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ON THE COVER Austrian painter and muralist Gustav Wilhelm Krollman (1888–1962) trained at the Academy of Fine Arts in Vienna before immigrating to the United States in 1923. He settled in Minneapolis and was hired by the Northern Pacific Railway to create advertisement posters, a job that brought him to Montana. This detail from a Northern Pacific poster (1930, oil on paper, 40" x 30", MHS Museum Collection, 1980.61.155) features Emigrant Peak in the Paradise Valley—one of many scenic attractions *North Coast Limited* passengers saw on a trip to Yellowstone National Park. While working for the Works Project Administration during the Great Depression, California artist Maynard Dixon (1875–1946) painted *Highscalers—Boulder Dam* (1934, oil on board, 15" x 19", courtesy University of Nevada–Reno Special Collections) depicting scalers working on the rocky face of Black Canyon during the construction of the Boulder Dam (later renamed Hoover Dam), which appears on the back cover. Dixon was primarily a self-taught artist, creating realistic depictions of the people and landscapes of the American Southwest.

A Mid-Century
MONOLITH
in Northwestern Montana
The Hungry Horse Dam Project

by Charlene Roise



The construction of the Hungry Horse Dam on the South Fork of the Flathead River transformed the natural landscape and, for a few short years, brought a major population boom to this remote region of northwestern Montana.

A. E. McCloud, photographer. US Bureau of Reclamation (USBR) P447-100-520, USBR Pacific Northwest Regional Office, Boise, Idaho

The Hungry Horse project, a mid-twentieth-century marvel, launched a ruggedly beautiful area southwest of Glacier National Park into a new era. Boomtowns mushroomed as thousands of people, including many recent veterans of World War II, sought work building a dam and power plant near the town of Hungry Horse. The massive concrete dam would fill a deep canyon, impound the South Fork of the Flathead River, and create a 3.5-million-acre-feet reservoir. It would also change the human landscape by bringing new workers and their families to Montana.

Hungry Horse was part of a series of dams along the Columbia River built to generate power, provide irrigation, control flooding, and improve navigation. Conceived in the early twentieth century, this system includes the Grand Coulee, Bonneville, Chief Joseph, McNary, and Dalles dams. Irrigation had been a primary motivation for developing the Columbia since the late nineteenth century, and it was one of the arguments used by advocates for a dam in the Kalispell area. By the 1930s, local boosters were pushing hard for an irrigation project, cheered on by the tireless encouragement of *Flathead Monitor* editor Harry J. Kelly (later dubbed the “Father of Hungry Horse”).¹

For decades, two federal agencies vied to control the Columbia watershed, and each claimed to be the best qualified to build the new dam. The U.S. Army Corps of Engineers traced its roots to the Revolutionary War and had played a key role in exploring the western frontier and building fortifications, roads, and bridges. Through its jurisdiction over navigable waters, the Corps had gained experience with dams. Dams were also a specialty of the U.S. Bureau of Reclamation, created by the Reclamation Act of 1902 to construct irrigation projects on the West’s fertile but arid lands. Reclamation introduced hydroelectricity into its projects as a practical expedient to provide power to settlers in remote locations and supply energy-demanding irrigation pumps. As the country developed an insatiable appetite for electricity in the twentieth century, generating power became a priority.

The Bureau of Reclamation proposed building a dam at a narrow gorge on the South Fork of the Flathead, and support for this idea gained momentum in the early 1940s as World War II loomed. The Corps of Engineers countered, advancing plans for a dam at Flathead Lake that would raise the lake to thirty-seven

feet above its existing high-water level and flood a large area. In the end, the only thing the Corps’s proposal raised was the ire of Montanans, who opposed the inundation of a vast swath of agricultural, industrial, and reservation land. One historical account noted that “to the people of western Montana, the ‘Battle of Flathead Lake’ ranks right up there with the ‘Battle of Gettysburg.’” Congressional subcommittee hearings held in the area in June 1943 attracted three thousand citizens. According to the Kalispell *Daily Inter Lake*, many Montanans thought the Corps and the Bonneville Power Administration (BPA) had rigged the process, making the hearing “an empty formality.” The BPA, an independent agency within the Department of the Interior, had been created by Congress in 1937 to market and distribute power produced by the Bonneville Dam, but it quickly expanded its mandate. “Insofar as these two agencies are concerned the plans have been made and agreed upon, and . . . under the guise of the war emergency they will be put into effect,” the state chamber of commerce president charged.²

