American Society of Civil Engineers, San Diego Section

Historic Civil Engineering Landmark

FIRST SAN DIEGO AQUEDUCT AND SAN VICENTE DAM

Story by Phil Kern, photos courtesy San Diego County Water Authority

In 1931, with local water supplies being stretched to their limit, the City and County of San Diego closed a deal with other water agencies for a share of California's Colorado River water. Granted an allotment of 112,000 acre-feet per year (155 cfs) from the All American Canal (AAC), the next challenge was how to get the water to San Diego. One faction, composed principally of businesses, land owners and developers, pushed for San Diego to have its own independent supply directly from the river via the AAC by constructing pumping stations and pipelines west over the mountains. The other option was tapping into pipelines already supplying the Los Angeles basin, which were owned by the Metropolitan Water District, and constructing pipelines to the south.

After Pearl Harbor, the influx of military personnel and industries to the strategically located San Diego area was to decide the issue very quickly. A report by the U.S. Bureau of Reclamation (USBR) in September 1944 showed that, with the increased demands, local reservoirs could be dry by July 1947 and an imported source of water was needed immediately. Due to the risk to wartime industries and military installations an appeal was made directly to President Franklin D. Roosevelt for a solution. Roosevelt appointed a committee and very quickly the Bureau of Reclamation was directed to design the project, while the U.S. Navy's Bureau of Yards and Docks would provide construction oversight for a project estimated at $17.5 million. USBR engineers quickly decided that tapping the Colorado River aqueduct near Hemet would save significant expense and a year of construction, and schedule was the highest priority on this project. The San Diego County Water Authority (SDCWA) was formed in June1944, and with this approach they had to sign over their new found Colorado River rights (acquired from the City of San Diego) to MWD. By February 1945 the USBR had mobilized 42 staff and engineers from several regional offices and sent them to San Diego to perform surveys and design. By June the design of the aqueduct was completed and ground was broken in September 1945, less than two weeks after the Japanese surrender. A total of seven construction contracts or "schedules" were

awarded for tunnels, pipelines, diversion structures and steel siphons at a final cost of $14.1 million, over $3 million below budget.

The First Aqueduct actually consists of two pipelines, both starting near the west portal of the San Jacinto tunnel of the Colorado River aqueduct and terminating at San Vicente Reservoir. The 71 mile route consists of 48-96 inch concrete pipeline, with the first barrel designed to carry 85 cfs which was expected to be adequate for the next 15-20 years. The tunnels were designed for the ultimate flow of 165 cfs. Siphons were typically installed at river and major stream crossings, and there were a total of seven 72 inch diameter tunnels constructed, the longest being the Fire Hill tunnel at 5,700 feet. The first water from the system, which operated entirely by gravity from the Colorado Aqueduct, was delivered on November 26,1947.

Although the war had ended in August 1945, nobody at the time foresaw the massive influx of people and growth in San Diego during the immediate postwar period, and it became apparent by April 1951 that the second barrel of the aqueduct would need to be constructed sooner rather than later. Paralleling both the approach and alignment of the first barrel, the second 48-75 inch pipeline was designed by USBR and constructed between March 1953 and October 1954 at a cost of $16 million.

The City of San Diego had first floated a ballot proposition to build San Vicente Reservoir in 1939, which was then rejected by voters. By 1940, voters had seen the growth and the need and approved $2.7 million to construct a 90,000 acre-foot reservoir on San Vicente Creek near Lakeside. The dam itself would be a 220 foot high concrete gravity arch, with a crest length of 980 feet. The bill to taxpayers also included construction of three 36 inch pipelines to connect the reservoir to the City's water system. Construction on the dam started in 1941 and was completed in 1943, four years before the aqueduct was ready to deliver water.

More recently, the Reservoir has become the centerpiece of the SDCWA's Emergency Storage Project to provide more local supplies in case an earthquake severs the aqueducts. The County Water Authority has now raised the dam to a height of 337 feet, more than doubling the reservoir's capacity to 242,000 acre-feet. The $568 million San Vicente Dam Raising is now the world's highest dam raising utilizing roller compacted concrete, and is the highest dam raising of any type in the U.S.