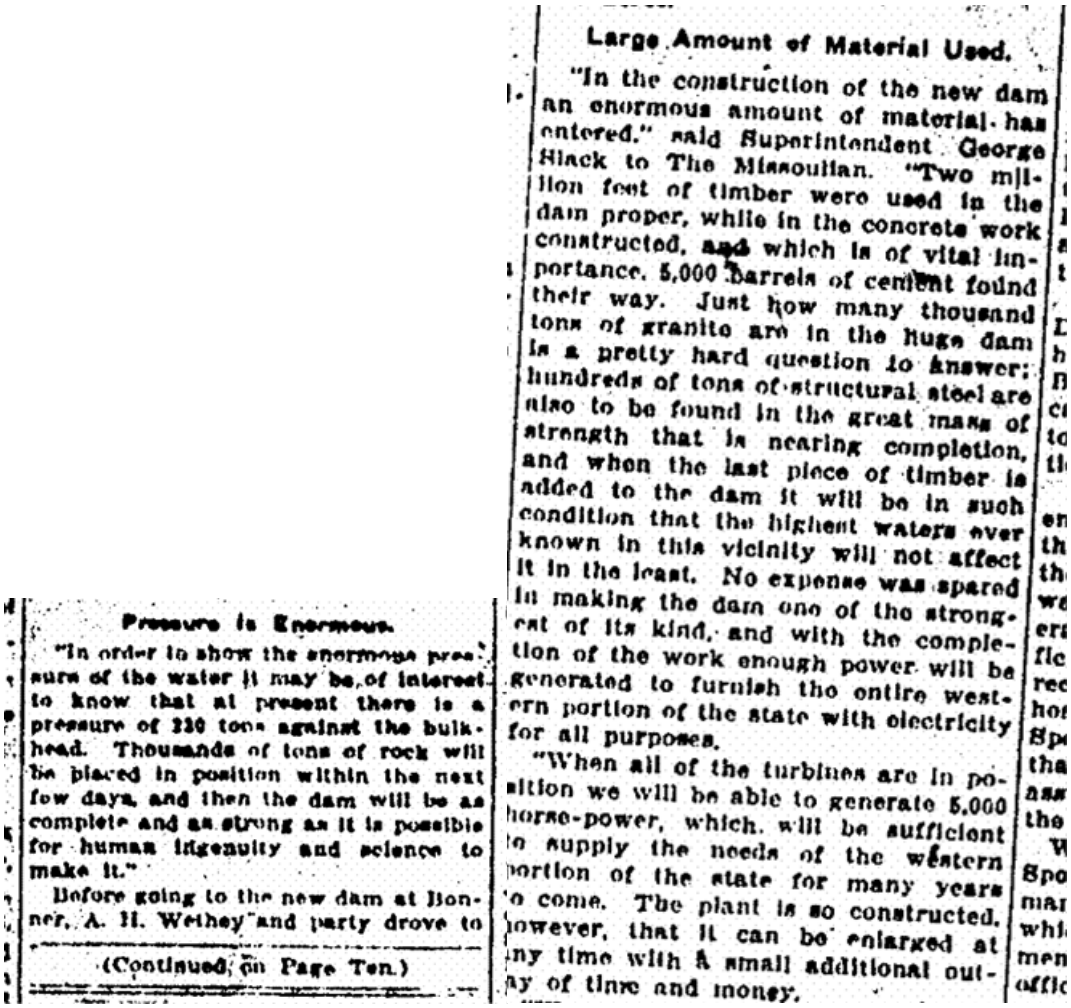
Milltown Dam and Superfund Site Update – April 7, 2008

One hundred years and three months ago the Milltown Dam was completed by William Andrews Clark to supply power for his mill, which supplied timbers and fuels for his copper mines and smelters in Butte. The dam was heralded as being "as complete and strong as it is possible for human ingenuity and science to make it" and able to withstand "The highest waters ever known in this vicinity…", as stated by Clark's representatives A.J Wethey and George Slack in the Missoulian Newspaper.:



Pressure Is Enormous.

"In order to show the enormous pressure of the water it may be of interest to know that at present there is a pressure of 220 tons against the bulkhead. Thousands of tons of rock will be placed in position within the next few days, and then the dam will be as complete and as strong as it is possible for human ingenuity and science to make it."