This assumption proved ungrounded. Soon after the hearings, Governor Sam Ford announced that plans to alter Flathead “have been definitely abandoned.” Early in 1944, looking back on the battle, the *Great Falls Tribune* reported: “Western Montana was joined last year by virtually the entire state in a successful fight to defeat a plan to raise the level of Flathead Lake.” The article noted that “at that time Hungry Horse was offered as an alternative site,” but given Reclamation’s apparent lead there, the Corps was not enthusiastic about that option. “There have been reports that army engineers are not exactly in accord with the plan as outlined, but this friction may be ended by consultation and, regardless, the final decision rests with Congress.”³

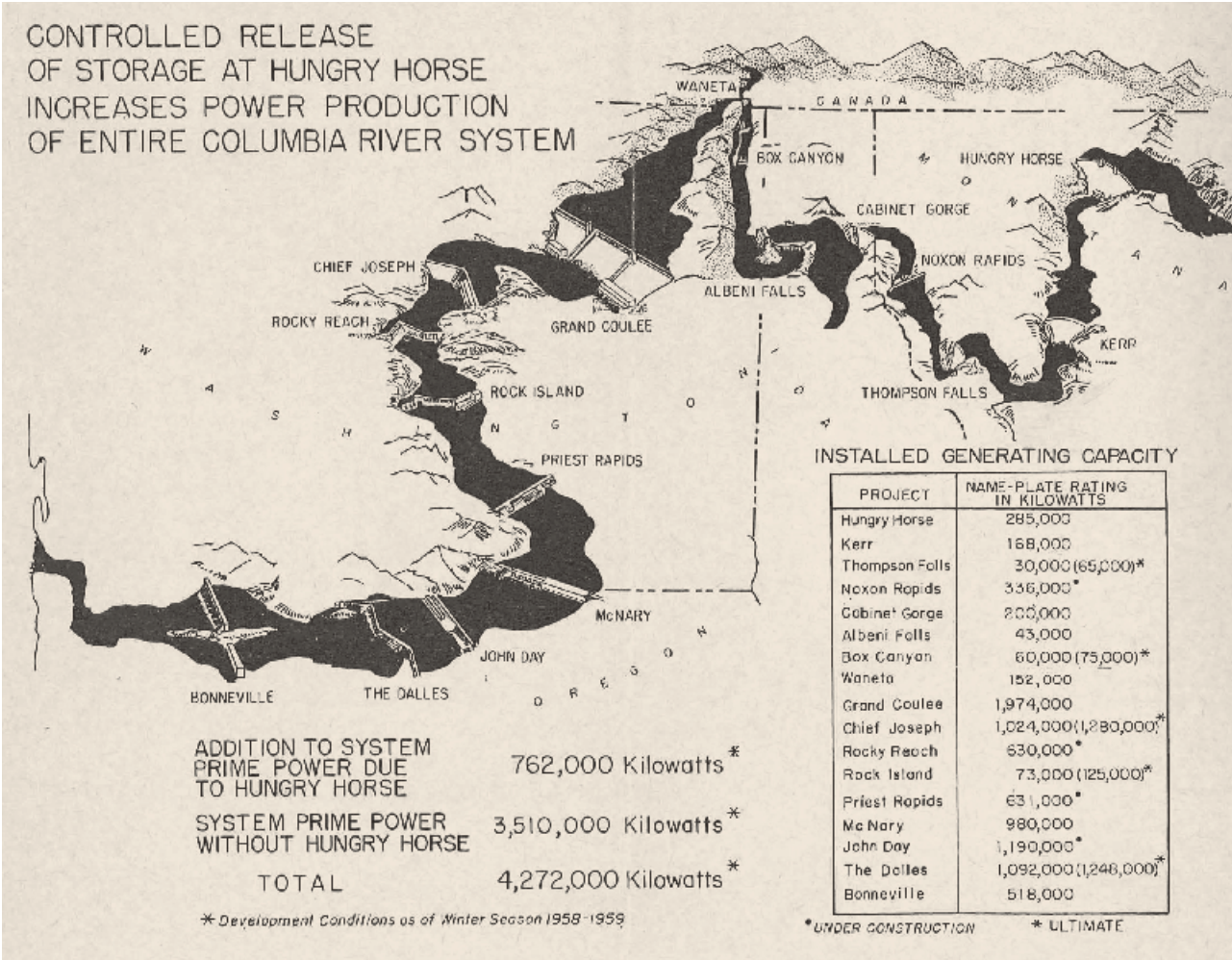
The Bureau of Reclamation garnered widespread support for its own plan. In May 1941, it had submitted a report to the Federal Power Commission outlining the parameters of the Hungry Horse project, estimating it would cost \$31 to \$40 million to build a dam 450 to 500 feet high and a power plant capable of generating between 132,000 and 172,000 kilowatts of electricity. Although World War II diverted the nation’s focus, Montana’s congressional delegation persisted, and on June 5, 1944—the day before the D-Day invasion of Normandy—Public

