

# Dam 6 and its Associated Structures

(from September 2014 *Along The Towpath*)

## Accompanied by the Past *by Karen Gray*

*History is the witness that testifies to the passing of time; it illumines reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity.* **Marcus Tullius Cicero (106 BCE–43 BC3), *Pro Publico Sestio***

The gem of this year's Heritage Hike is without a doubt Dam 6 and its associated structures, located in a relatively remote part of the canal at Mile 134.06. Each of the C&O Canal dam sites is a collection of structures that meet the always-unique engineering challenges of each location, and Dam 6 is a superb example of this.

Several things merit emphasis. As the dams exist to create a reliable pool of water from which to feed the main stem of the canal, their associated inlet locks are necessarily set six or more feet deep into the median level of the river behind the dam — and being at river level makes them uniquely vulnerable to high water. The standard solution is a high guard wall around these structures that can only be breached by the upstream end of the inlet lock. This design requires that the upstream gate of the lock be a guard gate, as high as the guard wall, in order to close off the opening for the lock when high waters threaten. Once past the dam, the canal is once again some distance above the river which is, of course, significantly lower below the dam than the level of the pool behind the dam. In the case of Dam 6 the difference is 16 feet in typical river conditions.<sup>1</sup>

Dam 6 has some similarities to the complex of structures at Dams 2 and 5. In all three cases the inlet locks are immediately beside the Maryland end of the dam and are integrated into the high abutment and its guard wall. At Dams 2 and 6 a lift lock is beside each inlet lock. But at Inlet 6 there is a feeder channel 0.12 miles long that brings water back into the main stem of the canal.

In the case of Dams 1 and 2, the inlets feed directly into the mainstream of the canal at their downstream gates. The situation at Dam 1 is somewhat different as it had a long inlet channel from the dam to a unique quasi-lock impoundment, the lower gate of which fed directly into the canal's main stream.

In the case of all the dams for the C&O Canal except 6, both sides of the river allowed the engineers to anchor the abutments against high river banks. However, the location at Dam 6 has only a substantial flood plain on the now-West Virginia side of the river. Seeming to make the situation even worse, Long Hollow Run drains a nearby mountain valley and flows into the Potomac at that location. The solution was a substantial, free-standing stone abutment with an impressively large masonry guard wall running from the abutment across the flood plain back to where the land begins to rise. Long Hollow Run, on its upriver (western) side, fed into the pool behind the dam. Today the B&O mainline (now a CSX Baltimore Division line) passes very near the landward end of the guard wall and can be seen from Amtrak's Capitol Limited in the winter when leaves are off the trees and brush that have grown up along it.

The dam itself was by no means a simple series of cribs. It is best described by Harlan Unrau in his Historic Structure Report:

Dam No. 6 stretched 475 feet in length across the Potomac and had a fall of nearly 16 feet. The dam was built of heavy timber cribbage securely fastened to the natural rock

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of the river bed. The cribbage was tightly pinned together and braced, and the voids were filled with stone rubble. The upstream face, much like [the original] Dams Nos. 4 and 5, was protected by vertical, heavy planking. The top surface sloped slightly upward in the direction of the river's flow and had a heavy plank deck. On its downstream side, the slope of the dam was much less than that of Dams Nos. 4 and 5. From the apex of the dam, the downward inclination was only 5 feet in a distance of 25 feet, at the end of which it assumed a perpendicular shape.<sup>2</sup>

The Maryland abutment was, as always, partially guard wall and thus extremely high, continuing as a guard wall through which the inlet lock passes. Because of the lock's proximity to the dam, an additional guard wall was built downstream along the river side of the inlet lock that adds protection against floods that significantly raise the river level immediately below the dam.

The inlet lock has a unique and very large bypass culvert built into its land-side wall. When the lock's gates were closed, water could continue to be passed down to the inlet channel through this culvert. The upstream end of the bypass culvert is located in a large rectangular indentation in the guard wall beside the pool on the land side of the entrance to the inlet lock. At the downstream end of the lock, the bypass culvert emptied into the inlet channel.

Water in the inlet channel flowed under a towpath bridge and into the main stem of the canal at the downstream end of Lift Lock 54. This lock raises the canal to a short level and Lock 55 raises it again to the same level as the top of the guard wall. It will maintain that level for 2.16 miles up to Lock 56 at Pearre.

Note that, as at Dam 6, there are always two or more locks in rapid succession at locations where an inlet or outlet opens to the river (Inlet Locks 4 and 5, where the main stem terminates at slackwater navigation sections, being excepted of course). These lift locks serve to quickly raise the main stem of the canal to as high a level above the Potomac as was affordable and practicable at that location.

