

FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Dam Safety and Inspections - Chicago Regional Office
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Chicago, Illinois 60604
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In reply, refer to: P-10810

July 15, 2020

Via Electronic Mail

Mr. Lee Mueller
Boyce Hydro Power, LLC
lwmueller@boycehydrollc.com

Re: Smallwood Hydroelectric Project No. 10810
Smallwood Dam Emergency Inspection Report – June 26, 2020

Dear Mr. Mueller:

Your June 30, 2020 letter belatedly provided the June 26, 2020 Smallwood Dam Emergency Inspection Report prepared by TRC Engineers Michigan, Inc. (TRC). The inspection report summarizes the visual observations of the Smallwood Dam made by TRC on June 9, 2020. Boyce Hydro did not have the Chief Dam Safety Engineer (CDSE) listed in the Owners Dam Safety Program at the time of the failure, Mr. Purkeypile, inspect the project.

A May 20, 2020 letter from the Director of the Division of Dam Safety and Inspections required dam safety inspections of the Sanford, Secord, and Smallwood Dams be performed within three days of flood flows receding and provide inspection reports within 3 days from the dates of the inspections. Flood flows had fully receded and reservoir elevations were at or below normal levels by May 20 for the Smallwood Project and May 22 for the Secord Project. The required inspections did not occur until June 8, 2020, at least 17 days after the projects could have been inspected. An inspection report for the Secord Project was filed on July 9, 2020, and we have not received an inspection report for Sanford Project as of the date of this letter. Our review of the Secord inspection report will be in a separate letter.

The inspections were performed by Mr. Shawn D. McGee, P.E. and Mr. Chris Hay, P.E. of TRC. The inspection report lists one Critical Action, five Recommended Actions, and five Non-Critical Actions/Maintenance Items for Boyce Hydro to undertake. These items are listed in Enclosure 1. We have not received a plan and schedule to address these items.

By the date of the inspection, Boyce Hydro had already dressed the embankments at the Smallwood and Secord Projects. This work was not supervised by TRC. Because

of this, the integrity of the projects features due to the flooding could not be adequately assessed by TRC during the inspection. In addition, Boyce Hydro did not provide any design/construction documentation to TRC for the completed work. By letter dated June 30, 2020, you submitted a revised Owners Dam Safety Program which now designates Mr. McGee as the CDSE of the Boyce Hydro projects.

By August 14, 2020, you must provide a supplemental report by TRC addressing the comments in Enclosure 2 and provide a plan and schedule to address TRC's recommendations from both the original inspection report (as listed in Enclosure 1) and TRC's supplemental report. You are reminded that you may not return the reservoir to normal levels until and unless all of the outstanding dam safety items are satisfactorily addressed and you receive authorization from FERC.

Please contact me at 312.596.4430 if you have any questions or concerns pertaining to this letter.

Sincerely,

John A. Zygaj, P.E.
Regional Engineer

Enclosures 1 and 2

Enclosure 1
Recommended Follow-up Actions from the TRC
Inspection Report of Smallwood Dam

Critical Action

C-1 - Repair and/or replace the left side (north) cutoff wall and missing portion of the retaining wall at the downstream end to prevent future loss of wall sections and backfill.

Recommended Actions

R-1 – Repair Spalling on Spillway Piers

R-2 - Seal the air vent within the powerhouse to prevent inadvertent discharge.

R-3 - Monitor the effectiveness of the areas recently repaired that were damaged due to erosion during the flooding. If the vegetation does not take within the hydro-seeded areas, reseed the areas and water until a good stand of grass is established.

R-4 - Close Tainter gates for a sufficient period of time to allow tailrace water levels to subside to facilitate visual inspection of the spillway tailrace structures.

R-5 - Conduct dive inspection of the submerged structures at the upstream side of the spillway and powerhouse.

Non-Critical Actions/Maintenance Items (summarized)

M-1 - Clean and repair concrete deterioration to retaining walls and wingwalls (bulkheads). Repairs include cleaning concrete surfaces, patching spalls and delaminated areas, and epoxy-injecting cracks.

M-2 - Clean and paint remaining steel equipment supports on the deck.

M-3 - Remove debris present within the ditch at the toe of slope of the left embankment so that drainage is not impeded.

M-4 - Perform maintenance of the vegetative cover throughout the project area. All vegetated embankment slopes should be maintained with a maximum grass height of 12 inches.

M-5 - Continue to maintain proper rodent control throughout. If a burrow or den is observed, it is recommended that it be backfilled by mudpacking - pour a mud-pack mixture (i.e., a slurry consisting of 90% soil and 10% cement mixture) with the aid of a pipe into the hole with dry soil tamped into the entrance and vegetation re-established.