Law 329 authorizing the construction of the Hungry Horse project was approved. Congress provided the first appropriation in July 1945. Construction would start as soon as materials and manpower, both in short supply because of the war, could be procured.⁴

With the war in its last throes, the Hungry Horse project took on the role of helping the country's social and economic transition to peacetime. As early as the summer of 1946, northwest Montana was drawing scores of families seeking employment, but the *Kalispell News* warned that the enthusiasm was premature: "War veterans are being put to needless hardships and expense by erroneous reports circulated in New York, Seattle, Portland, and other cities in the Pacific NW that numerous jobs are available on the construction of Hungry Horse Dam. . . . A number of veterans and other people are practically stranded in Western Montana because upon arriving

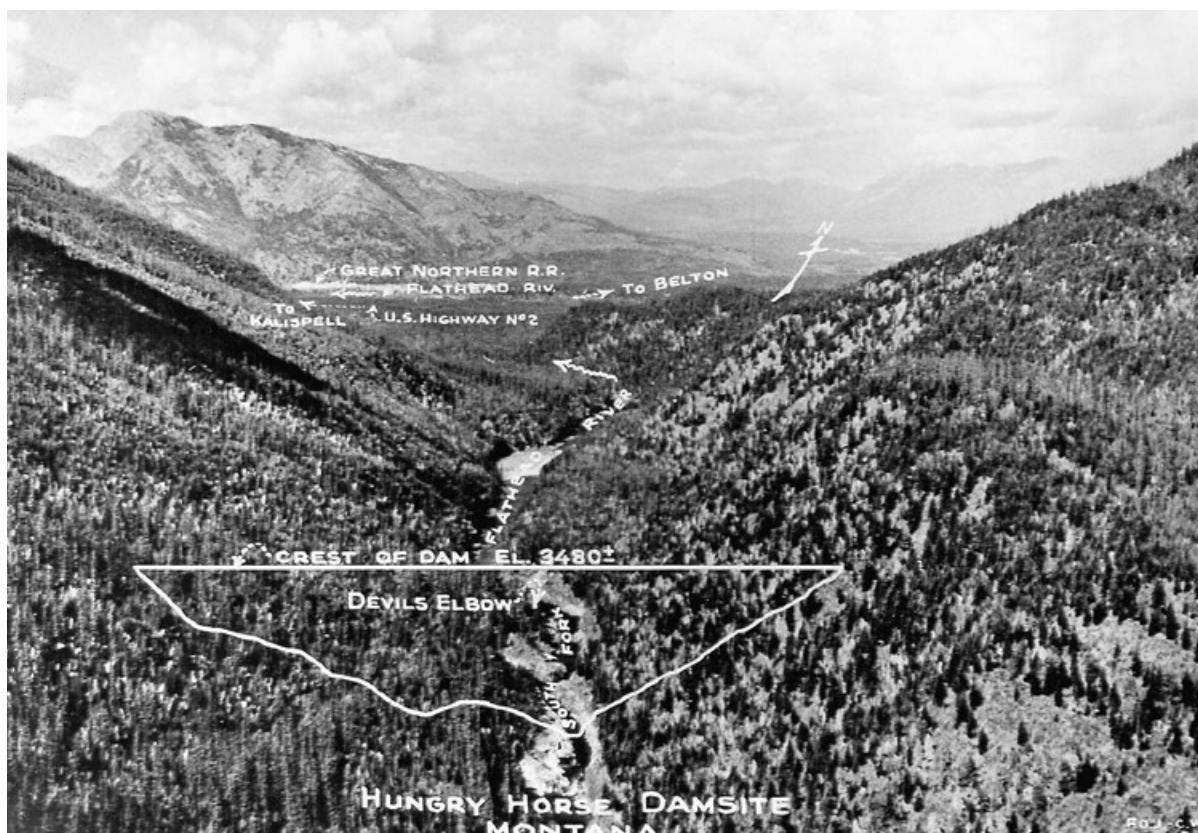
there they found no opportunities for employment on the proposed multimillion-dollar development." By early June 1946, the paper reported, "only 62 men are employed on the project, and there appears to be no immediate need for an additional large number of men."⁵

