Preliminary Report on Process for Modifying Lake Jackson Dam
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You asked us to research whether Prince William County, which owns the Lake Jackson Dam, would be required to obtain permits in order to modify the existing tainter gate by closing it permanently, thereby converting the dam to a spillway. We believe the clear answer is yes—at least an alteration permit from the Virginia Soil and Water Conservation Board (the "VSWCB") would be required. The requirements for such a permit, as well as other regulatory implications, are outlined below.

I. Issue

What laws and regulations govern the process that Prince William County must go through in order to modify the tainter gate operations on the Lake Jackson Dam?

II. Short Answer

We believe that Prince William County must apply for and obtain an alteration permit from the Virginia Soil and Water Conservation Board ("VSWCB") before it can begin to alter the Lake Jackson Dam. The granting of the permit is then conditioned upon the Director of the Department of Conservation and Recreation finding that the application is consistent with certain state and federal dam guidelines.

III. Discussion

The process of altering a dam in Virginia is governed by state regulations which, in turn, incorporates federal guidelines. All dams in Virginia are subject to the Dam Safety Act, Article 2, Chapter 6, Title 10.1 (10.1-604 et seq), unless specifically excluded.
[1] The Virginia Administrative Code ("VAC" or "code") provides that dams must be changed pursuant to an alteration permit if the changes meet the following conditions:

> A. Alterations which would potentially affect the structural integrity of an impounding structure include, but are not limited to, changing the height or otherwise enlarging the dam, increasing normal pool or principal spillway elevation or physical dimensions, changing the elevation or physical dimensions of the emergency spillway, conducting necessary repairs or structural maintenance, or removing the impounding structure. Structural maintenance does not include routine maintenance.

4VAC50-20-80(A); see also 4VAC50-20-30 (defining "alterations"). Thus, if the proposed change is an alteration, then an alteration permit must be obtained from the Virginia Soil and Water Conservation Board ("VSWCB") before any work is commenced. 4VAC50-20-50(B). For an alteration permit to be accepted, an applicant must submit a design report which "shall include, but not be limited to, the following [relevant] information:"[2] [3]

> 12. A report of the geotechnical investigations of the foundation soils, bedrock, or both in the areas affected by the proposed alterations and of the materials to be used to alter the impounding structure.
>
> 14. Calculations and assumptions relative to design of the improved spillway or spillways, if applicable.
>
> 15. Provisions to ensure that the impounding structure and appurtenances during

the alteration will be protected against unacceptable deterioration or erosion due to freezing and thawing, wind, wave action and rain or any combination thereof.

- has a maximum capacity less than 50 acre-feet and is less than 25 feet in height;
- has a maximum capacity of less than 15 acre-feet and is more than 25 feet in height;
- is operated primarily for agricultural purposes and has a maximum capacity of less than 100 acrefeet or is less than 25 feet in height (if the use or ownership changes, the dam may be subject to regulation);
- is owned or licensed by the federal government;
- is operated for mining purposes under 45.1-222 or 45.1-225.1 of the Code of Virginia;
- is an obstruction in a canal used to raise or lower water levels.

See Dam Safety Program, Virginia Dept. of Conservation and Recreation, https://www.dcr.virginia.gov/dam-safety-and-floodplains/dam-safety-index; see also 4VAC50-20-30 (defining impounding structure).

[2] For brevity, the factors are narrowed down to include only those that are most relevant to this discussion. A complete list of factors is listed in 4VAC50-20-80.

[3] A form for the design report is available from the Virginia Department of Conservation and Recreation, titled Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures. See https://www.dcr.virginia.gov/form/DCR199-101.pdf.

16. Other pertinent design data, assumptions and analyses commensurate with the nature of the particular impounding structure and specific site conditions, including when required by this chapter, a plan and water surface profile of the dam break inundation zone.

17. If applicable, a description of the techniques to be used to divert stream flow during alteration work so as to prevent hazard to life, health and property, including a detailed plan and procedures to maintain a stable impounding structure during storm events, a drawing showing temporary diversion devices, and a description of the potential impoundment during the alteration. Such diversion plans shall be in accordance with the applicable environmental laws.

C. A plan of construction is a required element of complete permit application and shall include:

2. Elements of the work plan that should be considered include, but are not limited to, foundation and abutment treatment, excavation and material fill processes, phased fill and compaction, testing and control procedures, construction of permanent spillway and drainage devices, if applicable.

3. The erosion and sediment control plan, as approved by the local government, which minimizes soil erosion and sedimentation during all phases of construction.