Before going to the new dam at Bonner, A. H. Wethey and party drove to

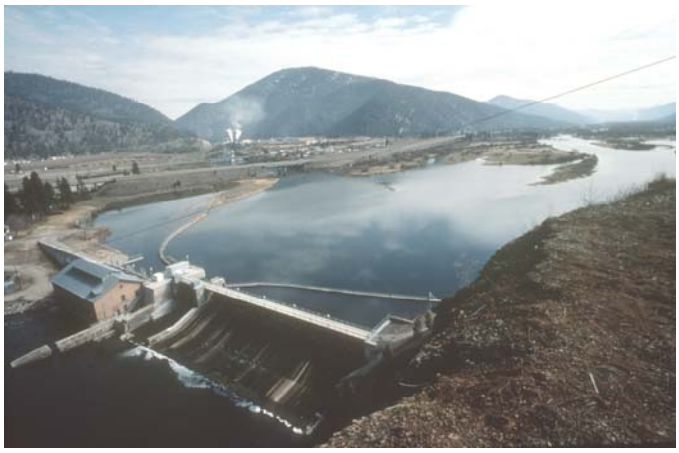
(Continued on Page Ten.)

Large Amount of Material Used.

"In the construction of the new dam an enormous amount of material has entered," said Superintendent George Black to The Missoulian. "Two million feet of timber were used in the dam proper, while in the concrete work constructed, and which is of vital importance, 5,000 barrels of cement found their way. Just how many thousand tons of granite are in the huge dam is a pretty hard question to answer; hundreds of tons of structural steel are also to be found in the great mass of strength that is nearing completion, and when the last piece of timber is added to the dam it will be in such condition that the highest waters ever known in this vicinity will not affect it in the least. No expense was spared in making the dam one of the strongest of its kind, and with the completion of the work enough power will be generated to furnish the entire western portion of the state with electricity for all purposes.

"When all of the turbines are in position we will be able to generate 5,000 horse-power, which will be sufficient to supply the needs of the western portion of the state for many years to come. The plant is so constructed, however, that it can be enlarged at any time with a small additional outlay of time and money.

A few months later, in June, 1908, the highest waters ever known in this vicinity flooded the Clark Fork and Blackfoot Rivers, and the 1908 flood carried millions of tons of sediments containing finely ground mining and smelting wastes known as "tailings" down the river, filling in the reservoir behind the Milltown Dam. The flood also choked the Blackfoot River from wall to wall with logs, which filled the channel behind the dam at Milltown and the smaller dam at Bonner.



Milltown dam and reservoir in the mid-1990's

In 1981, A Missoula Health Department official collected water samples showing arsenic contamination in Milltown's Aquifer. Two years later, the area was designated one of the country's first Superfund sites. In 1996, after 13 years of detailed studies of the groundwater arsenic contamination, the U.S. Environmental Protection Agency was poised to announce a decision to leave the contaminated sediments in place behind the Milltown Dam, which would be maintained in perpetuity while local residents were prohibited from drilling water wells into the contaminated aquifer. Then, in February, 1996, after a long cold spell, the weather warmed quickly and the rivers began to thaw. Ice jams formed on the Clark Fork River, scouring sediments from its bed and banks upstream of the reservoir. An unusually large ice flow then broke loose many miles upstream along the Blackfoot River, reaching more than ten miles in length and more than ten feet in height as it wound its way down the river, damaging bridges and a home along its course toward the Milltown Dam. The Montana Power Company protected its dam from the approaching ice flow by lowering the water level in the reservoir, scouring tons of sediment downstream. The Health Department collected water samples that documented high levels of copper in the river, at levels far exceeding those known to kill fish.

After the ice cleared, The EPA decided to re-examine its thinking about the cleanup of the reservoir. It ordered the Atlantic Richfield Company, the party responsible for paying for the cleanup, to look at new options including sediment and dam removal. Ultimately the EPA, State of Montana, Confederated Salish and Kootenai Tribes, Arco and Northwestern Corporation came to an agreement to clean up contaminated sediments, remove the dam and restore the rivers and the project was initiated in June, 2006.