Although Reclamation developed housing for its staff and contractors offered some facilities for its workers, no town in the area was equipped to host the substantial influx of people that the dam's construction would ultimately draw. Situated five miles upstream from the South Fork's confluence with the Flathead River, the dam site was spectacular—a steep gorge in the Flathead Range. It was also isolated. No roads linked the dam site to U.S. Highway 2, four miles to the north, and that highway traversed a sparsely populated region. Coram, the nearest stop on the Great Northern Railway's line, was two miles



Hungry Horse Dam brochure, USBR, 1958

This 1958 map shows the seventeen dams recently built or then under construction along the Columbia River watershed. The U.S. Army Corps of Engineers and U.S. Bureau of Reclamation promoted the dams as a means for generating electricity, improving irrigation, and controlling floods.



The site chosen by the Bureau of Reclamation for the dam was a steep, heavily forested gorge on the South Fork of the Flathead River between Coram and Columbia Falls.

east of where the dam's access road would intersect the highway. Columbia Falls, five miles west of the access road, was larger than Coram but too far away to serve as a base for the construction project.

As hopeful job seekers and entrepreneurs continued to arrive, Reclamation started creating a new community. The Denver office drew up plans for "Government Camp," the utilitarian moniker for the town that would accommodate the bureau's staff. Part of the town would be built to last as the base for operators and maintenance workers when the plant was up and running. The rest was temporary, including prefabricated houses that could be disassembled and moved to another location when the project was done.

Francis Warnock and his family were credited as being the first residents of Government Camp. Warnock, a navy veteran, had been employed at a Boston foundry since returning from service, but the work caused his health to deteriorate. He quit and ventured to Kalispell with his wife and daughter, "nearly

broke and with no immediate prospects of a job." They initially found shelter in a deserted farmhouse until Reclamation hired Francis as a night watchman. While living in Government Camp improved their situation, it was not easy. *Reclamation Era* reported in February 1947, "Mrs. Warnock does her cooking on a small field-type gas stove. They eat and read by a kerosene lamp, and take their baths at night in an old-fashioned tub in the backyard, often with the eyes of deer and other wild animals peering inquisitively from the darkness."⁶

The private sector saw an opportunity to prosper by meeting the needs of the new arrivals. Modern versions of nineteenth-century frontier outposts popped up in the area. In the fall of 1946, the *Great Falls Tribune* reported on the "activity in five new 'boom' towns which have sprung up in the vicinity of the dam site." *Reclamation Era* noted that "life in these towns, as on the project, has taken on a near primitive aspect. Streets are of dirt (and mud this winter) and there are no sidewalks. Many of



Government Camp—a community established by the Bureau of Reclamation—housed several hundred project employees in prefabricated dwellings, most of which were removed when the construction phase ended. A few houses of permanent construction remained for plant workers when the facility was in operation.

the dwellings provide not much more than shelter, ranging from small trailers to partly completed prefabricated houses.”⁷

This boomtown pattern was similar to that of other Reclamation projects. As the *Spokane Spokesman-Review* observed in September 1946, “The Hungry Horse of today is a striking parallel to the Grand Coulee of pre-construction days. Around the government town, as at Coulee, other small towns are mushrooming. Already five have been plotted and four have occupants.” One was Martin City, where “V. E. Greene, 57, is the unofficial mayor. . . . He owns about 440 acres of land near the townsite, has been there since 1939. The place has no city government, and most of its present problems are handled by Mr. Greene. It is not a government city.” An area history noted that “by the summer of 1946, there was already a grocery store, several bars and restaurants, a barbershop, a filling station, repair shops and a pool room.” Melvin Ruder, the editor-in-chief and publisher of the *Hungry Horse News*, saw

his entrepreneurial dreams flourish with the growing population. By spring 1947, Martin City claimed to be “America’s most scenic boomtown” and “had burgeoned with 53 establishments, including a town office, the Hungry Horse Planer Mill, the Glacier-Coram Lumber Company, a Texaco Oil Station, a variety store, hardware store, cabins and apartments, a sporting goods store, a confectionery, several restaurants and of course, at least ten bars. . . . The final bar count by old-timers wavers between 13 and 18.”⁸