See 4VAC50-20-80. Once the application is submitted to the VSWCB, the Director of the Department of Conservation and Recreation, or his designee, shall evaluate it using the following design criteria and standards:[4]

1. The design procedures, manuals and criteria used by the United States Army Corps of Engineers.
2. The design procedures, manuals and criteria used by the United States

> Department of Agriculture, Natural Resources Conservation Service.
> 3. The design procedures, manuals and criteria used by the United States Department of the Interior, Bureau of Reclamation.
> 4. The design procedures, manuals and criteria used by the United States Department of Commerce, National Weather Service.
> 5. The design procedures, manuals and criteria used by the United States Federal Energy Regulatory Commission.
> 6. Other design procedures, manuals and criteria that are accepted as current, sound engineering practices, as approved by the director prior to the design of the impounding structure.[5]

4VAC50-20-320. And so, the Army Corps of Engineers, Natural Resources Conservation Service, Bureau of Reclamation, National Weather Service, Federal Energy Regulatory Commission are all sources that the Director must consult when evaluating whether to grant or deny permit applications. For purposes of relevance and brevity, only the sources that bear most directly to the permit issue are discussed below.

A. U.S. Army Corps of Engineers

The Army Corps of Engineers issued a regulatory guidance letter in 2005, which places limitations on changes that dam owners can make that affect discharges. Regulatory Guidance Letter No. 05-04. The letter states that the discharge of large quantities of sediment through a dam is regulated under the Clean Water Act, which requires a CWA Section 404 permit in order to do so. Although normal discharges are exempt from the permit requirement, a change in frequency and volume, combined with a buildup of sediment upstream of the dam, may require a dam owner to obtain a Section 404 permit before modifying the discharge by changing a gate. The letter further states that when evaluating whether the discharge is de minimis, engineers should consider whether:

> [T]he discharge of dredged or fill material through the dam is necessary for dam maintenance, and proportional to the proposed activity and the size of the facility (i.e., size of the dam/structure and the surface acres and storage volume of the resulting impoundment). Other factors in this consideration should include the time of year and normal seasonality of high volume flows, the size of incoming and outgoing stream/river and the intended release volume, the natural hydrograph of the system, the speed of the drawdown, the normal amount of sediment in the watershed, and the potential for environmental harm.

RGL No. 050-04 at 4. The director may take into account the effect that the change in discharge from a dam will have on a body of water and then can either issue the permit allowing the requested use outright, with conditions, or deny it.

[5] It is unclear what materials may already be approved by the Board. The DCR provides links to FEMA, the Association of State Dam Safety Officials, and the Virginia Lakes and Watersheds Association on its website discussing permit requirements, however, the sources are not very helpful for our purposes.

The remaining issue from the letter is whether the sediment buildup behind the Lake

Jackson Dam would be large enough to fall under the CWA regulation. If so, then Prince William County would have the burden of showing that no practicable alternative exists that is less damaging to the aquatic environment or that the nation's waters would not be significantly degraded by their decision in order to receive an approved permit.

B. U.S. Federal Energy Regulatory Commission ("FERC")

The FERC regulates over a thousand non-federal dams across the United States. Of these dams, it does not appear that the Lake Jackson Dam falls under its authority as a registered dam.[6] Nonetheless, the FERC Compliance Handbook provides that the FERC "concentrate[s] on the proposed modification to determine its dam safety, environmental, operational, and other effects." FERC Compliance Handbook at 15, https://www.ferc.gov/industries/hydropower/geninfo/handbooks/compliance_handbook.pdf. Pursuant to the Virginia Administrative Code, these factors may then be relied upon by the Director when evaluating Prince William County's permit application.

C. U.S. Dept. of the Interior, Bureau of Reclamation

Next, the Virginia Administrative Code states that the Bureau of Reclamation's standards should also be considered when evaluating an alteration. The Bureau provides a list of the following considerations that should be weighed in determining if a dam is safe. Although not directed at a change in gate usage, these factors should be evaluated during the general construction and modification of dams: (1) Geology, (2) Seismicity, (3) Hydrology and spillway design floods. See Safety Evaluation of Existing Dams, US Dept. of the Interior, Bureau of Reclamation (1995), https://www.usbr.gov/tsc/techreferences/mands/mands-pdfs/SEED.pdf.