### **Dam 6 History and Lore**

There were unique issues relative to the location of Dam 6, as the original plan placed it half a mile downstream below the mouth of the Cacapon River — a location that would have allowed boats on that river to access the canal via the Dam 6 slackwater pool and inlet lock. However, as the B&O Railroad rapidly built its line from Martinsburg to Cumberland along the then-Virginia shore, it became apparent that a dam at that location would have backed up and raised the level of the Cacapon, creating flood issues for the railroad and its Cacapon viaduct. As a consequence, the canal company was forced to build the dam upstream above the village of Great Cacapon, with plans to later construct a dam on the Cacapon above the railroad's bridge, and a short canal that would carry boats from that dam's pool to the pool behind Dam 6 and the inlet lock. Needless to say, neither the Cacapon Dam nor its branch canal was ever built.<sup>3</sup>

Contracts were let for Dam 6 and its abutments in the fall of 1836, with construction beginning on the abutments shortly thereafter, and on the dam in the spring. The contract for the abutments was completed in September 1838, but the contract for the dam was abandoned at that same time and the remaining work on the dam was done by canal company employees, who finished it in February 1839.<sup>4</sup>

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The inlet lock was built between October 1836 and October 1838.<sup>5</sup> Work on Lock 54 was begun in May 1836, but its contract was abandoned in December 1839 when it was 40% completed. It was not completed until 1849 after a new contract had been issued in 1847 to Hunter, Harris and Co., who subcontracted it to Moyle, Randal and Jones. Work on Lock 55 was begun in 1836 under a contract with Henry Smith, the same contractor as for Lock 54, but he completed this lock in October 1840.<sup>6</sup>

Dam 6 is well known as the canal terminus during the period from 1839 to 1850 when construction stopped or proceeded sporadically along the final 50.44-mile stretch of the canal below Cumberland. In the summer of 1843 a preliminary agreement was made with the B&O to carry coal to a wharf on the then-Virginia side of Dam 6 from which it could be transshipped to boats. However the site selected for the railroad turnout and switches also required a 600 ft. trestle that would cost nearly \$1,000 — which the railroad engineer said could not be covered with the money budgeted for the other necessary work. The canal's chief engineer, Charles B. Fisk, replied by urging the railroad to complete “the track and trestle work...so far as [the money] will go,” which he assumed would be sufficient for them to “start business.”<sup>7</sup>

The Dam 6 railroad depot was ready on April 20, 1844, but in May 1845 the railroad abruptly terminated its arrangement for the transportation of coal from Cumberland to Dam No. 6 at two cents a ton per mile, raising its rates to four cents a ton per mile for coal and six cents for iron. Combined with other acts in opposition to the canal, it likely ended the brief period of “cooperation.” Whatever the case subsequently, any coal or iron cargo shipped on the canal via the Dam 6–B&O

connection does not appear in official records and was apparently inconsequential.

Dam 6 suffered serious damage in many of the great floods, but incurred only minor damage to its abutments in the flood of November 24, 1877. In 1884 a coffer dam was built to allow the company to assess the condition of the base of the dam, and significant repairs were made that reduced serious leaks that had developed, making it difficult to impound enough water behind the dam to maintain navigational levels of water in the canal. Then, as a result of extensive damage in the flood of April 1, 1886, the dam was largely rebuilt during June and July of that year.<sup>8</sup>

In mid-March 1936 — a dozen years after the canal had closed to navigation — the worst flood to date in the Potomac valley washed away approximately one-half of Dam No. 6 and the sheeting on the remaining half. It also destroyed the lockhouse on the berm side of Lock 55, having over-topped the guard wall and flooded across both the inlet lock and the lift lock to the adjacent hillside.<sup>9</sup>

Tom Hahn had famously called Dam 6 “the only dam which burned,” supposedly as a result of a fire started “on the wood-covered structure” on August 31, 1936 by fishermen.<sup>10</sup> However, this report is problematic, based on Unrau's description of the damage to the dam earlier that year. If the Unrau report is correct, we can assume that the only wood left to burn was some of the cribbing beams, and that even if the fire did spread to those, there was little damage left to be done to the ruins.

The lockhouse on the berm side of Lock 54, which had survived all the great floods and was documented by the Historic American Building Survey,<sup>11</sup> burned in 1981, according to Hahn.<sup>12</sup> The construction dates for that lockhouse and the one at Lock

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55 are unknown. Records show only that an 1836 contract to build the house for Lock 54 was declared abandoned in 1839. It appears the company may have built a temporary shanty in 1839 and, in 1842, improved it or constructed a more substantial structure to serve the tender for the inlet lock that had been put into service in late 1839.<sup>13</sup> As Locks 54 and 55 were not put into operation until 1850 with the watering of the last 50 miles, and as construction in the 1840s was so restricted financially, it is assumed that the construction of these lockhouses was deferred until the 1850s.

### Notes:

1. At Dam 4 where the inlet lock serves as the beginning of a new section of the main stem of the canal that continues down to Lock 41, it is the case that not just the inlet, but the entire 1.22-mile section of the canal downstream to the guard gate at Dam 4 is below the surface level of the river.
2. Unrau, Harlan D., *Historic Structure Report: Dam No. 6 and its Associated Structures*. Department of Interior, (original version 1974), digitized version 2014.
3. Ibid, p. 18.
4. Unrau, Harlan D., *Historic Resource Study: Chesapeake and Ohio Canal*. Department of the Interior, 2007 electronic version p. 242.
5. Unrau, *Historic Resource Study*, Ibid. p. 239
6. Ibid. pp. 234–235.
7. Unrau, *Historic Structure Report*, Ibid. p. 21.
8. Ibid. p. 31.
9. Ibid, p. 32.
10. Hahn, Thomas F., *Towpath Guide*, Fifteenth Edition, Harpers Ferry Historical Association, 1999, p. 182
11. See [www.loc.gov/pictures/collection/hh/item/md0599/](http://www.loc.gov/pictures/collection/hh/item/md0599/) for the digitized information and photographs from this survey, number: HABS-MD 747.
12. Hahn, *ibid*. p. 181.
13. Unrau, *Historic Resource Study*, Ibid. P. 249.