One sign of the area’s growth came in February 1948 when Flathead County commissioners approved changing the name of newly formed Damtown to Hungry Horse given “there may be other Damtowns in various parts of Montana, and mail confusion would result.” When the post office opened in mid-May, Hungry Horse claimed thirty buildings, with construction of four commercial buildings and three hotels anticipated in the near future.⁹

In addition to generating changes and challenges to local communities, the project also pushed its

engineers, methodical and conservative by nature, far beyond their comfort zones. One later reflected that only a few days after the project was authorized, the bureau's "commissioner assigned us the job of building a dam of a then unknown height. Detailed construction surveys had not been made. . . . Although pre-construction work could be and was started immediately, the final decision on a number of engineering problems of tremendous magnitude had to be made . . . in a period of time so short as to be without precedent in Bureau experience."¹⁰

Site preparation, including clearing the land that would be inundated, needed to be started even as the bureau was still working out many details of the dam's design. While trash racks could keep debris out of the penstocks supplying water to the powerhouse turbines, the perpetual maintenance required to clean them could be lessened by removing the trees. The trees also had value as lumber, and removing them would support the local timber industry. Reclamation awarded the first clearing contracts in May 1947, and the work was underway by June 1947.¹¹

Reclamation assumed that the logging would be a straightforward process and divided the work into several contracts but soon discovered that the process was more complicated and time consuming. Bad weather and rising costs plagued the first company hired, and it was eventually replaced by another firm. Two other timber companies, Wixson and Crowe and J. H. Trisdale, were more successful when Reclamation awarded them contracts to clear seven thousand acres. Starting in September 1948, these two companies employed a deforestation technique that Reclamation described as "Operations Highball" or the "Wixson-Trisdale Highball Method of Clearing" and a "novel scheme":



Rasmussen, photographer. USBR P447-100-691

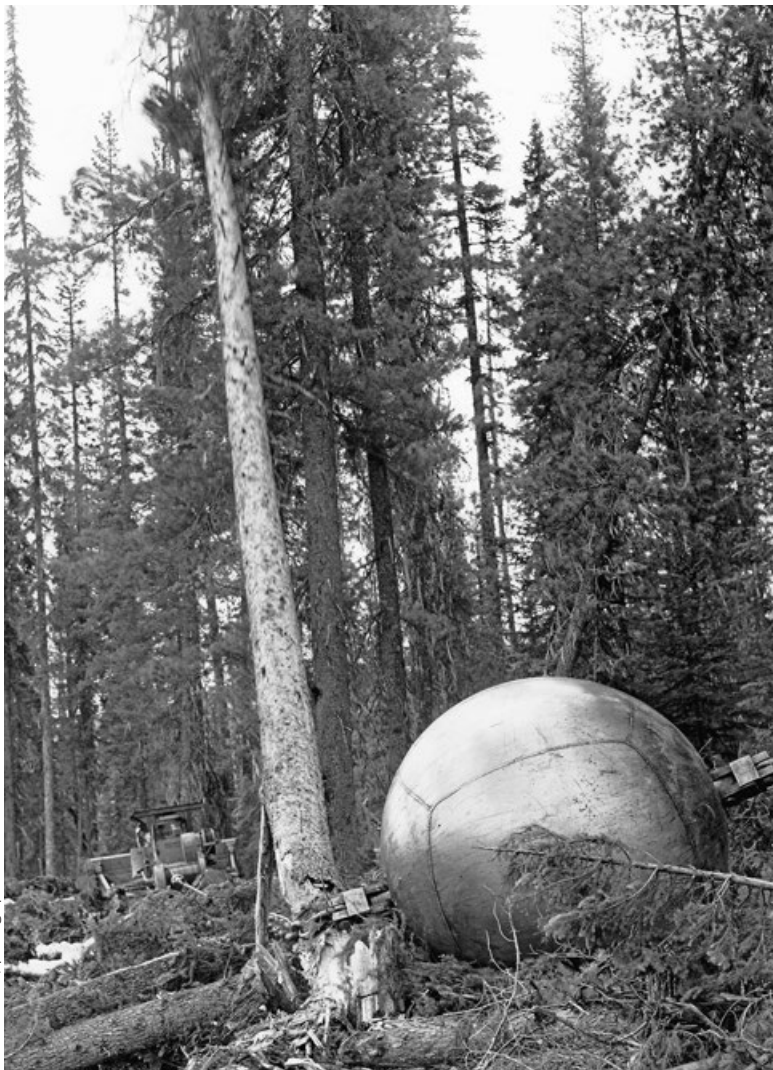
Prior to the Hungry Horse project, the little town of Martin City had few residents and even fewer businesses. That changed after the summer of 1946, when this photograph was taken.