These three sources account for the most relevant guidance on modifications to dam operations. The other sources that are cited by the VAC – the National Weather Service and Natural Resources Conservation Service – either lacked guidance documents that were relevant or lacked them entirely. The code also provides that "[o]ther design procedures, manuals and criteria that are accepted as current, sound engineering practices" may be used so long as they are approved by the director prior to the design of the impounding structure, and so, below are several other relevant sources of dam standards.

D. U.S. Society on Dams

The USSD is a 501(c)(3) nonprofit organization "dedicated to advancing the environmentally sustainable science of planning, design, construction, operation and maintenance of dams." In its Guidelines for Dam Decommissioning Projects, the USSD provides several factors that are to be considered when decommissioning a dam. Although the modification of a tainter gate is less impactful than decommissioning an entire dam, the factors that USSD provides in its evaluation are insightful as to what the Director may also consider. Those factors include: (1) public safety, (2) fish passage and aquatic migration, (3) river restoration, (4) economics, (5) project funding, (6) public benefits, (7) owner benefits, (8) environmental impacts. Guidelines for Dam Decommissioning Projects, United States Society on Dams, at 14, https://www.ussdams.org/wp-content/uploads/2016/05/15Decommissioning.pdf.

E. FEMA – Federal Guidelines for Dam Safety

Although FEMA has several materials on dams and is referenced by the Virginia Department of Conservation and Recreation, none of their materials specifically cover the modification of gates or similar changes. Their guides mainly consider dam deterioration and effects of natural disasters, such as earthquakes, on dams. Federal Guidelines for Dam Safety, FEMA (April 2004), https://www.fema.gov/media-library-data/20130726-1502-20490-5785/fema-93.pdf. And so, it is unlikely that FEMA's regulations will be relevant here.

F. 4VAC50-20-230. Complaints

Under the same section as the permit requirements discussed above, the Virginia Administrative Code provides another standard that bears on Prince William County's ability to change tainter gate operations. Specifically, the code provides that:

> A. Upon receipt of a complaint alleging that the person or property of the complainant is endangered by the construction, alteration, maintenance or operation of an impounding structure, the director shall cause an inspection of the structure, unless the data, records and inspection reports on file with the board are found adequate to determine if the complaint is valid.
> B. If the director finds that an unsafe condition exists, the director shall proceed under the provisions of §§ 10.1-608 and 10.1-609 of the Code of Virginia to render the extant condition safe.

4VAC50-20-230. And so, if upon receiving a complaint, the Director finds that an alteration – such as the removal of gate – creates an unsafe condition, the Board shall issue a report with recommendations for the dam owner to implement to correct deficiencies leading to that condition. These recommendations are not discretionary and the owner must comply with them. Notably, an unsafe condition can be one of nonimminent danger that threatens either life or property, if not corrected. And so, if the removal of a tainter gate created a nonimminent threat to the properties surrounding the dammed lake, then the Board would have to recommend that Prince William County keep the gate's condition intact.

G. Conclusion

Lake Jackson Dam has a spillway height of 28 feet and an uncontrolled spillway 213 feet long. See Phase I Report, National Dam Safety Program (1978), 1, https://apps.dtic.mil/dtic/tr/fulltext/u2/a063582.pdf. The dam's total length is approximately 380 feet and its hazard classification is high[7] based on its location in an urban area. Id. at 2. The reservoir capacity at the time of this publication was 13,500 acre feet at the top of the dam.[8] Id. at 4. Based on these specifications, Lake Jackson Dam should be subject to the Dam Safety Act.

Next, Prince William County's change to the tainter gate operations on the dam likely qualifies as an alteration under the Virginia Administrative Code. The code states that alterations include, but are not limited to, changes that increase normal pool or principal spillway elevation or physical dimensions. 4VAC50-20-80(A). If the tainter gate controls the amount of water going over the dam and is used to avoid flooding, then a change to it will likely increase normal pool dimensions as the gate will no longer be regulating the amount of water going over the dam. If so, then the change would qualify as an alteration under the code. Even if removing the tainter gate does not increase the pool dimensions, since the section's application is not

limited to what is expressly written, this change is likely similar enough to those stated to be included under the provision as well.

Accordingly, the change to the tainter gate should be contingent upon the VSWCB's acceptance of Prince William County's application for an alteration permit. The VSWCB's review and acceptance is conditional upon the County taking into account the abovementioned factors applied by different governmental and private sources. And so, the remaining questions are: (1) to what extent does the change in the tainter gate affect those factors listed above which the Director will have to consider in deciding whether to grant an alteration permit application, and (2) whether those effects would have enough weight for the Director to deny the permit application.