In January, 2008 the dam's north abutment and powerhouse removal was begun and a temporary gravel dam known as a "coffer dam" was built just upstream to allow the removal to proceed. On March 28, 2008, the coffer dam was breached, lowering the reservoir by about 14 feet over a period of 12 hours, and connecting the Clark Fork and Blackfoot Rivers for the first time in more than one hundred years.

The photo above was taken by Judy and Gary Matson, West Riverside residents and members of the organization Friends of Two Rivers. It shows an aerial view looking upstream just after noon on the day of the dam breach, as water flowed into a narrow channel built to initiate the breach. Water flowed through the area previously occupied by the dam's brick powerhouse, adjacent to the dam's spillway.

By 3:00 p.m. that afternoon, the rivers had eroded several feet down into the coffer dam and sediments in the Blackfoot River arm of the reservoir, which were not contaminated by mining waste during the 1908 flood. In the photo above, the river is flowing over and around a remnant of an old timber crib dam, probably used to divert the river when the dam was first built in 1907. The flow created a 15 foot waterfall that persisted for several hours, finally breaking through and cutting the channel upstream to the Blackfoot River at about 9:00 p.m. When that occurred, the reservoir dropped fairly quickly, raising water levels in the river downstream by one to two feet and releasing turbid water downstream.

By the next morning, the rivers were re-connected, with the Clark Fork flowing out of the temporary bypass channel into the Blackfoot river, visible in the upper right hand corner of the photo above. The former Clark Fork channel of the reservoir, in the lower right hand corner, was beginning to dry out. Arsenic levels in the river downstream increased to levels exceeding the drinking water standard, as pore water drained from the reservoir sediments. But arsenic concentrations dropped off after a day or so, and did not exceed levels observed during the ice floe in 1996. No drinking water wells are known to have suffered increased concentrations of arsenic following the dam removal.

On the following Tuesday, April 1, the banks of the Blackfoot River exposed sandy material submerged in the reservoir for most of the past century. Blackfoot River sediments eroded downstream, but not at levels predicted because the river flows are very low for this time of year. For example, the Clark Fork River below the dam site is flowing today at about 1,140 cubic feet per second (cfs), and the all time record low flow for this date in 1936 was 1,080 cfs. For comparison, the flow in 1908 was estimated at about 48,000 cfs. While the river flows have been very low, concentrations of suspended sediment have been no worse than predicted in studies leading up to the dam's removal. Thankfully, there has not yet been any mortality in fish populations downstream or in fish placed in cages by biologists to study the effects of the dam's removal.

The aerial photo above was taken by Mike Kustudia, of the Clark Fork River Technical Assistance Committee (CFRTAC) about a week after the dam breach. This photo is looking downstream, with the Blackfoot River flowing in from the right and joining the Clark Fork at the bypass channel outlet before flowing through the former dam site in the upper portion of the photo. Most of the sediment along the Blackfoot River below the bypass channel was expected to erode fairly quickly during the dam breach or this spring as water flows increased in the rivers. But because the rivers are flowing at such low levels, these sediments have not eroded downstream. This has presented the opportunity to remove and protect some of these sediments from erosion before spring runoff. EPA and the State have required Arco to complete this work. The sediment bar along the right bank of the river between the bypass channel and the former dam will be removed, and the sediments just upstream of the dam's spillway will be protected by early completion of the temporary coffer dam which was to be built for the spillway removal this summer. This coffer dam may be completed this spring, assuming the rivers stay low for the next several weeks to allow the work to be done. This is especially important since the sediments upstream of the spillway contain higher levels of copper and arsenic than the sediments in the Blackfoot channel.

This photo taken today shows al view of the cleanup area from the bluff overlook. Exposed sediments upstream of the spillway in the former Clark Fork Channel are to be removed. The new coffer dam will be constructed from the point of the contaminated sediment area, across to the north end of the dam's spillway and radial gate.

Downstream of the dam, sands and gravels are depositing and beginning to fill in the "scour hole" created by the force of the water over the dam for the past hundred years.

The photos above show views from bluff today. An excavator is beginning to remove sediments near the Blackfoot River, just above the spillway in the photos. The removal of the additional sediments and protection of the sediment upstream of the spillway will provide further protection for the Clark Fork River downstream. Thanks to EPA and DEQ for requiring this action, and for Arco and Envirocon for agreeing to proceed cooperatively with this work!

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