A. E. McCloud, photographer. Historic American Engineering Record (HAER) MT-120-159, USBR Pacific Northwest Regional Office, Boise, Idaho

By 1950, the date of this photograph of Martin City, the community boasted numerous bars, cafés, filling stations, and stores—testimony to the effects of thousands of new workers and families on the region's local communities.

Each giant ball, of which there are five, has attached to it 400 feet of 1½" cable with two D-8 Cats [Caterpillar bulldozers] at each end of the cable. In clearing, the Cats move along about 150 yards apart, using the ball to clear the cable of stumps as they proceed through the forest. Under ideal conditions, they can clear 200 acres in four hours, or nearly one acre per minute. On the average, however,



Thousands of acres of forest had to be cleared from the reservoir site, a process that took five years. Some contractors utilized a new logging method, shown in this May 1950 photograph, in which bulldozers dragged 8-foot, 4½-ton steel balls on massive chains through the forest, ripping down mature trees at a rate of 1,250,000 board feet per day.

the ball and Cats will knock down 100 acres during an eight-hour shift.

Another innovation was to link “two D-8’s with single controls. With a 22-foot-long rake, the monster can do the work of three D-8’s, stacking piles as high as 40 feet.” By June 1949, Reclamation engineers were pleased to report that “approximately 1,250,000 board feet of lumber are being removed from the reservoir each day” and that “this contractor is approaching 50 percent complete with approximately 20 percent elapsed time.” The project’s final report announced that 70 million board feet of salable pine, spruce, larch, and fir had been harvested from the site.¹²

A San Francisco contractor, the Guy F. Atkinson Company, won the project’s first large contract in October 1947 and was soon excavating a tunnel

to divert the river while the dam was being built. Bids for the prime contract to construct the dam and power plant were due April 7, 1948. Reclamation awarded that \$43.4-million contract to a joint venture of the General Construction Company, Shea Company, and Morrison-Knudsen Company (GSM). By mid-May, the contractor had begun clearing a site for its own camp with offices, warehouses, and residences on forty acres of federal land near Government Camp. A grid of streets was laid out, with the streets named for dam projects where the General Construction Company had worked, including

the Bonneville, Ruby, and Owyhee. May and June priorities included a Quonset hut to serve as a tool shed and warehouse and another for the main office, a six-unit guesthouse, and three two-story dormitories, each capable of housing 150 men. Also constructed by the end of 1948 were a mess hall, recreation hall, general store, four-room schoolhouse, first-aid station, twenty residences, and a single-story women’s dormitory. The accommodations were appropriately scaled to the workforce: as of late June, there was only one woman, a receptionist, on the contractor’s staff of 354, and this ratio was not expected to change for several months.¹³

Many of the workers gravitated to the fledgling communities nearby. Shortly after the bid opening, *Hungry Horse News* reported that in Martin City the “Christopherson 18-room hotel building is nearing completion. Sam Nelson’s new log cabin is getting



A. E. McCloud, photographer. USBR P447-100-650

Dam construction officially began on July 10, 1948. Above, Montana's governor Sam Ford ignites the first blast. Some five hundred people converged on Government Camp to witness the opening.



A. E. McCloud, photographer. USBR P447-100-444

Above, drilling crews bore holes and load dynamite on the edge of the abutment. In the background, bulldozers reshape the mountainside to accommodate the dam.

Secured by ropes, scalers with jackhammers work on the rock face high above the river. Much of the preparatory work was dangerous, and twenty-three workers died during the dam's construction.





Photographer unknown. HAER MT-120-143

While concrete work could only be carried out six to seven months of the year, other aspects of construction continued yearlong and round the clock with the aid of floodlights. Above, Hungry Horse Dam workers enjoy each other's company and the warmth of a campfire on a snowy night in 1948.

additional equipment for opening of the Martin City Dry Cleaners Plant. [The] interior of the union hiring hall is being completed, and the town jail will be ready for its first occupants, if and when, Saturday night [gets rowdy].” The newspaper observed that the “opening of bids on the Hungry Horse prime contract . . . started the spring flow of cars with ‘strange’ licenses into the area.”¹⁴