Enclosure 2
Additional Information Needed for
TRC's Smallwood Inspection Report

The following items must be performed and addressed by TRC in a supplemental report:

General

1. Review pre-flood event photos from all sources, and drawings and cross-sections. Compare them to the conditions currently observed, especially the embankments. Any section that shows physical change from previously approved designs should be surveyed and re-evaluated for stability and factors of safety.
2. Review and evaluate all data pertaining to the project operations, spillway gates, reservoir levels, generation, and total outflows throughout the flood event.
3. Provide headwater and tailwater elevations at the time of the inspections.
4. Provide commentary on the construction techniques and materials of the dam with regard to how the dam performed during the flood.

Embankments (Right and Left)

5. Provide a written description and show the extent of the flood damage to both the right and left embankments, including the auxiliary overflow spillway. Use photographs and an annotated site plan and typical cross-sections to show the extent of the damage. Erosion along the downstream toe of the right embankment dam, and along the Steel Sheet Pile (SSP) wall on the auxiliary spillway side were not discussed at all in the TRC inspection report. A detailed description and assessment of all damaged areas should accompany these exhibits.
6. Provide a survey of the embankment slopes and compare with the original design.
7. Provide stability analyses accounting for the surveyed embankment slopes to determine if adequate factors of safety exist in the interim, before restoration can return the slopes to their original alignment and cross-section.
8. TRC states that Boyce Hydro indicated that sand and clayey soil material from an existing borrow pit adjacent to the project site was brought in to backfill the embankment erosion areas. Also, TRC notes that riprap was obtained from a local source. Provide the following field inspection assessments:
 - a. Material classification and gradations, qualitative assessment of compaction effort of earth fill and backfill repairs based on foot inspection. Also, TRC

- must review the repair construction records, including loose placed and compacted lift heights, moisture conditioning, and compaction methods.
- b. Type, qualitative strength using geologic hammer, description and visual estimation of average, minimum, and maximum size of riprap material exposed along embankment toe and auxiliary spillway.
 - c. Comparison of riprap material type and size placed prior to and following the May 19, 2020 flood event. Include photos of the riprap materials with objects of known dimensions for scaling purposes.
9. Evaluate the adequacy of the turf matting and hydro-seed used in some areas instead of riprap protection for all the eroded areas. The repairs on the left embankment inside the SSP wall only partially treated what was eroded during the flood event. The downstream side of the embankment should be protected with riprap inside the SSP wall up to the IDF tailwater elevation.
 10. Review the adequacy of the erosion protection repairs along embankment slope/toe and at the auxiliary spillway in accordance with the dam safety industry practice. Also, confirm if bedding material was installed under the riprap.
 11. Provide commentary on the top and bottom elevation of embankment SSP walls relative to the May 2020 flood versus the IDF and PMF pools.
 12. Provide commentary on the original embankment construction techniques and materials.
 13. Review the piezometer data from the left embankment to evaluate embankment performance during the May 2020 flood event and any possible influence on stability of the structure.
 14. Provide commentary on the performance of the embankments in relation to findings and recommendations from the Potential Failure Mode Analysis from the 2016 CSIR.
 15. Assess the backfill placed for the powerhouse air vent erosion. Depending on TRC's assessment and our review, the material may need to be removed and replaced. This would entail the submittal of plans, specifications, and QCIP to the Commission for our review and approval before proceeding with work.

Spillway Structure

16. Include documentation and photographs of the inspection from the internal spillway gallery of the headwater/rollway slabs, piers, abutment walls, and air vent shaft.
17. Provide commentary on the top and bottom elevation of the spillway chute SSP

guide walls relative to the May 2020 flood versus the expected peak PMF pool and IDF peak pool.

18. Review the piezometer data from the May 2020 flood event to evaluate performance and any possible influence on the stability of these structures.
19. Given that this flood was far less than the IDF and caused significant damage, provide commentary on the project's ability to safely pass the IDF. A review of the operating procedures during the May 2020 flood may aid in the assessment.
20. TRC recommends the immediate repair or replacement of the north cutoff wall and missing portion of the downstream end of the wall. Provide a structural analysis of the existing wall to determine the adequacy of these repairs along with a plan and schedule for implementing repairs/replacement.
21. Include inspection documentation and photographs of the mechanical and electrical components of gate hoist equipment, including onsite electrical generators.

Powerhouse Structure

22. Include inspection documentation photographs from inside the powerhouse, including the water bearing walls (i.e., headwalls) and the turbine chamber (which was reportedly the source of leakage water from air vent).
23. TRC recommends that the air vent within the powerhouse be sealed to prevent inadvertent discharge onto the right embankment during a flood event. The functionality of the air vent relative to powerhouse operations must be examined prior to sealing the vent. The air vent may need to be relocated if found to be relevant to powerhouse operations.

Document Content(s)

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