Progression toward failure is confirmed to be taking place under normal operations. Dam is almost certain to fail under normal operations to within a few years without intervention. OR EXTREMELY HIGH INCREMENTAL RISK**: Combination of life or economic consequences with likelihood of failure is very high. USACE considers this level of life-risk to be unacceptable except in extraordinary circumstances.
HIGH (2)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions as warranted. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite confirmation of classification. Give very high priority for investigations to support the need for remediation.	FAILURE INITIATION FORESEEN: For confirmed and unconfirmed dam safety issues, failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety. OR VERY HIGH INCREMENTAL RISK**: The combination of life or economic consequences with likelihood of failure is high. USACE considers this level of life-risk to be unacceptable except in extraordinary circumstances.
MODERATE (3)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions as warranted. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Prioritize investigations to support the need for remediation informed by consequences and other factors.	MODERATE TO HIGH INCREMENTAL RISK**: For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with likelihood of failure is moderate. USACE considers this level of life-risk to be unacceptable except in unusual circumstances.
LOW (4)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Conduct elevated monitoring and evaluation. Give normal priority to investigations to validate classification, but do not plan for risk reduction measures at this time.	LOW INCREMENTAL RISK**: For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with likelihood of failure is low to very low and the dam may not meet all essential USACE guidelines. USACE considers this level of life-risk to be in the range of tolerability but the dam does not meet all essential USACE guidelines.
NORMAL (5)	Continue routine dam safety activities and normal operations, maintenance, monitoring, and evaluation.	VERY LOW INCREMENTAL RISK**: The combination of life, economic, or environmental consequences with likelihood of failure is low to very low and the dam meets all essential USACE guidelines. USACE considers this level of life-safety risk to be tolerable.

*At any time for specific events a dam, from any action class, can become an emergency requiring activation of the emergency plan.
 ** INCREMENTAL RISK is used to inform the decision on the DSAC assignment, NON-BREACH RISK is not reflected in this table.
 ***DSAC 1 and 2 dams with no life loss will be referred to the appropriate business line program and are given lower priority in the dam safety program.

Acknowledgements

The following photos were collected from a variety of sources in the public domain. The links to most original sources have been lost although a handful of the photos were provided by M. Acharya, Senior Dam Safety Engineer, Environment and Parks, Alberta.

All sources are nevertheless acknowledged.

Sinkhole

(1 of 3)



Sinkhole



Sinkhole



Seepage

(1 of 3)



Seepage



Seepage (Winter Inspection)



Excessive Vegetation on Dam

(1 of 2)



Excessive Vegetation on Dam



Embankment Slump

(1 of 5)



Embankment Slump



Embankment Slump



Upstream Slumping





**Erosion
(Overtopping)**



**Erosion
(Overtopping)**



Erosion (Low Level Outlet)



Erosion (Spillway Channel)



Cracking



Piping

(1 of 2)



Piping



Animal Burrows

(1 of 2)



Muskrat Burrows



Log Boom Deterioration



U/S Whirlpool



Sand Boils



**Deteriorated
Concrete in
Spillway**



**Low-Level
Outlet Pipe
Separation**



Corrosion



Corrosion (CSP Conduit)



**Gate Valve
Stem Damage**



**Blocked
Spillway**



Blocked Inlet



Ruts Along Crest



Be Prepared

Dam Owner Emergency Intervention Toolbox

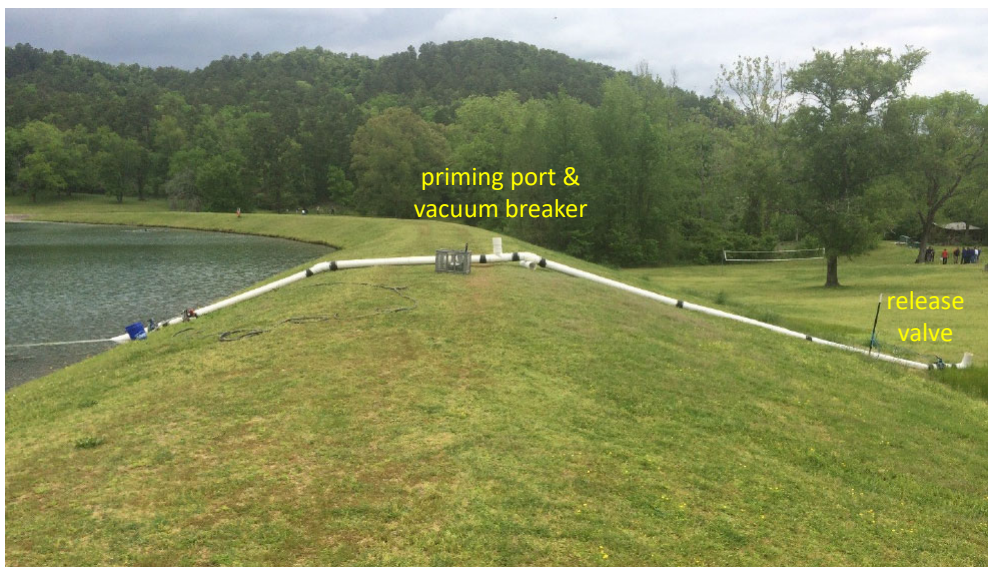
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Sandbags & Siphons



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Guidelines for Use of Pumps and Siphons for Emergency Reservoir Drawdown (2012)



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Sandbags



Sandbags