A weekend of ceremonies marked the official start of construction in June 1948. Before the end of the second construction season, in September 1949, GSM placed the first concrete, a major benchmark. The ambitious schedule called for placing concrete eight months of the year, but Montana’s tough winters reduced that to six or seven. Other activities continued even as snow blanketed the work site, challenging the project’s personnel. Snowslides sometimes swept down on workers. One was killed in February 1949 after being buried under six feet of snow. He was one

of twenty-three men who lost their lives during the dam’s construction. The danger, though, did not deter the thousands of workers who, by the summer of 1950, were swarming the site twenty-four hours a day, seven days a week.¹⁵

By the fall of 1951, the dam was high enough to allow GSM to plug the diversion tunnel and begin to fill the reservoir, and in October 1952 the last of 3 million cubic yards of mass concrete was in place. The power plant started generating electricity on September 30, 1953, the day before President Harry Truman ceremonially threw a switch that started power generation. The contractor continued to wrap up details over the following weeks, with a few small outdoor tasks, such as curbing in the parking areas, left for the spring. That did not stop a celebration on Sunday, November 2, when the road across the dam was first opened to the public, attracting 814 cars carrying an estimated 3,500 people.¹⁶

Constructing the Dam

The 2.9 million cubic yards of concrete that the project demanded, enough to build a twenty-foot-wide highway from Hungry Horse to Chicago or “the equivalent of an 80-pound piece of concrete for every man, woman, and child in the U.S.,” stimulated innovation.¹ The substantial quantity—and cost—encouraged Reclamation to adopt two innovations for the concrete mix: the entrainment of air and the incorporation of a fly ash, a man-made pozzolan, into the standard water and aggregate mix.

Prior to Hungry Horse, Reclamation had used natural pozzolans such as volcanic ash and siliceous sedimentary rocks but had balked at man-made ones. Reassured by extensive testing by the University of California–Berkeley and Reclamation’s laboratory in Denver—and motivated by a particularly cheap source from Chicago smokestacks—Reclamation engineers decided to incorporate fly ash in Hungry Horse’s concrete mix. That decision ultimately saved the project more than \$2 million and pioneered the use of that material for large dam construction. Thereafter, the bureau and the Army Corps of Engineers regularly specified fly ash in concrete mixes in subsequent projects.²

Likewise, Hungry Horse was Reclamation’s first major project to use air-entrained concrete. By distributing small air bubbles in the concrete mix, air-entraining agents reduced the effect of freeze-thaw cycles, improved the stability of fresh concrete, and increased the workability of the material—particularly in concrete that had a low proportion of cement because pozzolan was in the mix. The successful results at Hungry Horse led Reclamation to quickly and totally embrace this technology.

A worker surveys the dam’s progress in 1950. At over 564 feet in height, Hungry Horse Dam required over 2.9 million cubic yards of concrete.



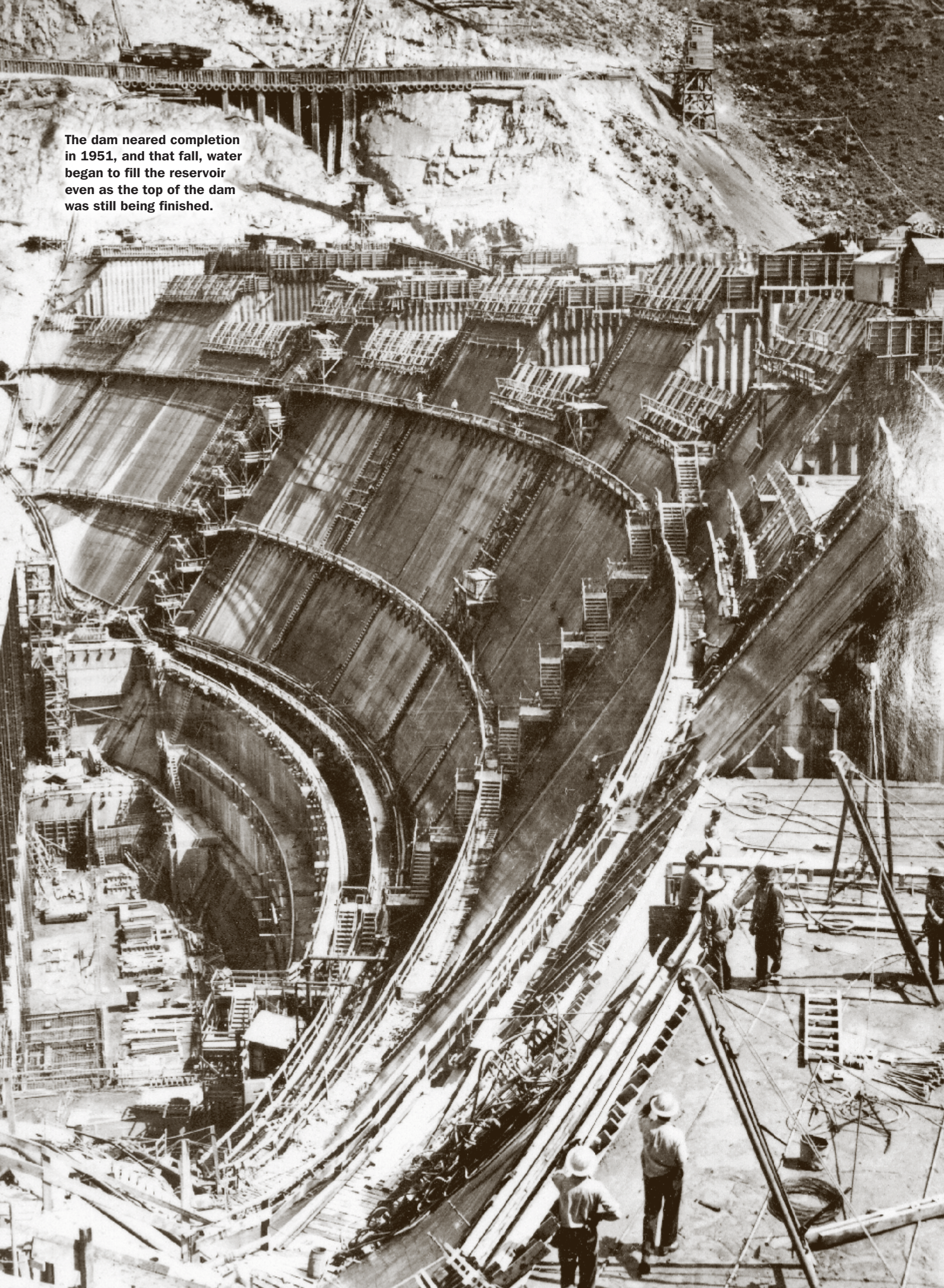
A. E. McCloud, photographer, HAER MT-120-164

On August 29, 1951, the two millionth cubic yard of concrete was poured—an event marked by this sign on the side of a highline bucket.



Historic American Engineering Record (HAER) MT-120-164

The dam neared completion in 1951, and that fall, water began to fill the reservoir even as the top of the dam was still being finished.





A. E. McCloud, photographer. USBR P447-100-645

At a dedication ceremony in Kalispell on October 1, 1952, President Harry Truman (standing, left) throws a switch to mark the beginning of Hungry Horse Dam's power generation.



A. E. McCloud, photographer. USBR P447-100-575

Cars drive across the dam and past the ring gate of the spillway in 1953. The spillway at Hungry Horse has three components: a ring-gate structure in the reservoir at the crest of the dam, an inclined or vertical shaft, and a horizontal tunnel terminating in an outlet. The ring gate, also known as a "glory hole" or "morning-glory" gate, is parallel to the surface of the water. When the gate is lowered, water flows over the lip and is funneled into an angled shaft within the dam and then discharges through a horizontal tunnel below the dam.



Above, the Hungry Horse Visitor Center, 1965. At the height of its construction, the Hungry Horse Dam employed over 2,700 men per year. Many of them moved on after its completion in 1953, but a few stayed to operate and maintain the dam and some found work in other industries and stayed in northwestern Montana.

Today, the Hungry Horse project continues to generate power and control flooding. During the summer months, the visitor center at the north end of the dam's crest offers information on its history. *Hungry Horse News* still reports on the local community, including descendants of construction workers who flocked to the area and decided to stay. These workers were joined by others attracted by jobs in local aluminum plants, lumber mills, and other industries that opened after the dam's completion. The scale—and in many cases, the very existence—of these industries would not have been possible without electricity from Hungry Horse, a concrete symbol of the Flathead Valley's transformation in the last half of the twentieth century.

Charlene Roise is president of Hess, Roise and Company, Minneapolis-based historical consultants specializing in architectural history, social and intellectual history, and the history of technology. Since 1990, she has worked across the country on a wide variety of research projects and Section 106 reviews for dams and power plants ranging from documenting the massive Grand Coulee project to the deconstruction of a low-head structure in Jackson, Minnesota. She enjoyed diving into Hungry Horse's history when the Bureau of Reclamation hired Hess, Roise and Company to document the project for the Historic American Engineering Record, archived at the Library of Congress.